

External Debt, Corruption and Capital Flight in Emerging Economies: A Dynamic GMM Analysis

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GMM approach.

Abstract. This study investigates the relationship between external debt, corruption, and capital flight in emerging economies over the period 2004–2020. The selected timeframe ensures the availability of consistent data while encompassing both periods of macroeconomic stability and episodes of global financial stress. To address potential endogeneity, unobserved country-specific effects, and the dynamic nature of capital flight, the analysis employs the Arellano–Bond dynamic panel estimator (dynamic panel framework estimated using the Generalized Method of Moments (GMM)). This approach uses lagged levels of the endogenous variables as instruments, allowing for consistent estimation of the impact of external debt and corruption on capital flight. The methodology provides robust evidence on the dynamic interactions between governance quality, external borrowing, and capital outflows in emerging economies.

1. INTRODUCTION

Over recent decades, emerging economies have increasingly turned to external borrowing as a means of financing development objectives, sustaining investment, and managing macroeconomic fluctuations. At the same time, many of these countries have been confronted with persistent and, in some cases, sizable capital outflows. The simultaneous rise in external debt and capital flight poses a major challenge for emerging economies, as it weakens domestic savings, intensifies balance-of-payments constraints, and heightens financial vulnerability.

The interaction between external debt and capital flight has long been a subject of interest in both policy and academic debates.

Seminal contributions by Boyce (1992), Boyce, and Ndikumana (2002) argue that these two phenomena are closely connected. External debt accumulation may trigger capital flight when it signals rising macroeconomic risks, weak governance structures, or future fiscal burdens, thereby encouraging private agents to reallocate assets abroad. Conversely, sustained capital flight can deepen dependence on external borrowing by reducing domestic financial resources and fiscal capacity. Such bidirectional linkages suggest the presence of self-reinforcing mechanisms with adverse consequences for growth and macroeconomic stability.

Despite the relevance of this issue, empirical findings remain inconclusive, particularly regarding the dynamic structure of the debt–capital flight relationship. While some studies document short-run effects of debt accumulation on capital outflows, others emphasize longer-run interactions shaped by institutional and structural characteristics. Moreover, a large part of the existing literature relies on static or single-equation models that are ill-equipped to account for feedback effects, unobserved heterogeneity, and endogeneity, all of which are central to the analysis of capital flight dynamics.

This study contributes to the literature by examining the interaction between external debt and capital flight in a panel of emerging economies over the period 2004–2020. This timeframe captures both relatively stable phases and episodes of heightened global financial stress, allowing for a comprehensive assessment of the underlying dynamics. To address potential endogeneity, unobserved country-specific effects, and the inherently dynamic nature of capital flight, the analysis adopts a dynamic panel framework estimated using the Generalized Method of Moments (GMM), specifically the Arellano–Bond estimator. This methodology exploits internal instruments derived from lagged variables to obtain consistent estimates and to explicitly model adjustment processes over time.

By focusing on dynamic interactions rather than static correlations, the study provides new insights into how external debt and capital flight evolve jointly in emerging economies. The findings carry important implications for debt management and macroeconomic policy, underscoring the need for credible institutional frameworks that limit capital outflows while supporting sustainable external financing.

The remainder of the paper is structured as follows. Section 2 reviews the theoretical and empirical literature on external debt and capital flight in emerging economies. Section 3 describes the data, model specification, and the dynamic GMM methodology. Section 4 presents and discusses the empirical results. Section 5 concludes with policy implications for financial stability and debt sustainability in emerging countries.

2. LITERATURE REVIEW

2.1. External Debt and Capital Flight

The relationship between external debt and capital flight has long been examined in the literature on development finance and macroeconomic stability. Early theoretical analyses suggest that excessive external borrowing may generate expectations of future macroeconomic instability, higher taxation, or exchange rate depreciation, thereby encouraging domestic agents to relocate assets abroad. In this context, external debt accumulation acts as a signal of rising sovereign risk and policy uncertainty. A seminal contribution is provided by Boyce (1992) and later extended by Boyce and Ndikumana (2002) through the debt-fueled

capital flight hypothesis. According to this framework, a substantial share of external borrowing does not finance productive domestic investment but instead exits the economy in the form of capital flight. External debt and capital flight thus reinforce each other, creating a vicious cycle that weakens domestic savings, constrains growth, and undermines macroeconomic stability. This theoretical perspective highlights the importance of treating debt accumulation and capital flight as jointly determined processes rather than isolated phenomena.

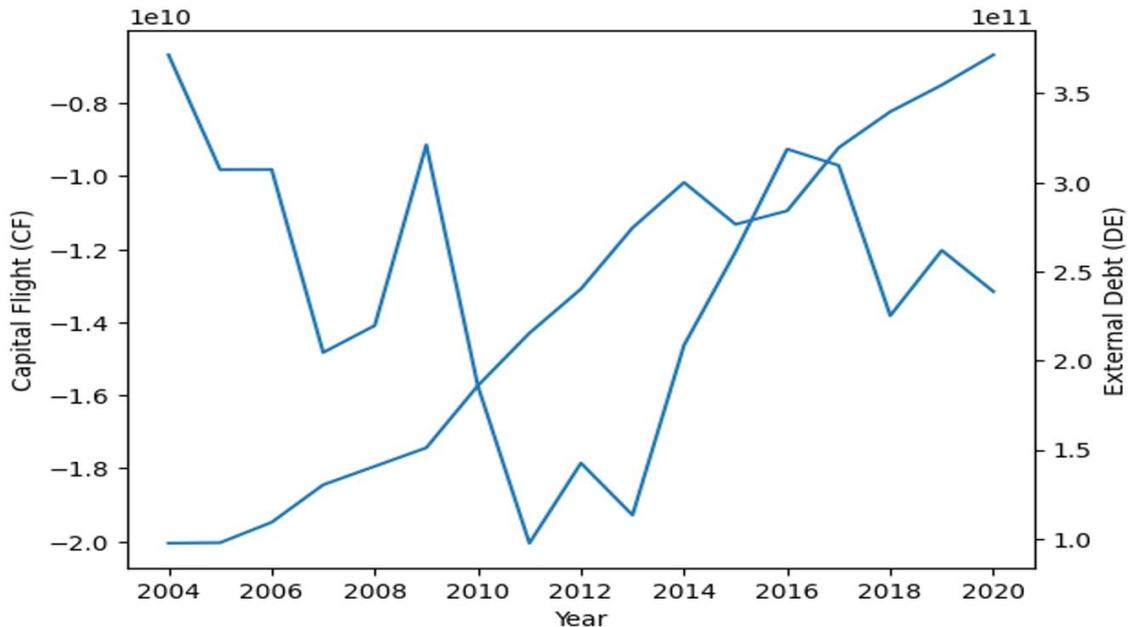


Figure 1. Capital Flight and External Debt in Emerging Economies (2004–2020).

Source: Author's calculations from Excel dataset.

The figure provides visual support for the hypothesis that external debt accumulation and capital flight are dynamically interconnected, reinforcing concerns about debt sustainability and financial stability in emerging economies.

2.2. Corruption, Institutional Quality and Capital Flight

Beyond macroeconomic factors, the literature increasingly emphasizes the role of institutional quality, particularly corruption, in shaping capital flight dynamics. Weak governance, limited transparency, and pervasive corruption undermine confidence in domestic institutions, weaken property rights protection, and heighten policy uncertainty. In such environments, economic agents are more inclined to transfer capital abroad as a precautionary response. Empirical evidence strongly supports this argument. Le and Zak (2006) show that higher levels of corruption are associated with larger illicit capital outflows, while Ndikumana and Sarr (2016) highlight how institutional weaknesses facilitate the diversion and concealment of public resources abroad. More recently, MTIRAOU, A. (2015) demonstrates that corruption and poor institutional quality significantly reduce the effectiveness of both domestic and external financing in emerging economies. According to MTIRAOU (2026), weak governance structures increase rent-seeking behavior and the misallocation of borrowed funds, thereby reinforcing incentives for capital flight. Conversely, improvements in institutional quality, such as stronger regulatory frameworks, enhanced accountability and better control of corruption, can mitigate capital outflows by restoring investor confidence and ensuring a more productive use of external resources. This perspective underscores corruption and institutional quality as key transmission channels through which external debt influences capital flight dynamics.

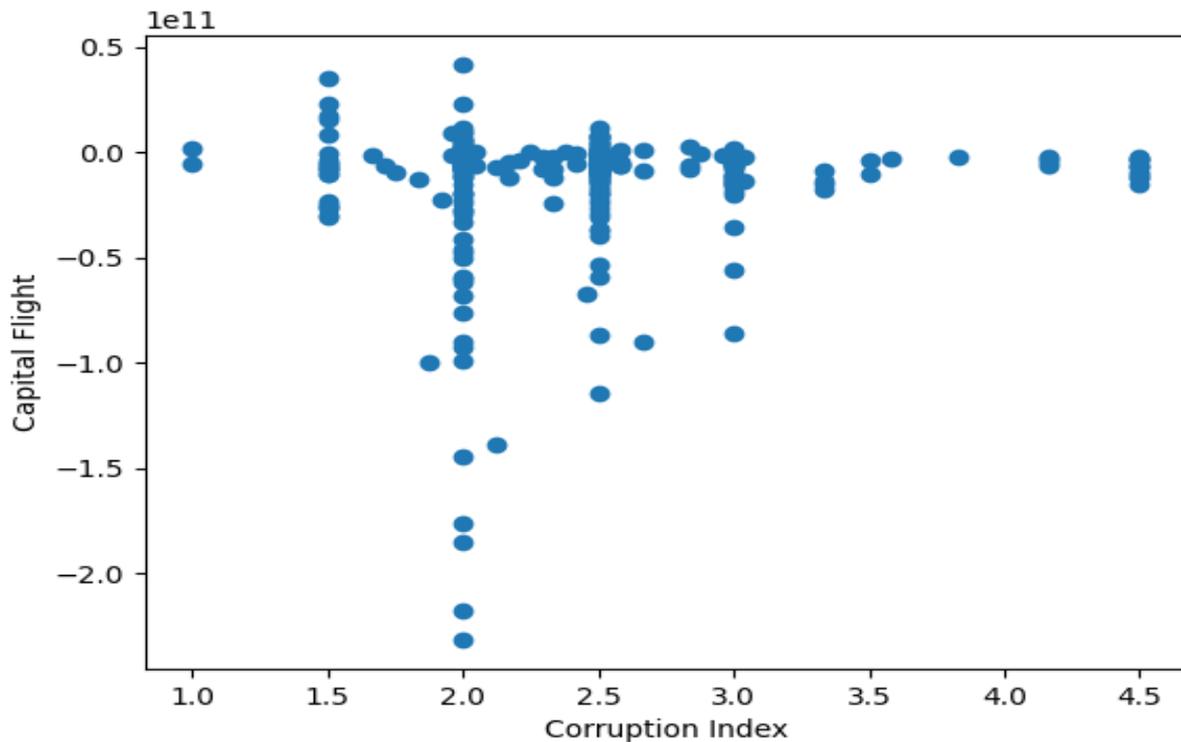


Figure 2. Composition of External Debt: Public vs Private External Debt (2004–2020).
Source: Author's calculations from Excel dataset.

The Figure 2 highlights a clear relationship between corruption and capital flight, with higher levels of corruption associated with larger capital outflows. This finding supports the argument that weak governance and institutional fragility amplify incentives for capital flight by reducing confidence in domestic economic and political institutions.

2.3. Empirical Evidence and Dynamic Panel Approaches

Empirical studies investigating the interaction between external debt, corruption, and capital flight yield mixed results, reflecting differences in country coverage, time periods, and econometric methodologies. While several studies document a positive association between rising external debt and capital outflows, others emphasize the moderating role of institutional and structural characteristics. Importantly, recent research underscores the dynamic and endogenous nature of capital flight, which tends to exhibit strong persistence over time. To address these issues, a growing body of literature advocates the use of dynamic panel data methods, particularly the Arellano–Bond (1991) Generalized Method of Moments (GMM) estimator. This approach accounts for endogeneity, unobserved country-specific effects, and feedback mechanisms by exploiting internal instruments derived from lagged variables. As highlighted by Baltagi (2008) and applied in recent studies by MTIRAOU, A., (2026) dynamic GMM techniques are especially well suited for analyzing macro-financial interactions in emerging economies, where simultaneity and institutional heterogeneity are pervasive. Despite these advances, empirical analyses that jointly examine external debt, corruption, and capital flight within a unified dynamic GMM framework remain relatively scarce. This gap provides the motivation for the present study.

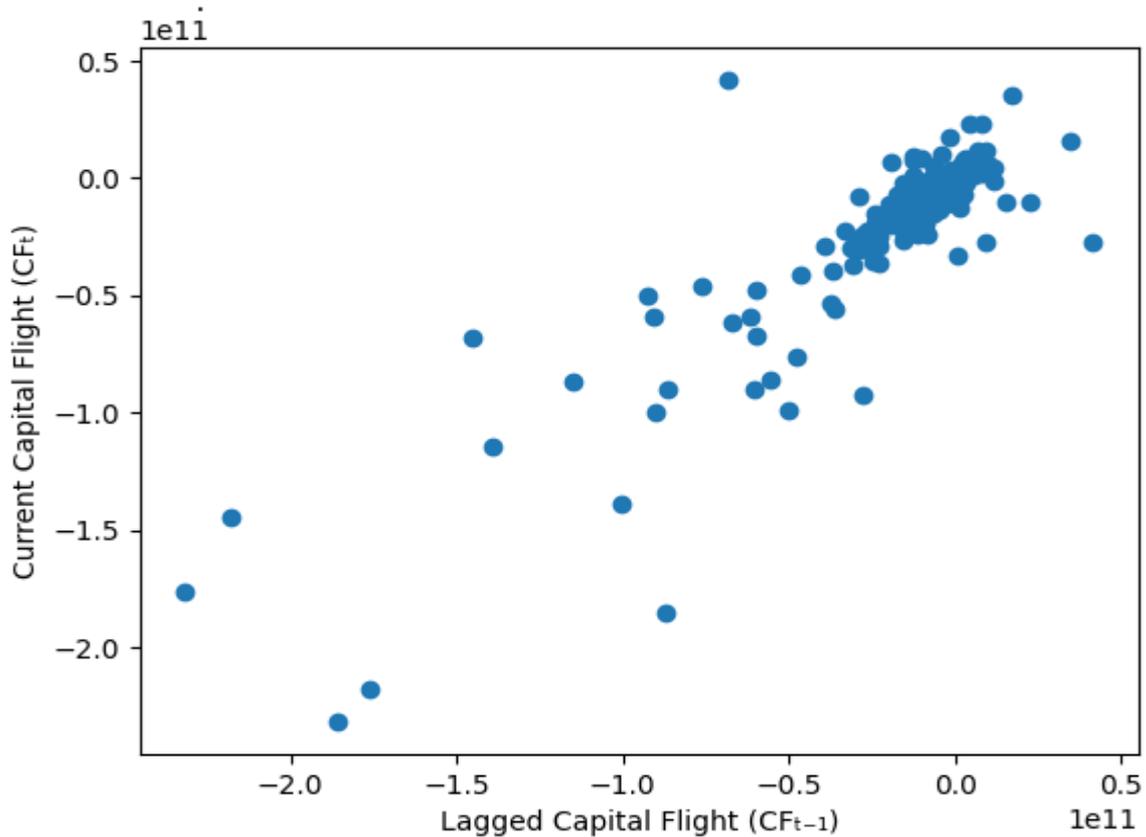


Figure 3. External Debt and Financial Openness in Emerging Economies (2004–2020)

Source: Author's calculations from Excel dataset

This figure 3 plots current capital flight against its one-period lag using panel data for emerging economies. Each point represents a country–year observation, allowing for a visual assessment of persistence and dynamic dependence.

3. DATA AND METHODOLOGY

By employing a dynamic GMM framework, this study moves beyond static correlations and provides a more accurate representation of the joint and endogenous evolution of external debt, corruption, and capital flight. The methodology allows the identification of both short-term adjustment mechanisms and persistent effects, offering robust insights into the role of governance and external borrowing in shaping capital outflows in emerging economies.

3.1. Research Hypotheses

Based on the theoretical arguments and empirical evidence reviewed in the literature, this study formulates the following research hypotheses:

- H₁: External debt has a positive and significant effect on capital flight in emerging economies. Higher levels of external borrowing increase macroeconomic uncertainty and future repayment expectations, thereby encouraging residents to transfer assets abroad.
- H₂: Corruption significantly amplifies capital flight in emerging economies. Weak governance and rent-seeking behavior reduce confidence in domestic institutions, increasing incentives for capital outflows.
- H₃: Capital flight exhibits strong persistence over time. Past capital outflows positively influence current capital flight, reflecting dynamic adjustment and reinforcing the need for a dynamic panel estimation approach.
- H₄: The interaction between external debt and corruption strengthens capital flight dynamics. In environments characterized by high corruption, the impact of external debt on capital flight is expected to be more pronounced.

3.2. Sample, Period, and Data

The empirical analysis is conducted on a panel of 20 emerging economies, selected based on data availability and their exposure to external debt and capital flight dynamics. The study covers a 17-year's period (2004–2020). The dataset combines macroeconomic, financial, and institutional indicators obtained from internationally recognized sources, including the World Bank, the IMF, and governance databases. Capital flight is constructed using balance-of-payments–based measures, while external debt, corruption, and control variables are drawn from standardized international datasets to ensure consistency and comparability.

Table 1. Definition and Sources of Variables.

Variable	Definition	Source
CF	Capital flight, measuring unrecorded capital outflows from the domestic economy, capturing residents' transfer of assets abroad in response to economic, financial, or institutional risks.	Author's calculations based on World Bank and IMF balance of payments data
GDP	Annual growth rate of real Gross Domestic Product (%), reflecting overall economic performance.	World Bank – World Development Indicators (WDI)
INF	Annual inflation rate measured by the Consumer Price Index (CPI, %), capturing price stability and macroeconomic uncertainty.	World Bank – WDI / IMF
TRADE	Trade openness measured as the ratio of exports plus imports to GDP (%), indicating integration into the global economy.	World Bank – WDI
REER	Real Effective Exchange Rate index; an increase indicates real appreciation and reduced external competitiveness.	IMF – International Financial Statistics (IFS)
SC	Current account balance expressed as a percentage of GDP, indicating the sustainability of external transactions and the economy's reliance on foreign financing.	World Bank – WDI
RN	Stock of international reserves excluding gold (current US dollars), reflecting external liquidity buffers.	World Bank – WDI / IMF
TR	Real interest rate (%), capturing the cost of capital and incentives for international capital flows.	World Bank – WDI
FO	Financial openness index measuring capital account liberalization and financial integration.	Chinn–Ito Index
DEBT	Total external debt stock (current US dollars), indicating the level of foreign indebtedness.	World Bank – International Debt Statistics
CORR	Corruption perception index measuring institutional quality; higher values indicate better control of corruption.	Worldwide Governance Indicators (WGI)

The variable **CF** measures capital flight, capturing residents' transfer of assets abroad to protect against economic, financial, or institutional risks. **GDP** reflects the overall performance of the economy through annual real growth, while **INF**, measured by the Consumer Price Index, indicates price stability and macroeconomic uncertainty. **TRADE** represents the level of trade openness, showing the economy's integration into international markets. The variables **REER**, **SC**, **RN**, **TR**, and **FO** capture external competitiveness, the current account balance, the stock of international reserves, the real cost of capital, and financial openness, all of which directly influence international capital flows. Finally, **DEBT** and **CORR** provide information on external indebtedness and institutional quality, key factors shaping investor confidence and economic stability.

3.3. Model Specification

Estimating the above model using conventional panel estimators would lead to biased and inconsistent results due to endogeneity, unobserved heterogeneity, and the presence of the lagged dependent variable. To address these issues, the study adopts the Arellano–Bond (1991) difference Generalized Method of Moments (GMM) estimator. This approach first-differences the model to eliminate country-specific effects and then uses lagged levels of the endogenous variables as internal instruments. By doing so, it effectively controls for reverse causality between external debt, corruption, and capital flight, while accounting for feedback effects and dynamic adjustment processes.

The validity of the GMM estimates is assessed using standard diagnostic tests, including tests for serial correlation in the differenced residuals and over-identifying restrictions. This methodology is particularly well suited for panels with a relatively large cross-sectional dimension and a moderate time dimension, as is the case in this study, and has been widely applied in recent macro-financial analyses of emerging economies

General Presentation of Arellano–Bond Dynamic Model

In this section of Empirical Methodology, the model is introduced in a general way.

$$Y_{i,t} = \alpha Y_{i,t-1} + \beta_1 K_{i,t} + \beta_2 Z_{i,t} + \gamma X_{i,t} + \mu_i + \varepsilon_{i,t} \quad (E)$$

Estimation Technique: Dynamic Model GMM

$$CF_{i,t} = \alpha CF_{i,t-1} + \beta_1 DEBT_{i,t} + \beta_2 CORR_{i,t} + \gamma X_{i,t} + \mu_i + \varepsilon_{i,t} \quad (E')$$

Where;

$CF_{i,t}$: denotes capital flight;

$DEBT_{i,t}$: represents external debt;

$CORR_{i,t}$: captures corruption;

$X_{i,t}$: is a vector of control variables;

μ_i : denotes unobserved country-specific effects;

$\varepsilon_{i,t}$: is the idiosyncratic error term.

4. DESCRIPTIVE ANALYSES, PRESENTATION OF RESULTS, AND COMMENTS

4.1. Descriptive Statistics Analysis

Table 2. Descriptive Statistics Analysis.

Variables	Observations.	Mean	Standard Deviation	Minimum	Maximum
CF	340	-1.31e+10	3.01e+10	-2.32e+11	4.17e+10
COR	340	2.490206	0.6254732	1	4.5
DEBT	340	2.29e+11	3.24e+11	4.11e+09	2.33e+12
GDP	340	3.548437	3.812447	-10.93331	14.14999
INF	340	4.976474	4.308265	-5.992201	29.51848
TR	340	2.51e+11	6.13e+11	2.29e+09	3.90e+12
TRADE	340	73.08033	39.79453	22.10598	210.3743
FO	340	.3916765	1.304834	-1.24	2.3
RN	340	4.486774	4.331486	0.0311351	19.10498
REER	340	103.3921	15.43204	59.79	168.34
SC	340	-.3054411	4.522985	-14.60949	16.8598

Source: Output from STATA 15.1

The descriptive statistics indicate significant heterogeneity among emerging economies, particularly in capital flight and external debt, which display large dispersions and wide ranges across countries. The negative average value of capital flight reflects persistent net outflows, while the high variability suggests episodic surges during periods of instability. Corruption levels appear relatively persistent, pointing to structural governance challenges. Macroeconomic indicators such as growth and inflation exhibit notable volatility, highlighting exposure to economic shocks. Overall, these patterns support the use of a dynamic panel framework to capture persistence and cross-country differences.

4.2. Correlation Matrix

Table 3. Correlation matrix between variables used.

VARIABLES	CF	CORR	DEBT	GDP	INF	TR	TRADE	FO	RN	REER	SC
CF	1.00										
CORR	0.11	1.00									
DEBT	-0.53	-0.28	1.00								
GDP	-0.25	-0.01	0.06	1.00							
INF	-0.02	-0.14	0.07	0.21	1.00						
TR	-0.73	-0.19	0.81	0.22	-0.08	1.00					
TRADE	0.25	0.14	-0.37	-0.05	-0.28	-0.19	1.00				
FO	0.29	0.26	-0.34	-0.24	-0.16	-0.31	0.28	1.00			
RN	0.05	-0.03	0.05	0.22	0.47	-0.04	-0.13	0.01	1.00		
REER	-0.17	0.02	0.19	0.10	-0.08	0.30	-0.07	-0.03	0.04	1.00	
SC	-0.03	-0.12	0.08	0.14	0.04	0.20	0.37	-0.14	0.35	-0.06	1.00

Source: Stata15.1 output generated by the author's

The correlation matrix shows that capital flight is strongly negatively associated with interest rates and external debt, while it is moderately positively correlated with trade and financial openness, suggesting higher capital mobility in more open economies.

Corruption exhibits generally weak contemporaneous correlations, indicating that its effects may be indirect or dynamic. Overall, the low pairwise correlations suggest limited multicollinearity, supporting the validity of the multivariate empirical analysis.

4.3. Presentation of Results

Table 4. Interaction between Debt– Corruption–Capital Flights.

Eq. Number Vbles	Eq. N°1	Eq. N°2	Eq. N°3	Eq. N°4
Const.	-1.35e+10 (-0.67)	-1.32e+10 (-0.65)	-9.13e+09 (-0.46)	-1.96e+10 (-0.90)
CF _{i,t-1}	0.540*** (11.48)	0.539*** (11.43)	0.479*** (9.03)	0.475*** (8.98)
GDP	-4.22e+08** (-2.41)	-4.11e+08* (-1.87)	-2.45e+08* (-1.84)	-2.49e+08** (-2.05)
INF	-1.42e+08 (-0.43)	-1.70e+08 (-0.51)	-1.19e+08 (-0.37)	-1.69e+08 (-0.52)
TRADE	-9.85e+07 (-0.56)	-1.01e+08 (-0.57)	-1.85e+08 (-1.05)	-1.70e+08 (-0.97)
REER	2.47e+08** (2.14)	2.42e+08** (2.10)	2.10e+08* (1.86)	1.87e+08* (1.83)
SC	1.27e+08 (0.27)	1.49e+08 (0.32)	3.22e+08 (0.71)	2.83e+08 (0.62)
RN	-1.45e+09** (-2.40)	-1.48e+09** (-2.44)	-1.00e+09* (-1.91)	-1.01e+09* (-1.86)
TR	-0.0107*** (-2.26)	-0.0107*** (-2.26)	-0.0227*** (-3.18)	-0.0239*** (-3.32)

FO	—	1.22e+09* (1.86)	—	—
DEBT	—	—	0.0208*** (2.32)	—
CORR	—	—	—	4.79e+09** (2.10)
N. obs.	300	300	300	300
Wald χ^2	207.46	207.67	223.53	226.02
Prob > χ^2	0.000	0.000	0.000	0.000

Note: *** Significant at 1%, ** Significant at 5%, * Significant at 10%.

- Equation 1: Arellano-Bond dynamic panel data estimation: Estimation of this first equation without FO, DEBT and CORR.;
- Equation 2: Arellano-Bond dynamic panel-data estimation: Estimation of this first equation with FO without DEBT and CORR.;
- Equation 3: Arellano-Bond dynamic panel-data estimation: Estimation of this first equation with DEBT without FO and CORR.;
- Equation 4: Arellano-Bond dynamic panel-data estimation: Estimation of this first equation with CORR without FO and DEBT.

4.4. Interpretation of Results

Table 4 highlights the estimation of the dynamic model used to address our research question, which is to analyze the extent to which corruption contributes to capital flight by increasing reliance on external debt, and how this dynamic interaction exacerbates the financial vulnerability of emerging economies. This is achieved by adopting a dynamic GMM (Arellano–Bond) methodology over a 17-year period for 20 emerging countries.

4.4.1. Baseline model without (FO, DEBT, and CORR)

The first specification, estimated using the Arellano–Bond dynamic panel approach, examines the determinants of capital flight without including financial openness, external debt, or corruption. The lagged capital flight variable ($CF_{i,t-1}$) is positive and highly significant at the 1% level, confirming strong persistence and path dependency in capital outflows. This indicates that past capital flight significantly increases current outflows, reflecting a structural and cumulative process, consistent with Ndikumana (2008, 2011) and James K. Boyce (2003), as well as Mtiraoui, A., (2015). Economic growth (GDP) has a negative and significant effect at the 5% level, suggesting that stronger economic performance reduces incentives to externalize capital. Inflation (INF) and trade openness (TRADE) are statistically insignificant. The real effective exchange rate (REER) is positive and significant at the 5% level, indicating that real appreciation stimulates capital outflows, in line with Sebastian Edwards (1989, 2000). Natural resources (RN) show a negative and significant coefficient at the 5% level, while transparency (TR) has a negative and highly significant effect at the 1% level, underscoring the stabilizing role of institutional quality, as emphasized by Daniel Kaufmann (1999, 2010).

4.4.2. Model including Financial Openness (FO)

In the second specification, financial openness (FO) is introduced while excluding debt and corruption. The Financial openness (FO) displays a positive and statistically significant coefficient at the 10% level, suggesting that greater liberalization of financial flows facilitates capital outflows. This result supports the argument that financial integration, in the absence of strong institutions, may increase capital mobility and leakage, consistent with Dani Rodrik (1998) and reinforced by Mtiraoui, A., et al. (2026). The signs and significance of the other control variables remain broadly stable: GDP continues to reduce capital flight (5% level), REER remains positive and significant (5% level), RN retains its negative and significant effect (5% level), and TR remains negative and highly significant (1% level). This confirms the robustness of the baseline determinants.

4.4.3. Model Including External Debt (DEBT)

The third equation introduces external debt (DEBT) while excluding financial openness and corruption. The lagged dependent variable remains positive and highly significant at the 1% level, confirming persistent dynamics. External debt (DEBT) exhibits a positive and highly significant effect at the 1% level, indicating that higher indebtedness increases capital flight. This supports the “debt-fueled capital flight” hypothesis developed by Ndikumana (2008, 2011), according to which borrowed funds may partly exit the country through private channels. Similar findings are reported in Mtiraoui, A., (2015). GDP remains negatively significant (10% or 5% depending on specification), REER remains positive and significant (10% level), RN continues to show a negative and significant effect (10% level), and TR remains negative and highly significant (1% level). These results indicate that the debt variable reinforces the structural explanation of capital flight without altering the direction of the core macroeconomic effects.

4.4.4. Model including Corruption (CORR)

The fourth specification incorporates corruption (CORR) while excluding financial openness and debt. Capital flight persistence remains strong, with $CF_{i,t-1}$ positive and significant at the 1% level. Corruption (CORR) shows a positive and statistically significant coefficient at the 5% level, indicating that higher levels of corruption stimulate capital outflows. This finding confirms that weak governance and rent-seeking behavior encourage wealth externalization, consistent with Susan Rose-Ackerman (1999) and Paolo Mauro (1995), and supported by Mtiraoui, A., et al. (2022). Other control variables maintain their expected signs: GDP remains negatively significant (5% level), REER remains positive and significant (10% level), RN retains its negative effect (10% level), and TR continues to be negative and highly significant (1% level). This highlights the central role of institutional quality in shaping capital flight dynamics.

These results demonstrate that capital flight is driven by a combination of dynamic persistence, macroeconomic imbalances, financial liberalization, external indebtedness, and institutional weaknesses, consistent with both international empirical literature and the contributions of Mtiraoui, A., (2015, 2022, and 2026).

5. CONCLUSION

This study has investigated the dynamic interactions between external debt, corruption, and capital flight in 20 emerging economies over the period 2004–2020, employing the Arellano–Bond dynamic panel GMM methodology. The empirical findings reveal that capital flight exhibits strong persistence, with past outflows significantly influencing current capital movements. This confirms that capital flight is not a one-time phenomenon but a structural and cumulative process that can undermine domestic financial resources over time.

The empirical results show that higher levels of external debt significantly increase capital flight, supporting the “debt-fueled capital flight” hypothesis: when governments accumulate debt, private agents anticipate macroeconomic risks and fiscal pressures, prompting them to move assets abroad. Corruption further amplifies this effect, as weak institutions, rent-seeking, and limited transparency erode confidence in domestic governance, creating strong incentives for capital to leave the country. In contrast, stronger economic growth mitigates capital flight, suggesting that stable macroeconomic performance can restore some confidence in the domestic economy.

Financial openness and real exchange rate appreciation are also shown to stimulate capital outflows, particularly in contexts of institutional weakness, highlighting that liberalized financial systems without strong governance can accelerate capital mobility. These findings collectively illustrate that the interaction between external debt, corruption, and institutional quality plays a decisive role in shaping the dynamics of capital flight.

From a policy perspective, the study emphasizes that addressing capital flight requires more than macroeconomic management. Strengthening governance, improving institutional quality, and ensuring transparency in the use of external debt are essential to limit capital outflows. Additionally, prudent debt management and carefully regulated financial liberalization are necessary to preserve domestic savings and protect financial stability.

In conclusion, the study provides robust evidence that capital flight in emerging economies is jointly determined by external indebtedness, institutional weaknesses, and macroeconomic conditions. By linking debt accumulation and corruption to outflows, it highlights the need for integrated policy strategies combining fiscal prudence, institutional reform, and macroeconomic stability to mitigate capital flight and support sustainable development.

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