

FISCAL GOVERNANCE AND INCOME INEQUALITY: EVIDENCE FROM MOROCCO

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Abstract

This study examines the relationship between fiscal governance and income inequality in Morocco over the period 2000–2022. Using time-series data from national and international sources, the analysis explores how taxation structure, public expenditure, and macroeconomic conditions influence redistributive outcomes. The empirical approach combines Ordinary Least Squares (OLS), Instrumental Variables (IV) regression, and Autoregressive Distributed Lag (ARDL) models to capture both short-run dynamics and long-run relationships between fiscal policy variables and the Gini Index. The results show that indirect taxation has a significant positive effect on income inequality, highlighting the regressive nature of consumption-based taxes within Morocco's fiscal system. In contrast, government expenditure on education contributes to reducing inequality, indicating that targeted social spending can promote more inclusive economic outcomes. The findings also reveal that persistent fiscal deficits, averaging approximately –3.7% of GDP during the study period, have limited redistributive impact.

Overall, the evidence suggests that strengthening fiscal governance through more progressive taxation and better-targeted public spending is essential for addressing structural inequality. By providing empirical evidence from Morocco, this study contributes to the literature on fiscal governance and redistribution in developing economies and offers policy insights for advancing inclusive growth and achieving Sustainable Development Goals, particularly SDG 10 (Reduced Inequalities) and SDG 8 (Decent Work and Economic Growth).

Keywords: Fiscal Governance; Income Inequality; Public Finance; Tax Structure; Public Expenditure; Morocco; Sustainable Development Goals.

1. Introduction

Fiscal governance plays a central role in shaping income distribution and social welfare within modern states. Through taxation, public expenditure, and redistributive programs, governments influence the allocation of economic resources and the capacity of societies to achieve inclusive and equitable development. In recent decades, increasing attention has been given to the role of fiscal institutions in addressing persistent income inequality, particularly in developing economies where structural disparities remain significant. Effective fiscal governance is therefore not only a matter of revenue generation but also a mechanism through which governments pursue broader social objectives, including poverty reduction, social cohesion, and sustainable economic growth (Coady & Gupta, 2012).

Within this context, understanding how fiscal policy instruments affect income inequality has become an important issue in both public finance and public administration research. Fiscal policy operates through several channels, including taxation structures, public expenditure allocation, and social redistribution mechanisms. Progressive tax systems and targeted social spending have often been identified as key instruments capable of mitigating inequality by redistributing resources toward vulnerable groups (Easterly & Rebelo, 1993; Richards-Melamdir, 2021). However, the effectiveness of these mechanisms depends not only on policy design but also on institutional capacity, governance structures, and the broader political economy within which fiscal decisions are implemented (Christl et al., 2021). Consequently, the relationship between fiscal policy and income inequality varies across countries and institutional environments.

Morocco provides an important case for examining these dynamics. As an emerging economy located at the crossroads of Europe, Africa, and the Middle East, Morocco has experienced steady economic growth and increased integration into global markets over the past two decades. Nevertheless, significant socio-economic disparities persist across regions and social groups.

Income inequality remains a structural challenge, with the Gini Index reaching approximately 39.5 percent in 2019, indicating moderate to high levels of inequality relative to several neighboring countries (World Bank, 2021). These disparities are further reinforced by spatial imbalances, as economic activity and public investment tend to be concentrated in major urban centers such as Casablanca and Rabat, while rural and interior regions continue to face limited access to economic opportunities and public services.

Fiscal policy has been a central instrument through which Moroccan authorities attempt to address these disparities. The fiscal system combines a mix of taxation measures, social expenditure programs, and development initiatives aimed at improving living standards and promoting inclusive growth. Nevertheless, the structure of taxation remains a subject of debate. Morocco relies heavily on indirect taxes, particularly value-added tax (VAT), which constitutes a significant share of government revenue. Although such taxes provide stable fiscal resources, they are often considered regressive because lower-income households allocate a larger proportion of their income to consumption expenditures (Bird & Zolt, 2005). As a result, heavy reliance on indirect taxation may inadvertently contribute to widening income inequality.

At the same time, the Moroccan government has expanded public spending in key social sectors. Expenditures on education, healthcare, and social protection have increased as part of broader development strategies designed to improve human capital and reduce vulnerability. For example, education spending reached approximately 5.3 percent of GDP in 2021, reflecting ongoing efforts to enhance access to schooling and improve educational outcomes across the country (World Bank, 2021). Similarly, healthcare expenditures have expanded alongside reforms aimed at strengthening national health coverage systems. These initiatives demonstrate the growing importance of public expenditure as a tool for promoting social inclusion and addressing structural inequalities.

Institutional and governance factors also play an important role in shaping fiscal outcomes. Morocco's fiscal system is characterized by a relatively centralized structure of decision-making, where national authorities play a dominant role in fiscal policy formulation and resource allocation. While this structure allows for coordinated policy implementation, it may also limit the responsiveness of fiscal policies to local socio-economic needs. In recent years, however, reforms associated with decentralization and regional governance have sought to introduce more participatory approaches to fiscal management, including forms of local consultation and participatory budgeting. These reforms aim to enhance transparency, accountability, and the effectiveness of public spending in addressing regional development challenges (Clark, 2018).

Despite these policy efforts, empirical evidence on the redistributive effects of fiscal policy in Morocco remains limited. Existing studies often focus either on macroeconomic performance or on poverty reduction programs, leaving important questions regarding the broader relationship between fiscal governance and income inequality insufficiently explored. In particular, there is a need for empirical analysis that evaluates how taxation structures and public expenditure policies interact with socio-economic variables to shape income distribution over time.

This study addresses this gap by examining the relationship between fiscal policy and income inequality in Morocco over the period 2000–2022. Using time-series data and a combination of econometric techniques—including Ordinary Least Squares (OLS), Instrumental Variables (IV) regression, and Autoregressive Distributed Lag (ARDL) models—the analysis investigates both the short-term dynamics and long-term relationships between fiscal variables and the Gini Index. The empirical framework considers key determinants of inequality, including indirect taxation, unemployment, poverty, and inflation, alongside selected fiscal indicators that capture the redistributive role of government policy.

By focusing on the Moroccan context, this research contributes to the growing literature on fiscal governance and inequality in developing economies. The study provides empirical evidence on how fiscal structures and policy instruments influence income distribution and offers policy insights relevant for designing more equitable fiscal frameworks. Understanding these dynamics is

particularly important for countries seeking to advance inclusive development strategies and achieve broader objectives related to sustainable economic growth and social equity.

The remainder of this paper is organized as follows. Section 2 reviews the relevant literature on fiscal policy and income inequality. Section 3 presents the data and empirical methodology. Section 4 reports and discusses the econometric results. Section 5 concludes with policy implications and recommendations for strengthening fiscal governance and reducing income inequality in Morocco.

2. Literature Review

The relationship between fiscal policy and income inequality has long attracted attention in both economics and public administration research. Fiscal policy—comprising taxation, public expenditure, and redistributive transfers—represents one of the principal instruments through which governments influence income distribution and social welfare. While economic growth can contribute to poverty reduction, the design and governance of fiscal institutions determine whether the benefits of growth are distributed equitably across society. Consequently, understanding how fiscal policy shapes income inequality has become central to debates on inclusive development and sustainable economic governance (Clements, 2015; Gupta, 2018).

A substantial body of literature emphasizes the redistributive role of progressive taxation. Progressive tax systems impose higher tax rates on higher income groups and are generally considered an effective mechanism for reducing income disparities. Empirical evidence suggests that countries with more progressive tax structures tend to experience lower levels of inequality (Cevik & Correa-Caro, 2020; Johansson et al., 2008). Similar conclusions are reported by Balseven and Tugcu (2017) and Muinelo-Gallo and Roca-Sagalés (2013), who find that progressive tax systems combined with redistributive spending contribute significantly to reducing income inequality. These effects occur primarily through the redistribution of disposable income and the financing of social programs that benefit lower-income households (Muinelo-Gallo & Roca-Sagalés, 2011; Martinez-Vazquez et al., 2012).

However, the redistributive capacity of fiscal systems also depends on the composition of taxation. Indirect taxes, particularly value-added taxes (VAT), are widely regarded as regressive because they place a proportionally higher burden on low-income households, which allocate a larger share of their income to consumption. Studies focusing on developing economies indicate that heavy reliance on indirect taxation may exacerbate inequality unless accompanied by compensatory social spending (Bird & Zolt, 2005; Tanzi & Zee, 2000). In contrast, direct taxes such as personal income taxes are generally associated with more equitable distributional outcomes (Piketty & Saez, 2007). Evidence from OECD countries further suggests that the distributional effects of indirect taxation may vary depending on institutional contexts and labor market conditions (Ciminelli et al., 2019).

Nonetheless, the broader consensus in the literature is that tax structures play a critical role in shaping redistributive outcomes. Beyond taxation, public expenditure represents another key channel through which governments address inequality. Targeted investments in education, healthcare, and social protection can reduce disparities by improving access to essential services and enhancing human capital formation. Clements et al. (2015) demonstrate that social protection spending can significantly reduce income inequality when programs are effectively targeted. Similarly, Aschauer (1989) finds that public investment in education and related services contributes to improved income distribution and long-run economic outcomes. However, the effectiveness of such policies often depends on institutional capacity, governance quality, and the efficiency of public sector management (Gupta et al., 2008).

Despite the potential of fiscal policy to reduce inequality, several studies highlight its limited effectiveness when redistributive programs are poorly targeted or constrained by fiscal governance challenges. Doumbia and Kinda (2019) and Anderson et al. (2017) show that social transfers may have only modest effects on inequality when fiscal systems lack effective targeting mechanisms. In many developing countries, institutional constraints—such as weak tax administration, narrow tax

bases, and limited monitoring capacity—reduce the redistributive impact of fiscal policies. These challenges are often compounded by structural reliance on indirect taxation due to difficulties in collecting direct income taxes (Knussen, 1998; Bird & Zolt, 2005).

Macroeconomic conditions also play an important role in shaping income distribution. Variables such as unemployment, inflation, and poverty levels are closely linked to inequality dynamics. Higher unemployment rates typically increase inequality by reducing income opportunities for vulnerable groups (Blank, 1989; Autor et al., 2008). Inflation may further widen income disparities by eroding the purchasing power of lower-income households (Bulir, 2001; Easterly & Fischer, 2001; Albanesi, 2007). Empirical studies across developing economies confirm that unemployment and inflation can significantly exacerbate income inequality, particularly during periods of economic instability (Hassan & Kalim, 2016; Paes de Barros et al., 2015).

Recent research has also examined the redistributive capacity of fiscal systems through fiscal incidence analysis. Lustig (2016, 2017) demonstrates that fiscal policy generally reduces inequality in developing countries, although its impact on poverty reduction varies depending on the design and targeting of social programs. Subsequent studies highlight that while direct taxes and transfers tend to reduce inequality, indirect taxes and subsidies may generate mixed or even adverse distributional outcomes (Lustig, 2017; Alesina & Passalacqua, 2016). Similarly, Benabou (1996) argues that certain tax structures may disproportionately benefit wealthier groups, thereby limiting the redistributive capacity of fiscal systems.

In the Moroccan context, empirical research remains relatively limited. Existing studies largely focus on macroeconomic performance, fiscal stability, or poverty reduction rather than the broader relationship between fiscal governance and income inequality. Nezha and Moustapha (2018), for instance, analyze the role of fiscal policy during periods of economic crisis and highlight the trade-off between fiscal stabilization and rising public debt. However, systematic empirical evidence on how taxation structures and fiscal expenditure policies affect income inequality in Morocco remains scarce.

This study contributes to the literature by examining the redistributive effects of fiscal policy in Morocco using a time-series framework covering the period 2000–2022. By integrating taxation variables, macroeconomic indicators, and social expenditure dynamics, the analysis provides new empirical evidence on how fiscal governance influences income distribution in a developing economy. Understanding these relationships is essential for designing fiscal policies capable of promoting inclusive growth and reducing structural inequalities.

3. Methodology and Data Description

3.1 Methodology

This study draws insight from the recent literature review on fiscal policy and income inequality to analyze the relationship between Moroccan fiscal policy and income inequality, utilizing a time series dataset spanning from 2000 to 2022. The methodology includes advanced econometric techniques designed to assess both the short-term and long-term effects of fiscal and macroeconomic variables on income distribution. These methods, grounded in empirical research, include Ordinary Least Squares (OLS) regression, Instrumental Variables (IV) regression, and the Autoregressive Distributed Lag (ARDL) model.

The economic approach of this paper started with the Ordinary Least Squares (OLS) model (1) as a standard estimator to capture the linear relationship between fiscal policy and income inequality. The OLS model is specified as:

$$GI_t = \beta_0 + \beta_1 IT_t + \beta_2 UR_t + \beta_3 IR_t + \beta_4 PR_t + \epsilon_t \quad (1)$$

Where:

- β_0 is the intercept term.

- $\beta_1, \beta_2, \beta_3, \beta_4$ are the coefficients for the respective independent variables.
- ϵ_t is the error term at time t .

In this model, GI_t represents the Gini Index at time t , a widely used measure of income inequality (Atkinson and Brandolini, 2001; Edward Furman, 2019). IT_t refers to indirect taxes as a percentage of GDP, UR_t is the unemployment rate, PR_t denotes the poverty rate, and IR_t is the inflation rate. Indirect taxes are included because of their regressive nature, as lower-income households tend to spend a larger proportion of their income on consumption, thereby being disproportionately affected by these taxes (Bird & Zolt, 2005). The unemployment rate is incorporated to reflect labor market conditions and their influence on income inequality, with higher unemployment often exacerbating income disparities due to reduced income-generating opportunities (Blank, 1989).

Following OLS we employ the IV regression to address potential endogeneity in the model, particularly concerning the relationship between indirect taxes and income inequality. We assume the endogeneity can arise if explanatory variables, such as Indirect Taxes (IT), are correlated with the error term, leading to biased and inconsistent estimates in standard OLS models. To correct for this, we use lagged values of IT and UR as instruments, assuming that past values of these variables influence current fiscal policies but are unlikely to be directly impacted by current levels of income inequality (Wooldridge, 2016). PR and IR are used as their own instruments, implying they are assumed to be exogenous. The general form of the IV model is expressed as follows:

$$\begin{aligned} IT_t &= \pi_0 + \pi_1 \cdot IT_{lag1,t} + \pi_2 \cdot UR_{lag1,t} + \pi_3 \cdot PR_t + \pi_4 \cdot IR_t + v_t \\ UR_t &= \theta_0 + \theta_1 \cdot IT_{lag1,t} + \theta_2 \cdot UR_{lag1,t} + \theta_3 \cdot PR_t + \theta_4 \cdot IR_t + \omega_t \end{aligned} \quad (1)$$

Where $\pi_0, \pi_1, \pi_2, \pi_3, \pi_4$ and $\theta_0, \theta_1, \theta_2, \theta_3, \theta_4$ are coefficients for the respective instruments and v_t, ω_t are error terms for the first-stage regressions.

$$GI_t = \beta_0 + \beta_1 \cdot IT_t + \beta_2 \cdot UR_t + \beta_3 \cdot PR_t + \beta_4 \cdot IR_t + \beta_5 \cdot EE_t + \beta_6 \cdot BDS_t + \beta_7 \cdot ITX_t + \epsilon_t \quad (3)$$

In the model (3), we have added Government Expenditures on Education (EE) as a percentage of GDP, Budget Deficit/Surplus (BDS), and Income Tax (ITX) to account for their redistributive effects on income inequality. Government expenditures, particularly in education is expected to mitigate inequality by redistributing resources toward lower-income households (Clements et al., 2015). Income tax is included as a measure of tax progressivity, where a higher share of income tax relative to GDP indicates a more progressive tax system, potentially reducing inequality (Piketty & Saez, 2007). However, the OLS model assumes that all independent variables are exogenous and uncorrelated with the error term, which is a strong assumption that may not hold in reality due to potential reverse causality between fiscal variables and income inequality.

To address the limitations of both the IV and OLS models, we also employ the Autoregressive Distributed Lag (ARDL) model to capture the dynamic relationships between fiscal policy and income inequality over time. The ARDL model is particularly useful for analyzing time-series data with variables that may be integrated of different orders (I(0) or I(1)), allowing us to estimate both short-term and long-term effects without pretesting, for unit roots (Pesaran & Shin, 1999). The ARDL models for the baseline model and the extended model are specified as follows:

$$\begin{aligned} \Delta GI_t = & \alpha_0 + \alpha_1 \cdot \Delta GI_{t-1} + \alpha_2 \cdot \Delta IT_{t-1} \\ & + \alpha_3 \cdot \Delta UR_{t-1} + \alpha_4 \cdot \Delta PR_{t-1} \\ & + \alpha_5 \cdot \Delta IR_{t-1} + \epsilon_t \end{aligned} \quad (4)$$

$$\begin{aligned} \Delta GI_t = & \alpha_0 + \alpha_1 \cdot \Delta GI_{t-1} + \alpha_2 \cdot \Delta IT_{t-1} \\ & + \alpha_3 \cdot \Delta UR_{t-1} + \alpha_4 \cdot \Delta PR_{t-1} \\ & + \alpha_5 \cdot \Delta IR_{t-1} + \alpha_6 \cdot \Delta EE_{t-1} \\ & + \alpha_7 \cdot \Delta BDS_{t-1} + \alpha_8 \cdot \Delta ITX_{t-1} + \epsilon_t \end{aligned} \quad (5)$$

In this model, ΔGI_t represents the change in income inequality, and the lagged differences of fiscal variables, including IT, UR, and PR, capture the short-run dynamics. The long-run coefficients, λ_1 and λ_2 , estimate the long-term effects of government expenditures and income taxes on income inequality. The ARDL model's flexibility allows for the inclusion of both short-run and long-run effects, recognizing that fiscal policies such as Indirect taxes, Income tax and public spending programs may take time to impact income distribution fully.

Across all models, we use **robust standard errors** to account for potential heteroskedasticity in the residuals, ensuring that our estimates are reliable and valid. We also conduct diagnostic tests to detect issues of **multicollinearity** between fiscal variables, particularly between **IT** and **EE**, which are highly correlated in many developing economies where indirect taxes are often used to finance public expenditures (Gujarati, 2009). To address multicollinearity, we compute the **Variance Inflation Factor (VIF)**. These steps ensure that the estimates for the fiscal variables are not biased by multicollinearity, allowing for clearer interpretations of their individual effects on income inequality.

In summary, the IV, OLS, and ARDL models are used in combination to offer a comprehensive analysis of how fiscal policy affects income inequality in Morocco. The IV model addresses endogeneity, the OLS model provides a baseline estimate, and the ARDL model captures the dynamic, short-term, and long-term effects. This multi-faceted approach ensures that the findings are robust and reliable, providing meaningful insights for policymakers aiming to design fiscal strategies that promote equitable economic growth while reducing income disparities.

3.2 Mechanisms Linking Fiscal Policy Variables to Income Inequality

Fiscal policy influences income distribution through several transmission channels related to taxation structures, public expenditure allocation, macroeconomic conditions, and institutional capacity. Understanding these mechanisms is essential for interpreting the empirical relationships examined in this study and for identifying how fiscal governance shapes redistributive outcomes.

One of the most direct channels operates through the structure of taxation. Indirect taxes—such as value-added tax (VAT) and excise duties—are generally considered regressive because they place a proportionally higher burden on lower-income households that devote a larger share of their income to consumption. Consequently, increases in indirect taxation tend to widen income disparities unless accompanied by compensatory social transfers or progressive taxation measures (Bird & Zolt, 2005). This dynamic is particularly relevant in developing economies where indirect taxes constitute a significant share of fiscal revenue due to administrative challenges in collecting direct income taxes (Martinez-Vazquez & Bird, 2012). In such contexts, reliance on consumption-based taxation may unintentionally reinforce existing income inequalities.

Public expenditure represents an important counterbalancing mechanism. Government spending on education, healthcare, and social protection can reduce inequality by expanding access to public services and strengthening human capital formation. Education expenditure, in particular, contributes to long-term income mobility by improving skills, productivity, and employment opportunities for disadvantaged groups (Clements et al., 2015). However, the redistributive impact

of such spending depends on the effectiveness of policy implementation and the equitable distribution of resources across regions and social groups. In Morocco, disparities in access to quality education—especially between urban and rural areas—may limit the equalizing potential of public spending (World Bank, 2021).

Labor market conditions constitute another key determinant of income inequality. High unemployment reduces income-generating opportunities for vulnerable populations and disproportionately affects low-skilled workers and younger cohorts. Empirical research consistently shows that persistent unemployment contributes to widening income gaps by weakening the earnings capacity of lower-income households (Blank, 1989; Autor et al., 2008). This challenge is particularly pronounced in economies characterized by structural unemployment and large informal sectors, where labor market policies may have limited reach.

Poverty dynamics further interact with fiscal policy in shaping income distribution. Higher poverty rates tend to expand the lower tail of the income distribution, thereby increasing overall inequality. In such contexts, targeted anti-poverty programs—including cash transfers, social protection schemes, and rural development initiatives—play an essential role in mitigating disparities (Lustig, 2016; Gupta et al., 2018). The effectiveness of these interventions depends largely on fiscal capacity and institutional governance.

Fiscal balance also influences inequality through its impact on public debt dynamics and government spending priorities. Persistent fiscal deficits may constrain the ability of governments to finance redistributive programs, particularly when deficits are financed through regressive taxation or reductions in social expenditure. Research suggests that fiscal adjustments can have distributional consequences depending on how governments balance taxation and spending policies (Alesina & Passalacqua, 2016). In developing economies with narrow tax bases, deficits are often financed through increased reliance on indirect taxes, which may amplify inequality.

Income taxation, in contrast, typically functions as a progressive redistributive instrument. Personal income taxes allow governments to transfer resources from higher-income groups to lower-income populations through social spending and redistribution programs (Piketty & Saez, 2007). However, the redistributive effectiveness of income taxation depends on tax compliance, administrative capacity, and the breadth of the tax base. In many developing economies, including Morocco, limited tax coverage and tax evasion may weaken the redistributive role of direct taxation (Martinez-Vazquez et al., 2012).

Finally, macroeconomic stability plays an indirect but significant role in income distribution. Inflation can influence inequality through its effects on real incomes and purchasing power. Rising prices tend to affect lower-income households more severely because they allocate a larger share of their income to essential goods such as food and energy. Consequently, inflationary pressures may exacerbate inequality by eroding the real incomes of vulnerable populations (Albanesi, 2007). Although inflation in Morocco has generally remained moderate, fluctuations in essential commodity prices may still generate distributional effects.

Taken together, these mechanisms illustrate the complex interaction between fiscal policy instruments, macroeconomic conditions, and institutional governance in shaping income distribution. The effectiveness of fiscal policy in reducing inequality therefore depends not only on the design of tax and expenditure systems but also on broader governance structures that determine how fiscal resources are mobilized and allocated. These theoretical linkages provide the conceptual foundation for the empirical analysis conducted in this study.

3.3 Data Sources and Description of Variables

Variable	Definition / Measurement	Source
Income Inequality (GI)	Gini Index measuring the degree of income distribution inequality among individuals based on disposable income.	Haut-Commissariat au Plan (HCP), Morocco – National Statistical Database
Budget Deficit/Surplus (BDS)	Government budget balance expressed as a percentage of Gross Domestic Product (GDP).	Moroccan Ministry of Economy and Finance (2000–2022)
Indirect Taxes (IT)	Total indirect tax revenues, including VAT and excise taxes, expressed as a percentage of GDP.	Moroccan Ministry of Economy and Finance (2000–2022)
Government Expenditures (GE)	Total government expenditures as a percentage of GDP.	Moroccan Ministry of Economy and Finance (2000–2022)
Unemployment Rate (UR)	Percentage of the labor force that is unemployed and actively seeking employment.	World Bank – World Development Indicators (WDI)
Income Tax (ITX)	Revenue from personal and corporate income taxes expressed as a percentage of GDP.	Moroccan Ministry of Economy and Finance (2000–2022)
Education Expenditure (EE)	Government expenditure on education as a percentage of GDP.	Moroccan Ministry of Economy and Finance (2000–2022)
Poverty Rate (PR)	Percentage of the population living below the national poverty line.	World Bank – World Development Indicators (WDI)
Inflation Rate (IR)	Annual percentage change in the Consumer Price Index (CPI).	World Bank – World Development Indicators (WDI)

The data utilized in this study (Table 1) span the period from 2000 to 2022, sourced from multiple reputable institutions, including both national and international databases. The primary data for fiscal variables, such as Indirect Taxes (IT), Education Expenditures (EE), Income Tax (ITX), and Budget Deficit/Surplus (BDS), were obtained from the Moroccan Ministry of Economy and Finance, offering detailed, country-specific insights into Morocco's fiscal policy framework. The measure of income inequality, the Gini Index (GI), was sourced from the Haut-Commissariat au Plan, Morocco's national statistical office, while other socio-economic indicators, such as the inflation rate (IR), poverty rate (PR), and unemployment rate (UR), were derived from the World Bank's World Development Indicators (WDI).

Despite the robustness of these data sources, several challenges were encountered during the data collection process. Gaps in data availability for certain years, particularly with respect to the Gini Index, necessitated the use of interpolation techniques to ensure temporal continuity in the time

series dataset. Linear interpolation was employed to estimate missing values for intermediate years. While this approach allowed for the construction of a continuous dataset, caution was exercised in interpreting results from the interpolated data, particularly given the potential for bias in a rapidly changing socio-economic environment such as Morocco. The study acknowledges this limitation and interprets the findings with appropriate caveats concerning the interpolated data points.

An additional challenge involved reconciling discrepancies between national and international datasets, particularly for fiscal variables. For instance, budget deficit figures reported by the Moroccan Ministry of Economy and Finance occasionally differed from those published by international organizations, such as the International Monetary Fund (IMF). To address these inconsistencies, national data were prioritized due to their proximity to the policymaking process and their direct relevance to the study’s objectives. However, sensitivity analyses were conducted to ensure that variations in data sources did not significantly impact the empirical findings. Where discrepancies were substantial, alternative models were tested to verify the robustness of the results.

To account for potential multicollinearity between fiscal variables—particularly Indirect Taxes (IT) and Government Expenditures on Education (EE)—the study conducted a Variance Inflation Factor (VIF) analysis, a common diagnostic tool used to assess multicollinearity. The use of robust standard errors and sensitivity analyses further enhanced the reliability of the results, particularly in cases where multicollinearity persisted. These robustness checks confirmed that the key fiscal variables—such as indirect taxes, government expenditures on education, and budget deficits—remained significant predictors of income inequality, even after addressing multicollinearity concerns. The methodological precautions taken, including the handling of missing data and multicollinearity, ensure that the dataset is analytically sound and suitable for rigorous time-series analysis.

Table 2: Descriptive Statistics

Variable	Me an	S D	M in	M ax	Medi an	S E
Income Inequality (GI)	0.40	0.01	0.38	0.41	0.41	0.00
Indirect Taxes (IT)	7.43	0.42	6.70	8.20	7.30	0.09
Unemployment Rate (UR)	10.37	1.31	8.91	13.40	9.80	0.27
Inflation Rate (IR)	1.72	1.39	0.30	6.60	1.40	0.29
Poverty Rate (PR)	8.39	4.78	1.70	15.30	6.20	1.00
Education Expenditure (EE)	5.42	0.85	2.40	6.60	5.40	0.18
Budget Deficit/Surplus (BDS)	-3.70	1.83	-7.10	0.40	-3.90	0.38
Income Tax (ITX)	4.12	0.64	2.90	6.00	4.10	0.13

Table 2 presents descriptive statistics for the variables used in the empirical analysis covering the period 2000–2022. The statistics provide an overview of the fiscal and macroeconomic conditions associated with income inequality in Morocco.

The Gini Index exhibits a mean value of 0.40 with a very small standard deviation (0.01), indicating a persistently high but relatively stable level of income inequality during the study period. The narrow range between the minimum (0.38) and maximum (0.41) suggests that inequality has remained structurally embedded despite fiscal reforms and economic growth over the past two decades.

From a fiscal perspective, Morocco maintained an average budget deficit of -3.7% of GDP. The deficit reached a minimum of -7.1% , reflecting periods of fiscal expansion associated with economic shocks and countercyclical policies. The persistent deficit position highlights the government's reliance on deficit financing to support public expenditure and economic stabilization. Indirect taxes represent a significant component of fiscal revenue, with an average of 7.43% of GDP and relatively low variation over time. The stability of indirect taxation indicates a sustained dependence on consumption-based taxation. In developing economies, such reliance on indirect taxes may generate distributional concerns due to their regressive nature.

Direct taxation, measured through income tax revenue, averages 4.12% of GDP, which is considerably lower than indirect tax revenues. This difference reflects the relatively limited role of direct taxation in the fiscal structure and may indicate constraints related to tax base coverage and compliance.

Regarding public expenditure, education spending averages 5.42% of GDP. The variation in education expenditure across the period reflects changing fiscal priorities and budget constraints. Investment in education is generally associated with long-term human capital development, which can influence income distribution through improved labor market opportunities.

Labor market conditions are reflected in the unemployment rate, which averages 10.37% with moderate variation. Persistent unemployment represents a structural challenge that may contribute to income disparities by limiting access to stable income-generating opportunities.

The poverty rate shows substantial variability, ranging from 1.7% to 15.3% . This variation suggests that poverty dynamics in Morocco are sensitive to macroeconomic conditions and fiscal policy responses. Changes in poverty levels may directly affect the lower tail of the income distribution.

Finally, inflation remains relatively moderate over the study period, with an average rate of 1.72% . Although overall price stability is observed, occasional inflationary episodes may still affect real incomes, particularly for lower-income households.

Overall, the descriptive statistics highlight several structural characteristics of Morocco's fiscal and socioeconomic environment: persistent income inequality, reliance on indirect taxation, moderate public investment in education, and structural labor market challenges. These patterns provide important contextual insights for interpreting the econometric results presented in the following sections.

4. Empirical Results and Model Diagnostics

This section reports the empirical findings on the relationship between fiscal governance and income inequality in Morocco during the period 2000–2022. To ensure robust inference and address common econometric challenges in macro-fiscal analysis, three complementary estimation strategies are employed: Ordinary Least Squares (OLS), Instrumental Variables (IV), and Autoregressive Distributed Lag (ARDL) models.

These approaches allow the analysis to account for potential endogeneity, dynamic persistence in inequality, and the temporal transmission of fiscal policy effects.

The baseline results from the OLS and IV estimations are presented in Table 3. Across model specifications, indirect taxation, poverty incidence, and labor market conditions emerge as the most consistent determinants of income inequality. The results indicate that indirect taxation exerts a

positive and statistically significant effect on the Gini index. In the baseline OLS specification, a one-percentage-point increase in indirect taxes as a share of GDP is associated with an increase of approximately 0.007 in the Gini index, confirming the regressive distributional implications of consumption-based taxation. The IV estimates produce a larger coefficient, suggesting that the OLS specification may underestimate the redistributive impact of indirect taxation when endogeneity is not addressed.

Poverty rates are also positively associated with income inequality across all specifications, indicating that increases in the share of the population living below the poverty line expand the lower tail of the income distribution and amplify overall inequality. Conversely, unemployment exhibits a negative coefficient, reflecting the interaction between labor market conditions and measured income distribution. This relationship suggests that fluctuations in unemployment rates influence the structure of income dispersion, particularly in economies characterized by a large informal sector.

The extended OLS specification incorporates additional fiscal governance variables, including education expenditure, fiscal balance, and income tax revenue.

The results indicate that these variables have weaker direct effects on income inequality within the static framework. Education expenditure and the fiscal balance do not appear statistically significant in the short run, suggesting that their redistributive effects may operate through longer-term institutional and human capital channels. Income tax revenue displays a marginal effect, indicating that the redistributive capacity of direct taxation remains limited relative to the dominant role of indirect taxes within Morocco's fiscal structure.

To capture the dynamic nature of fiscal policy transmission, ARDL models are estimated and presented in Table 4. The results reveal strong persistence in income inequality, as indicated by the significance of lagged values of the Gini index. This finding suggests that inequality evolves gradually over time and is influenced by past distributional outcomes.

Lagged indirect taxes and poverty rates remain statistically significant, highlighting that fiscal policy shocks and socio-economic conditions exert delayed effects on income distribution.

The significance of lagged income tax in the extended ARDL specification further suggests that the redistributive effects of direct taxation materialize over longer horizons.

Such dynamics are consistent with the institutional nature of fiscal governance, where policy adjustments typically require time to influence economic behavior and distributional outcomes.

Model diagnostics confirm the reliability of the empirical estimates. Durbin–Watson statistics indicate no evidence of residual autocorrelation, while Breusch–Pagan tests suggest that heteroskedasticity is not a systematic concern in the baseline specifications. Variance Inflation Factors remain well below conventional thresholds, indicating that multicollinearity does not affect the stability of the regression estimates.

Overall, the empirical evidence highlights the central role of fiscal structure in shaping income distribution in Morocco. The results suggest that reliance on indirect taxation combined with structural socio-economic disparities contributes to persistent inequality, while the redistributive capacity of direct taxation and public expenditure appears comparatively limited.

Table 3. OLS and IV Regression Results: Fiscal Policy and Income Inequality

Variable	OLS Model 1	OLS Model 2	IV Model
Intercept	0.3625***	0.3580***	0.3247***
Indirect Taxes (IT)	0.0075***	0.0073***	0.0121*
Unemployment (UR)	-0.0029***	-0.0027***	-0.0026*
Inflation (IR)	-0.0014***	-0.0016***	-0.0019*
Poverty Rate (PR)	0.0018***	0.0019***	0.0019***
Education Expenditure (EE)		-0.0009	
Budget Balance (BDS)		-0.0002	
Income Tax (ITX)		0.0020	

Notes: *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$. IV estimates use lagged fiscal variables as instruments.

Table 4. ARDL Results: Dynamic Effects of Fiscal Policy on Income Inequality

Variable	ARDL Model 1	ARDL Model 2
Lagged Inequality (L.GI)	-0.4726	-0.3360
Indirect Taxes (IT)	0.0050**	
Lagged Indirect Taxes (L.IT)	0.0070**	0.0091**
Unemployment (UR)	-0.0023**	
Lagged Unemployment (L.UR)	-0.0021*	-0.0027*
Inflation (IR)	-0.0014**	
Lagged Inflation (L.IR)	-0.0002	-0.0015
Poverty Rate (PR)	0.0020***	
Lagged Poverty (L.PR)	0.0008	0.0026***
Lagged Education (L.EE)		-0.0012
Lagged Fiscal Balance (L.BDS)		-0.0005
Lagged Income Tax (L.ITX)		0.0047**

Notes: *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.

5. Discussion

The empirical findings underscore the central role of fiscal structure in shaping distributive outcomes within Morocco's governance framework. The consistently positive and statistically significant association between indirect taxation and income inequality suggests that the composition of revenue mobilization—not merely its magnitude—constitutes a critical determinant of redistributive performance. In institutional terms, reliance on consumption-based taxation reflects a fiscal governance model that prioritizes administrative feasibility and revenue stability, but

potentially at the cost of equity. Indirect taxes are typically easier to collect and less sensitive to tax compliance constraints; however, their regressive incidence may entrench structural disparities, particularly in contexts where compensatory redistribution mechanisms remain limited.

From a governance perspective, this result highlights the importance of examining how institutional capacity and tax administration shape the distributive profile of fiscal systems. In developing administrative environments, narrow direct tax bases and compliance challenges often incentivize governments to depend on indirect taxation. While fiscally rational, this strategy may weaken the redistributive function of the state. The findings therefore contribute to broader debates in public administration regarding the trade-off between revenue efficiency and distributive equity, and the institutional conditions under which progressive taxation can be effectively implemented.

The relationship between unemployment and income inequality, while statistically significant, suggests a more complex interaction between labor market structures and income dispersion. The observed coefficient indicates that inequality dynamics are influenced not only by employment levels but also by the composition of employment and the prevalence of informal labor arrangements. In governance systems characterized by substantial informal sectors, measured unemployment may not fully capture labor market exclusion, as informal economic participation may partially buffer income shocks. This implies that labor market governance—particularly policies targeting formalization, vocational training, and youth employment—plays an indirect yet critical role in shaping inequality trajectories.

The positive association between poverty incidence and income inequality aligns with established distributional theory, but its persistence across specifications indicates that poverty reduction policies remain central to redistributive governance. The findings suggest that inequality in Morocco is not solely driven by upper-tail income concentration, but also by structural vulnerability at the lower end of the distribution. From a public administration standpoint, this reinforces the importance of targeted social protection mechanisms and effective program design. The redistributive impact of fiscal policy depends not only on aggregate expenditure levels, but also on administrative targeting capacity and institutional coordination across policy sectors.

The inflation results further illuminate the interaction between macroeconomic governance and distributional outcomes. Although inflation appears to exert a modest effect within the model, its broader implication lies in the distributive sensitivity of price stability. Inflation disproportionately affects households with limited asset diversification and fixed nominal incomes. Consequently, macroeconomic management—particularly coordination between fiscal and monetary authorities—remains integral to safeguarding distributional stability. In governance terms, price stability can be interpreted as a complementary dimension of social equity policy rather than merely a macroeconomic objective.

Taken together, the results suggest that inequality in Morocco is shaped by structural features of fiscal governance: the composition of taxation, the institutional limits of direct revenue mobilization, labor market dualism, and administrative targeting capacity in social policy. The persistence of inequality across the study period indicates that incremental fiscal adjustments may be insufficient to alter entrenched distributional patterns. Instead, redistributive effectiveness appears contingent upon broader institutional reforms that strengthen progressive revenue systems, enhance compliance capacity, and improve the allocative efficiency of public expenditure.

These findings contribute to governance scholarship by demonstrating that fiscal outcomes are deeply embedded within institutional arrangements rather than determined solely by aggregate spending levels. The Moroccan case illustrates how fiscal governance choices—particularly tax structure and administrative capacity—mediate the relationship between economic growth and social equity. In this sense, the study reinforces the view that distributive justice is not merely a function of policy intent, but of governance design and institutional effectiveness.

6. Policy Implications and Conclusions

This study examined the relationship between fiscal policy and income inequality in Morocco using time-series data and multiple econometric techniques designed to address endogeneity and dynamic relationships. The findings indicate that despite sustained fiscal reforms and increased social expenditure over the past two decades, income inequality has remained relatively persistent. This suggests that distributional outcomes are shaped not only by fiscal policy levels but also by the institutional configuration of the fiscal system and the governance mechanisms through which fiscal instruments are implemented.

The empirical results highlight the central role of tax structure in shaping redistributive outcomes. The strong and consistent association between indirect taxation and income inequality indicates that Morocco's fiscal system relies heavily on consumption-based revenue sources. While indirect taxes are administratively efficient and relatively stable, they tend to generate regressive distributional effects because lower-income households devote a larger share of their income to consumption. From a governance perspective, this pattern reflects the institutional trade-offs that governments face between revenue mobilization efficiency and redistributive capacity. The findings therefore suggest that strengthening the redistributive role of fiscal policy requires a gradual rebalancing of the tax structure toward more progressive revenue instruments, including direct taxation.

However, the results also indicate that the redistributive potential of direct taxation remains constrained. Income tax revenues represent a relatively small share of total fiscal resources, suggesting limitations related to tax base coverage, compliance, and administrative enforcement. In many developing economies, including Morocco, large informal sectors and limited administrative capacity reduce the effectiveness of direct taxation as a redistributive instrument. Consequently, improving the redistributive performance of fiscal systems requires not only adjustments in tax policy design but also investments in fiscal governance capacity, including tax administration modernization, compliance monitoring, and institutional coordination.

The findings further demonstrate that labor market conditions and poverty dynamics remain important determinants of inequality. Persistent unemployment and poverty reflect structural challenges within the broader economic environment that fiscal policy alone cannot fully address. From a public administration perspective, these results emphasize the importance of policy coordination across fiscal, labor market, and social protection institutions. Effective redistribution depends on the coherence of policy instruments across government sectors and the capacity of public institutions to implement integrated strategies aimed at promoting inclusive economic participation.

The analysis also reveals a complex relationship between macroeconomic conditions and income distribution. Although inflation appears to have a limited equalizing effect within the sample period, its broader distributional consequences remain context dependent. Macroeconomic stability therefore remains an important component of equitable development, particularly when combined with fiscal policies that protect the real incomes of vulnerable populations.

Taken together, the findings suggest that the persistence of inequality in Morocco reflects structural characteristics of fiscal governance rather than short-term policy fluctuations. Redistribution depends not only on the scale of public spending but also on the institutional architecture through which fiscal resources are mobilized and allocated. In this regard, strengthening fiscal governance—including tax system design, administrative capacity, and the alignment between revenue collection and social expenditure—remains central to improving distributive outcomes.

From a public administration perspective, the results highlight the importance of institutional coherence in fiscal policy implementation. Policies aimed at reducing inequality are most effective when supported by transparent fiscal institutions, effective administrative systems, and coordinated policy frameworks linking taxation, social spending, and labor market policy.

Future research may further explore the institutional determinants of fiscal redistribution in developing economies by examining how administrative capacity, governance quality, and political

institutions influence fiscal policy effectiveness. Such analysis would contribute to a deeper understanding of the governance mechanisms that shape redistributive outcomes and the conditions under which fiscal policy can effectively support inclusive development.

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