“Heterogeneous effect of external debt on capital flight: Evidence from lower-middle-income countries”

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HETEROGENEOUS EFFECT OF EXTERNAL DEBT ON CAPITAL FLIGHT: EVIDENCE FROM LOWER-MIDDLE-INCOME COUNTRIES

Abstract

Capital flight remains a paramount concern for lower-middle-income countries (LMICs) when securing external debt, as its volume and the country's economic vulnerability can heighten this concern. This study aims to investigate the heterogeneous effect of external debt on capital flight across 42 lower-middle-income countries from 2004 to 2023. Methodologically, we applied the Methods of Moments quantile regression (MM-QR) approach, benchmarking our estimates against static fixed effects and two-step system Generalized Method of Moments (GMM) models. The panel quantile regression shows that capital flight increases in tandem with external debt; however, the positive impact of external debt on capital flight is more pronounced in the lower quantiles and less pronounced in the upper ones. The quantile estimates reveal a highly heterogeneous relationship, with the positive impact of external debt almost doubling from 1.671 at the 90th quantile to 2.663 at the 10th quantile. Ultimately, these findings suggest policymakers must implement targeted, tier-specific debt management strategies to contain capital flight effectively, and adopt adequate infrastructure to detect misinvoicing, fake shipments, manipulation of transfer pricing, moral hazard problems, and weak economic governance.

Keywords LMICs, capital flight, external debt, panel quantile regression, debt management strategy

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INTRODUCTION

Countries with high capital flights invest 25% less in health and 58% less in education than comparable countries with low capital flights (Global Financial Integrity, 2026). Indeed, lower-middle-income countries (LMICs) are susceptible to capital flight. For instance, the Financial Action Task Force (FATF) has determined that more than 50% of high-risk nations are lower-middle-income countries (FATF, 2026). Moreover, the international community has pledged to reduce capital flight by 2030 as per Target 16.4 of the Sustainable Development Goals (SDGs). Moreover, LMICs account for 40% of the world's population; therefore, capital flight from external debt would seriously undermine the basic needs of a large share of the world's population. LMICs heavily rely on external debt because their domestic debt markets cannot meet government financing needs, leading to dominance of external debt and undermining macroeconomic stability (Dawood et al., 2021). Due to persistent fiscal imbalances, the external debt of many developing nations, including LMICs, has increased significantly over the past forty years (Beyene & Kotosz, 2020). For example, in 2023, low-income countries and LMICs paid a record USD 1.4 trillion, around 4% of their gross national product, simply to pay down their debt

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(World Bank, 2024). Furthermore, if external debt is not managed properly, increased external debt may lead to capital flight if local investors fear a debt crisis, excessive debt repayments, or the depletion of foreign currency resources (Eaton, 1987).

Given the vulnerability of LMICs to capital flight, these countries may encounter obstacles in securing external debt from creditor countries and institutions. Moreover, mismanagement of external debt in LMICs may make creditors unwilling to provide it. Creditor countries may also require debtor countries with high levels of government effectiveness to regulate capital flight and ensure a favorable return on their investment. Furthermore, external debt may affect capital flight dynamics, depending on its volume and the country's economic vulnerability.

1. LITERATURE REVIEW AND HYPOTHESES

The theoretical foundation of capital flight rests primarily on two complementary economic frameworks: portfolio adjustment theory and the debt-driven capital flight hypothesis. Portfolio adjustment theory posits that capital flight occurs when domestic investors reallocate wealth toward foreign assets in response to domestic macroeconomic conditions, including instability, political risk, tax burdens, and unfavorable interest rate differentials (Cuddington, 1986; Dim & Ezenekwe, 2014). In contrast, the debt-driven capital flight hypothesis explains outflows through the accumulation of sovereign debt. When foreign debt reaches elevated levels, domestic economic agents anticipate future fiscal crises such as currency devaluations and sharp tax increases needed to service external obligations. Thus, to protect private assets from debt-servicing taxation or potential confiscation, investors move capital to lower-risk international havens instead (Eaton, 1987).

Empirical investigations into the external debt–capital flight nexus present two divergent strands of literature. The first and dominant strand demonstrates a statistically significant positive relationship, asserting that foreign borrowing actively induces capital flight. In many developing nations, where external borrowing is mismanaged or channeled into unyielding public ventures, the economy fails to generate sufficient revenue to meet principal and interest obligations. This fiscal burden depresses domestic growth and incentivizes capital flight. This positive relationship has been extensively documented across various developing regions. For instance, in Sub-Saharan Africa (SSA), Ndikumana and Boyce (2011) revealed that between 1970 and 2004, 33 SSA nations lost approximately 67 cents in capital flight for every dollar of new external borrowing. Subsequent studies across African economies consistently reinforce this finding. Ampah et al. (2018) identified external debt as a primary driver of capital flight across the subcontinent, while Brou and Thiam (2023) demonstrated how institutional weaknesses exacerbate debt-fueled outflows across 26 Sub-Saharan African nations. More recently, Mawutor and Adjasi (2024) and Abille and Adjei (2025) confirmed that rising debt accelerated capital flight in samples of 40 and 21 African economies, respectively.

Similar dynamics are observed in other developing regions. In East Africa, Otieno et al. (2022) found a strong positive correlation: a 1% increase in foreign debt leads to a 0.35% increase in capital flight across East African Countries (EAC). Regional studies outside Africa tell a remarkably similar story. Across eight ASEAN economies from 1994 to 2018, Istikomah et al. (2020) showed that rising foreign debt consistently pushed capital offshore. In the Middle East and North Africa, Al-Fayoumi et al. (2012) uncovered an even sharper dynamic, estimating that institutional and macroeconomic weaknesses caused 90% to 95% of external borrowing to leak back out of the region. Country-level research, such as Dachraoui et al.'s (2020) work on Tunisia, further reinforces this link between rapid debt buildup and domestic capital flight.

Conversely, another strand of literature points to an inverse relationship, rooted in the productive infrastructure hypothesis. This view contends that when foreign debt is put to good use, it builds vital public capital that strengthens economic foundations and expands domestic supply capacity. As

these public investments raise the expected returns on local assets, the push to send capital offshore naturally fades (Chunhachinda & Sirodom, 2007). Empirically, Liew et al. (2016) supported this perspective in Malaysia, finding that a 1% increase in external debt-to-GDP was associated with a 0.35-unit decline in capital flight, demonstrating that adequate public debt provision can support long-term domestic returns.

Beyond external debt, a broad consensus in the literature indicates that capital flight depends on various macroeconomic and institutional determinants. Factors such as economic growth, trade openness, and financial development help stabilize domestic investment climates (Ndikumana & Sarr, 2019; Pradhan et al., 2024), whereas high inflation, unfavorable interest rates, and political instability tend to push capital abroad (Anetor, 2019; Pradhan & Hiremath, 2020; Basorudin & Kusmaryo, 2018). Furthermore, capital flight exhibits strong dynamic persistence, as historical outflows establish financial channels and behavioral patterns that perpetuate capital flight over time (A. Y. Yalta & A. T. Yalta, 2012, 2024).

In summary, while extensive literature documents the relationship between external debt and capital flight, empirical conclusions remain divided across regions, institutional contexts, and debt-use efficiency. Beyond these mixed findings, most existing research relies on standard linear models, such as OLS and panel fixed effects, which effectively assume that all countries respond to foreign debt in the same way. This one-size-fits-all approach is especially problematic for LMICs, where political environments, governance standards, and geographic vulnerabilities vary dramatically. In well-governed LMICs with manageable debt loads, foreign loans can successfully finance productive infrastructure. However, in nations plagued by political instability, weak regulatory enforcement, or acute economic fragility, external debt can easily trigger severe capital flight. Consequently, how the external debt–capital flight nexus varies conditionally across low, moderate, and extreme levels of capital flight in LMICs remains an unaddressed gap in the literature.

To address this gap, this study examines the conditional, non-linear effect of external debt on capital flight across 42 LMICs from 2004 to 2023 using panel quantile regression. By evaluating different conditional quantiles, this study accounts for the political and structural diversity across LMICs, capturing whether external debt exerts a stronger destabilizing impact in countries experiencing extreme capital flight compared to those with lower capital leakage. Considering the theoretical and empirical literature, this study formulates the following hypotheses:

H1: *A statistically significant heterogeneous relationship exists between external debt and capital flight across different conditional quantiles in LMICs.*

H2: *External debt positively affects capital flight across all conditional quantiles in LMICs.*

2. METHOD

The study examines the impact of external debt on capital flight across 42 lower-middle-income countries (LMICs) from 2004 to 2023 (Table A1, Appendix A). For this investigation, the dataset was taken from the World Bank's World Development Indicators (WDI) website, which is accessible to the public. Nine countries are excluded from the study because they lack any real interest rate (RIR) data. In addition, the analysis incorporates control variables such as trade openness (TO), inflation (INF), real interest rate (RIR), exchange rate (EXR), real Gross Domestic Product per capita (GDP), domestic credit to the private sector (DCPS), and political stability estimate (POL) index (Table 1).

To determine the extent of capital flight, we employ the Hot Money method of Cuddington (1986), which is the sum of short-term capital, net portfolio equities, and net errors and omissions.

$$Capital\ Flight_{it} = STK_{it} + NPE_{it} + EO_{it}, \qquad (1)$$

where STK_{it} represents short-term capital of country i at time t; NPEit measures net portfolio equities, and EOit measures the net errors and omissions of the Balance of Payments of each country at time t.

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Table 1. Description of variables

Variables	Paper Code	WDI / Database Code	Measurement Unit and Equation	Data Source
Capital Flight	CF	Derived	% of GDP; Hot Money Method: $\text{Capital Flight}_{it} = STK_{it} + NPE_{it} + EO_{it}$	WDI
External Debt	LnEXD	DT.DOD.DECT.CD	Log of EXD; Total external debt stocks (Current USD)	WDI
Trade Openness	TO	NE.TRD.GNFS. ZS	% of GDP; Total exports and imports of goods and services divided by GDP	WDI
Real GDP Per Capita	LnGDP	NY.GDP.PCAP. KD	Log of GDP per capita (constant 2015 US$)	WDI
Inflation	INF	FP.CPI.TOTL. ZG	Inflation, consumer prices (annual %)	WDI
Real Interest Rate	RIR	FR.INR.RINR	Real interest rate (%); Nominal lending rate adjusted for inflation via Fisher equation: $\left(\frac{i-\pi}{1+\pi}\right)\cdot 100$	WDI
Local Currency per SDR	LnEXR	EX_XDC_XDR	Log of Domestic Currency Per Special Drawing Rights	WDI
Domestic Credit to Private Sector	DCPS	FS.AST.PRVT.GD.ZS	Domestic credit to private sector (% of GDP)	WDI
Political Stability Estimate	POL	WGI.PV.EST	Standardized estimate score ranging from –2.5 (weak/ high risk) to +2.5 (strong/low risk)	WDI

To examine the heterogeneous effect of external debt on capital flight, the study uses panel quantile regression. Traditional methods may overestimate coefficient estimates, yielding incorrect results, according to Lamarche (2010). Because the study includes variables from multiple countries, outliers and skewed distributions may occur. In these circumstances, quantile regression provides more robust results than ordinary least squares (Onwuka & Ayeni, 2023). The general expression of the panel quantile regression is as follows:

$$Q_{yit}(T \mid X_{it}) = X_{it}^{T}\beta_{T}. \quad (2)$$

The variable $Q_{yit}(\mathrm{T}|\mathrm{X}_{it})$ represents the T^{th} quantile of the capital flight variable. It is the vector of explanatory variables for each nation i for the year t that is represented by the symbol $X_{it}{}^{T}$. β_{T} is a symbol that represents the gradient of the exogenous factors for a quantile that is T^{th}.

The study uses Methods of Moments quantile regression (MM-QR) of Machado and Santos Silva (2019) to estimate the heterogeneous impact of external debt on capital flight at multiple quantiles. This approach reduces absolute residuals and is robust to monotonic transformations (Lee & Chen, 2020). Moreover, the study employs formal tests of coefficient equality across quantiles from the panel quantile regression. Furthermore, this study uses a quantile–quantile plot to assess variable normality. The plot presents all Q-Q economic variables on the X = Y axis, indicating a non-normal distribution and the need for panel quantile regression (Figure A1, Appendix A).

As a robust test, the study uses fixed effects over random effects based on the Hausman test (with *p*-value 0.001 and the two-step System Generalized Method of Moments (GMM)). Furthermore, we use graphical presentations of the quantile distributions of all independent variables to confirm heteroscedasticity across variables. All the descriptive analyses, graphical presentations, and empirical analyses are computed and derived using STATA 15.1 software.

3. RESULTS

The study uses Methods of Moments (MM-QR) panel quantile regression to examine the heterogeneous effect of external debt on capital flight in lower-middle-income countries (LMICs). Before presenting the findings, Table 2 shows descriptive statistics to provide an overview of the variables used in the model. Based on Table 2, the skewness and kurtosis values for all variables justify using panel quantile regression in the study. Additionally, correlation analysis, multicollinearity tests, cross-sectional dependence test, and panel stationarity tests are shown in Tables 3, 4, and 5, respectively. Table 6 presents the results of the two hypotheses, while Table 9 offers a robustness assessment of these results.

Table 2. Descriptive statistics

Variables	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Obs	Mean	Std. dev.	Min.	Max.	Skew.	Kurt.
CF	840	5.06	7.76	–19.35	52.31	2.22	11.00
LnEXD	840	22.66	1.82	18.42	27.19	–0.25	2.56
LnGDP	840	7.48	0.50	18.55	28.90	–0.01	2.08
INF	840	6.96	6.44	–16.85	49.72	2.13	10.20
RIR	840	6.23	8.08	–58.68	90.93	0.93	23.93
LnEXR	840	4.51	2.33	–0.05	10.40	0.32	2.65
TO	840	74.49	33.07	11.85	186.68	0.67	2.87
DCPS	840	32.85	24.46	2.01	132.81	1.22	4.12
POL	840	–0.48	0.78	–2.81	1.38	–0.09	3.03

Note: CF = Capital flight; LnEXD = Log of external debt; LnGDP = log of real gross domestic product per capita; INF = Inflation; RIR = Real interest rate; LnEXR = Log of domestic currency Per special drawing rights; TO = Trade openness; DCPS = Domestic credit to the private sector; and POL = Political stability.

Table 3 indicates that multicollinearity is not a concern, as each coefficient is less than 0.85. Additionally, a low positive correlation between LnEXD and CF (r = 0.11) is observed in LMICs. Table 4 shows that the mean variance inflation factor (VIF) across all exogenous variables is less than 10, indicating no multicollinearity.

Pesaran (2004) CD test reveals cross-sectional dependency, implying that one nation's social, political, and technical growth influences other countries' LMICs activities (Table 5). Second-generation unit root tests based on CIPS and CADF reveal that all variables are stationary at level and first difference, consistent with the CD test findings in Table 5.

Table 3. Pairwise correlation

Variables	CF	LnEXD	LnGDP	INF	RIR	LnEXR	TO	DCPS	POL
(1) CF	1.00								
(2) LnEXD	0.11***	1.00							
(3) LnGDP	0.15***	0.15***	1.00						
(4) INF	–0.07**	0.11***	–.15***	1.00					
(5) RIR	0.02	–0.14**	–0.06***	–0.24***	1.00				
(6) LnEXR	–0.21***	0.09***	–0.30***	0.01***	0.03***	1.00			
(6) TO	0.28***	–0.19***	0.20***	–0.12***	0.14***	–0.03***	1.00		
(7) DCPS	0.21***	0.16***	0.54***	–0.24***	–0.09***	–0.09***	0.31***	1.00	
(8) POL	0.08**	–0.50 ***	0.29 ***	–0.23***	0.10***	–0.11***	0.33***	0.38***	1.00

Note: *** p < 0.01, ** p < 0.05, * p < 0.1. Note:CF = Capital flight; LnEXD = Log of external debt; LnGDP = log of real gross domestic product per capita; INF = Inflation; RIR = Real interest rate; LnEXR = Log of domestic currency per special drawing rights; TO = Trade openness; DCPS = Domestic credit to the private sector; and POL = Political stability.

Table 4. Multicollinearity test

Variables	(2)	(3)
	VIF	1/VIF
POL	2.00	0.50
DCPS	1.80	0.55
LnEXD	1.79	0.57
LnGDP	1.68	0.66
TO	1.27	0.78
INF	1.18	0.84
LnEXR	1.14	0.87
RIR	1.13	0.88
Mean VIF	1.50	.

Note: LnEXD = Log of external debt; LnGDP = log of real gross domestic product per capita; INF = Inflation; RIR = Real interest rate; LnEXR = Log of domestic currency per special drawing rights; TO = Trade openness; DCPS = Domestic credit to the private sector; and POL = Political stability.

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Table 5. Cross-sectional dependence and stationarity test

Variables	(2)	(3)	(4)	(5)	(6)
	CD-test	CIPS I (0)	CIPS I (1)	CADF I (0)	CADF I (1)
CF	4.894***	–2.962***	–4.849***	–2.242***	–3.586***
LnEXD	98.453 ***	–2.149**	–3.990***	–2.070**	–2.652***
TO	15.763 ***	–2.141**	–3.582***	–2.184***	–2.649***
LnGDP	83.292 ***	–1.890	–3.828***	–1.919	–3.054***
DCPS	47.547***	–3.209***	–5.112***	–2.449***	–3.671***
INF	37.839 ***	–3.307***	–4.956***	–2.756***	–3.990***
RIR	16.55***	–2.938***	–5.094***	–2.176***	–3.758***
LnEXR	48.875***	–2.025	–3.671***	–2.192	–2.738***
POL	2.284***	–2.427***	–4.450***	–2.421***	–3.386***

Note: *** p < 0.01, ** p < 0.05, * p < 0.1 Note: CF = Capital flight; LnEXD = Log of external debt; LnGDP = log of real gross domestic product per capita; INF = Inflation; RIR = Real interest rate; LnEXR = Log of domestic currency per special drawing rights; TO = Trade openness; DCPS = Domestic credit to the private sector; and POL = Political stability.

The panel quantile regression results in Table 6 present findings across five quantiles, 0.10, 0.25, 0.50, 0.75, and 0.90. These results support the study's hypothesis by demonstrating heterogeneous effects of external debt on capital flight in LMICs. The influence of external debt on capital flight is statistically significant and positive for the five quantiles. This result is consistent with Mawutor and Adjasi (2024). Notably, the quantile regression findings reveal that in economies experiencing low capital flight (at quantile 0.10), external debt has a more pronounced positive effect on capital flight than in the higher quantiles (0.25, 0.50, 0.75, and 0.90), unlike in countries with sig-

Table 6. Methods of Moments panel quantile regression (MM-QR)

Dependent Variable: Capital Flight (CF)					
Variable	Q_{10}	Q_{25}	Q_{50}	Q_{75}	Q_{90}
CF_{t-1}	0.255***	0.330***	0.403***	0.480***	0.577***
	(0.590)	(0.062)	(0.063)	(0.077)	(0.104)
LnEXD	2.663***	2.431***	2.206***	1.970***	1.671**
	(0.071)	(0.501)	(0.482)	(0.571)	(0.754)
LnGDP	1.472	–0.602	–2.619*	–4.743**	–7.414***
	(1.948)	(1.553)	(1.516)	(1.901)	(2.632)
INF	0.039	0.029	0.020	0.010	–0.002
	(0.052)	(.042)	(0.037)	(0.042)	(0.057)
RIR	0.041	0.016	–0.006	–0.031	–0.063
	(0.043)	(0.036)	(0.032)	(0.035)	(0.046)
LnEXR	–0.843**	–0.432	–0.032	0.387	0.917
	(0.386)	(0.299)	(0.303)	(0.420)	(0.613)
TO	–0.015	0.011	0.037**	0.065***	0.100***
	(0.023)	(0.019)	(0.017)	(0.020)	(0.026)
DCPS	–0.013	0.003	0.020	0.037	0.059*
	(0.022)	(0.018)	(0.019)	(0.023)	(0.032)
POL	–0.867	–0.262	0.325	0.944	1.723*
	(0.616)	(0.504)	(0.541)	(0.730)	(1.04)
Country Effect	YES	YES	YES	YES	YES
Obser.	798	798	798	798	798

Note: *** p < 0.01, ** p < 0.05, * p < 0.1; Bootstrap standard errors are in parentheses. CFt–1 = lagged Capital flight; LnEXD = Log of external debt; LnGDP = log of real gross domestic product per capita; INF = Inflation; RIR = Real interest rate; LnEXR = Log of domestic currency per special drawing rights; TO = Trade openness; DCPS = Domestic credit to the private sector; and POL = Political stability.

Table 7. Formal tests of equality of coefficients across quantiles

Variable	χ^2	p-value
Wald statistic	36.22	0.0000
LnEXD	5.40	0.0201

Note: LnEXD = Log of external debt.

Table 8. Summary of hypothesis testing

Hypothesis	Result
H1 = A heterogeneous relationship exists between external debt and capital flight in LMICs	Significant and supported
H2 = The level of external debt positively affects capital flight across quantiles in LMICs	Significant and supported

nificant capital flight. For example, at the 10th quantile, the coefficient of EXD is 2.663, almost twice that at the 25th quantile (1.970) and the 90th quantile (1.671). A further demonstration of the equality test across quantiles is shown in Table 7. Table 8 shows a summary of hypothesis testing.

Considering external debt, the Wald Statistic indicates that the influence varies across quantiles. The quantile regression results on EXD's effect on CF in LMICs also align with those found in the fixed-effect and two-step system GMM regressions. Table 6 shows a positive and significant impact of the lag-dependent variable on capital flight across all quantiles. This finding is consistent with Pradhan et al. (2024). The result clearly shows that lagged capital flight positively influences current capital flight from LMICs, creating a vicious cycle.

Additionally, Table 6 presents the findings for the study's control variables. The study controls for real gross domestic product per capita, inflation, trade openness, real interest rate, exchange rate, domestic credit to the private sector, and the political stability estimate. Among the control variables, capital flight is significantly impacted by real gross domestic product per capita, exchange rate, trade openness, domestic credit to the private sector, and political stability at various quantiles. The real gross domestic product per capita result shows that increased economic activity reduces capital flight in LMICs. The real gross domestic product per capita coefficient is consistent with Forson et al. (2017); higher economic activity yields strong returns and financial stability, discouraging investors from moving funds abroad. The computed coefficient for exchange rate is negative and highly significant at the 10th quantile, indicating that depreciation of the local currency discourages capital flight from LMICs. One explanation is that local currency depreciation increases exports, improving the trade balance and reducing capital flight.

The calculated coefficient for trade openness is significant at the 50th, 75th, and 90th quantiles, indicating that capital flight from LMICs is driven by trade openness. This outcome aligns with Abbas et al. (2024). Fixed effects and GMM analyses further support this association, both pointing in the same direction as the significant relationship observed in Table 9. Two other control variables, domestic credit to the private sector and political stability, also show a positive and significant impact on capital flight at the 90th quantile. We use two-step system GMM estimation to guarantee analytical robustness. The dynamic model's AR (1) and AR (2) tests demonstrate no autocorrelation at AR (2), with a *p*-value of 0.742. The paper uses Sargan and Hansen statistics to evaluate the instruments, with *p*-values of 0.153 and 0.426, indicating no overidentifying restrictions.

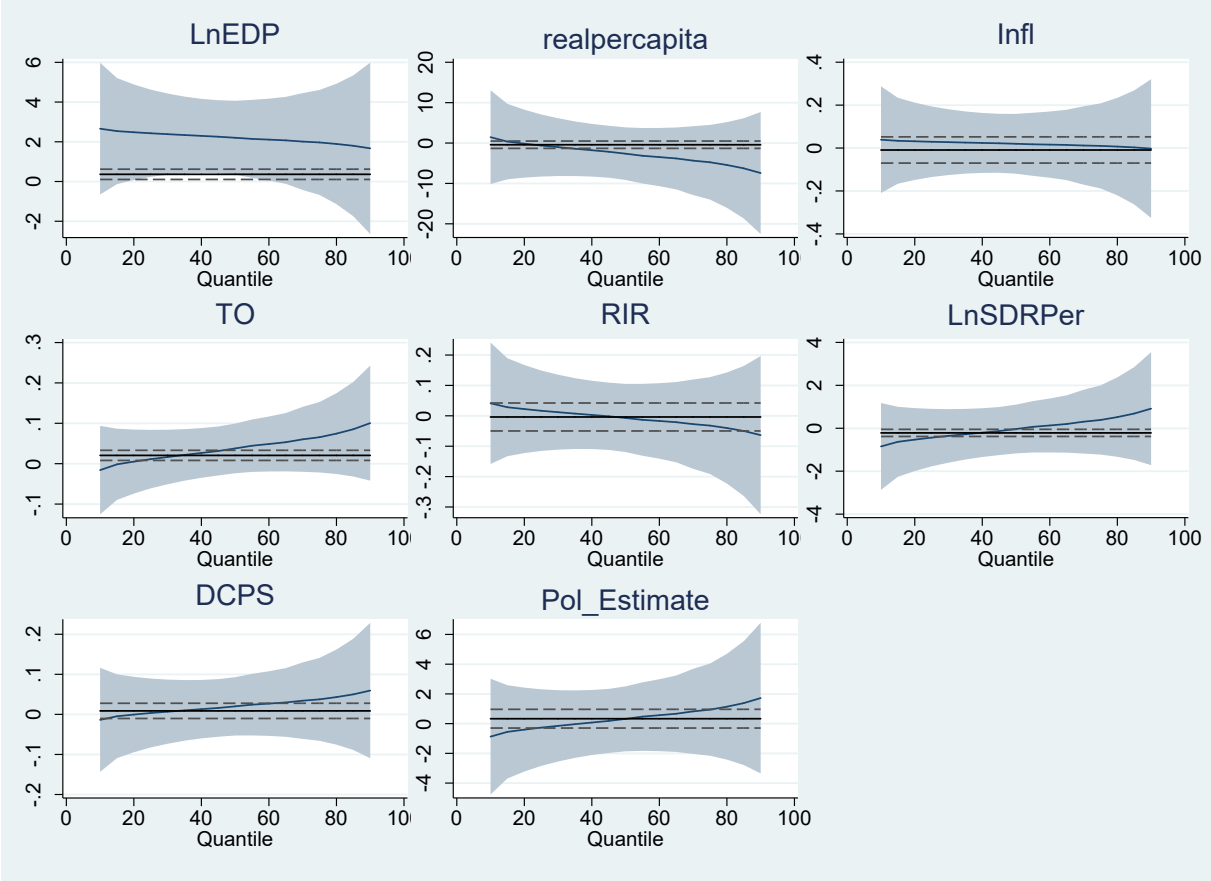
The empirical quantile regression estimates for all independent variables are further illustrated. In the quantile distribution, the OLS coefficients are depicted in the dotted line at a confidence level of 95%, while the quantile coefficient levels are represented in the solid line (San & Chin, 2023). The upper and lower limits of the 95% confidence intervals for quantile regression are depicted in the shaded area. The quantile distribution clearly demonstrates that all explanatory variables exceed the significance level at a given percentile, thereby confirming heteroscedasticity across all variables in Figure 1.

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Table 9. Robustness test

Variable	Fixed Effect	Two-Step System GMM
	Dependent Variable: Capital Flight	
$CF_{t-}1$	0.408***(0.034)	0.355*** (0.094)
LnEXD	2.852***(0.652)	1.769*** (1.068)
LnGDP	–2.535 (1.946)	–1.542*** (0.840)
INF	0.005 (0.042)	–0.069 (0.058)
RIR	–0.014 (0.027)	–0.020 (0.015)
LnEXR	0.221(0.424)	–0.589**(0.282)
TO	0.032**(0.014)	0.054***(0.016)
DCPS	0.030 (0.020)	–0.009 (0.032)
POL	0.531 (0.622)	1.872 (1.641)
Constant	–46.057***(17.161)	–25.353 (19.281)
Observation	798	798
Countries	42	42
Number of instruments		34
Arellano-Bond test for AR (1): p-value		0.001
Arellano-Bond test for AR (2): p-value		0.742
Sargan test of overid. Restrictions: p-value		0.153
Hansen test of overid. restrictions: p-value		0.426

Note: *** p < 0.01, ** p < 0.05, * p < 0.1. CFt–1 = lagged Capital flight; LnEXD = Log of external debt; LnGDP = log of real gross domestic product per capita; INF = Inflation; RIR = Real interest rate; LnEXR = Log of domestic currency per special drawing rights; TO = Trade openness; DCPS = Domestic credit to the private sector; and POL = Political stability.



Note: LnEDP = Log of external debt; realpercapita = log of real gross domestic product per capita; INF = Inflation; RIR = Real interest rate; LnSDRPer = Log of domestic currency Per special drawing rights; TO = Trade openness; DCPS = Domestic credit to the private sector; and POL_Estimate = Political stability.

Figure 1. Quantile distribution of independent variables

4. DISCUSSION

The study demonstrates that capital flight is affected by external debt across quantiles, with a consistently positive relationship that strengthens at lower quantiles. The result supports the debt-fueled capital flight strategy. Although lower-middle-income countries (LMIC) economies have low levels of capital flight, higher external debt can signal currency depreciation, unusually high tax rates, and poor fiscal management to investors, increasing capital flight. According to Ampah and Kiss (2019), the macroeconomic climate is further destabilized by the concurrent burden of growing foreign debt, which renders stabilization measures ineffective and exacerbates the drain on domestic resources. The analysis indicates that external debt's impact on capital flight expansion is less pronounced in LMICs with elevated capital flight levels. Although capital flight is significant, the concurrent rise in foreign debt does not by itself destabilize the macroeconomic landscape, weaken stabilization measures, or accelerate local resource depletion. Conversely, when administered judiciously, foreign debt may enhance capacity and spur output expansion, resulting in lower levels of capital flight (Pattillo et al., 2002, 2004).

Moreover, the results, specifically regarding the control variables, reveal some interesting phenomena. Overall, LMICs face significant structural deficiencies in managing external debt. For instance, there is a positive correlation between trade openness, domestic credit to the private sector, political stability and capital flight, suggesting that LMICs face challenges in managing capital flight as international business activity expands. This correlation indicates structural deficiencies in these countries. Capital flight can persist even during periods of high trade openness. In LMICs, trade openness shows a positive, substantial correlation with capital flight, indicating that higher capital flight levels are associated with greater trade openness. The results are consistent with Nasreen et al. (2021) and Abbas et al. (2024). The trade openness finding reflects an imbalance in trade openness, with excessive imports relative to exports and inadequate trade policies in LMICs. These factors may deplete foreign exchange reserves, diminish investor confidence in these markets, and compel LMICs to incur additional debt to service existing obligations. Capital flight may result from misinvoicing (both over- and under-invoicing), false declarations of tradable products, and inadequate infrastructure at customs and financial institutions to detect trade-based financial crimes. Due to the lack of adequate infrastructure, transfer pricing by multinational businesses, which involves manipulating prices to shift profits to low-tax countries, can result in a loss of tax revenue for the host nation and may prompt local investors to shift their money to countries with lower tax rates. Additionally, the positive influence of domestic credit on private-sector capital flight suggests a possible moral hazard issue for private-sector borrowers in LMICs. Similarly, the positive correlation between political stability and capital flight suggests that political stability alone cannot prevent capital flight in LMICs; institutional and economic governance deficiencies remain critical to preventing it.

Finally, the results demonstrate that LMICs have a poor institutional framework for managing external debt, leading to excessive debt service obligations and further capital flight. Imprudent debt management may explain this inappropriateness and excessiveness of external debt. This directly reflects the 'revolving door' mechanism identified by Ndikumana and Boyce (2003), who found that in environments lacking institutional oversight, externally borrowed funds are swiftly siphoned right back out. Because our empirical findings confirm that LMICs are experiencing this exact type of debt-driven capital flight, this underscores the importance of effectively utilizing external debt. Supporting this, Muhanji and Ojah (2011) argue that persistent external debt issues in borrowing nations significantly stem from ineffective debt management in developing countries. To prevent capital flight, LMICs should implement appropriate strategies to effectively manage external debt, as indicated by the heterogeneous effect. Given the importance of effective external debt management, the study develops a framework for an effective debt management strategy (Figure A2, Appendix A). The framework starts with the optimal level of borrowing, followed by impact assessment, selection of an appropriate financing package, and comprehensive record-keeping. The optimal level of external borrowing should be determined by public and private sector demand in

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LMICs. The borrowing decision must be in accordance with the feasibility study and impact assessment on productivity, export earnings, exchange rates, and interest rates.

Additionally, LMICs should evaluate the effects of external borrowing on the current structure of debt obligations, the potential displacement of private investment, the repercussions of additional EXD borrowing, and the implications for debt service obligations. Additionally, LMICs should prioritize the most suitable financing package, including concessional loans, low or no interest rates, interest subsidies, lower service charges, a reasonable grace period, and adequate loan repayment terms. Moreover, the financing package should be determined by the quantity and potential of future supply, as well as the currency composition, to mitigate interest rate and exchange rate risk over the borrowing period. In addition to the optimal level of borrowing, impact assessment, and financing package, LMICs should have a comprehensive record-keeping mechanism that includes the terms and conditions of the financing package, sectoral record-keeping, utilization, and future debt obligations. In the final stage, LMICs should establish a coordination unit to oversee the performance and non-performance of public and private sector initiatives. Additionally, the coordination unit should have a mechanism for external shock analysis to identify the potential impact of systemic risk, as well as a legal and settlement unit to address disputes arising from external debt.

CONCLUSION

This study investigated the heterogeneous effect of external debt on capital flight across 42 lower-middle-income countries from 2004 to 2023. Using external debt alongside controls (trade openness, inflation, real interest rates, exchange rates, domestic credit to the private sector, and the political environment), our Method of Moments (MM-QR) panel quantile regressions reveal that higher debt levels are consistently associated with greater capital flight. The study finds that countries with lower capital flight rates experience a greater impact from external debt than those with higher capital flight rates. Furthermore, trade openness, domestic credit to the private sector, and political stability positively influence capital flight at the upper quantiles, indicating that exports and imports of goods and services, moral hazard, and weak economic governance play a larger role when conditional capital flight pressures are severe.

These findings demonstrate that economies experiencing low conditional capital flight face disproportionately greater risks from external borrowing, indicating that policymakers must implement tier-specific debt management strategies that balance optimal borrowing with rigorous feasibility studies, structured repayment financing packages, and real-time project monitoring systems. Additionally, the study suggests that lower-middle-income countries implement sufficient infrastructure to identify trade-based financial crimes, such as false shipments, misinvoicing, and transfer pricing manipulation.

Notwithstanding the thorough and rigorous econometric analyses, the report had limitations. The study's weakness is the lack of real interest rate and exchange rate data for some nations, which led to their exclusion. Subsequent research might investigate country-specific debt management practices and their effects on capital flight. Moreover, future research might examine the influence of external debt on the institutional quality of lower-middle-income countries, since structural shortcomings pose significant obstacles to the effective use of external debt.

AUTHOR CONTRIBUTIONS

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Writing – original draft: Tofayel Ahmed, Mohd Ashari Bakri.
Writing – review & editing: Tofayel Ahmed, Mohd Ashari Bakri, Nurshila Binti Ahmad, Ribed Vianneca W. Jubilee.

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APPENDIX A

Table A1. List of the LMICs for the study

Region	Names of the countries
Sub-Saharan Africa (SSA)	Angola, Benin, Cabo Verde, Cameroon, Comoros, Congo, Rep, Côte d'Ivoire, Eswatini, Ghana, Guinea, Kenya, Lesotho, Mauritania, Nigeria, São Tomé and Principe, Senegal, Tanzania, Zambia
East Asia and Pacific (EAC)	Combodia, Myanmar, Papua New Guinea, the Philippines, Samoa, Solomon Islands, Vanuatu, and Vietnam
South Asia	Bangladesh, Bhutan, India, Nepal, Srilanka, and Pakistan
Middle East and North Africa (MENA)	Egypt, Jordan, Morocco, and Tunisia
Latin America & Caribbean	Bolivia, Haiti, Honduras, and Nicaragua
Europe and Central Asia (ECA)	The Kyrgyz Republic and Tajikistan

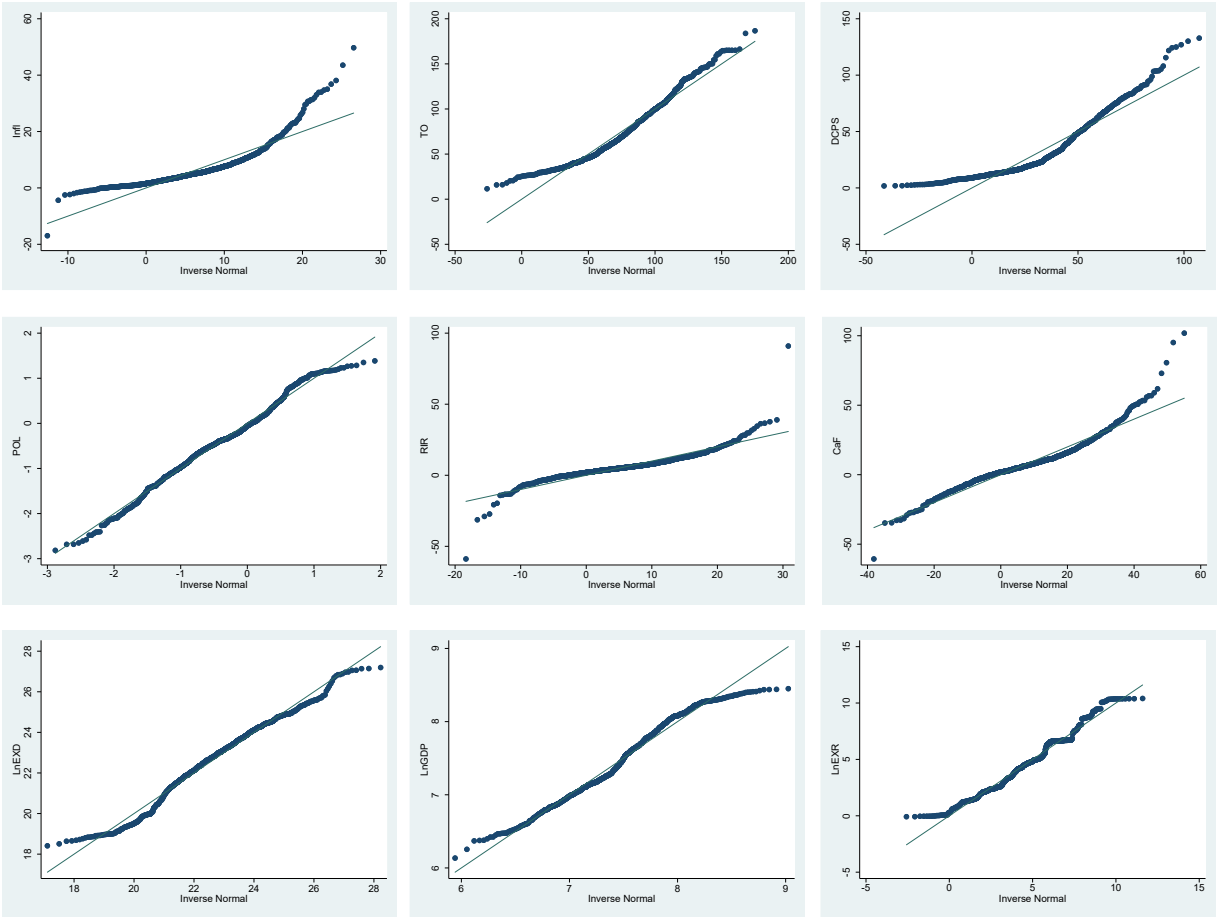


Figure A1. Quantile-quantile plot

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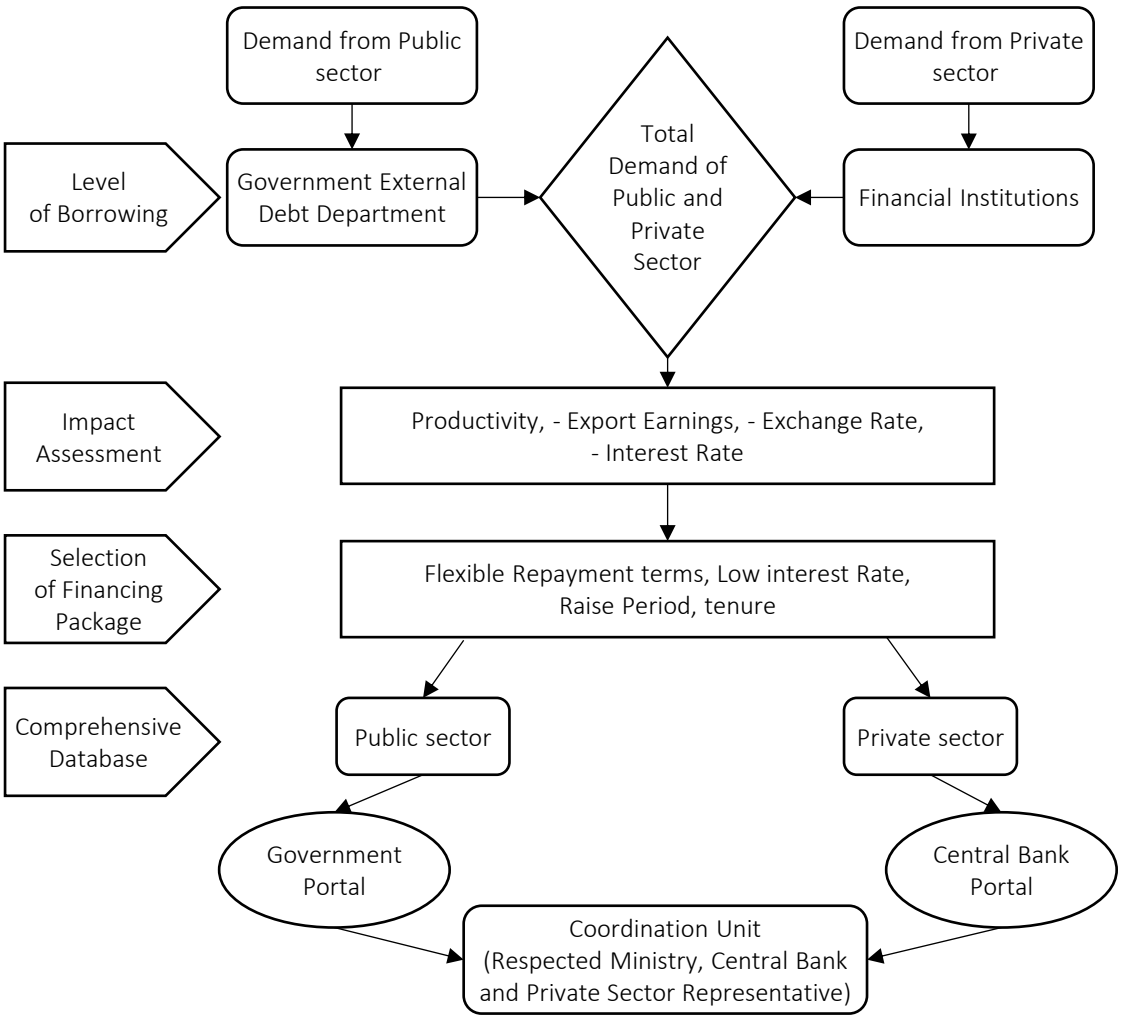


Figure A2. External debt management strategy