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AID EFFECTIVENESS AND ECONOMIC PERFORMANCE: EVIDENCE FROM DEBT RELIEF INITIATIVES IN CEMAC COUNTRIES

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Abstract

This study examines the conditions under which debt relief initiatives have improved economic performance in CEMAC countries and investigates why their effects have remained limited or unsustainable. The study focuses on three debt relief initiatives (HIPC, MDRI, and DSSI). We collected data from 1990 to 2024, and we use three methods to answer the research question: The fixed-effects regressions, Generalized Synthetic Control and Difference-in-Differences. We find that debt relief created some fiscal space by reducing external debt and in some specifications debt-service pressure. However, these gains did not translate into higher investment or sustained growth. The evidence on GDP growth is weaker and not consistently confirmed across methods and due to data constraints, we did not test the role of domestic debt re-accumulation directly. Overall, the results suggest that the limited effectiveness of debt relief in CEMAC countries is explained by the weak transmission from debt reduction and lower debt-service pressure to productive investment and sustained growth, while institutional quality and commodity dependence remain plausible but only suggestive mechanisms.

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1. INTRODUCTION

During the 1980s and 1990s, several Sub-Saharan African countries experienced severe external debt accumulation. Debt became increasingly unsustainable after the rise in global interest rates in the early 1980s and the collapse in commodity prices, which reduced export revenues across the continent and contributed to the debt crisis (Greene, 1989; Geda, 2003). In response to this crisis, and after a long period of structural adjustment and debt restructuring, the International Monetary Fund and the World Bank launched the Heavily Indebted Poor Countries Initiative in 1996. The objective of the HIPC Initiative was to reduce the external debt of eligible countries to sustainable levels through coordinated debt relief from multilateral, bilateral, and commercial creditors. It also aimed to reduce debt-service burdens and create fiscal space that could be redirected toward poverty-reduction priorities, including health, education, infrastructure, and social spending (IMF, 1999).

In 2005, The HIPC initiative was reinforced by the Multilateral Debt Relief Initiative (MDRI) at the G8 Summit in Gleneagles to provide 100 percent cancellation of eligible multilateral debts for countries that had completed the HIPC process. Recently, the COVID-19 pandemic has brought debt vulnerabilities back to the forefront leading the G20 to launch the Debt Service Suspension Initiative (DSSI) in April 2020 to give eligible countries a temporary debt service suspension. Between May 2020 and December 2021, around $12.9 billion in debt-service payments were suspended (World Bank, 2022). However, despite these reductions, cancellations, and temporary suspensions, external debt vulnerabilities have not disappeared. In many countries, they have remained a major concern in recent years. This is the reason why the debate on the effectiveness of debt relief is still open. The empirical evidence remains mixed, and the benefits of debt relief appear to be more limited than initially expected. Several studies point in this direction. Presbitero (2009), for instance shows that although debt relief helped reduce external debt-service burdens, its broader impact on growth, investment, and institutional quality remained uncertain and relatively limited. Marcelino and Hakobyan (2014) on the other hand, focused on African HIPC countries and they find that debt relief was associated with higher economic growth, stronger domestic revenue, and increased public investment. Still, they also highlight an important issue: it remains difficult to isolate the independent effect of debt relief from other reforms, macroeconomic changes, and country-specific conditions. In other cases, countries that benefited from debt relief have experienced rapid debt re-accumulation (Merotto, Stučka, & Thomas, 2015).

This debate is particularly relevant in the Economic and Monetary Community of Central Africa (CEMAC), a regional bloc of six countries (Cameroon, Chad, Central African Republic, Gabon, Equatorial Guinea and Republic of Congo) that share a common currency and a common central bank. The region presents several characteristics that make it an appropriate case for assessing the effectiveness of debt-relief policies. Firstly, CEMAC economies remain highly dependent on commodity exports, especially oil. This makes them particularly exposed to external shocks, such as changes in global commodity prices, shifts in international demand, or tightening financial conditions. Secondly, four CEMAC member states, Cameroon, the Central African Republic, Chad, and the Republic of Congo have benefited from the three debt-relief initiatives: HIPC, MDRI, and DSSI. Yet, despite these interventions, debt vulnerabilities have not disappeared. They remain a persistent issue across the region, which raises an important question about the long-term effectiveness of debt relief.

In the CEMAC region, debt crises have therefore not only been the result of excessive borrowing. They are also deeply linked to broader structural weaknesses like commodity dependence, weak institutional capacity, limited economic diversification, and repeated exposure to adverse external shocks. The CEMAC region represents one of the most extreme cases of shock sensitive debt dynamics, but comparable patterns are observed in other African economies. Several post-HIPC countries such as Zambia, Mozambique, Ghana, Ethiopia, and Malawi, have experienced rapid debt re-accumulation after debt relief. In many of these cases, vulnerabilities stem from the same combination of commodity dependence, governance challenges, and increased reliance on non-concessional borrowing.

Recent evidence from the CEMAC Economic Barometer (World Bank, 2025) confirms the persistence of debt-sustainability challenges among member states. As shown in Table 1.1, Cameroon, the Central African Republic, Chad, and Gabon are currently classified as being at high risk of debt distress, while the Republic of Congo is already assessed as being in debt distress. Equatorial Guinea is the only country facing a moderate level of debt risk.

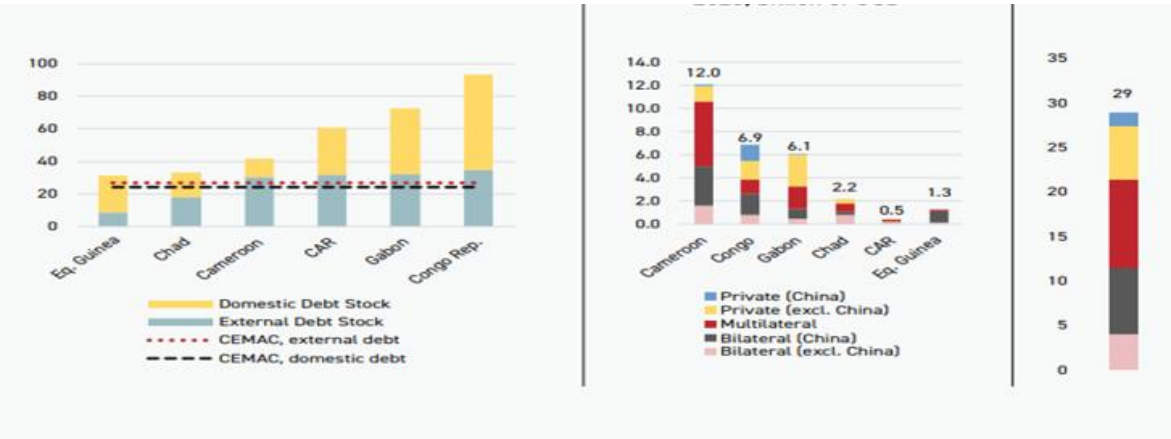
Table 1.1: Debt sustainability analysis in Economic and Monetary Community of Central Africa

Country	Year of Analysis	Overall risk of stress	Risk of External Debt Distress	Sustainability
Cameroon	2024	High	High	Sustainable
CAR	2024	High	High	Sustainable
Chad	2024	High	High	Sustainable
Congo, Rep	2024	In debt distress	In debt distress	Sustainable
Eq. Guinea	2024	Moderate		
Gabon	2024	High		

Source: World Bank/IMF LIC DSA for Cameroon, CAR (Central African Republic) and the Republic of Congo, and IMF DSA for Gabon and Equatorial Guinea.
CEMAC Economic Barometer – June 2025 (Vol. 8)

These findings are particularly striking, and the persistence of high debt distress risks suggests that debt relief alone may not have been sufficient to generate durable economic improvements. Additional evidence is provided in Figure 1.1 which shows a large increase in domestic debt stock. This is mainly because as external borrowing became more difficult, governments in the CEMAC region relied more on domestic financing. This shift was mainly driven by tighter international financial conditions and growing concerns about debt sustainability. This trend is clearly visible in the data. According to the BEAC Rapport Annuel 2023, outstanding government securities in the CEMAC region rose sharply, from around CFAF 1.2 trillion in 2015 to more than CFAF 6 trillion in 2023. This shows how quickly the regional securities market expanded over a relatively short period. BEAC data reported in the Monetary Policy Report indicates that the stock of securities continued to grow, rising from CFAF 8.45 trillion in March 2025 to CFAF 9.63 trillion in March 2026. At the same time, World Bank Debt Sustainability Analyses classify most CEMAC countries as being at high risk of debt distress, which further limits their ability to borrow externally and reinforces the shift toward domestic financing.

Figure 1.1: Domestic and External Debt in CEMAC Countries



Source: World Bank/IMF LIC DSA for Cameroon, CAR (Central African Republic) and the Republic of Congo, and IMF DSA for Gabon and Equatorial Guinea.
CEMAC Economic Barometer – June 2025 (Vol. 8)

Taken together, the evidence presented in Table 1.1 and Figure 1.1 points to an important paradox. Several CEMAC countries have received debt relief but the expected improvements in economic performance did not always follow. This raises a central question for the region: under what conditions can debt relief translate into better economic outcomes?

While several existing studies have examined debt relief in developing countries and in Sub-Saharan Africa more broadly, relatively little attention has been devoted to understanding why these interventions have produced limited or unsustainable outcomes in the specific context of CEMAC economies. This study therefore addresses the following questions: Under what conditions have debt-relief initiatives improved economic performance in CEMAC countries, and why have their effects remained limited or unsustainable?

More specifically, the study examines whether the limited effectiveness of debt relief can be explained by rapid debt re-accumulation, weak institutional quality, inefficient use of fiscal space, and the structural dependence of CEMAC economies on commodity exports. To answer these questions, the study uses Fixed-Effects Panel Regression, Generalized Synthetic control method and the Difference-in-Differences Method.

The main contribution of this dissertation lies in its focus on CEMAC as an integrated economic region and its attempt to identify the conditions under which debt relief can or cannot translate into sustainable economic performance. Ultimately, the study seeks to contribute to both the academic literature on aid effectiveness and debt relief and to policy discussions concerning debt sustainability and economic development in Central Africa.

2. LITERATURE REVIEW

2.1. Definitions

2.1.1. Foreign Aid

Foreign Aid, also known as international aid, refers to international transfer of capital, goods or services from a country or international organization for the benefit of a recipient country or its population. In simple terms, foreign aid is a transfer of different types of resources such as money, goods or services from one country which is a donor to a recipient country. There are different types of aid: bilateral and multilateral aid, humanitarian, military training and equipment, development, government loans, educational exchanges etc. foreign aid is typically measured as *Official Development Assistance (ODA)* and according to the Organization for Economic Co-operation and Development (OECD), Official Development Assistance (ODA) consists of flows provided by official agencies, including state and local governments, or by their executive agencies, to countries and territories on the DAC List of ODA Recipients and to multilateral institutions, which are administered with the promotion of economic development and welfare as the main objective and are concessional in character.

2.1.2. Aid effectiveness

Aid effectiveness is the degree of success or failure of international aid. Craig Burnside and David Dollar (2000) defined aid effectiveness as the impact of foreign aid on economic growth conditional on the quality of macroeconomic policies and institutions.

2.1.3. Economic Performance

Economic performance reflects the capacity of an economy to generate sustained growth in income, employment, and productivity, while maintaining macroeconomic stability (World Bank). It is usually measured by indicators such as real GDP growth, GDP per capita, investment rates, fiscal balance, inflation, employment, and productivity.

2.2. Debt Relief concept

widely treated as a form of Official Development Assistance (ODA), Debt relief or debt cancellation is the partial or total forgiveness of external debt owed by countries to different creditors. Debt relief can also be defined as a partial or total remission of external debt owned by developing countries or heavily indebted poor countries to other countries or international organizations like IMF and the World Bank.

For this study, the HIPC and MDRI initiatives are the primary debt relief, and DSSI is taken as temporary debt relief.

2.2.1. Heavily Indebted Poor Countries Initiative

The Heavily Indebted Poor Countries Initiative was initiated by the International Monetary Fund and the World Bank in 1996 and later one strengthened in 1999 through the Enhanced HIPC Initiative. Its objective was to reduce the external debt of eligible low-income countries to a sustainable level. The initiative followed a two-stage process. First, the decision point. At the decision point, a country became eligible for interim relief after establishing an economic reform program and developing a poverty-reduction strategy.

Second, the completion point. At the completion point, relief became irrevocable once the country had maintained macroeconomic stability and implemented agreed structural and social reforms. Within the CEMAC region, Cameroon completed the process in 2006, the Central African Republic in 2009, the Republic of Congo in 2010 and Chad in April 2015. Gabon and Equatorial Guinea were not eligible to take part of the program.

2.2.2. Multilateral Debt Relief Initiative

The Multilateral Debt Relief Initiative was introduced in 2005 to reinforce the HIPC initiative and to provide debt cancellation to countries that have reached the HIPC completion point. Although The Multilateral Debt Relief Initiative looks like the HIPC initiative, it is different from its depth and structure. While HIPC reduced debt to a specified sustainability level and involved multiple creditor groups, MDRI provided full cancellation of eligible multilateral debt accumulated before institution-specific cut-off dates. The initiative therefore produced an additional discrete reduction in the debt stock of qualifying countries.

HIPC and MDRI are closely connected empirically because MDRI eligibility normally follows the HIPC completion point. It is consequently difficult to identify their separate effects, particularly when completion-point relief and MDRI cancellation occur within a short period. For this reason, some empirical studies estimate the combined effect of the two initiatives, while others distinguish between the HIPC decision point, HIPC completion point and implementation of MDRI. For this dissertation we will combine the effect of the two initiatives.

2.2.3. The Debt Service Suspension Initiative

The Debt Service Suspension Initiative was introduced by the G20 in May 2020 to address the financial pressure caused by the COVID-19 pandemic. It allowed eligible countries to postpone debt-service payments owed to official bilateral creditors between May 2020 and December 2021. Forty-eight of seventy-three eligible countries participated, and nearly 12.9 billion USD in debt-service payments was suspended. Cameroon, the Central African Republic, Chad and the Republic of Congo have received debt service suspension between 2020 and 2021.

The DSSI initiative is also different from HIPC and MDRI. It did not cancel or reduce external debt but it postponed payments that had to be repaid later. Its purpose was to address an immediate liquidity shortage rather than eliminate a structural solvency problem. Therefore, the expected effects of DSSI should be temporary. It could preserve health, social and crisis-related expenditure during the pandemic but it could not, on its own, place an unsustainable debt stock on a permanently sustainable trajectory.

2.3. Theoretical framework

2.3.1. Debt overhang theory and debt Laffer curve

One of the principal justifications behind debt relief programs is debt overhang by Krugman. He defined Debt overhang as situation where a country has accumulated so much debt that the expected future debt obligations become too large causing the investment incentive to fall as returns are expected to accrue to creditors rather than the domestic economy (Krugman, 1988; Sachs, 1989). Krugman illustrated this mechanism with the Debt Laffer Curve. The curve shows that, at the beginning, the expected debt repayments increase as the level of debt rises. However, beyond a certain point, the debt burden becomes so large that it weakens investment, reduces growth, and lowers the country's repayment capacity. From

that point onward, having more debt no longer means higher expected repayment but it has the opposite effect. After a critical threshold, debt becomes self-defeating. In that situation, partial debt forgiveness can benefit both the debtor country and its creditors. By reducing the debt burden, debt relief can restore investment incentives, support economic activity, and ultimately increase the amount that creditors can realistically expect to recover.

Empirically, this critical debt threshold cannot be observed directly. It must be estimated from the relationship between indebtedness and economic performance. There are two main approaches that can be used to estimate it. The first one consists of adding both the debt ratio and its squared term in a growth or investment regression. This allows the model to capture a non-linear relationship between debt and economic outcomes. The second approach is to use a panel threshold regression, where the effect of debt can differ depending on whether the debt level is below or above an estimated threshold. In this case, the threshold is not chosen randomly. It is estimated as the debt level that best fits the data. Usually, it is done by selecting the value that minimizes the residual sum of squares. This makes it possible to identify the point at which debt may start to have a more harmful effect on growth or investment.

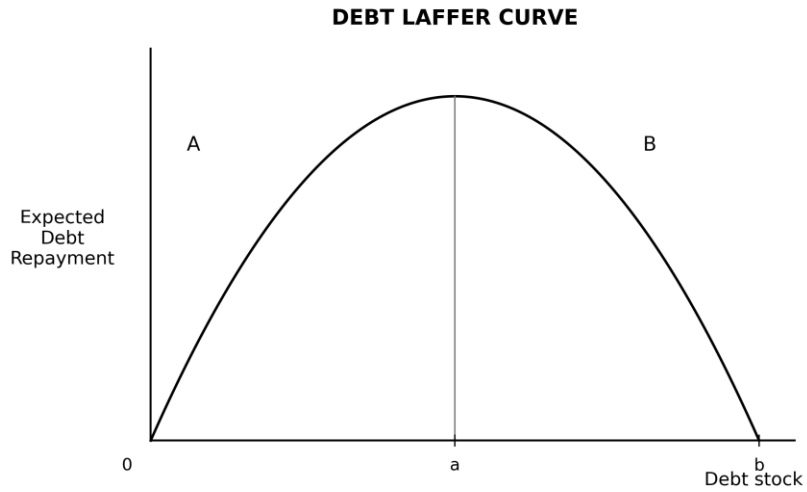


Figure 2.1: Laffer debt curve

Source: Author's elaboration based on Krugman (1988) and Claessens (1990).

The Laffer debt curve has an inverted-U shape and helps to explain how a country's expected debt repayment changes as its debt stock increases. First, when debt increases, expected repayment also increases. This is because the debt level is manageable and the country is still able to repay it without constraining the economy. However, after a certain point, the debt burden becomes too heavy. Any additional debt reduces expected repayment because it weakens investment, slows growth, and increases the risk of default. This applies most directly to external debt because repayment involves a transfer of resources from the debtor country to foreign creditors. For domestic debt, the mechanism is less direct

because repayments are mainly transfers within the country. But similar effects can still be observed. For example, a high level of domestic debt may require higher taxes, increase uncertainty, distort incentives, and reduce private-sector confidence.

Sachs (1989) extended the debt-overhang argument beyond the investment-return logic and showed that excessive external debt affects the entire macroeconomic environment of developing countries. His main point was that excessive external debt creates a climate of uncertainty where investors and households do not know whether the government will default, whether taxes will increase, whether inflation will be used to reduce the real value of debt, whether the currency will depreciate, or whether future IMF programs will impose austerity measures. This uncertainty matters because it discourages investment and weakens confidence in the economy.

Sachs also argued that high debt forces governments to choose policies that are bad for development because they are trying to survive the debt burden. He shows that heavily indebted economies face a double constraint. On one hand, private investors are discouraged because they expect that future returns will be used to repay creditors. On the other hand, governments are often forced into pro-cyclical fiscal adjustments, meaning they cut spending or raise taxes precisely when the economy is already weak. This further suppresses growth.

Like Krugman, Sachs relies on the logic of the Debt Laffer Curve. When debt reaches unsustainable levels, the country's repayment capacity starts to decline because growth itself collapses. Sachs' central conclusion is that debt relief may be necessary to restore macroeconomic stability, revive investment, and support long-term development in developing countries.

2.3.2. Debt sustainability analysis

Debt-overhang theory helps explain why reducing an excessive debt burden can improve investment incentives and, more broadly, economic performance. However, this theory does not fully explain whether the positive effects of debt relief will last over time. This is where debt-sustainability analysis becomes important. It looks at whether a government can continue to meet its current and future financial obligations without having to default, restructure its debt again, or implement unrealistic fiscal adjustments.

2.3.2.1. Government budget constraint

The starting point of debt-sustainability analysis is the government budget constraint. Basically, the government must finance its spending and repay existing obligations. In nominal terms, this can be done through government revenue, new domestic borrowing, new external borrowing, or, in some cases, monetary financing. This framework is useful because it shows that public debt does not evolve in isolation. It depends on fiscal choices, interest payments, borrowing conditions, and the way the government covers its financing needs. A simplified consolidated government and central-bank budget constraint can therefore be written as:

$$D_t + i_t B_{t-1} + i_t^* E_t B_{t-1}^* = \Delta B_t + E_t \Delta B_t^* + \Delta M_T \qquad (2.1)$$

Where:

- D_t is the primary fiscal deficit

- B_t is the stock of domestic-currency public debt,
- B_t^* is the stock of foreign-currency public debt,
- i_t and i_t^* are the corresponding nominal interest rates,
- E_t is the nominal exchange rate expressed as units of domestic currency per unit of foreign currency,
- ΔM_t represents monetary financing.

Equation 2.1 shows that both the primary deficit and interest payments must be financed. To finance both, the government can rely on domestic debt, external debt or money creation. The equation also differentiates primary deficit from fiscal deficit. The primary deficit excludes interest payments. It focuses only on the gap between government revenue and non-interest expenditure. The fiscal deficit, however, includes the cost of servicing debt that was accumulated in the past. This distinction is important for debt relief case. Debt relief can ease interest payments and improve the fiscal balance, yet this does not automatically reflect a healthier fiscal stance. A country may pay less interest after debt relief while still running a large primary deficit. In that case, the debt burden may start building up again over time. To analyze this more clearly, the budget constraint can be divided by the price level. If we first abstract from foreign-currency borrowing, the real consolidated budget constraint can be written as:

$$d_t + r_t b_{t-1} = \Delta b_t + s_t \qquad (2.2)$$

Where:

- d_t is the real primary deficit
- b_t is the real stock of government debt
- r_t is the real interest rate
- s_t is seigniorage revenue generated through money creation

The real interest rate is given by:

$$r_t = \frac{1 + i_t}{1 + \pi_t} - 1 \qquad (2.3)$$

Where:

- i_t is the nominal interest rate and
- π_t is the inflation rate.

The equation shows that the real burden of debt depends not only on the nominal interest rate but also on inflation.

2.3.2.2. Debt-to-GDP dynamics

Because a government's repayment capacity depends on the size of its economy, debt sustainability is generally assessed by expressing debt and fiscal variables as percentages of GDP. Dividing Equation 2.2 by real GDP produces:

$$b_t = \left(\frac{1 + r_t}{1 + g_t}\right) b_{t-1} + d_t - s_t \qquad (2.4)$$

Where:

- b_t now represents public debt as a share of GDP,
- d_t is the primary deficit as a share of GDP,
- g_t is the real GDP growth rate
- s_t is seigniorage revenue as a share of GDP.

Equation 2.4 identifies three principal determinants of debt dynamics. First, debt increases when the real interest rate exceeds the real economic growth rate:

$$r_t > g_t \qquad (2.5)$$

Under this condition,

$$\frac{1 + r_t}{1 + g_t} > 1 \qquad (2.6)$$

This means that the existing stock of debt increases faster than the economy's ability to service it. Put differently, debt starts growing more quickly than GDP, which makes the debt burden harder to manage over time. Unless the government can generate sufficient primary surpluses, or obtain additional revenue from other sources, the debt-to-GDP ratio will continue to rise.

A second important factor is the persistence of primary deficits. When government expenditure, excluding interest payments, remains higher than non-interest revenue, the country keeps adding new debt to finance current spending. In that case, even a large debt cancellation may only provide temporary relief. If the fiscal position does not improve after debt relief, the debt burden can build up again quite quickly. This is one of the reasons why debt relief does not always lead to long-term debt sustainability.

A third mechanism is seigniorage, which refers to the government's ability to finance part of its spending through money creation. In theory, seigniorage can reduce the amount that needs to be financed through borrowing. However, this mechanism is quite limited in the case of CEMAC countries. governments do not control money creation independently, because monetary policy is conducted at the regional level by the Bank of Central African States.

This matters because CEMAC governments cannot use monetary financing in the same way as countries that issue debt in a currency controlled by their own national central bank. In other words, they cannot simply rely on domestic money creation to absorb fiscal pressures. Their debt dynamics are therefore more constrained.

For the CEMAC region, the debt-dynamics equation should also account for stock-flow adjustments:

$$b_t = \left(\frac{1 + r_t}{1 + g_t}\right) b_{t-1} + d_t - s_t + v_t \qquad (2.7)$$

where v_t captures changes in debt that are not fully explained by the recorded primary balance. These may include exchange-rate valuation effects on foreign-currency debt, recognition of previously unrecorded arrears, government guarantees that are called, assumption of state-owned-enterprise liabilities, bank

recapitalization costs and finally discrepancies between fiscal flows and debt stocks. This extension is important because the official fiscal deficit may underestimate the effective increase in government liabilities

2.3.2.3. The debt-stabilizing primary balance

Equation 2.7 can be used to determine the fiscal balance required to prevent the debt-to-GDP ratio from increasing. Setting $b_t = b_t - 1$ gives:

$$pb_t^* = \left(\frac{r_t - g_t}{1 + g_t}\right) b_{t-1} - s_t + v_t \qquad (2.8)$$

where pb_t^* is the debt-stabilizing primary surplus. When the real interest rate exceeds economic growth, a positive primary surplus is required to stabilize debt. The required surplus becomes larger when the initial debt ratio is high, the effective interest rate increases, economic growth declines, stock-flow adjustments added to recorded debt and monetary financing are unavailable or highly constrained

v_t represents the stock-flow adjustments. These are changes in the debt-to-GDP ratio that are not fully explained by the recorded primary balance. They may come from exchange-rate valuation effects, the recognition of arrears, government guarantees that are called bank recapitalization costs, or the assumption of liabilities from state-owned enterprises. A positive stock-flow adjustment increases public debt independently of the primary deficit. For this reason, it raises the primary surplus required to stabilize debt. By contrast, a negative stock-flow adjustment would reduce the required primary surplus.

The same condition, without stock-flow adjustments, can be expressed as:

$$s - d \geq \frac{r - g}{1 + g} b_0 \qquad (2.9)$$

where d is the primary deficit and s is seigniorage revenue. When seigniorage is negligible, the government must generate a primary surplus at least equal to:

$$-d \geq \frac{r - g}{1 + g} b_0 \qquad (2.10)$$

This condition explains why the debt-to-GDP ratio alone is insufficient to analyze sustainability. A country with a moderate debt ratio may still require a large fiscal adjustment when borrowing costs are high, economic growth is weak, or government revenue is limited. In sum, a country with a high debt ratio may maintain sustainability when growth is strong and financing costs remain low.

2.3.3. Liquidity and solvency in CEMAC

The distinction between liquidity and solvency becomes even more important in the context of monetary unions, where governments do not control their own currency. A solvency crisis is about the long-term ability of a government to repay its debt. A government is solvent if its expected revenue is greater than its debt stock. A liquidity crisis, by contrast, is about the short-term ability to meet payments due today or this year. A government can be perfectly solvent but still unable to roll over maturing bonds, pay interest due this month, access financial markets at reasonable rates. This distinction is crucial because liquidity problems can trigger default even when solvency is not an issue. This matters more in a monetary union

because countries with their own central bank and debt in their own currency have tools to manage liquidity shortages. The central bank can act as a lender of last resort to provide emergency liquidity, purchase government bonds or create money if needed. This means temporary liquidity shortages are less likely to turn into defaults. The government has a backstop. But CEMAC members states do not have this backstop. Their governments rely on the regional securities market for financing. Even though debt is denominated in CFA francs, refinancing risks remain high. Borrowing in CFA francs helps, but it does not fully protect those governments from market pressures. They remain exposed to liquidity shocks that can quickly escalate into debt stress.

2.3.4. Institutional quality

The effectiveness of debt relief does not depend on itself but it's also dependent on the institutional environment. This means that institutional quality and debt management go hand in hand with post-relief performance. When Governments have weak institutions, or when debt is managed poorly, the benefits of debt relief may remain temporary and eventually disappear. Institutions can influence the economic effects of debt relief through several channels.

First, budgetary institutions. Budgetary institutions determine whether the savings generated by debt relief are effectively captured within the national budget. When budgets are transparent, comprehensive, and credible, reductions in debt-service payments become visible and can be reallocated toward productive expenditures such as public investment, education, health care, infrastructure, and poverty-reduction programs. In contrast, when budget systems are weak or opaque, it becomes difficult to identify where the savings go, making it difficult for debt relief to translate into economic growth.

Second, public-investment institutions. Public-investment institutions determine how the fiscal space created by debt relief is transformed into productive assets. These institutions determine how projects are selected, evaluated, implemented, and monitored. When public-investment systems are strong, governments select projects based on economic and social returns. They conduct proper cost-benefit analysis, prioritize infrastructure and social investments that have high impact and they ensure that projects are completed on time and within budget. They also monitor performance and evaluate outcomes. In such environment, the fiscal space created by debt relief becomes growth-enhancing. More spending leads to better roads and energy infrastructure, improved health and education outcomes, higher productivity and long-term growth. However, in many developing countries, public-investment institutions are weak. This is where the transmission mechanism can weaken. In Weak government systems, corruption is high, projects are often picked without proper analysis, and they are selected based on political gain. Most of those projects end up being delayed or abandoned. In such cases, higher spending may fail to generate productive assets or durable improvements in public services.

Third, domestic revenue-mobilization. Domestic revenue-mobilization institutions play a crucial role in sustaining the benefits of debt relief. Strong revenue collection institutions help countries avoid falling back into unsustainable debt. Even after debt relief, governments still need to finance public investment, social services, infrastructure and recurrent expenditures. If domestic revenue is low or unstable, governments may struggle to fund essential services, accumulate new debt or become vulnerable to external shocks. Debt sustainability is therefore not only about spending control, but also about revenue capacity. When tax administration is weak or inefficient, several problems arise. There can be low tax collection, high informality or tax evasion. To fill the gap, governments borrow more, recreating debt vulnerabilities. In

short, weak tax institutions erode fiscal capacity, making it harder to maintain debt sustainability. When tax systems are transparent, well-managed, and efficiently administered, governments can collect revenue consistently and fairly. This means the fiscal space created by debt relief becomes self-sustaining so governments can continue funding development priorities without returning to high debt levels.

Fourth, political and accountability institutions. Political and accountability institutions shape how governments decide to borrow, why they borrow, and what they borrow for. When legislative oversight is weak, parliaments cannot effectively analyze borrowing decisions, question the reasons for new loans, demand cost-benefit analysis or ensure transparency in debt contracts. Without strong oversight, borrowing decisions may be made by a small group of officials without proper evaluation or accountability. This increases the likelihood of poorly justified loans. If debt contracts, project details, or fiscal risks are not publicly disclosed citizens cannot monitor how borrowed funds are used and hold leaders accountable. The media cannot investigate misuse or corruption as well. Low transparency creates an environment where governments can borrow without public scrutiny, making it easier to finance projects that do not benefit the economy. In many countries, people in power or interest groups can borrow to finance prestige projects, patronage networks, and infrastructure benefiting specific regions or businesses. These projects often generate private benefits for a small group rather than public returns for the economy. As a result, debt accumulates without improving productive capacity. In this scenario, debt relief does not solve the underlying problem because the political system continues to encourage unproductive borrowing.

The broader institutional diagnostic developed by Bourguignon and Houssa (2023) is useful for understanding this mechanism. Their work shows how corruption, weak public management, opacity in government decision-making, and rent-seeking can interact and constrain development. Although their empirical analysis focuses on Benin rather than CEMAC, their approach remains relevant here. It shows that institutional weaknesses should not only be measured through one broad governance score. Instead, they should be examined through their concrete effects on public decisions, especially how governments allocate resources, manage debt, and transform fiscal space into real development outcomes.

Institutional quality is hard to measure because institutions are complex. They have parts that are informal and can't be seen and measured directly. For example, government effectiveness, control of corruption, regulatory quality, rule of law, and public-sector management They are qualities which means researchers must approximate them using perceptions, expert assessments, administrative data, or observe what happens. Chapter 3 of Bourguignon et al. (2023) Written by Houssa and Bourguignon (2023) is especially helpful for understanding this. The authors compare the quality of institutions using three international sources: the Quality of Government database the Worldwide Governance Indicators and the World Bank's Country Policy and Institutional Assessment. In addition, they added a survey of local decision-makers and evidence from country-specific growth studies. This mix is helpful because it shows that measuring institutions is not as simple as picking one score. Their analysis also shows important limitations when overall scores for institutions are used.

To begin with, indicators with similar names do not always measure the same thing. For example, control of corruption, government effectiveness, and public management may look similar, but they can be built from different, different sources, different variables, and different weighting methods. This means that two indicators with similar names may measure different aspects of institutional performance because one might emphasize formal rules, while another emphasizes actual outcomes or perceptions.

Second, institutional databases can give different assessments of the same country. A country might have a high score in corruption in one corruption indicator but a low one in another indicator. This does not mean one source is wrong. It could mean that the ways they define things, where they get the data, the aggregation methods they used, or the specific dimension of institutional performance that each indicator emphasizes are different. In words the differences show that institutions are hard to describe in just one number.

Third, overall scores do not show the precise source of institutional dysfunction. For example, a low score in government effectiveness does not tell us what the problem is. Is it because the tax system is not good? Weak budget execution? Inefficient infrastructure regulation? Or poor delivery service? Overall scores are useful for comparisons, but they do not always explain exactly what is wrong.

Fourth, comparing institutional indicators over time can also be tricky. Sometimes an improvement can be the result of a change in measurement, data sources, or aggregation methods not because the actual institutions changed. This is important because changes in institutions usually happen slowly and a change in how they are measured can make it look like improvement or decline when the real situation is not clear.

Finally expert and perception-based surveys also have limitations. They provide valuable information because they reflect the views of people who are directly exposed to institutions. But answers can depend on the respondent's profession, access to information, political position, or personal. Different groups may see the institution differently. Also, surveys can show which areas are seen as problematic, but they do not always explain how those problems affect the economy. Because of these reasons using a single institutional indicator as a complete measure of institutional quality would be inappropriate. The quality of institutions is too big and too complex to be shown in one number. A better way is needed. Overall scores can be useful, but They should be used carefully and if possible, supported with more specific evidence on how institutions shape government choices handling money and the economy.

2.3.5. Debt Management

Debt management is a specific and practical part of how good institutions are. It refers to the legal, administrative, and strategic system that helps a government to meet its financing needs while keeping the cost and risks of borrowing under control over the medium and long term. This is important when it comes to debt relief. Debt relief can help with debt problems, but what happens after the relief depends on how the government manages new borrowing. In words debt relief can be a new start but it does not mean the country will stay on a good path. The World Bank's Debt Management Performance Assessment framework lists important elements for effective debt management. These include the legal framework, managerial structure, debt strategy, coordination with fiscal and monetary policy, borrowing procedures, operational risk management, debt recording, reporting, and audit practices (World Bank, 2021). These elements are important because the sustainability of the remaining debt and new debt depend on how the government handles borrowing after relief.

Post-relief debt-management capacity can therefore be examined through four main areas. The first is borrowing strategy and portfolio risk, which concerns the type of debt governments contract, its maturity, currency composition, and cost. The second is debt recording and transparency, because governments need reliable information on what they owe, to whom, and under what conditions. The third is fiscal coordination and control of contingent liabilities, since public debt risks may also come from state-owned enterprises, guarantees, or off-budget commitments. Finally, the fourth area is accountability and the proper use of

borrowed resources, which determines whether new borrowing finances productive development projects or simply recreates debt pressures without generating long-term returns.

2.4. Empirical findings

Multiple studies have been conducted on debt relief, and one of the most consistent findings in the literature is that the HIPC Initiative and the MDRI reduced external debt burdens and, in many cases, debt-service obligations. Debt relief can therefore be considered financially effective, even when its broader developmental effects remain less clear (Ferry and Raffinot, 2019; Cassimon et al., 2015b). Lower debt service can relax the government's short-run financing constraint, reduce pressure on public budgets, and create room for social or productive expenditure.

One of the main findings in the literature is that debt relief has more consistent effects on fiscal and debt outcomes than on long-term economic growth. Cassimon et al. (2015a) show that debt relief affected fiscal space and public-finance behaviour. Similarly, Cassimon and Van Campenhout (2008) examine 24 African HIPC countries and find that debt relief was associated with higher current expenditure, lower domestic borrowing, and some improvement in domestic revenue after a lag. However, they do not find strong evidence that debt relief increased public investment. Dessy and Vencatachellum (2007) also find that debt relief increased the share of resources allocated to education and health, mainly in countries where institutional quality improved. This suggests that the same amount of fiscal space can produce different results depending on public-sector capacity, expenditure management, and political accountability.

The literature also shows that some HIPC beneficiaries rapidly rebuilt their public debt after relief. Merotto, Stučka, and Thomas (2015) identify eight African HIPC/MDRI recipients whose debt accumulation was sufficiently rapid that they risked returning to their pre-HIPC debt levels within a relatively short period. Cassimon et al. (2015b) also show that the "clean slate" effect of debt relief could be weakened by renewed borrowing, especially commercial and non-concessional borrowing. This created new repayment pressures and refinancing risks. Presbitero (2009) also finds that debt relief was correlated with rising domestic debt in HIPC countries, which may have partly offset the improvement in external debt.

This post-relief vulnerability is also linked to broader changes in African borrowing patterns. Essers and Cassimon (2022) show that greater access to capital markets, the growing role of emerging creditors, and changes in borrowing structures were associated with greater debt risks in many African countries after relief. Ndulu and O'Connell (2021) also place renewed debt vulnerabilities in a broader borrowing cycle shaped by commodity shocks, increased borrowing capacity, primary deficits, changing financing conditions, and rising debt-service risks. In other words, debt relief created fiscal space, but many countries later borrowed again under conditions that were not always sustainable.

The literature also suggests that the effectiveness of fiscal space depends on domestic revenue mobilization. Debt relief may reduce debt-service payments and create short-term fiscal breathing space, but it does not automatically create a sustainable fiscal position. Houssa and Megersa (2020) discuss several constraints that developing countries face in raising tax revenue, including weak administrative capacity, implementation problems, and political resistance to reform. These constraints are especially relevant for fragile and resource-dependent economies, where tax collection can be weakened by dependence on natural-resource revenues and limited administrative capacity.

This point is important for the CEMAC context. If governments cannot strengthen domestic revenue mobilization after debt relief, they may remain dependent on external borrowing, domestic borrowing, or commodity revenues to finance public expenditure. In that case, the fiscal space created by debt relief may

remain temporary. Similarly, Houssa and Megersa (2026) show that institutional quality improves tax-revenue performance and strengthens the revenue gains associated with VAT adoption. This suggests that the developmental impact of debt relief depends not only on lower debt-service payments, but also on the broader fiscal capacity of the state. Debt relief can create an opportunity, but stronger tax institutions and better revenue mobilization are needed to make that opportunity sustainable.

Finally, commodity dependence may limit the durability of debt relief. A narrow export base reduces foreign exchange earnings and makes debt-service capacity highly sensitive to international commodity prices. Yang and Nyberg (2009) show that many post-completion-point countries continued to face narrow export structures, weak domestic revenue mobilization, weak institutional frameworks, and risks linked to non-concessional borrowing. Therefore, export diversification can be understood as an important condition for preventing renewed debt distress, even if it is not their exact estimated finding. The post-HIPC debt literature also suggests that commodity dependence contributed to renewed debt vulnerability by exposing countries to adverse price movements after new obligations had been accumulated (Merotto, Stučka, and Thomas, 2015; Cassimon et al., 2015b).

3. METHODOLOGY

3.1. Data

The study is based on an annual country-level panel that covers the time from 1990 to 2024 for CEMAC member states (Cameroon, the Central African Republic, Chad the Republic of Congo Gabon and Equatorial Guinea). Out of these countries Cameroon, the Central African Republic, Chad and the Republic of Congo are considered debt-relief countries because they reached the HIPC completion point and received HIPC/MDRI debt relief. On the other hand, Gabon and Equatorial Guinea did not get HIPC/MDRI relief. These two countries are used as untreated comparison countries within CEMAC.

For the Generalized Synthetic Control analysis and the difference in difference methods, the data is expanded beyond CEMAC to create a donor pool. This donor pool includes Angola, Kenya, Botswana, Namibia, South Africa, Eswatini, Lesotho, Cabo Verde, Mauritius, Eritrea, Zimbabwe and Sudan. These countries serve as comparison units. To keep the analysis the same the data for these donor countries was collected from the sources and during the same time period as the CEMAC countries.

The debt-related data comes from the World Bank International Debt Statistics. This source is used to collect data on external debt, debt service and debt forgiveness or debt reduction. Total external debt and debt service are used as measures of debt sustainability while debt forgiveness is used to create the debt-relief-intensity variable. The macroeconomic data is taken from the World Bank World Development Indicators. This includes GDP growth, gross fixed capital formation, inflation, population growth, trade openness and oil rents. GDP growth is the indicator of economic performance while gross fixed capital formation shows the investment channel. Inflation, population growth, trade openness and oil rents are used as control variables because they represent stability, population pressure, openness to trade and reliance on commodities. Institutional quality is measured using government effectiveness, which is taken from the Worldwide Governance Indicators provided by the World Bank. Government effectiveness is used as a sign of strength, especially the ability of governments to create and carry out public policies. Along with government effectiveness, the analysis also looks at control of corruption from the Worldwide Governance Indicators.

The treatment variable depends on the HIPC/MDRI completion point. This date is important because it is when debt relief is final and eligible countries get HIPC help along with more debt cancellation under MDRI. The HIPC/MDRI completion dates were found in IMF and World Bank HIPC completion documents and country reports. The HIPC/MDRI treatment dummy is set to one starting from the completion year. Zero before that year. Gabon, Equatorial Guinea and all the donor countries are never treated.

The study also includes the Debt Service Suspension Initiative. DSSI is treated separately from HIPC/MDRI because it was not a long-term debt-cutting program. Instead, it was a short-term pause in paying debt during the time of the COVID-19 pandemic. Information about DSSI participation came from World Bank DSSI documents. In the study the DSSI dummy is set to one for countries that took part in 2020 and 2021 and zero otherwise.

Lastly domestic debt is not included as a variable in the analysis because there was not consistent annual data for domestic public debt in all CEMAC countries, over the whole time period. This is a limitation especially considering how much domestic and regional borrowing is increasing in CEMAC. Because of this the study should mainly be seen as showing what is happening with debt not with all public debt.

3.2. Fixed-Effects Panel Regression

The main empirical strategy is a fixed-effects panel regression. This method is appropriate because the objective is to estimate whether larger debt relief is associated with better economic performance and more sustainable debt dynamics.

The Baseline equation is:

$$Y_{it} = \alpha_i + \lambda_t + \beta DebtReliefIntensity_{i,t-1} + \gamma X_{it} + \varepsilon_{it} \qquad (3.1)$$

where:

- Y_{it} is the outcome variable for country i in year t
- α_i is the country fixed effects
- λ_t is year fixed effects
- $DebtReliefIntensity_{i,t-1}$ is the lagged debt relief intensity
- X_{it}vector of control variables
- ε_{it} is the error term

The coefficient of interest is β. It measures whether higher debt relief intensity is associated with changes in the outcome variable.

The treatment variable is lagged by one year to reduce simultaneity concerns. Debt relief is often granted in response to severe debt distress, using the lagged value helps examine whether relief is followed by changes in outcomes rather than simply reflecting contemporaneous crisis conditions.

The first set of regressions examines the direct association between debt relief intensity and economic performance:

$$GDPGrowth_{it} = \alpha_i + \lambda_t + \beta DebtReliefIntensity_{i,t-1} + \gamma X_{it} + \varepsilon_{it} \qquad (3.2)$$

Control variables:

- Inflation
- Population growth
- Trade
- Oil rents
- Government effectiveness
- Control of corruption

In the baseline fixed-effects models, the control variables are inflation, population growth, and trade. Oil rents are only introduced in the models testing whether commodity dependence conditions the effect of debt relief**.**

3.2.1. Mechanism Analysis

The research question is not only whether debt relief worked, but under what conditions it worked and why its effects may have remained limited or unsustainable. The fixed-effects framework is therefore extended through mechanism regressions.

3.2.1.1. Rapid Debt Re-Accumulation

To test whether the effects of debt relief were limited by renewed borrowing, the analysis uses debt-sustainability outcomes: External debt as a percentage of GNI and Debt service as a percentage GNI

The model is:

$$DebtOutcome_{it} = \alpha_i + \lambda_t + \beta DebtReliefIntensity_{i,t-1} + \gamma X_{it} + \varepsilon_{it} \qquad (3.3)$$

If debt relief intensity is associated with a decline in external debt, this would suggest that the initiative achieved its direct financial objective. However, because the analysis does not include consistent domestic public debt data, it cannot directly test whether this external debt reduction was later offset by new domestic or regional borrowing.

This is particularly relevant for CEMAC because the regional securities market has become increasingly important and may reintroduce debt vulnerabilities through interest-rate, rollover, and liquidity risks.

The analysis uses total external debt and debt service as the main debt-sustainability outcomes. These variables make it possible to examine whether debt relief was followed by a reduction in external debt burdens and repayment pressure. In that sense, they are useful for assessing whether debt relief improved the external side of debt sustainability.

However, they do not capture the full picture of public debt dynamics. This is because consistent annual data on domestic public debt are not available for all CEMAC countries over the entire sample period. As a result, the analysis cannot fully assess whether the decline in external debt was later offset by new domestic or regional borrowing.

For this reason, rapid debt re-accumulation is treated mainly as a contextual and interpretative mechanism, rather than as a mechanism directly tested in the regressions. The empirical analysis can show whether debt relief reduced external debt, but it cannot determine with certainty whether governments later rebuild debt through domestic financing or borrowing on the regional market.

This limitation is particularly important in the CEMAC context. In recent years, governments have increasingly relied on the regional securities market to meet their financing needs. So, even when external debt falls, debt vulnerabilities may persist if countries continue to accumulate domestic or regional debt.

3.2.1.2. Institutional Quality

To test whether institutional quality impacts the effect of debt relief, the following interaction models are estimated:

$$Y_{it} = \alpha_i + \lambda_t + \beta_1 DebtReliefIntensity_{i,t-1} + \beta_2 GovernmentEffectiveness_{it} + \beta_3\left(DebtReliefIntensity_{i,t-1} \times GovernmentEffectiveness_{it}\right) + \gamma X_{it} + \varepsilon_{it} \quad (3.4)$$

$$Y_{it} = \alpha_i + \lambda_t + \beta_1 DebtReliefIntensity_{i,t-1} + \beta_2 Control\_of\_Corruption_{it} + \beta_3\left(DebtReliefIntensity_{i,t-1} \times Control\_of\_Corruption_{it}\right) + \gamma X_{it} + \varepsilon_{it} \quad (3.5)$$

The coefficient $\beta_3$is the key parameter. If the dependent variable is GDP growth, a positive $\beta_3$would suggest that debt relief is more effective when government effectiveness or control of corruption is higher. If the dependent variable is external debt or debt service, a negative $\beta_3$would suggest that stronger institutions help transform debt relief into more durable debt reduction.

This specification directly addresses the hypothesis that weak institutions and limited debt-management capacity reduce the effectiveness of debt relief.

3.2.1.3. Fiscal-Space Use

Debt relief may improve economic performance by lowering debt-service payments and freeing public resources that can be redirected toward investment, social expenditure, or other growth-enhancing uses. This is the main logic behind the fiscal-space channel. If governments spend less on debt repayment, they should, in principle, have more room to finance public investment, infrastructure, education, health care, or other expenditures that can support long-term development.

In this dissertation, the fiscal space mechanism is tested indirectly. The first step is to examine whether debt relief reduced debt-service pressure. If debt service falls after debt relief, this suggests that some fiscal space may have been created. The second step is to examine whether this fiscal space translated into stronger economic outcomes, especially higher investment and GDP growth. For this reason, gross fixed capital formation is used as the main dependent variable for the investment channel, while GDP growth captures the broader economic-performance effect.

The expected mechanism is therefore the following: debt relief should reduce debt service, lower fiscal pressure, and then support investment and growth. However, if debt relief reduces debt-service pressure but does not increase gross fixed capital formation or GDP growth, this would suggest that the fiscal-space channel is weak. In that case, the resources released by debt relief may have been limited, temporarily, absorbed by other spending needs, or not fully transformed into productive expenditure.

This interpretation must remain cautious. The analysis does not directly observe how governments used the fiscal space created by debt relief. It does not include detailed data on public-investment efficiency, budget execution, health expenditure, education expenditure, or the quality of public spending. Therefore, the results cannot formally prove that fiscal space was inefficiently used. They can only show whether debt relief reduced debt-service pressure and whether this reduction was followed by stronger investment or growth.

3.2.1.4. Commodity Dependence

To test whether commodity dependence weakens the effectiveness of debt relief, the model includes interactions between debt relief intensity and commodity-dependence indicators:

$$Y_{it} = \alpha_i + \lambda_t + \beta_1 DebtReliefIntensity_{i,t-1} + \beta_2 OilRents_{it} + \beta_3\left(DebtReliefIntensity_{i,t-1} \times OilRents_{it}\right) + \gamma X_{it} + \varepsilon_{it} \quad (3.6)$$

If the outcome is GDP growth, a negative $\beta_3$would suggest that debt relief is less growth-enhancing in commodity-dependent economies. If the outcome is external debt or debt service, a positive $\beta_3$would suggest that commodity dependence makes debt sustainability more fragile after relief.

This is important because CEMAC economies are highly exposed to commodity shocks, especially oil shocks, and commodity dependence represents a key structural vulnerability in the region.

3.3. Generalized Synthetic Control

The fixed-effects regressions provide the main panel evidence. However, they may not fully account for unobserved time-varying heterogeneity. This matters because CEMAC countries differ in debt structures, political conditions, commodity dependence, and institutional capacity.

For this reason, the analysis complements the fixed-effects regressions with the Generalized Synthetic Control Method. This method constructs counterfactual trajectories for treated countries by combining information from untreated comparison countries. It is more flexible than standard Difference-in-Differences because it allows unobserved factors to vary over time and affect countries differently.

For the GSC analysis, treatment is defined as a binary indicator equal to one from the HIPC completion year onward:

$$D_{it} = \begin{cases} 1 & \text{if country } i \text{ has reached HIPC completion by year } t \\ 0 & \text{otherwise} \end{cases} \quad (3.7)$$

Debt relief intensity is not used as the treatment variable in the GSC model. Instead, it is used after estimation to interpret heterogeneity across treated countries. For example, the estimated GSC effects can be compared with each country's relief intensity to assess whether larger relief was associated with stronger or more durable improvements.

3.3.1. Donor pool for Generalized Synthetic control

The donor pool includes Gabon and Equatorial Guinea because they are CEMAC countries that did not receive HIPC relief. However, the donor pool is expanded beyond these two countries because relying only on two CEMAC controls would be too restrictive and may produce weak counterfactuals.

Table 3.1: Donor pool

Country	ISO code	Reason for inclusion
Gabon	GAB	CEMAC non-HIPC country
Equatorial Guinea	GNQ	CEMAC non-HIPC country
Angola	AGO	Resource dependent
Kenya	KEN	Non-HIPC comparison with relatively broad data availability
Botswana	BWA	Resource-exporting with strong data availability
Namibia	NAM	Resource exporting
South Africa	ZAF	Large African economy with strong data coverage
Eswatini	SWZ	Small African economy
Lesotho	LSO	Small African economy
Cabo Verde	CPV	Small African economy with non-HIPC comparison value
Eritrea	ERI	Fragile economy comparison, subject to data availability
Zimbabwe	ZWE	Fragile macroeconomic comparison, subject to data availability
Sudan	SDN	Resource-dependent and fragile comparison, subject to data availability

The same master donor pool is considered for all treated countries. However, the effective comparison set may differ across outcomes because some donor countries may have missing data or poor pre-treatment fit.

The methodology therefore uses one common master donor pool but not one mechanically identical final donor set in every estimation. Countries that received comparable HIPC/MDRI debt relief during the relevant treatment window are excluded from the main donor pool to avoid contamination of the counterfactual. These countries may be considered only in robustness checks with an expanded donor pool.

3.3.2. GSC Outcomes

The GSC analysis is estimated separately for the main outcomes:

- GDP growth
- Gross fixed capital formation as a percentage of GDP
- External debt as a percentage of GDP or GNI
- Debt service as a percentage of external debt or exports

The estimated treatment effect is:

$$\hat{\tau}_{it} = Y_{it} - \hat{Y}_{it}(0) \qquad (3.8)$$

where Y_{it} is the observed outcome and $\hat{Y}_{it}(0)$ is the estimated counterfactual outcome in the absence of debt relief.

The GSC results are interpreted as complementary evidence. They help assess whether the fixed-effects results are consistent with country-specific counterfactual trajectories. Because statistical inference could not be implemented reliably in all GSC specifications, the GSC estimates are interpreted as descriptive counterfactual evidence rather than definitive causal estimates.

3.4. Robustness Check: Difference-in-Differences

As a robustness check, the study uses Difference-in-Differences to compare the post-treatment outcomes of HIPC/MDRI-treated countries with untreated comparison countries. Unlike the fixed-effects specification, which uses debt relief intensity, the Difference-in-Differences analysis uses a binary treatment indicator. This choice reflects the objective of the robustness check: to examine whether countries that reached the HIPC/MDRI completion point experienced different post-treatment outcomes relative to countries that did not receive comparable debt relief.

The treatment variable is defined as follows:

$$D\_HIPC\_MDRI_{it} = \begin{cases} 1 & \text{if country } i \text{ has reached HIPC/MDRI completion by year } t \\ 0 & \text{otherwise} \end{cases} \qquad (3.9)$$

The notation $D\_HIPC\_MDRI_{it}$ is used to make the treatment variable explicit. It refers to the same treatment concept as D_{it} the indicator used in the Generalized Synthetic Control section. The difference is that, in the DiD section, the variable is written more precisely because the analysis later introduces as D_DSSI_{it} a separate treatment variable. $D\_HIPC\_MDRI_{it}$ it captures long-term debt-stock relief associated with HIPC/MDRI completion, while D_DSSI_{it} captures the temporary debt-service suspension during the COVID-19 period.

Cameroon is treated from 2006 onward, the Central African Republic from 2009 onward, the Republic of Congo from 2010 onward, and Chad from 2015 onward. Gabon, Equatorial Guinea, and the donor countries are coded as never treated. The baseline Difference-in-Differences model is written as:

$$Y_{it} = \alpha_i + \lambda_t + \beta D\_HIPC\_MDRI_{it} + \gamma X_{it} + \varepsilon_{it} \qquad (3.10)$$

Where:

- Y_{it} denotes the outcome variable for country
- α_i represents country fixed effects,
- λ_t represents year fixed effects,
- $D\_HIPC\_MDRI_{it}$ is the binary HIPC/MDRI treatment indicator,
- X_{it} is a vector of control variables,
- ε_{it} is the error term.

The coefficient of interest is β, which captures the average post-treatment difference between HIPC/MDRI-treated countries and untreated comparison countries, conditional on country and year fixed effects.

The model is estimated separately for four main outcomes: GDP growth, gross fixed capital formation, total external debt, and debt service. GDP growth captures the broader economic-performance channel, while gross fixed capital formation captures the investment channel. Total external debt and debt service are used to assess whether debt relief improved debt sustainability. The control variables include inflation, population growth, trade openness, and oil rents. Standard errors are clustered at the country level.

The analysis also accounts for the Debt Service Suspension Initiative. DSSI differs from HIPC and MDRI because it did not cancel debt stock. Instead, it temporarily suspended debt-service payments during the COVID-19 period. For this reason, DSSI is introduced as a separate treatment variable rather than combined with HIPC/MDRI. The extended specification is:

$$Y_{it} = \alpha_i + \lambda_t + \beta_1 D\_HIPC\_MDRI_{it} + \beta_2 D\_DSSI_{it} + \gamma X_{it} + \varepsilon_{it} \qquad (3.11)$$

In Equation (3.11), D_DSSI_{it} is equal to one for DSSI-participating countries during 2020 and 2021, and zero otherwise. The coefficient β_1 captures the effect of HIPC/MDRI after accounting for DSSI, while β_2 captures the additional association between DSSI participation and the outcome during the suspension period.

Finally, the study estimates interaction models to examine whether the growth effect of HIPC/MDRI depends on oil dependence or institutional quality. The first interaction model is:

$$GDPGrowth_{it} = \alpha_i + \lambda_t + \beta_1 D\_HIPC\_MDRI_{it} + \beta_2 OilRents_{it} + \beta_3 (D_{HIPC_{MDRI}\,it} \times OilRents_{it}) + \gamma X_{it} + \varepsilon_{it} \qquad (3.12)$$

The coefficient β_3 in Equation (3.12) measures whether oil dependence changes the effect of HIPC/MDRI on GDP growth. A negative coefficient would suggest that commodity dependence weakens the growth effect of debt relief.

The second interaction model is:

$$GDPGrowth_{it} = \alpha_i + \lambda_t + \beta_1 D\_HIPC\_MDRI_{it} + \beta_2 GovernanceEffectiveness_{it} + \beta_3 (D_{HIPC_{MDRI}\,it} \times GovernanceEffectiveness_{it}) + \gamma X_{it} + \varepsilon_{it} \qquad (3.13)$$

The coefficient β_3 in Equation (3.13) measures whether governance effectiveness conditions the growth effect of HIPC/MDRI. A positive coefficient would suggest that debt relief is more effective in countries with stronger institutional capacity.

The third interaction model is:

$$GDPGrowth_{it} = \alpha_i + \lambda_t + \beta_1 D\_HIPC\_MDRI_{it} + \beta_2 Control\_of\_Corruption_{it} + \beta_3 (D_{HIPC_{MDRI}\,it} \times Control\_of\_Corruption_{it}) + \gamma X_{it} + \varepsilon_{it} \qquad (3.14)$$

The coefficient β_3 in Equation (3.14) measures whether control of corruption conditions the growth effect of HIPC/MDRI. A positive coefficient would suggest that debt relief is more effective in countries where corruption is better controlled.

The Difference-in-Differences results are interpreted cautiously. The parallel-trends assumption is difficult to verify in the CEMAC context because treated and comparison countries differ in economic structure, debt dynamics, institutional quality, and exposure to commodity shocks. Therefore, the Difference-in-Differences estimates are not used as the main causal identification strategy. Instead, they are used as robustness evidence to assess whether the results are consistent with the fixed-effects and Generalized Synthetic Control findings

4. EMPIRICAL RESULTS

4.1. Fixed-Effects Regression Results

Table 4.1: Fixed-effects regression results

Dependent Variables: Model:	GDP_growth (1)	Gfcf (2)	Total_external_debt (3)	Debt_service (4)	GDP_growth (5)	GDP_growth (6)	GDP_growth (7)
Variables							
Debt_Relief_lag	-0.0011 (0.0017)	0.0082 (0.0056)	-0.0197*** (0.0036)	-0.0017** (0.0004)	0.0013 (0.0057)	0.0021* (0.0008)	0.0033 (0.0084)
Inflation	-0.0974 (0.1095)	2.891 (1.448)	1.674 (1.902)	0.1287 (0.1909)	-0.3393 (0.2112)	-0.3635* (0.1724)	-0.0482 (0.1411)
Population_Growth	1.532 (0.7928)	-6.477 (5.983)	-6.654 (7.311)	-0.6172* (0.2855)	1.218 (1.468)	1.363 (1.294)	1.580 (1.003)
Trade	0.0562 (0.0572)	0.4636 (0.2496)	0.4877 (0.4522)	2.79×10^{-6} (0.0111)	0.0704 (0.0602)	0.0745 (0.0609)	0.0203 (0.0698)
Government_effectiveness					0.2030 (0.2064)		
Oil_rents					0.2230 (0.1206)	0.1878 (0.1208)	0.1870 (0.1123)
Debt_Relief_lag × Government_effectiveness					0.0003 (0.0007)		
Control_of_corruption						0.4395* (0.1982)	
Debt_Relief_lag × Control_of_corruption						-0.0016*** (0.0004)	
Debt_Relief_lag × Oil_rents							-0.0001 (0.0002)
Fixed-effects							
Country	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fit statistics							
Observations	188	165	168	168	130	130	169
R^2	0.34895	0.35229	0.69699	0.48243	0.42594	0.45022	0.37264
Within R^2	0.06971	0.15460	0.05796	0.03895	0.18721	0.22159	0.10715

Clustered (Country)standard-errors in parentheses

*Signif. Codes: ***: 0.01,**: 0.05,*: 0.1*

Table 4.1 shows the results of seven fixed-effects regressions examining the relationship between lagged debt relief intensity and GDP growth, investment, external debt and debt service in CEMAC countries. Model (1) examines the effect of debt relief on GDP growth. The coefficient on Debt_Relief_lag is -0.0011, with a standard error of 0.0017. The coefficient is negative, but it is not statistically significant. In other words, the results do not show a clear relationship between lagged debt relief intensity and higher GDP growth in CEMAC countries. The control variables in Model (1) do not show strong statistical effects. Inflation has a negative coefficient of -0.0974, suggesting that higher inflation may be associated with lower GDP growth, but the coefficient is not statistically significant. Population growth has positive coefficient of 1.532, and trade has a positive coefficient of 0.0562. However, both estimates are also statistically insignificant. Overall, after controlling for country and year fixed effects, these macroeconomic controls do not strongly explain GDP growth in this model.

Model (2) looks at the investment channel, using gross fixed capital formation as the dependent variable. The coefficient on Debt_Relief_lag is 0.0082, with a standard error of 0.0056. The coefficient is positive, which goes in the expected direction. Theoretically, debt relief should reduce debt overhang, create fiscal space, and possibly encourage investment. However, the coefficient is not statistically significant. The control variables tell a similar story. Inflation has a coefficient of 2.891, population growth has a coefficient

of -6.477, and trade has a coefficient of 0.4636. None of these coefficients are statistically significant. This means that the investment result is not strongly driven by the control variables either. Overall, the model does not provide robust evidence that debt relief was followed by higher investment.

Model (3) examines total external debt, and this is where the results are much stronger. The coefficient on Debt_Relief_lag is -0.0197, with a standard error of 0.0036. It is statistically significant at the 1 percent level. This means that higher lagged debt relief intensity is associated with a significant reduction in total external debt. This result is in line with the main objective of HIPC and MDRI, which was to reduce the external debt burden of heavily indebted countries. Unlike the results for GDP growth and investment, the external-debt result is statistically strong. It suggests that debt relief worked well on the variable and it was most directly designed to affect external debt. In that sense, debt relief appears to have been financially effective. The control variables in Model (3) are not statistically significant. Inflation has a coefficient of 1.674, population growth has a coefficient of -6.654, and trade has a coefficient of 0.4877. Since these controls are insignificant, the reduction in external debt seems to be mainly associated with debt relief intensity rather than with the macroeconomic controls included in the model.

Model (4) focuses on debt-service pressure. The coefficient on Debt_Relief_lag is -0.0017, with a standard error of 0.0004, and it is statistically significant at the 5 percent level. This result shows that higher debt relief intensity is associated with lower debt-service obligations. This is also consistent with the main objective of HIPC and MDRI. By reducing the debt service pressure, debt relief can free up public resources that would have been used to service debt. Among the control variables, population growth has a coefficient of -0.6172 and is statistically significant at the 10 percent level. This suggests that higher population growth is associated with lower debt service in this model, although this result should be interpreted carefully. Inflation has a positive but insignificant coefficient of 0.1287, while trade has a very small and insignificant coefficient of 2.79e-6.

Model (5) examines whether the effect of debt relief on GDP growth depends on government effectiveness. This model is useful because it allows us to test whether debt relief works better in countries where governments have stronger capacity to design, implement, and maintain effective policies. The coefficient on Debt_Relief_lag is 0.0013, while the coefficient on government effectiveness is 0.2030. Both coefficients are statistically insignificant. The interaction term, Debt_Relief_lag × Government effectiveness, is 0.0003, with a standard error of 0.0007, and it is also statistically insignificant. The positive sign of the interaction is consistent with the idea that debt relief may be more effective when government effectiveness is stronger. However, because the coefficient is not statistically significant, the result does not provide strong evidence that government effectiveness significantly changes the growth effect of debt relief.

Model (6) uses control of corruption as another measure of institutional quality. In this model, the coefficient on Debt_Relief_lag is 0.0021, with a standard error of 0.0008, and it is statistically significant at the 10 percent level. This suggests that, at the average level of control of corruption, debt relief is positively associated with GDP growth. The coefficient on Control_of_corruption is 0.4395, with a standard error of 0.1982, and it is also statistically significant at the 10 percent level. This means that stronger control of corruption is associated with higher GDP growth. This result is intuitive. When corruption is better controlled, public resources are less likely to be diverted, public spending may become more efficient, and confidence in public policy can improve. However, the interaction term Debt_Relief_lag × Control_of_corruption is -0.0016, with a standard error of 0.0004, and it is statistically significant at the 1 percent level. This means that the marginal relationship between debt relief and GDP growth becomes

weaker as control of corruption improves. This result is more delicate to interpret. It does not mean that corruption is good, nor does it mean that weaker institutions make debt relief more effective in a simple sense. A more cautious interpretation is that the effect of debt relief may have been stronger in countries where the initial debt situation and institutional weaknesses were more severe. Another possible explanation is that countries with stronger control of corruption may already have had better macroeconomic conditions, so the additional effect of debt relief was smaller. Because the sample is small and governance indicators are broad perception-based measures, this result should be read carefully. Still, it is useful because it shows that the relationship between debt relief, institutions, and growth is not straightforward.

Model (7) examines whether the effect of debt relief on GDP growth depends on oil rents, which is used as a proxy for commodity dependence. This is particularly relevant in the CEMAC context, where several economies rely heavily on oil revenues. The coefficient on Debt_Relief_lag is 0.0033, with a standard error of 0.0084, and it is statistically insignificant. The coefficient on oil rents is 0.1870, with a standard error of 0.1123, and it is also insignificant. The interaction term Debt_Relief_lag × Oil_rents is -0.0001, with a standard error of 0.0002. The coefficient is negative, which is consistent with the idea that commodity dependence may weaken the growth effect of debt relief. However, the estimate is not statistically significant.

Taken together, the results in Table 4.1 suggest that debt relief in CEMAC was financially effective but developmentally limited. Debt relief intensity is significantly associated with lower external debt and lower debt service. These findings are consistent with the direct goals of HIPC and MDRI. However, even though debt service falls, Models (1) and (2) do not show significant improvements in GDP growth or investment. This suggests that the fiscal space created by lower debt-service payments did not fully translate into stronger economic performance. So, debt relief did ease financial pressure, but that relief was not clearly converted into productive investment or sustained growth.

4.2. Generalized Synthetic Control results

Table 4.2: Generalized Synthetic Control Results

Outcome	ATT	Interpretation
GDP growth	1.34	Higher growth than counterfactual
Investment	-1.74	Lower investment than counterfactual
External debt	-54.81	Lower external debt than counterfactual
Debt service	-1.42	Lower debt-service pressure than counterfactual

Table 4.2 presents the results from the Generalized Synthetic Control analysis. The table reports the Average Treatment Effect on the Treated, or ATT, for the main outcomes of the study. The ATT compares the actual post-treatment performance of HIPC/MDRI-treated countries with their estimated counterfactual outcome. In other words, it shows how treated countries performed compared with the trajectory they would have been expected to follow if they had not received debt relief. A positive ATT means that treated countries performed better than their counterfactual, while a negative ATT means that they performed below it.

For GDP growth, the estimated ATT is 1.34. This means that, after HIPC/MDRI treatment, treated countries experienced GDP growth around 1.34 percentage points higher than their estimated counterfactual. At first sight, this suggests that debt relief may have had a positive effect on growth. However, this result should be interpreted carefully. The fixed-effects and Difference-in-Differences results do not provide strong statistical evidence that debt relief consistently increased GDP growth. Therefore, the positive GSC estimate should be seen as suggestive rather than definitive.

A plausible interpretation is that this positive growth effect occurred through a short-run fiscal-relief or debt-sustainability channel, rather than through a clear investment channel. By reducing external debt and lowering debt-service pressure, debt relief may have temporarily relaxed government financing constraints. This could have given governments more room to maintain public spending, reduce arrears, improve macroeconomic confidence, or avoid sharper fiscal adjustment. Put simply, debt relief may have provided some breathing space, which helped support economic activity in the short term. However, because the investment results do not improve, this growth effect does not appear to reflect a strong process of capital accumulation or long-term productive transformation.

For investment, measured by gross fixed capital formation, the ATT is -1.74. This indicates that treated countries had investment levels around 1.74 percentage points lower than their counterfactual after debt relief. This result is important because one of the main theoretical arguments for debt relief is that it should encourage investment. By reducing debt overhang and debt-service pressure, debt relief is expected to create fiscal space and improve investor confidence. However, the negative ATT suggests that this investment channel did not clearly materialize in the CEMAC context. In other words, even if debt relief eased financial pressure, it did not translate into higher gross fixed capital formation.

The strongest result concerns external debt. The ATT for external debt is -54.81, meaning that treated countries had external debt levels around 54.81 percentage points lower than their estimated counterfactual. This is one of the clearest findings of the analysis. It shows that HIPC/MDRI was effective in achieving its most direct objective: reducing the external debt burden of heavily indebted countries. Compared with what would have happened without treatment, treated CEMAC countries experienced a much stronger decline in external debt. This result is also consistent with the fixed-effects and Difference-in-Differences estimates, where external debt is one of the most robust outcomes. The GSC analysis therefore reinforces the conclusion that debt relief was financially effective, especially in reducing external debt stocks.

For debt service, the ATT is -1.42. This means that treated countries had debt-service pressure around 1.42 percentage points lower than their counterfactual after debt relief. This result also goes in the expected direction. If external debt falls, debt-service obligations should also decrease. Lower debt service can create fiscal space by freeing resources that would otherwise have been used for repayment.

Overall, the GSC results suggest that debt relief had its strongest and most consistent effects on debt-sustainability outcomes, especially external debt and debt service. The positive GDP-growth effect may reflect a temporary fiscal-relief channel, where lower debt pressure helped support short-term economic activity. However, because investment did not increase, the results do not support the idea that debt relief generated a strong investment led growth process. This distinction is important. Debt relief appears to have created financial breathing space, but this space was not clearly transformed into sustained productive investment or long-term growth.

4.3. Difference-in-Differences Results

Table 4.3: Difference-in-Differences Results: Main Outcomes

Variable	GDP growth (1)	GFCF (2)	Total external debt (3)	Debt service (4)
Variables				
D_HIPC_MDRI	2.353 (1.520)	-3.518 (4.552)	-72.90** (30.69)	-1.982 (1.272)
Inflation	-0.0129* (0.0066)	-0.0001 (0.0173)	0.0456 (0.0492)	0.0021 (0.0042)
Population growth	1.357* (0.7676)	-5.243 (5.905)	-24.08** (9.794)	-0.6454 (0.5408)
Trade	0.0345 (0.0450)	0.3747** (0.1697)	0.7759** (0.2796)	0.0190 (0.0274)
Oil rents	0.1198 (0.0723)	-0.1778 (0.4113)	-0.4905 (0.6932)	-0.0239 (0.0529)
Fixed-effects				
Country	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes
Fit statistics				
Observations	392	304	352	352
R^2	0.33921	0.24184	0.69011	0.46123
Within R^2	0.07536	0.05031	0.30202	0.03641
Note	Clustered country standard errors in parentheses. Significance: *** p<0.01, ** p<0.05, * p<0.1.			

Table 4.3 presents the main Difference-in-Differences results. The purpose of this model is to compare the post-treatment performance of HIPC/MDRI-treated countries with the performance of untreated countries. The key variable is D_HIPC_MDRI, which takes the value 1 after a country reaches the HIPC/MDRI completion point, and 0 otherwise. The table focuses on four main outcomes: GDP growth, gross fixed capital formation, total external debt, and debt service.

Model (1) examines the effect of HIPC/MDRI on GDP growth. The coefficient on D_HIPC_MDRI is 2.353, with a standard error of 1.520. The coefficient is positive, suggesting that treated countries experienced higher GDP growth after HIPC/MDRI compared with untreated countries. However, the coefficient is not statistically significant. This means that the evidence is not strong enough to conclude that HIPC/MDRI systematically increased GDP growth.

Model (2) uses gross fixed capital formation as the dependent variable to capture the investment channel. The coefficient on D_HIPC_MDRI is -3.518, with a standard error of 4.552. The coefficient is negative and statistically insignificant. This means that the DiD results do not provide evidence that HIPC/MDRI increased investment.

Model (3) examines total external debt, and this is the strongest result in the table. The coefficient on D_HIPC_MDRI is -72.90, with a standard error of 30.69, and it is statistically significant at the 5 percent level. This means that HIPC/MDRI-treated countries experienced a significantly larger reduction in external debt compared to untreated countries. This result is highly consistent with the objective of HIPC and MDRI.

Model (4) examines debt service pressure. The coefficient on D_HIPC_MDRI is -1.982, with a standard error of 1.272. The coefficient is negative, which goes in the expected direction, but it is not statistically significant. This suggests that treated countries may have experienced lower debt-service pressure after HIPC/MDRI, but the evidence is not strong enough to confirm this effect statistically.

Overall, Table 4.3 confirms the main message of the thesis. HIPC/MDRI appears to have been more effective in reducing external debt than in generating broader economic gains. The strongest result is found in Model (3), where the coefficient on D_HIPC_MDRI is -72.90 and statistically significant at the 5 percent level. This shows that treated countries experienced a substantial decline in external debt relative to untreated countries.

Table 4.4: Difference-in-Differences Results Including DSSI

Variable	GDP growth (1)	GFCF (2)	Total external debt (3)	Debt service (4)
Variables				
D_HIPC_MDRI	2.364 (1.423)	-3.717 (4.925)	-73.26** (31.21)	-1.894 (1.272)
D_DSSI	-0.0702 (1.776)	1.309 (4.374)	2.288 (14.11)	-0.5676 (0.9414)
Inflation	-0.0129* (0.0069)	0.0006 (0.0187)	0.0471 (0.0532)	0.0017 (0.0041)
Population growth	1.358* (0.7668)	-5.271 (5.932)	-24.11** (9.834)	-0.6357 (0.5439)
Trade	0.0345 (0.0451)	0.3752** (0.1691)	0.7768** (0.2811)	0.0187 (0.0276)

Oil rents	0.1198 (0.0731)	-0.1800 (0.4148)	-0.4932 (0.6868)	-0.0233 (0.0533)
Fixed-effects				
Country	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes
Fit statistics				
Observations	392	304	352	352
R^2	0.33922	0.24189	0.69013	0.46146
Within R^2	0.07536	0.05037	0.30207	0.03683
Note	Clustered country standard errors in parentheses. Significance: *** p<0.01, ** p<0.05, * p<0.1.			

Table 4.4 adds the Debt Service Suspension Initiative, or DSSI, to the Difference-in-Differences model. This is useful because DSSI was different from HIPC/MDRI. HIPC and MDRI reduced debt stocks, while DSSI temporarily suspended debt-service payments during the COVID-19 period. Therefore, including both D_HIPC_MDRI and D_DSSI allows the analysis to separate the long-term effect of HIPC/MDRI from the temporary liquidity effect of DSSI.

In Model (1), the coefficient on D_HIPC_MDRI is 2.364, with a standard error of 1.423. The coefficient is positive, suggesting that HIPC/MDRI-treated countries experienced higher GDP growth after treatment. However, it is not statistically significant. So, as in the previous DiD table, the result does not provide strong evidence that HIPC/MDRI systematically increased GDP growth. The coefficient on D_DSSI is -0.0702, with a standard error of 1.776. This coefficient is very small and statistically insignificant. This suggests that DSSI was not associated with a clear change in GDP growth. This is not surprising, since DSSI was designed as a temporary debt-service suspension rather than a growth-enhancing reform. Among the controls, inflation has a coefficient of -0.0129, significant at the 10 percent level, suggesting that higher inflation is associated with lower growth. Population growth has a coefficient of 1.358, also significant at the 10 percent level, suggesting a positive association with GDP growth in this specification. Trade and oil rents are positive but insignificant, with coefficients of 0.0345 and 0.1198, respectively.

Model (2) uses gross fixed capital formation as the dependent variable. The coefficient on D_HIPC_MDRI is -3.717, with a standard error of 4.925. The coefficient is negative and statistically insignificant. This means that HIPC/MDRI does not appear to have increased investment once DSSI is included in the model. The coefficient on D_DSSI is 1.309, with a standard error of 4.374. It is positive, but again statistically insignificant. This suggests that DSSI did not significantly increase investment either. Overall, the investment channel remains weak, even after accounting for DSSI.

Model (3) examines total external debt. The coefficient on D_HIPC_MDRI is -73.26, with a standard error of 31.21, and it is statistically significant at the 5 percent level. This is one of the strongest results in the table. This result confirms that HIPC/MDRI was associated with a significant reduction in external debt. Importantly, the coefficient remains very close to the previous DiD estimate, where the coefficient was 72.90. This means that the external-debt result is robust to the inclusion of DSSI. The coefficient on D_DSSI is 2.288, with a standard error of 14.11, and is statistically insignificant. This suggests that DSSI did not significantly reduce external debt. This makes sense because DSSI did not cancel debt stock. It only suspended debt-service payments temporarily. Among the controls, population growth has a coefficient of -24.11, significant at the 5 percent level, while trade has a coefficient of 0.7768, also significant at the 5 percent level. Inflation and oil rents are not statistically significant.

Table 4.5: Difference-in-Differences : Interaction models

Dependent Variable:	GDP_growth		
Model:	(1)	(2)	(3)
Variables			
D_HIPC_MDRI	3.001*	3.154	1.420
	(1.629)	(3.262)	(5.821)
Oil_rents	0.1222	0.1330	0.1277
	(0.0724)	(0.0880)	(0.0887)
Inflation	-0.0130*	-0.0135**	-0.0147***
	(0.0066)	(0.0049)	(0.0045)
Population_growth	1.417*	0.8883	1.157
	(0.7536)	(0.7606)	(0.8721)
Trade	0.0309	0.0883**	0.0766*
	(0.0462)	(0.0380)	(0.0392)
D_HIPC_MDRI × Oil_rents	-0.0561		
	(0.0370)		
Governance_effectiveness		0.0881	
		(0.1261)	
D_HIPC_MDRI × Governance_effectiveness		-0.0823	
		(0.1170)	
Control_of_corruption			0.0789
			(0.0960)
D_HIPC_MDRI × Control_of_corruption			0.0088
			(0.2350)
Fixed-effects			
Country	Yes	Yes	Yes
Year	Yes	Yes	Yes
Fit statistics			
Observations	392	300	303
R^2	0.34041	0.37295	0.36973
Within R^2	0.07702	0.10450	0.10175

Clustered Country standard-errors in parentheses

*Signif. Codes: ***: 0.01,**: 0.05,*: 0.1*

Table 4.5 examines whether the effect of HIPC/MDRI on GDP growth depends on three conditioning factors: oil rents, governance effectiveness, and control of corruption. The dependent variable in all three

models is GDP growth. The purpose of these interaction models is to test whether debt relief works differently depending on structural dependence and institutional quality.

Model (1) tests whether oil dependence conditions the effect of HIPC/MDRI on GDP growth. The coefficient on D_HIPC_MDRI is 3.001, with a standard error of 1.629, and it is statistically significant at the 10 percent level. This suggests weak evidence of a positive association between HIPC/MDRI and GDP growth when oil rents are equal to zero. However, because this is an interaction model, the coefficient on D_HIPC_MDRI cannot be interpreted alone. The total effect of HIPC/MDRI depends on the level of oil rents. The interaction term D_HIPC_MDRI × Oil_rents is -0.0561, with a standard error of 0.0370. The coefficient is negative but statistically insignificant. The negative sign is consistent with the theoretical argument that commodity dependence may weaken the effect of debt relief. In other words, countries that rely heavily on oil revenues may not fully transform debt relief into sustained growth because their economies remain exposed to commodity-price volatility. However, since the coefficient is not statistically significant, this result should be interpreted as suggestive rather than conclusive.

Model (2) examines whether the effect of HIPC/MDRI depends on governance effectiveness. The coefficient on D_HIPC_MDRI is 3.154, with a standard error of 3.262, and it is statistically insignificant. The coefficient on governance effectiveness is 0.0881, with a standard error of 0.1261, and is also statistically insignificant. The interaction term D_HIPC_MDRI × Governance_effectiveness is -0.0823, with a standard error of 0.1170. This coefficient is negative but statistically insignificant. This means that the model does not provide strong evidence that government effectiveness significantly changes the effect of HIPC/MDRI on GDP growth. This result is important because, theoretically, stronger government effectiveness should help countries use the fiscal space from debt relief more productively. However, the DiD interaction results do not confirm this mechanism statistically.

Model (3) uses control of corruption as an alternative institutional-quality indicator. The coefficient on D_HIPC_MDRI is 1.420, with a standard error of 5.821, and is statistically insignificant. The coefficient on control of corruption is 0.0789, with a standard error of 0.0960, and is also statistically insignificant. The interaction term D_HIPC_MDRI × Control_of_corruption is 0.0088, with a standard error of 0.2350. This coefficient is positive but statistically insignificant. This means that the DiD results do not provide evidence that better control of corruption significantly strengthens or weakens the growth effect of HIPC/MDRI.

Overall, Table 4.5 provides limited evidence that oil dependence, governance effectiveness, or control of corruption significantly condition the effect of HIPC/MDRI on GDP growth. The oil-rents interaction is negative, which is consistent with the thesis argument that commodity dependence may weaken the impact of debt relief. However, the coefficient is not statistically significant. The governance-effectiveness interaction is also insignificant, meaning that the DiD results do not confirm that stronger government effectiveness changes the effect of debt relief on growth. Similarly, the control of corruption interaction is positive but insignificant, suggesting that the DiD framework does not provide strong evidence that corruption control conditions the growth effect of HIPC/MDRI. The control variables provide some useful patterns. Inflation is consistently negative and statistically significant across the three models, suggesting that macroeconomic instability weakens growth. Trade is positive and significant in Models (2) and (3), indicating that more open economies may experience stronger growth. Population growth is positive but only weakly significant in Model (1), while oil rents are positive but insignificant across the specifications.

5. CONCLUSION

This study examined the effectiveness of debt-relief initiatives in CEMAC countries, with a focus on the HIPC Initiative, the MDRI, and the DSSI. The main objective was to understand whether these initiatives improved economic performance in the region, and why their effects may have remained limited or unsustainable over time. To answer this question, the dissertation used three complementary empirical methods: fixed-effects panel regressions, the Generalized Synthetic Control method, and Difference-in-Differences models.

Overall, the results suggest that debt relief in CEMAC was financially effective but developmentally limited. The strongest and most consistent finding is that debt relief reduced external debt burdens. In the fixed-effects regressions, debt relief intensity is significantly associated with lower external debt. This result is confirmed by the Difference-in-Differences estimates, where HIPC/MDRI treatment is also associated with a significant reduction in total external debt. The Generalized Synthetic Control results point in the same direction, showing that treated countries had lower external debt than their estimated counterfactual. In this sense, debt relief achieved its most direct objective: reducing the external debt burden of heavily indebted countries.

The results also suggest that debt relief helped reduce debt-service pressure, although this finding is less consistent across methods. In the fixed-effects model and in the Generalized Synthetic Control results, debt relief is associated with lower debt-service pressure. However, the Difference-in-Differences estimate is negative but not statistically significant. The broader economic effects are much weaker. The results do not provide robust evidence that debt relief significantly increased GDP growth or investment. In other words, reducing external debt and, in some cases, debt service pressure did not automatically lead to stronger economic performance. The positive growth effect observed in the Generalized Synthetic Control results should therefore be interpreted cautiously. It may reflect a temporary fiscal-relief or debt-sustainability channel, where lower debt pressure gave governments, some breathing space and helped support short-run economic activity.

This weak transmission from debt reduction to investment and growth is one of the main findings of the dissertation. Debt relief may have relaxed fiscal constraints, but the fiscal space created was not fully transformed into productive economic outcomes. This does not mean that the resources were necessarily wasted. The analysis does not directly observe the detailed allocation or quality of public spending. Still, the absence of robust investment and growth effects suggests that debt relief alone was not enough to generate sustained economic transformation.

The institutional results are also mixed. Government effectiveness does not significantly condition the effect of debt relief in the empirical models. Control of corruption appears to matter in the fixed-effects specification, where stronger control of corruption is positively associated with GDP growth. However, this result is not confirmed in the Difference-in-Differences interaction model. Therefore, institutional quality remains a plausible explanation for the limited effectiveness of debt relief, but the evidence is not strong enough to treat it as a fully confirmed mechanism.

The evidence on commodity dependence is also suggestive rather than conclusive. The interaction between debt relief and oil rents has a negative sign, which is consistent with the idea that commodity dependence may weaken the growth effect of debt relief. This interpretation makes sense in the CEMAC context, where

several economies rely heavily on oil revenues and remain exposed to commodity-price shocks. However, the coefficient is not statistically significant. As a result, commodity dependence should be interpreted as a likely structural constraint, but not as a mechanism that is formally proven by the empirical results.

One important limitation of this study is that it cannot directly confirm whether the reduction in external debt was later offset by domestic or regional borrowing. Consistent annual data on domestic public debt was not available for all CEMAC countries over the full sample period. For this reason, rapid debt re-accumulation is treated mainly as a contextual explanation rather than as a mechanism directly tested in the regressions. This limitation is particularly relevant because CEMAC governments have increasingly relied on the regional securities market to finance their needs.

Overall, the findings suggest that the limited effectiveness of debt relief in CEMAC can be partly explained by weak transmission from debt reduction to productive investment and sustained growth, persistent institutional constraints, and continued dependence on commodity revenues. The evidence is strongest for the financial effect of debt relief: HIPC/MDRI significantly reduced external debt and, in some specifications, debt-service pressure. However, these financial improvements did not translate into robust gains in growth or investment.

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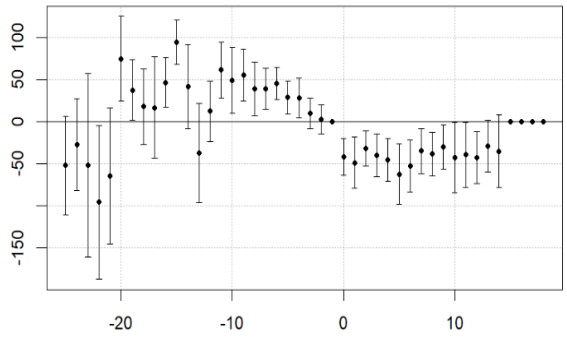
7. APPENDIX

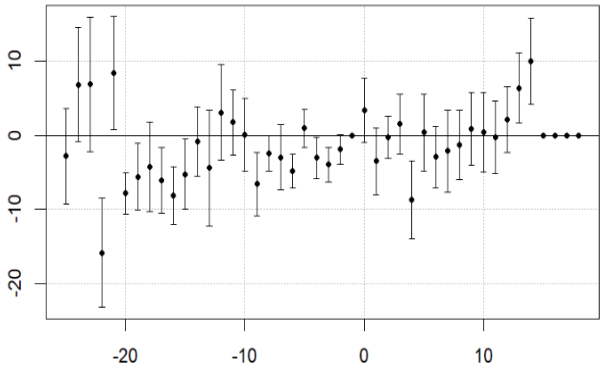
During the preparation of this dissertation, I used artificial intelligence tools, mainly ChatGPT, Copilot, Gemini and Undermind as support tools. I used them for writing, coding, references checking, and for the interpretation of some empirical results. For the writing part, AI was mostly used to reformulate what I wrote. It helped me improve transitions between ideas, vary sentence structure, and make some sections easier to read. Some of the prompts I used were, for example: Rewrite this text in fluent way, vary sentence length and add smooth transitions, and rewrite this paragraph in English with a more academic tone.

I also used AI for coding. I used prompts like: Give me the R code for the analysis, add control of corruption to the fixed-effects and DiD interaction models, create the HIPC/MDRI treatment variable with the correct completion years, Add the DSSI dummy for 2020 and 2021. I checked whether the variable names matched my dataset, whether the treatment years were correctly coded, and whether the results produced by R corresponded to the tables included in the dissertation.

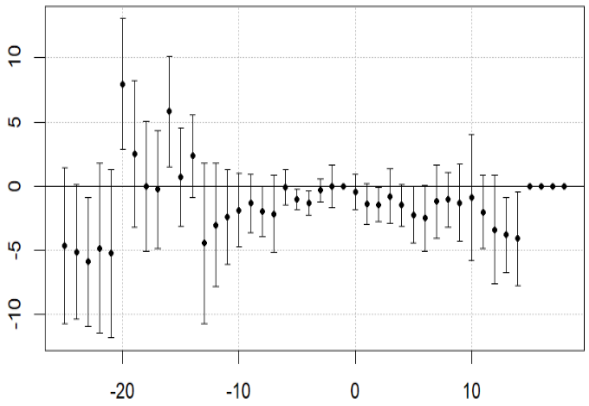
Event studies



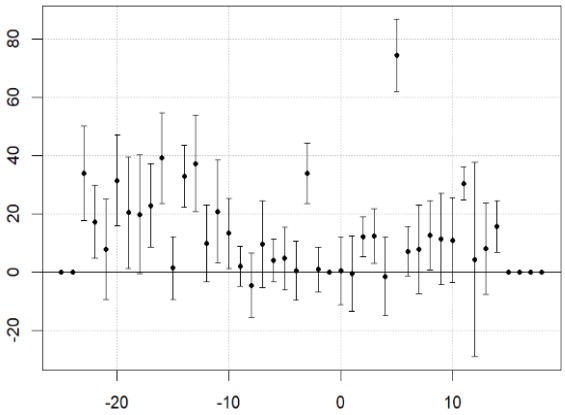
External Debt Dynamics Before and After HIPC/MDRI Treatment



GDP Growth Dynamics Before and After HIPC/MDRI Treatment



Debt-Service Dynamics Before and After HIPC/MDRI Treatment



Investment Dynamics Before and After HIPC/MDRI Treatment

Note: The figures show dynamic treatment effects before and after HIPC/MDRI treatment. The treatment year is normalized to zero. Dots represent estimated coefficients and vertical lines represent confidence intervals.