



THE EFFECT OF MACROECONOMIC STABILITY ON TAX REVENUES: A PANEL DATA ANALYSIS OF DEVELOPING ECONOMIES

MAKROEKONOMİK İSTİKRARIN VERGİ GELİRLERİ ÜZERİNDEKİ ETKİSİ: GELİŞMEKTE OLAN EKONOMİLER ÜZERİNE PANEL VERİ ANALİZİ

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ABSTRACT

This study investigates the macroeconomic drivers of tax revenue in developing economies, with particular attention to the roles of economic growth, trade openness, and inflation. The analysis is based on a panel of 57 developing countries covering the 2000-2022 period. The results show that tax revenue performance is shaped unevenly across these core determinants. Trade openness emerges as the most stable and consistently positive correlate of tax revenue, suggesting that deeper integration into formal and externally connected markets strengthens revenue mobilization. Economic growth also contributes positively, although its effect is less uniform across specifications. Inflation, by contrast, has a negative influence on tax revenue. These findings indicate that revenue mobilization in developing economies depends not only on expanding taxable activity, but also on preserving macroeconomic stability. The broader implication is that tax performance should be understood as a macro-fiscal outcome: stronger growth and external integration can support revenue collection, but inflationary instability can materially erode it.

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ÖZ

Bu çalışma, gelişmekte olan ekonomilerde vergi gelirlerinin makroekonomik belirleyicilerini, özellikle ekonomik büyüme, ticari açıklık ve enflasyonun rollerini merkeze alarak incelemektedir. Analiz, 2000-2022 dönemini kapsayan 57 gelişmekte olan ülkeye ait panel veri setine dayanmaktadır. Bulgular, vergi gelirlerinin bu temel değişkenlerden eşit ölçüde etkilenmediğini göstermektedir. Ticari açıklık, vergi gelirleriyle en istikrarlı ve en güçlü pozitif ilişki sergileyen değişken olarak öne çıkmakta; bu durum, daha yüksek düzeyde dışa entegrasyonun ve daha görünür piyasa işlemlerinin gelir mobilizasyonunu desteklediğine işaret etmektedir. Ekonomik büyüme de vergi gelirlerini pozitif etkilemekle birlikte, bu etkinin farklı spesifikasyonlarda daha sınırlı ve daha az istikrarlı olduğu görülmektedir. Buna karşılık enflasyon, vergi gelirleri üzerinde negatif bir etki yaratmaktadır. Bulgular, gelişmekte olan ekonomilerde vergi performansının yalnızca vergilendirilebilir faaliyetin genişlemesine değil, aynı zamanda makroekonomik istikrarın korunmasına da bağlı olduğunu göstermektedir. Daha genel olarak çalışma, vergi gelirlerinin makro-fiskal bir sonuç olarak değerlendirilmesi gerektiğine işaret etmektedir: büyüme ve dışa açıklık gelir mobilizasyonunu destekleyebilirken, enflasyonist istikrarsızlık bu kazanımları ciddi biçimde aşındırabilmektedir.

Keywords: Tax revenue; panel data analysis; fixed effects; Driscoll-Kraay standard errors.

Anahtar Kelimeler: Vergi gelirleri; panel veri analizi; sabit etkiler; Driscoll-Kraay standart hatalar.

INTRODUCTION

Tax revenue constitutes one of the central foundations of fiscal capacity because it enables governments to finance public services, infrastructure investment, social expenditure, and long-term development priorities. For developing economies, this issue is particularly important because expenditure needs are often high, while the tax base remains relatively narrow, informality is widespread, and administrative capacity is uneven. Previous studies emphasize that tax revenue performance is shaped by macroeconomic, structural, and institutional conditions rather than by a single universal mechanism (Gupta, 2007; van Oordt, 2023; Thath, 2024). In this context, understanding the macroeconomic conditions that support or weaken tax revenue performance is not only a technical fiscal issue, but also a broader question of state capacity, macroeconomic stability, and development.

Developing economies face a persistent challenge in mobilizing stable domestic revenue. External borrowing, foreign aid, and natural-resource income may provide temporary fiscal space, but they cannot substitute for a

durable and broad-based tax system. A stronger tax base allows governments to plan expenditure more effectively, reduce fiscal vulnerability, and respond more flexibly to economic shocks. Therefore, identifying the macroeconomic factors associated with tax revenue performance is essential for designing more resilient fiscal policies. This is especially relevant in developing-country contexts, where fiscal systems are often exposed to growth volatility, external-sector fluctuations, inflationary pressures, and institutional constraints.

The analysis centers on economic growth, trade openness, and inflation as three key macroeconomic determinants of tax revenue. Economic growth may strengthen tax revenue by expanding incomes, profits, consumption, and formal economic activity. Trade openness may support revenue mobilization by increasing the volume of observable transactions and deepening integration with formal domestic and international markets. However, its revenue effect may also depend on whether governments can replace or compensate for potential tariff-related losses through stronger domestic taxation. Inflation, by contrast, may weaken tax performance by eroding the real value of collections, disrupting compliance, and creating broader macroeconomic instability. These channels are frequently emphasized in the tax-revenue literature, but their empirical strength varies across samples, periods, and model specifications (Gupta, 2007; Ha et al., 2022; Tsaurai, 2021).

Although the study focuses on economic growth, trade openness, and inflation, tax revenue performance may also be shaped by structural and institutional conditions. Previous studies show that sectoral composition, urbanization, administrative capacity, and governance conditions may affect the size and visibility of the tax base (Gupta, 2007; van Oordt, 2023; Thath, 2024). For this reason, the empirical model includes selected structural controls in order to isolate the role of the core macroeconomic variables more clearly.

The motivation for this study comes from the fact that these three variables are theoretically central but empirically unsettled. In developing economies, the same macroeconomic variable may have different fiscal implications depending on institutional capacity, sectoral structure, inflation persistence, and the ability of governments to adjust tax administration to changing economic conditions. Growth may expand the tax base, but its effect may be limited when informality remains high. Openness may increase

the visibility of economic transactions, but its fiscal contribution may depend on the structure of trade taxation and domestic revenue mobilization. Inflation may raise nominal tax bases in some settings, yet it may also reduce real collections when tax systems adjust slowly. These ambiguities make it necessary to examine the relationships in a broad panel framework rather than relying only on country-specific or region-specific evidence.

Accordingly, this study investigates the effects of GDP per capita growth, trade openness, and inflation on tax revenue in 57 developing economies over the 2000-2022 period. The empirical analysis uses panel data methods with country and year fixed effects and complements the baseline estimates with Driscoll-Kraay standard errors. Additional robustness checks include parsimonious specifications, lagged models, period-split regressions, and formal interaction tests. This design allows the study to assess not only the average relationship between macroeconomic conditions and tax revenue, but also the stability of these relationships across specifications and periods.

The study contributes to the literature in three ways. First, it provides updated evidence for a broad group of developing economies using recent data covering the period up to 2022. Second, it focuses on a parsimonious set of theoretically central macroeconomic variables, which helps clarify the relative roles of growth, openness, and inflation without overloading the empirical model with an excessive number of controls. Third, it examines temporal heterogeneity by testing whether these relationships changed after 2010, with particular attention to the inflation-tax revenue relationship. This is important because the fiscal consequences of inflation may differ across macroeconomic environments and may become more damaging when inflationary pressures are persistent or institutionally destabilizing.

The remainder of the paper is organized as follows. Section 2 reviews the related literature. Section 3 presents the data, variables, econometric specification, and estimation strategy. Section 4 reports the baseline empirical findings. Section 5 provides robustness checks and temporal heterogeneity tests. Section 6 concludes the study by relating the empirical findings to the existing literature, discussing policy implications, and outlining directions for future research.

1. LITERATURE REVIEW

The literature on tax revenue determinants can be organized around four broad themes: development and growth, trade openness, macroeconomic stability, and structural-institutional conditions. Although these themes are interrelated, separating them clarifies where the strongest empirical regularities lie and where the evidence remains inconclusive.

The first major theme concerns the level of development and economic growth. The basic argument is that more developed economies can collect more tax revenue because they have broader tax bases, more monetized transactions, stronger institutions, and greater administrative reach. Gupta (2007) finds that per capita income is positively associated with tax revenue effort in developing countries. Boukbech et al. (2018) similarly report that per capita GDP strengthens tax capacity in lower-middle-income countries, while Saptono and Mahmud (2021) show that per capita income positively affects both tax revenue and tax effort in Southeast Asia. Yıldız (2019) reaches a similar conclusion for 19 high-income OECD countries, where per capita GDP exerts a positive and statistically significant effect on tax revenues. At the country level, Al-Qudah (2021) confirms this positive relationship for Jordan, and Mmbulaheni et al. (2024) do the same for South Africa. Overall, the literature strongly suggests that income expansion and broader development deepen taxable capacity.

A related but distinct issue is whether economic growth itself strengthens revenue mobilization. In principle, stronger growth should expand profits, wages, employment, and consumption, thereby increasing the revenue base. This expectation is supported by Tsaurai (2021), who finds a positive growth effect in upper-middle-income countries, and by Todorović et al. (2024), who show that GDP positively affects tax revenue in Visegrad countries, especially in the short run. Chamisa and Sunde (2024) also find that GDP growth contributes positively in the short run for Zimbabwe, while Gökpinar (2023) identifies positive long-run effects of industrial production and related macroeconomic variables in Türkiye. However, the growth effect is not always strong in every sample, which indicates that growth may support tax revenue more clearly in some institutional and structural contexts than in others.

The second major theme is trade openness. Many studies argue that openness can raise tax revenue by increasing the volume of recorded domestic and external transactions and by supporting formalization. Gupta (2007), Ha et al. (2022), Saptono and Mahmud (2021), Chettri et al. (2023), Thath (2024), and Mmbulaheni et al. (2024) all report positive effects of openness or trade-related indicators on tax performance. In these studies, greater external integration appears to improve revenue mobilization by widening the effective tax base. Yet the literature also contains a competing argument: trade liberalization may reduce revenue when tariff cuts are not offset by stronger domestic taxation. Tsaurai (2021) reports a negative effect of trade openness in upper-middle-income countries, while Yıldız (2019) finds no statistically significant effect in high-income OECD economies. Çalcalı and Altınır (2019) likewise show strong cross-country heterogeneity in OECD cases. Hence, openness may be revenue-enhancing, but only under supportive tax and administrative conditions.

The third line of research focuses on inflation and macroeconomic stability. In much of the literature, inflation is interpreted as harmful to tax performance because it erodes the real value of tax receipts, weakens compliance, and reflects broader instability. This negative view appears in Gupta (2007), Bati (2025), Öztürk et al. (2019), Mmbulaheni et al. (2024), and Todorović et al. (2024). Çalcalı and Altınır (2019) also report that inflation generally has a negative effect across OECD countries. However, not all studies support this conclusion. Boukbech et al. (2018) find a positive relationship between inflation and tax effort, Kebede et al. (2024) report a positive effect in Ethiopia, and Thath (2024) finds that inflation is positively associated with tax revenue in Southeast Asia. Meanwhile, Saptono and Mahmud (2021) and Yıldız (2019) conclude that inflation is not statistically significant in their main models. This wide dispersion of findings makes inflation one of the least settled determinants in the literature.

The fourth strand of the literature highlights structural and institutional factors. Sectoral composition is important because agriculture is often difficult to tax, whereas manufacturing and formal industry are generally easier to monitor and assess. Gupta (2007) and Yıldız (2019) both suggest that agriculture is associated with weaker tax performance, while Ha et al. (2022) and Saptono and Mahmud (2021) report positive roles for industry and manufacturing. Yet Thath (2024) finds a negative manufacturing effect

in Southeast Asia, which suggests that industrial tax incentives and sector-specific exemptions may offset the expected formalization advantage. Thus, sectoral effects are not automatic; they depend on the specific tax structure and the policy regime in place.

Institutional factors also play a significant role in shaping tax outcomes. Van Oordt (2023) argues that tax ratios are influenced by deeper determinants such as geography, formal institutions, and informal norms. Özmen (2016) finds that economic freedom and anti-corruption conditions support tax performance in BRIC-T countries. Thath (2024) identifies government effectiveness and human development as positive drivers in Southeast Asia, while Gülşen and Yıldiran (2021) show that tax structures and institutional settings interact with corruption and governance dynamics in transition economies. These studies collectively indicate that macroeconomic conditions alone cannot fully explain tax performance; institutional quality remains a critical conditioning factor.

Methodologically, the literature is highly diverse. Time-series studies such as Al-Qudah (2021), Chamisa and Sunde (2024), Eng and Lim (2026), Gökpinar (2023), and Kebede et al. (2024) rely on ARDL-type frameworks, while panel studies such as Gupta (2007), Ha et al. (2022), Saptono and Mahmud (2021), Thath (2024), Tsaurai (2021), Yıldız (2019), and Todorović et al. (2024) employ fixed effects, random effects, GMM, or PMG-type estimators. This methodological diversity partly explains why the findings remain mixed. Different estimators emphasize different sources of variation, and relationships that appear robust in one context may weaken in another. Therefore, the contradictions in the literature are not merely substantive; they are also methodological.

Overall, the literature yields three implications that directly motivate the present study. First, growth-related variables are the most consistently positive determinants of tax revenue. Second, trade openness is often beneficial but clearly conditional on country context. Third, inflation is the most ambiguous of the core macroeconomic determinants, with its sign and significance varying sharply across studies. This unresolved empirical pattern justifies a fresh panel-data assessment focused specifically on developing economies. The present study responds to this need by re-examining the effects of economic growth, trade openness, and inflation on tax revenue in a broad developing-country sample and by testing whether these relationships remain robust across alternative specifications and subperiods.

2. DATA AND METHODOLOGY

2.1. Data

This study uses annual panel data for developing economies covering the 2000–2022 period. All variables were obtained from the World Bank’s World Development Indicators (WDI) database, which is the World Bank’s main compilation of internationally comparable development statistics assembled from officially recognized sources. The empirical design was constructed with a clear objective: to preserve the broadest possible country-year coverage while maintaining a usable and internally consistent estimation sample. For this reason, the dataset was organized as an unbalanced panel rather than a balanced one, since imposing full balance would have led to an unnecessary loss of information and a substantial reduction in sample size. After applying the completeness criteria required for the core specification, the final estimation sample consists of 57 developing economies and 1,037 country-year observations.

The dependent variable is tax revenue as a percentage of GDP. According to the WDI metadata, this indicator measures compulsory, unrequited payments made to government units and expresses them relative to gross domestic product; in the WDI database, the underlying source is the IMF’s Government Finance Statistics Yearbook and associated data files. This variable is particularly suitable for cross-country work because it normalizes tax collection by economic size and therefore allows revenue performance to be compared across countries with very different income levels and production scales.

The core explanatory variables are GDP per capita growth (annual %), trade openness (% of GDP), and inflation, consumer prices (annual %). In the WDI, GDP per capita growth is defined as the annual percentage growth rate of GDP per capita based on constant local currency; trade openness is measured as the sum of exports and imports of goods and services expressed as a percentage of GDP; and inflation is measured by the annual percentage change in the consumer price index, generally using a Laspeyres formulation. These three variables are selected because they capture three distinct but central macroeconomic channels through which tax performance may evolve: the expansion of taxable economic activity, the degree of integration into external markets, and the extent of nominal instability.

To reduce omitted-variable bias in the baseline specification, three control variables are incorporated: urban population share, industry value added as a share of GDP, and agriculture, forestry, and fishing value added as a share of GDP. In the WDI metadata, urban population refers to the share of the population living in urban areas as defined by national statistical offices and compiled by the United Nations Population Division. Industry value added covers mining, manufacturing, construction, electricity, gas, and water activities, whereas agriculture value added captures production in agriculture, forestry, and fishing. These controls are included to account for differences in settlement patterns and sectoral structure that may shape the effective tax base and the administrative ease of tax collection.

A practical issue in cross-country tax research is the trade-off between sample breadth and data completeness. In the present study, the dataset was therefore designed to maximize the number of usable observations without sacrificing the coherence of the empirical specification. Rather than narrowing the sample to a small balanced panel, all country-year observations with complete information on the dependent variable and the main regressors were retained. This choice is preferable in the present context because the core objective is to identify within-country relationships in a broad developing-country sample, not to restrict the analysis to a highly selective subset of countries with uninterrupted reporting histories. The resulting panel remains sufficiently large for fixed-effects estimation while preserving a substantially wider country coverage than a balanced-panel design would have allowed.

2.2. Econometric Specification

To examine the determinants of tax revenue, the study estimates the following baseline fixed-effects model:

$$TaxRev_{it} = \alpha + \beta_1 GDPPCG_{it} + \beta_2 Trade_{it} + \beta_3 Inflation_{it} + \gamma_1 Urban_{it} + \gamma_2 Industry_{it} + \gamma_3 Agriculture_{it} + \mu_i + \lambda_t + \varepsilon_{it}$$

where $TaxRev_{it}$ denotes tax revenue as a share of GDP in country i and year t ; $GDPPCG_{it}$ is GDP per capita growth; $Trade_{it}$ is trade openness; $Inflation_{it}$ is the annual inflation rate; $Urban_{it}$, $Industry_{it}$, and $Agriculture_{it}$ are the control variables; μ_i captures unobserved country-specific effects; λ_t denotes year effects common to all countries; and ε_{it} is the idiosyncratic error term.

The use of a country fixed-effects estimator is motivated by the presence of persistent cross-country characteristics that are difficult to observe directly but are likely to influence tax performance, such as institutional quality, administrative traditions, legal capacity, geographic constraints, or long-run state-building trajectories. If these time-invariant factors are correlated with the explanatory variables, pooled estimators or simple cross-sectional approaches will be biased. Fixed effects address this concern by exploiting within-country variation over time and netting out country-specific unobserved heterogeneity. Year fixed effects are included in order to absorb common global shocks, such as changes in commodity prices, external financial conditions, global crises, or worldwide inflationary episodes, that may affect all countries simultaneously. This is the standard logic of two-way fixed-effects estimation in panel settings with unobserved country heterogeneity and common time shocks (Wooldridge, 2025).

From an economic standpoint, the expected signs of the core coefficients are straightforward. GDP per capita growth is expected to exert a positive effect on tax revenue because stronger growth tends to expand taxable incomes, profits, and consumption. Trade openness is also expected to be positive, as more open economies generally display broader formal-market transactions and greater tax-base visibility, even when direct trade taxation itself is not dominant. Inflation is expected to be negative, particularly in settings where collection lags, weak indexation, and administrative rigidities reduce the real value of tax receipts and impair compliance. Accordingly, the study tests the following formal hypotheses:

- H1: GDP per capita growth has a positive effect on tax revenue in developing economies.
- H2: Trade openness has a positive effect on tax revenue in developing economies.
- H3: Inflation has a negative effect on tax revenue in developing economies.

The signs of the structural controls are less clear a priori, which is precisely why they are treated as controls rather than as the central focus of the analysis.

2.3. Estimation Strategy and Robustness Design

The empirical analysis proceeds in three stages. First, the baseline specification is estimated using fixed effects with country-clustered standard errors. This provides a natural starting point for inference in a panel setting where the disturbances may be correlated within countries over time. Second, the same specification is re-estimated using Driscoll–Kraay standard errors, following Driscoll and Kraay (1998). The rationale for doing so is that macro panels of developing economies are unlikely to satisfy the idealized assumptions of homoskedasticity and cross-sectional independence. Countries may be exposed to common external disturbances, regional contagion, or synchronized macroeconomic shocks, and ignoring such dependence may lead to misleading inference. The Driscoll-Kraay correction is therefore employed as a more conservative robustness device because it is consistent in the presence of heteroskedasticity, serial correlation, and sufficiently general forms of cross-sectional dependence.

Third, several additional robustness checks are implemented in order to assess whether the baseline relationships depend on a particular specification choice. A parsimonious model is estimated by excluding the structural controls and focusing only on the three main macroeconomic regressors. This allows us to verify whether the principal coefficients are driven by the core variables themselves or by the inclusion of auxiliary controls. A lagged specification is also estimated by replacing the contemporaneous macroeconomic variables with their one-period lags. This specification is useful because tax systems do not always respond instantaneously to changes in growth, trade conditions, or inflation; administrative reporting, compliance adjustment, and collection processes may generate delayed effects. Together, these two robustness exercises help determine whether the core findings reflect short-run contemporaneous correlations only or whether they display a more durable pattern.

Finally, the study explores temporal heterogeneity by splitting the sample into two periods, 2000-2010 and 2011-2022, and by estimating both subsample regressions and pooled interaction models. The period split is introduced to investigate whether the relationships between tax revenue and the core explanatory variables remained stable across the earlier and later parts of the sample. The pooled interaction specification provides the formal

statistical test of whether the relevant coefficients changed after 2010. This design is preferable to relying only on visual comparisons of split-sample coefficients because the interaction framework directly tests whether the estimated differences are statistically meaningful.

In sum, the methodological strategy is intentionally disciplined. The analysis begins with a transparent two-way fixed-effects baseline, strengthens inference through Driscoll-Kraay standard errors, and then evaluates the stability of the main results through parsimonious, lagged, and period-specific specifications. This structure is well suited to the data at hand because it balances broad sample coverage with econometric caution, and it allows the study to identify robust within-country associations without imposing unnecessarily restrictive sample-selection rules.

3. EMPIRICAL RESULTS

3.1. Descriptive Statistics and Preliminary Diagnostics

The final estimation sample consists of 1,037 country-year observations drawn from 57 developing economies over the 2000-2022 period. The descriptive statistics reported in Table 1 reveal substantial heterogeneity across the sample. On average, tax revenue amounts to 13.84% of GDP, although the observed values range from near zero to almost 40% of GDP. GDP per capita growth averages 2.12%, trade openness averages 81.99% of GDP, and inflation averages 6.67%. The dispersion of inflation and trade openness is particularly pronounced, indicating that the sample includes economies with markedly different macroeconomic and external-sector conditions. This degree of variation is fully consistent with the structural diversity of developing countries and reinforces the need for an estimation strategy that controls for unobserved country-specific heterogeneity.

Table 1: Descriptive Statistics

Variable	Obs.	Mean	Std. Dev.	Min	Median	Max
Tax revenue (% of GDP)	1,037	13.843	5.884	0.041	13.332	39.986
GDP per capita growth	1,037	2.122	4.037	-20.894	2.569	14.431
Trade openness (% of GDP)	1,037	81.986	54.186	22.772	67.927	437.327
Inflation	1,037	6.666	21.257	-16.86	3.939	513.907
Urban population share	1,037	58.999	22.017	14.574	59.642	100
Industry value added share	1,037	29.783	10.866	2.759	27.347	84.349
Agriculture value added share	1,037	11.06	8.854	0.026	8.455	44.331

The panel diagnostics further justify the chosen empirical framework. The sample is unbalanced, with country-specific time coverage ranging from 10 to 23 years and an average of roughly 18 observations per country. At the same time, the preliminary multicollinearity check does not suggest any serious problem, as the mean VIF remains low. By contrast, the residual diagnostics point to clear departures from the classical error assumptions: the modified Wald test rejects homoskedasticity across panels, and the Wooldridge test rejects the null of no first-order autocorrelation. Accordingly, the main fixed-effects estimates are complemented with Driscoll-Kraay standard errors in order to obtain inference that is more robust to heteroskedasticity, serial correlation, and broader cross-sectional dependence concerns.

3.2. Baseline Fixed-Effects Estimates

Table 2 reports the baseline two-way fixed-effects results. The coefficient on GDP per capita growth is positive and statistically significant in both specifications. In quantitative terms, a one-point increase in GDP per capita growth is associated with an increase of approximately 0.08 percentage points in tax revenue as a share of GDP. This result is economically plausible. Higher growth tends to expand taxable incomes, stimulate consumption, improve firm profitability, and strengthen formal-sector activity, all of which enlarge the effective tax base. In developing economies, stronger growth may also improve collection capacity indirectly by easing fiscal pressure and increasing the administrative feasibility of revenue mobilization.

Table 2: Baseline Fixed-Effects Results

Variables	FE Clustered	FE Driscoll–Kraay
GDP per capita growth	0.080**	0.080***
	(0.035)	(0.020=
Trade openness (% of GDP)	0.057***	0.057***
	(0.014)	(0.007)
Inflation	-0.009	-0.009**
	(0.006)	(0.004)
Urban population share	0.032	0.032
	(0.066)	(0.045)
Industry value added share	-0.011	-0.011
	(0.042)	(0.017)

Variables	FE Clustered	FE Driscoll-Kraay
Agriculture value added share	0.030	0.030
	(0.120)	(0.049)
Country fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
Observations	1,037	1,037

Notes: Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Trade openness emerges as the most stable determinant in the baseline model. Its coefficient is positive, precisely estimated, and virtually identical across the clustered fixed-effects and Driscoll-Kraay specifications. The magnitude of the coefficient indicates that greater external integration is systematically associated with stronger tax revenue performance. This finding is consistent with the view that more open economies tend to operate through broader and more traceable formal-market channels. Even when direct trade taxes become less central over time, openness can still support revenue mobilization through higher value-added taxation, stronger corporate activity, and wider transaction visibility for tax authorities. In this sense, trade openness appears to proxy not only external integration, but also a broader degree of economic formalization and administratively observable activity.

Inflation enters the baseline model with a negative sign in both columns, although its statistical significance depends on the error structure. In the clustered fixed-effects specification, the coefficient is not statistically significant, whereas it becomes negative and significant once Driscoll-Kraay standard errors are used. This pattern suggests that the adverse effect of inflation on tax revenue is present, but somewhat sensitive to the treatment of the residual dependence structure. The economic intuition remains clear: inflation can reduce the real value of tax collections, weaken compliance incentives, and create administrative frictions, especially in settings where collection lags, imperfect indexation, and institutional rigidities are more pronounced. Thus, while the baseline evidence does not warrant an exaggerated claim, it does point to inflation as a plausible constraint on revenue performance.

By contrast, the coefficients on urban population share, industry value added, and agriculture value added are statistically insignificant in the baseline specification. These variables may still matter in a broader developmental or structural sense; however, within the present within-country fixed-effects framework, they do not appear to explain tax revenue variation as consistently as the core macroeconomic variables. Accordingly, the main empirical narrative of the paper should not be built around these controls. The more defensible interpretation is that tax revenue performance in the sample is more closely associated with macroeconomic dynamism and external openness than with the sectoral composition variables included in the baseline model.

Overall, the baseline evidence establishes a clear ranking of associations. GDP per capita growth and trade openness exhibit positive and robust links with tax revenue, while inflation displays a negative but more inference-sensitive relationship. This configuration provides a coherent starting point for the subsequent robustness analysis.

4. ROBUSTNESS ANALYSIS

4.1. Parsimonious and Lagged Specifications

Table 3 presents two sets of robustness checks. The first removes the structural controls and estimates a more parsimonious specification containing only GDP per capita growth, trade openness, inflation, and year effects. The principal findings remain intact. GDP per capita growth continues to display a positive and significant coefficient, trade openness remains positive and strongly significant, and inflation preserves its negative sign while becoming weakly significant. This is an important result because it shows that the baseline relationships are not being mechanically generated by an unnecessarily crowded specification. Put differently, the positive roles of growth and openness do not disappear once the model is stripped down to its core macroeconomic components.

Table 3: Robustness Checks

Variables	Parsimonious FE	Parsimonious DK	Lagged FE	Lagged DK
GDP per capita growth	0.074**	0.074***		
	(0.034)	(0.020)		
Trade openness (% of GDP)	0.055***	0.055***		
	(0.012)	(0.006)		
Inflation	-0.009*	-0.009*		
	(0.005)	(0.005)		
L.GDP per capita growth			0.139***	0.139***
			(0.030)	(0.026)
L.Trade openness (% of GDP)			0.052***	0.052***
			(0.013)	(0.011)
L.Inflation			0.000	0.000
			(0.004)	(0.002)
Urban population share			0.022	0.022
			(0.070)	(0.046)
Industry value added share			-0.024	-0.024
			(0.042)	(0.016)
Agriculture value added share			0.009	0.009
			(0.131)	(0.057)
Country fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Observations	1,037	1,037	972	972

Notes: Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

The second robustness exercise introduces lagged macroeconomic variables. In this formulation, the lagged values of GDP per capita growth and trade openness remain positive and highly significant under both inference methods, whereas lagged inflation is essentially zero and statistically insignificant. These results strengthen the interpretation of the baseline findings. The positive association between tax revenue and both growth and openness is not limited to contemporaneous co-movement; it also persists with a one-period delay. This is economically reasonable, as tax systems do not always adjust instantaneously to changes in the macroeconomic environment. Higher growth and stronger trade integration may require time to translate into realized tax collections through reporting, assessment, and enforcement processes. By contrast, inflation does not appear to operate

through a similarly stable lagged channel, which suggests that its adverse effect is more immediate and disruption-based rather than smoothly persistent over time.

Overall, the robustness checks reinforce the core findings rather than weaken them. Trade openness remains the most consistent positive correlate of tax revenue across specifications, GDP per capita growth retains its positive contribution both contemporaneously and in lagged form, and the negative effect of inflation remains visible but less structurally stable than the other two core variables.

4.2. Period-Split Evidence

To examine whether the baseline relationships are temporally stable, Table 4 splits the sample into two subperiods, 2000-2010 and 2011-2022. The most striking result concerns trade openness. Its coefficient remains positive and statistically significant in both subsamples, with nearly identical magnitudes. This indicates that the positive relationship between openness and tax revenue is not confined to one particular phase of the sample, but instead persists across both the earlier and later periods. Such stability is economically meaningful. It suggests that the mechanisms linking external integration to tax performance, namely broader taxable activity, greater formalization, and enhanced administrative observability, continued to operate throughout the sample period.

Table 4: Period-Split Regressions

Variables	FE 2000-2010	FE 2011-2022	DK 2000-2010	DK 2011-2022
GDP per capita growth	-0.011	0.041	-0.011	0.041
	(0.024)	(0.033)	(0.025)	(0.025)
Trade openness (% of GDP)	0.043**	0.043***	0.043***	0.043***
	(0.018)	(0.015)	(0.007)	(0.003)
Inflation	-0.010***	-0.056***	-0.010***	-0.056***
	(0.003)	(0.008)	(0.002)	(0.005)
Urban population share	0.163***	-0.114**	0.163***	-0.114***
	(0.045)	(0.050)	(0.016)	(0.033)
Industry value added share	0.142**	-0.039	0.142***	-0.039***
	(0.071)	(0.041)	(0.041)	(0.010)

Variables	FE 2000-2010	FE 2011-2022	DK 2000-2010	DK 2011-2022
Agriculture value added share	0.192*	-0.108	0.192**	-0.108*
	(0.108)	(0.101)	(0.070)	(0.050)
Country fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Observations	422	615	422	615

Notes: Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

The growth coefficient behaves differently. Once the sample is split into shorter periods, GDP per capita growth loses statistical significance in both subsamples. This does not invalidate the positive full-sample result reported in Table 2. Rather, it indicates that the growth effect becomes less precisely estimated when the time dimension is reduced and the within-country variation is distributed across narrower windows. The most balanced interpretation, therefore, is that growth contributes positively to tax revenue in the full-sample average, but it does not display strong and separately identifiable period-specific effects in the split-sample regressions.

Inflation, by contrast, shows pronounced temporal heterogeneity. In the 2000-2010 subsample, the coefficient is already negative and highly significant, but in the 2011-2022 period it becomes much larger in magnitude while remaining strongly significant. This is one of the most important findings in the paper. It implies that inflation became substantially more damaging to tax revenue performance in the later period. Economically, this may reflect the fact that inflationary episodes in the post-2010 environment were more destabilizing, more persistent, or more tightly linked to broader fiscal and macroeconomic fragilities. In such a setting, inflation can more severely erode the real value of collections, compress compliance, and undermine the efficiency of revenue administration.

The structural controls also vary across subperiods, with urbanization and sectoral shares changing sign and significance. However, these coefficients are not sufficiently stable to support a strong structural interpretation. Their instability further strengthens the case for focusing the paper's core argument on the three macroeconomic variables of central interest (growth, openness, and inflation) rather than on the auxiliary controls.

4.3. Formal Interaction Tests

Table 5 provides the formal test of whether the main coefficients differ statistically between the two periods. The interaction terms for GDP per capita growth and trade openness are statistically insignificant in both the fixed-effects and Driscoll-Kraay specifications. This is an important corrective to any overinterpretation of the split-sample estimates. Although the growth coefficient becomes insignificant when the sample is divided, the interaction model indicates that its effect does not shift in a statistically meaningful way across periods. The same is true for trade openness: its positive relationship with tax revenue remains stable, and there is no formal evidence of a structural break in its coefficient after 2010.

Table 5: Period Interaction Models

Variables	FE Interaction	DK Interaction
GDP per capita growth	0.054	0.054
	(0.035)	(0.035)
2011–2022 × GDP per capita growth	0.012	0.012
	(0.047)	(0.050)
Trade openness (% of GDP)	0.059***	0.059***
	(0.013)	(0.008)
2011–2022 × Trade openness (% of GDP)	0.003	0.003
	(0.004)	(0.003)
Inflation	-0.004	-0.004
	(0.003)	(0.002)
2011–2022 × Inflation	-0.061***	-0.061***
	(0.009)	(0.008)
Urban population share	0.033	0.033
	(0.063)	(0.045)
Industry value added share	-0.017	-0.017
	(0.042)	(0.019)
Agriculture value added share	-0.003	-0.003
	(0.115)	(0.055)
Country fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
Observations	1,037	1,037

Notes: Standard errors in parentheses. * p < 0.10, ** p < 0.05, *** p < 0.01.

Inflation is the only variable for which the interaction term is negative and highly significant in both columns. This result formally confirms what Table 4 already suggested: the adverse association between inflation and tax revenue became significantly stronger in the post-2010 period. This is the most convincing source of temporal heterogeneity in the paper. Accordingly, the period analysis should not be framed as showing broad instability in all coefficients. The data do not support that claim. What the evidence does support is a much narrower and more credible conclusion: the inflation–tax revenue relationship deteriorated markedly in the later period, while the positive relationship between trade openness and tax revenue remained stable and the growth effect did not experience a statistically significant structural shift.

CONCLUSION

This study examined the macroeconomic determinants of tax revenue in developing economies by focusing on GDP per capita growth, trade openness, and inflation. Using annual panel data for 57 developing economies over the 2000–2022 period, the analysis employed country and year fixed effects, Driscoll–Kraay standard errors, parsimonious and lagged specifications, period-split regressions, and formal interaction models. This empirical design allowed the study to evaluate not only the average relationship between macroeconomic conditions and tax revenue, but also the robustness and temporal stability of these relationships.

The findings lead to three main conclusions. First, trade openness is the most stable and consistently positive determinant of tax revenue in the sample. Its coefficient remains positive and statistically significant across the baseline, parsimonious, lagged, and period-split specifications. This suggests that external integration may strengthen revenue mobilization by increasing the volume of observable transactions, expanding formal economic activity, and improving the visibility of the tax base. This result is consistent with studies that report a positive link between trade openness and tax revenue, such as Gupta (2007), Ha et al. (2022), Saptono and Mahmud (2021), Chettri et al. (2023), and Mmbulaheni et al. (2024). At the same time, the finding differs from studies that report weaker, insignificant, or negative effects of openness, including Tsaurai (2021), Yıldız (2019), and Al-Qudah (2021) for the long-run openness coefficient. This contrast supports the view that the fiscal effect

of openness is not automatic. It depends on whether countries can convert external integration into broader domestic tax bases and stronger revenue administration.

Second, GDP per capita growth is positively associated with tax revenue in the full-sample analysis and remains important in the lagged specifications. This finding supports the conventional expectation that stronger economic performance expands taxable incomes, profits, consumption, and formal transactions. It is broadly consistent with the positive growth or income effects reported by Gupta (2007), Al-Qudah (2021), Saptono and Mahmud (2021), Yıldız (2019), Tsaurai (2021), and Todorovic et al. (2024). However, the growth coefficient loses statistical significance in the period-split regressions. This does not overturn the full-sample result, but it suggests that the revenue effect of growth is less stable across shorter subperiods. In developing economies, growth may not translate into tax revenue automatically when informality is high, administrative capacity is limited, or growth is concentrated in sectors that are difficult to tax.

Third, inflation emerges as the main source of macro-fiscal vulnerability. In the baseline model, inflation has a negative sign, and the period-split and interaction results show that its adverse association with tax revenue becomes substantially stronger after 2010. This finding aligns with studies that interpret inflation as a constraint on tax performance, including Bati (2025), Öztürk et al. (2019), Çalcalı and Altınır (2019), Mmbulaheni et al. (2024), and Todorovic et al. (2024). It also helps explain why the inflation-tax revenue relationship remains contested in the literature. Some studies find positive or insignificant inflation effects, such as Boukbech et al. (2018), Kebede et al. (2024), Thath (2024), Saptono and Mahmud (2021), and Yıldız (2019). The present results suggest that the fiscal impact of inflation may depend on period-specific macroeconomic conditions. When inflation becomes more persistent or destabilizing, it can erode the real value of tax collections, weaken compliance, increase uncertainty, and reduce the effectiveness of tax administration.

The results also show that the structural controls do not provide a stable independent explanation of tax revenue in the baseline model. This does not mean that structural and institutional factors are unimportant. Rather, it indicates that their effects may be more complex, country-specific, or mediated through broader administrative and governance conditions.

This interpretation is consistent with studies emphasizing the role of sectoral composition, institutional quality, government effectiveness, and administrative capacity in shaping tax outcomes (van Oordt, 2023; Özmen, 2016; Thath, 2024). Therefore, the contribution of the present study is not to deny the importance of structural and institutional factors, but to show that trade openness, growth, and inflation remain central macroeconomic channels through which tax revenue performance evolves in developing economies.

These findings have important policy implications for strengthening revenue mobilization in developing economies. Developing economies should not treat revenue mobilization as a narrow tax-rate problem. Stronger tax performance requires a macroeconomic environment that supports formal economic activity, trade-based visibility, and price stability. Policies that promote sustainable growth can widen the tax base, but this effect will be limited unless growth is accompanied by formalization and administrative capacity. Trade openness can support tax revenue, but governments need domestic tax systems capable of capturing the gains from external integration, especially when tariff revenues decline. Most importantly, the strong negative post-2010 inflation effect shows that price stability is directly relevant for fiscal capacity. Reducing inflation, shortening collection lags, improving compliance monitoring, and modernizing tax administration should therefore be viewed as part of a broader revenue mobilization strategy.

Future research can extend this study in several ways. First, it may distinguish between direct taxes, indirect taxes, and trade taxes in order to identify which components of tax revenue are most sensitive to growth, openness, and inflation. Second, future studies may examine whether institutional quality, informality, digital tax administration, or government effectiveness condition the relationship between macroeconomic variables and tax performance. Third, threshold and nonlinear models may be useful for testing whether inflation becomes more damaging only after certain levels are reached. Finally, regional comparisons and country-group analyses may help explain why the same macroeconomic determinant produces different revenue effects across developing economies. These extensions would deepen our understanding of how macroeconomic stability and administrative capacity jointly shape fiscal performance.

REFERENCES

- Al-Qudah, A. M. (2021). The determinants of tax revenues: Empirical evidence from Jordan. *International Journal of Financial Research*, 12(3), 43-54.
- Bati, B. (2025). Institutional and macroeconomic determinants of tax revenue in Sub-Saharan African countries. *Future Business Journal*, 11(1), 217.
- Boukbech, R., Bousselhamia, A., & Ezzahid, E. (2018). Determinants of tax revenues: Evidence from a sample of Lower Middle Income countries. MPRA Paper No. 90268.
- Chamisa, M. G., & Sunde, T. (2024). Key determinants of tax revenue in Zimbabwe: assessment using autoregressive distributed lag (ARDL) approach. *Cogent Economics & Finance*, 12(1), 2386130.
- Chettri, K. K., Bhattarai, J. K., & Gautam, R. (2023). Determinants of tax revenue in South Asian countries. *Global Business Review*, 1-15.
- Çalcalı, Ö., & Altınar, A. (2019). Makro ekonomik açıdan vergi gelirlerinin belirleyicileri: OECD ülkeleri üzerine bir uygulama. *Maliye ve Finans Yazıları*, (112), 175-198.
- Driscoll, J. C., & Kraay, A. C. (1998). Consistent covariance matrix estimation with spatially dependent panel data. *Review of Economics and Statistics*, 80(4), 549-560.
- Eng, R., & Lim, S. (2026). The Determinants of Tax Revenue in Cambodia: An ARDL Approach to Cointegration. *Economies*, 14(3), 74.
- Gökpinar, S. (2023). Monetary and macroeconomic determinants of tax revenue: The case of Türkiye. *İktisadi İdari ve Siyasal Araştırmalar Dergisi (İKTİSAD)*, 8(Spec. Iss.), 202-216.
- Gülşen, M. A., & Yıldırım, M. (2021). Geçiş ekonomilerinde vergi yapısı ve kurumsal belirleyicileri. *Maliye Çalışmaları Dergisi*, (65), 49-69.
- Kebede, T. N., Erena, O. T., & Bawiso, E. P. (2024). Determinants of Tax Revenue: A Cointegration and Causality Analysis for Ethiopia, 1992–2022. *Journal of Tax Reform*, 10(3), 493-509.
- Kutbay, H. (2019). Vergi gelirlerini etkileyen faktörler: Seçilmiş ülkeler için panel veri analizi. *Journal of Mehmet Akif Ersoy University Economics and Administrative Sciences Faculty*, 6(3), 602-617.
- Mbulaheni, A., Nyamazunzu, Z., & Dagume, M. A. (2024). Determinants of tax revenue performance in South Africa for the period 1990-2018. *International Journal of Applied Economics, Finance and Accounting*, 19(1), 82-96.
- Ha, N. M., Tan, P. M., & Binh, Q. M. Q. (2022). The determinants of tax revenue: A study of Southeast Asia. *Cogent Economics & Finance*, 10(1), 2026660.

- Özmen, İ. (2016). Vergi gelirlerinin belirleyicileri üzerine karşılaştırmalı bir analiz: BRIC-T. Sosyal Ekonomik Araştırmalar Dergisi, 16(32), 232-252.
- Öztürk, Ö. F., Şaşmaz, M. Ü., Bayar, Y., & Odabaş, H. (2019). Türkiye’de başlıca ekonomik değişkenlerin vergi gelirleri üzerindeki etkisi: Çoklu doğrusal regresyon analizi. Sayıştay Dergisi, (115), 37-53.
- Saptono, P. B., & Mahmud, G. (2021). Macroeconomic determinants of tax revenue and tax effort in Southeast Asian countries. Journal of Developing Economies, 6(2), 253-274.
- Sen Gupta, A. (2007). Determinants of tax revenue efforts in developing countries. IMF Working Paper WP/07/184.
- Thath, R. (2024). The determinants of tax revenue in Southeast Asia: The role of government effectiveness and human development. Journal of Accounting, Finance, Economics, and Social Sciences, 9(2), 15-28.
- Todorović, J. D., Đorđević, M., Mirović, V., Kalaš, B., & Pavlović, N. (2024). Modeling tax revenue determinants: the case of visegrad group countries. Economies, 12(6), 131.
- Tsaurai, K. (2021). Determinants of tax revenue in upper middle-income group of countries. The Journal of Accounting and Management, 11(2), 148-160.
- van Oordt, M. (2023). Exploring the deep determinants of tax revenues. eJournal of Tax Research, 21(1), 93-121.
- Wooldridge, J. M. (2025). Two-way fixed effects, the two-way mundlak regression, and difference-in-differences estimators. Empirical Economics, 69(5), 2545-2587.
- Yıldız, B. (2019). Vergi gelirlerinin ekonomik belirleyicileri üzerine ampirik bir analiz: yüksek gelirlili OECD ülkeleri örneği. Yönetim ve Ekonomi Araştırmaları Dergisi, 17(3), 324-339.

MAKROEKONOMİK İSTİKRARIN VERGİ GELİRLERİ ÜZERİNDEKİ ETKİSİ: GELİŞMEKTE OLAN EKONOMİLER ÜZERİNE PANEL VERİ ANALİZİ

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GENİŞLETİLMİŞ ÖZET

Vergi gelirleri, devletlerin mali kapasitesini ve kalkınma önceliklerini sürdürebilme gücünü belirleyen temel unsurlardan biridir. Bu konu, vergi tabanının dar, kayıt dışılığın yaygın, idari kapasitenin sınırlı ve makroekonomik kırılganlıkların yüksek olduğu gelişmekte olan ekonomilerde daha kritik hale gelmektedir. Bu nedenle vergi gelirlerini güçlendiren veya zayıflatan makroekonomik koşulların belirlenmesi, maliye politikası kadar devlet kapasitesi ve makroekonomik istikrar açısından da önem taşımaktadır.

Bu çalışma, gelişmekte olan ekonomilerde vergi gelirlerinin makroekonomik belirleyicilerini ekonomik büyüme, ticari açıklık ve enflasyon odağında incelemektedir. Çalışmanın temel motivasyonu, bu değişkenlerin teorik olarak vergi gelirleriyle yakından ilişkili olmasına rağmen ampirik literatürde etkilerinin yönü ve büyüklüğü konusunda farklı sonuçlara ulaşılmasıdır. Ekonomik büyüme ve ticari açıklığın vergi tabanını genişletmesi beklenirken, enflasyonun reel tahsilatları aşındırarak ve makroekonomik belirsizliği artırarak vergi performansını zayıflatabileceği öngörülmektedir.

Çalışmada, 2000-2022 dönemine ait yıllık panel veri kullanılmıştır. Dünya Bankası Dünya Kalkınma Göstergeleri veri tabanından elde edilen örneklem, 57 gelişmekte olan ekonomiye ilişkin 1,037 ülke-yıl gözleminden oluşmaktadır. Bağımlı değişken vergi gelirlerinin GSYH içindeki payı iken, temel açıklayıcı değişkenler kişi başına GSYH büyümesi, ticari açıklık ve tüketici fiyatları enflasyonudur. Modele ayrıca kent nüfusu, sanayi katma değeri ve tarım katma değeri payları kontrol değişkenleri olarak dahil edilmiştir. Bu değişkenlerin kullanılması, vergi gelirlerinin yalnızca kısa dönemli makroekonomik dalgalanmalardan değil, aynı zamanda yerleşim yapısı ve sektörel kompozisyon gibi daha yapısal unsurlardan da etkilenebileceği varsayımına dayanmaktadır.

Ampirik analiz, ülke ve yıl sabit etkilerini içeren panel veri modelleriyle yürütülmüştür. Ülke sabit etkileri, ülkeler arasında zaman içinde değişmeyen fakat vergi performansını etkileyebilecek kurumsal yapı, idari gelenekler, hukuki kapasite, coğrafi özellikler ve uzun dönemli devlet kapasitesi gibi gözlenemeyen faktörleri kontrol etmektedir. Yıl sabit etkileri ise küresel krizler, dış finansman

koşulları, emtia fiyatları ve dünya genelindeki enflasyonist dönemler gibi tüm ülkeleri aynı anda etkileyebilecek ortak şokları dikkate almaktadır. Temel tahminlerde ülke düzeyinde kümelenmiş standart hatalar kullanılmış, ardından heteroskedastisite, seri korelasyon ve yatay kesit bağımlılığına karşı daha dayanıklı çıkarımlar elde etmek amacıyla Driscoll-Kraay standart hataları uygulanmıştır.

Çalışmanın sağlamlık tasarımı üç aşamadan oluşmaktadır. İlk olarak, yapısal kontrol değişkenleri dışarıda bırakılarak yalnızca temel makroekonomik değişkenleri içeren daha sade bir model tahmin edilmiştir. Bu yaklaşım, temel bulguların aşırı yüklü bir model yapısından kaynaklanıp kaynaklanmadığını test etmektedir. İkinci olarak, makroekonomik değişkenlerin bir dönem gecikmeli değerleri kullanılarak vergi gelirlerinin büyüme, dışa açıklık ve enflasyona gecikmeli tepki verip vermediği incelenmiştir. Üçüncü olarak, örneklem 2000-2010 ve 2011-2022 olmak üzere iki alt döneme ayrılmış, ayrıca dönem etkileşim modelleriyle katsayıların 2010 sonrası dönemde istatistiksel olarak değişip değişmediği test edilmiştir. Böylece çalışma yalnızca ortalama ilişkileri değil, bu ilişkilerin zaman içindeki istikrarını da değerlendirmektedir.

Bulgular, vergi gelirlerinin makroekonomik değişkenlerden eşit ölçüde etkilenmediğini göstermektedir. En güçlü ve en istikrarlı sonuç ticari açıklık değişkeninde ortaya çıkmaktadır. Ticari açıklık, tüm temel ve sağlamlık analizlerinde pozitif ve istatistiksel olarak anlamlıdır. Bu bulgu, dışa açıklığın yalnızca dış ticaret hacmini değil, aynı zamanda formel ekonomik faaliyetlerin ve vergilendirilebilir işlem görünürlüğünün artmasını da yansıttığını göstermektedir.

Ekonomik büyüme de vergi gelirleriyle pozitif ilişkilidir. Temel ve gecikmeli modeller, kişi başına GSYH büyümesinin vergi gelirlerini artırdığını göstermektedir. Ancak dönemlere ayrılmış analizlerde büyüme katsayısının anlamlılığını kaybetmesi, bu ilişkinin her dönemde aynı güçte işlemediğine işaret etmektedir. Bu sonuç, gelişmekte olan ekonomilerde büyümenin vergi gelirlerine otomatik olarak dönüşmediğini göstermektedir.

Enflasyon ise çalışmanın temel makro-fiskal kırılganlık unsurudur. Temel modelde negatif işaretli olan enflasyon katsayısı, Driscoll-Kraay tahminlerinde anlamlı hale gelmektedir. Dönem analizi ve etkileşim modelleri ise enflasyonun vergi gelirleri üzerindeki olumsuz etkisinin 2011-2022 döneminde belirgin

biçimde güçlendiğini göstermektedir. Buna karşılık büyüme ve ticari açıklık için anlamlı bir dönemsel kırılma tespit edilmemiştir. Bu nedenle çalışmanın en güçlü dönemsel bulgusu, enflasyon-vergi geliri ilişkisindeki bozulmadır.

Bu sonuç, enflasyonun yalnızca fiyat istikrarı sorunu değil, aynı zamanda mali kapasiteyi aşındıran bir unsur olduğunu göstermektedir. Yüksek ve kalıcı enflasyon, vergi tahsilatlarının reel değerini azaltabilir, uyum davranışlarını bozabilir ve vergi idaresinin etkinliğini zayıflatabilir. Bu nedenle fiyat istikrarı, sürdürülebilir gelir mobilizasyonunun temel koşullarından biri olarak değerlendirilmelidir.

Çalışmanın bulguları, gelişmekte olan ekonomilerde vergi gelirlerini artırmanın yalnızca vergi oranlarını değiştirmekle sınırlı görülemeyeceğini göstermektedir. Daha güçlü vergi performansı, sürdürülebilir büyüme, ticari açıklıktan doğan ekonomik görünürlüğün etkin biçimde vergilendirilmesi, fiyat istikrarı ve modern vergi idaresinin birlikte ele alınmasını gerektirir. Sonuç olarak çalışma, vergi gelirlerinin büyüme, dışa açıklık ve enflasyon gibi makroekonomik koşullarla yakından ilişkili bir makro-fiskal sonuç olduğunu ortaya koymaktadır. Özellikle enflasyonun 2010 sonrası dönemde vergi gelirleri üzerindeki olumsuz etkisinin güçlenmesi, gelir mobilizasyonu tartışmalarında makroekonomik istikrarın merkezi önemini vurgulamaktadır.