THE DYNAMIC LINKAGES BETWEEN FOREIGN DIRECT INVESTMENT, GOVERNANCE, AND ECONOMIC GROWTH IN CEMAC COUNTRIES: A PANEL VAR ANALYSIS

Peter Ajonghakoh Foabeh

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ABSTRACT

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This dissertation examines the dynamic interactions among foreign direct investment (FDI), economic growth, and governance in six Central African Economic and Monetary Community (CEMAC) countries from 1990 to 2019. Using a panel vector autoregression (VAR) model, the study identifies short-term dynamic patterns and trends, with a focus on the important role of effective governance, as measured by worldwide governance indicators, in determining the impact of FDI on sustainable economic growth. The analysis takes into account heterogeneity across income groups, Highly Indebted Poor Countries (HIPC), and Least Developed Countries (LDC), providing a framework for studying the determinants of FDI.

This study also examines the effects of the 2008 global financial crisis and the 1994 CFA currency devaluation on the relationship between FDI inflows, economic growth, and governance. The results show bidirectional Granger causality between economic growth and FDI, highlighting the influence of economic growth in attracting FDI to CEMAC countries. Governance does not Granger cause FDI, and vice versa, emphasizing the distinct nature of their relationship. Additionally, the inclusion of seven macroeconomic variables offers further insights into the linkages between FDI, growth, and governance, contributing to an understanding of the resilience of CEMAC economies in the face of external shocks. The findings of this study are valuable for policymakers and foreign investors, providing evidence-based guidance for promoting sustainable economic growth.

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TABLE OF CONTENTS

Page

ABSTRACT iii

ACKNOWLEDGEMENTS iv

TABLE OF CONTENTS v

LIST OF TABLES x

LIST OF FIGURES xii

CHAPTER 1 INTRODUCTION 1

1.1 Background of the Study 5

1.2 Prior FDI-related Research 11

1.3 Problem Statement 19

1.4 Gap, Contribution, and Rationale of this Research 19

1.5 Research Questions 22

1.6 Research Objectives 23

1.6.1 The Impact of Growth on Attracting FDI 23

1.6.2 The Role and Impact of Governance on Growth and FDI Inflow 24

1.6.3 FDI Inflow, Growth, and Governance 24

1.7 Summary and Structural Outline 24

CHAPTER 2 CEMAC COUNTRIES 26

2.1 Background and Organization of CEMAC 27

2.2 Characteristics of CEMAC Countries 31

2.2.1 CEMAC Country-by-Country Analysis 36

2.2.1.1 Cameroon 38

2.2.1.2 Central African Republic 43

2.2.1.3 Chad 47

2.2.1.4 Republic of the Congo 49

2.2.1.5 Equatorial Guinea 51

2.2.1.6 Gabon……..53
2.3 Stylized Facts about CEMAC 55
2.4 CEMAC's Institutions 61
2.4.1 Central African Economic Union (UEAC) 61
2.4.2 Other CEMAC Institutions, UMAC and other World Organizations 62
2.5 Heterogeneity across CEMAC Countries.....63
2.5.1 Income Classification (CEMAC-2-2-2) 64
2.5.2 Heavily Indebted Poor Countries (HIPC Status) (CEMAC-4-2) 64
2.5.3 Least Developing Countries (LDC Stage) (CEMAC-2-4) 65
CHAPTER 3 LITERATURE REVIEW 69
3.1 Foreign Direct Investment.....73
3.1.1 Determinants of FDI inflows.....74
3.2 Theories Sustaining Governance, Economic Growth, and FDI Inflows 82
3.2.1 Theories on Governance and FDI 84
3.2.2 Theories on Economic Growth and FDI 87
3.2.3 Theories Sustaining the Governance, Economic Growth, and FDI 95
3.2.4 Theories Sustaining the Importance of FDI Financing 96
3.2.5 More Empirical Literature on FDI Financing 103
3.3 Empirical Studies on Economic Growth 108
3.3.1 Measuring Economic Growth 110
3.4 Definitions of Governance Dimensions and Institutional Factors 112
3.4.1 Control of Corruption.....113
3.4.2 Government Effectiveness 113
3.4.3 Regulatory Quality 113
3.4.4 Rule of Law.....113
3.4.5 Absence of Violence/Terrorism 113
3.4.6 Voice and Accountability.....114
3.5 The Growth-FDI or FDI-Growth Nexus and other Determinants.....114
3.6 Conceptual Framework and Path Diagram.....116

3.7 Overview of Theoretical Hypotheses 120
3.7.1 Institutional Hypothesis 120
3.7.2 Convergence Hypothesis 120
3.7.3 Unified Growth Hypothesis 122
CHAPTER 4 METHODOLOGY 128
4.1 Data, Definition of Variables and Hypotheses 129
4.1.1 Data Sources 129
4.1.2 Definition of Variables 133
4.1.3 Research Hypotheses 142
4.2 Model Specification 144
4.2.1 VAR Models 144
4.2.2 Panel VAR Models 147
4.2.3 Restricted panel VAR Models 152
4.3 VAR Diagnostics 152
4.4 Causality and Structural Analyses 159
4.4.1 Panel Granger Causality 159
4.4.2 Impulse Response Functions (IRFs) and Structural VAR Models 164
4.4.3 Forecast Error Variance Decomposition (FEVD) 165
4.4.4 Panel Structural VAR 167
4.5 Panel Bayesian VAR Models 168
CHAPTER 5 RESULTS AND DISCUSSION 171
5.1 Preliminary Results 172
5.1.1 Data, Sources and Sample Characteristics 172
5.1.2 Descriptive Statistics 174
5.2 Unit Root and Stationarity 177
5.2.1 Stationarity and Trends in the Data Series 177
5.2.2 Test of Stationarity (panel unit root tests) 178
5.2.3 Panel Unit Root Test (second generation) 181
5.2.4 Correlation Matrix 185

5.2.5 Westerlund Panel Cointegration Test 187
5.2.6 Lag Order Selection Criteria from PVAR Model 192
5.2.7 Cross Sectional Dependence 196
5.2.8 PVAR Residual Serial Correlation using LM Test 197
5.3 PVAR Model Estimation 201
5.3.1 Baseline Model 202
5.3.2 PVAR with Economic Activity and Development 206
5.3.3 Panel VAR with Economic Structure and Market 210
5.3.4 Panel VAR with Coups and Political Crises 216
5.3.5 Continuous PVAR Models: Two-and-Three-Way Interaction VAR 220
5.4 Panel VAR Diagnostic Tests 222
5.4.1 Summary Diagnostics 222
5.4.2 Model Stability 224
5.4.3 PVAR Residuals for Model 1 (PVAR(1)) 226
5.5 Granger Causality and Structural Analysis 226
5.5.1 Panel Granger Causality Tests 227
5.5.2 Impulse response functions of the panel VAR core model 235
5.5.3 FEVD Results 242
5.6 Robustness Tests for PVAR Models 248
5.6.1 PVAR with Linear Restrictions 248
5.6.2 Panel Bayesian VAR Analysis 249
5.6.3 Panel Structural VAR Analysis 255
5.6.4 Specification and Robustness 263
CHAPTER 6 CONCLUSION AND POLICY IMPLICATIONS 266
6.1 Summary of Findings 267
6.2 Overview of Policy Recommendations 273
6.3 Limitations and Future Research 276
6.4 Contribution and the Politics of FDI in CEMAC Countries 278
BIBLIOGRAPHY 282

APPENDICES 327
Appendix A Supplementary Graphs for Trends and Structural Analysis.....328
Appendix B Supplementary Tables for Data and PVAR Estimates.....358
BIOGRAPHY 397

LIST OF TABLES

Page

Table 2.1 Cameroon Power Sector and Renewable Energy Potential 41
Table 2.2 Cameroon Briefs (General 2016 est.) and Power Sector (2014 est.) 42
Table 2.3 Companies Present in C.A.R. as at 2004 46
Table 2.4 Key Economic Indicators of C.A.R., 2010–2014 47
Table 2.5 Chad's Key Indicators 48
Table 2.6 Congo's Key Indicators 51
Table 2.7 Equatorial Guinea's Key Indicators 52
Table 2.8 Gabon's Key Indicators 54
Table 2.9 Heterogeneity Across CEMAC Countries 67
Table 3.1 Summary of Some Relevant Empirical Literature 123
Table 4.1 List of Variables and their Measurements 131
Table 4.2 Sample and Characteristics 132
Table 4.3 Summary of Research Hypotheses 143
Table 4.4 Summary of Selected Methodology (VAR) Citations 150
Table 4.5 Summary of VAR Methods and Associated Diagnostic Tests 157
Table 4.6 Summary of Recent Articles Using Panel VAR Methodology 170
Table 5.1 Panel Dimensions and Time Periods 174
Table 5.2 Descriptive Statistics of Core Variables 176
Table 5.3 Panel Unit Root Tests (with constant and trend) 180
Table 5.4 Panel Unit Root with Three Heteroskedasticity-Robust PURTS 181
Table 5.5 Panel Unit Root Test Assuming CSD 183
Table 5.6 Correlation Matrix and VIF Statistics 186
Table 5.7 Westerlund Tests for Panel Cointegration 190
Table 5.8 Johansen Cointegration Test 191
Table 5.9 Johansen Cointegration Test for the Core Variables 192
Table 5.10 Estimation of the VAR Lag Order 195

Table 5.11 Cross Section Dependence....198
Table 5.12 Autocorrelation Tests (PVAR(1))....199
Table 5.13 Baseline Model Estimates Across Different Samples 204
Table 5.14 PVAR(1) with Economic Activity and Development 208
Table 5.15 PVAR(1) with Economic Structure and Market....211
Table 5.16 Panel VAR Model for Structural Breaks 214
Table 5.17 PVAR Model for Income, HIPC, and LDC....215
Table 5.18 PVAR(1) with Structural Breaks (Regime Change and Instability)....218
Table 5.19 Continuous PVAR(1) Models: 2–and 3–Way Interaction VAR 221
Table 5.20 Panel VAR Models and their Diagnostic Status....223
Table 5.21 VAR Granger Causality Matrix for CEMAC Sample 228
Table 5.22 Panel Granger and DH Causality Tests (1)....233
Table 5.23 Panel Granger and DH Causality Tests (2)....234
Table 5.24 FEVD Matrix for with FDI, Growth and Governance....244
Table 5.25 PVAR(1) Core Model with Restrictions....251
Table 5.26 Standard PVAR and Bayesian PVAR Estimates....252
Table 5.27 Bayesian Estimation with Different Priors (1992-2019) 253
Table 5.28 F-Matrix with Long-run Effects 262
Table 5.29 Panel VAR Model for an Alternative Lag Length Specification....264

LIST OF FIGURES

Page

Figure 2.1 Location of CEMAC in Africa 37
Figure 2.2 Heterogeneity across CEMAC Countries 68
Figure 3.1 Conceptual Framework 118
Figure 3.2 Conceptual Path Diagram of a Trilateral Causality Model 119
Figure 4.1 Estimation Steps of VAR Modeling 147
Figure 5.1 Trends in Core Variables with Structural Breaks 213
Figure 5.2 Stability of Model 1 225
Figure 5.3 PVAR Residuals (Cross-Correlations Matrix) 226
Figure 5.4 IRFs of the FDI-GDP-Governance System (CEMAC Sample) 238
Figure 5.5 IRFs of FDI, Growth and Governance System (INC Sample) 239
Figure 5.6 IRFs of FDI, Growth and Governance System (HIPC Sample) 240
Figure 5.7 IRFs of FDI, GDP per capita, and Governance (LDC Sample) 241
Figure 5.8 Orthogonal FEVDs 245
Figure 5.9 Impulse Responses of Bayesian VAR 254
Figure 5.10 IRFs Structural VAR of FDI with Policy Shocks 258
Figure 5.11 IRFs of the Structural VAR Model for Core Variables 259
Figure 5.12 Variance Decomposition Using Structural VAR Factors 260

CHAPTER 1

INTRODUCTION

Foreign direct investment (hereafter referred to as FDI) presents an interconnected global economy with the chance for international collaboration among countries and aids the inflow of investments made by nonresidents. As such, FDI has emerged as a critical engine for economic growth (Bouchoucha & Ali, 2019; Emamverdi & Boland-Ghamat, 2019; Hassan, Sanchez, & Yu, 2011; Herzer & Klasen, 2008; Le et al., 2021; Ma et al., 2019; Mariska, Hamzah, & Ratih, 2021; Miao, 2021; Sirag, SidAhmed, & Ali, 2018; Van Bon, 2019; Yimer, 2023; Zhuo et al., 2021). It is, therefore, not uncommon for governments and researchers to emphasize the significance, impact, and factors that drive growth in the inflow of FDI. However, this relationship is more complex than it appears, with the mediating role of other variables such as governance (Agyeman et al., 2022; Bouchoucha & Yahyaoui, 2019; Hamid et al., 2022; Radulescu, Serbanescu, & Sinisi, 2019; Raza, Shah, & Arif, 2021; Saidi & Ochi, 2023), household consumption (Radulescu, Serbanescu, & Sinisi, 2019), as well as financial market development (Alfaro et al., 2003; Nor, Ripain, & Ahmad, 2015), proving to be preconditions for the effectiveness of FDI. Hence, empirical results and conclusions in this relationship are ambiguous (Abbes et al., 2015; Alfaro et al., 2004; Chanegriha, Stewart, & Tsoukis, 2020).

The role of growth in attracting FDI or the impact of FDI on economic growth is, according to Narula and Driffield (2011), ambiguous, especially for developing countries. Despite this ambiguity, the link between these variables is still thought to be multifaceted, with both positive and negative externalities. Alfaro et al. (2004) attribute this to the contingent role of a third factor: financial markets. This dissertation points to the effect of the host country's governance structure. Thus, effective governance, characterized by the six worldwide governance indicators

(Kaufmann, Kraay, & Mastruzzi, 2011), plays a crucial role in determining the extent to which FDI contributes to sustainable economic growth.

This thesis delves into an additional dimension of the nexus between FDI, economic growth, and governance while narrowing the research gap as highlighted through the lens of the sustainable development goals (SDGs). Note that SDGs provide a comprehensive framework for addressing global challenges while ensuring sustainability (Giwa et al., 2020; Griggs et al., 2014; Leal Filho, Tripathi, et al., 2019). The interplay between these variables is explored in the context of achieving SDGs, as Giwa et al. shed light on how FDI can serve as a catalyst for inclusive and sustainable industrial growth and how this is achieved when coupled with sound governance practices. Conversely, poor governance may lead to less investment flow and slow growth, undermining the achievement of SDGs. Note that this does not extend to the inclusion of SDG scores into the analysis (Aust, Morais, & Pinto, 2020). Instead, economic growth is seen as progress toward the path of sustainable growth in CEMAC countries.

Based on empirical evidence and theoretical frameworks, this thesis underscores the need for a holistic approach that considers the synergies and trade-offs between FDI, economic growth, governance, and the pursuit of SDGs. To this end, Suehrer (2019) remarks that while FDI plays a crucial role in fostering sustainable economic growth, there is a notable absence of policies and a comprehensive framework that effectively connect the 2030 Agenda with tangible investment opportunities. Hence, emphasis on the importance of policy interventions that promote FDI, improve governance, and align economic growth with sustainability goals is imperative. As CEMAC countries strive to navigate the complexities of the global economy, understanding the dynamic relationships among FDI, economic growth, and governance through SDGs becomes imperative for crafting policies that promote enduring and equitable development.

FDI itself is driven by myriad socio-economic and political factors, as well as complex and strategic considerations. According to recent studies, key determinants of FDI include market size (Nunnenkamp & Spatz, 2002; Vijayakumar, Sridharan, & Rao, 2010), cost factors, human capital, openness to trade, globalization (Nunnenkamp & Spatz, 2002), and labor cost, infrastructure, currency value, and

gross capital formation as potential factors (Vijayakumar, Sridharan, & Rao, 2010). FDI inflow into most developing countries has been a significant challenge for both investors and host countries. Although the slow inflow of FDI into developing countries is attributed to these countries' slow growth, governance might also hinder FDI. For instance, poor governance can undermine the positive impact of FDI, resulting in concerns such as corruption, regulatory barriers, and a lack of transparency, which can dissuade both foreign and domestic investments, limiting overall economic advancement. Thus, governance is an important determinant and plays a central role in attracting FDI. Several studies, including Niarachma, Effendi and Ervani (2021), Drabek (2021), and Ofori and Asongu (2021), have linked empirical evidence to support this assertion. Regulatory quality, rule of law, corruption control, governance effectiveness, voice and accountability, and political stability are dimensions or indicators of governance, also known as aggregate governance have been recognized as essential factors that boost FDI inflows (Adeleke, 2014; Subasat & Bellos, 2013).

Good governance is paramount for the government of each country to reduce poverty and achieve its growth objectives, but due to corruption, political instability, and government ineffectiveness, the quality of governance indicators has failed in most CEMAC countries (Ewane, 2023). This introductory phase highlights the intriguing dynamics of FDI and its determinants within six developing countries in central Africa. The dynamic interplay between FDI, economic growth, and governance has piqued the interest of policymakers, economists, and academics alike (Karau & Mburu, 2014; Narayanan, Choong, & Lau, 2020; Njoku & Chiwira, 2017). The most recent study by Saidi, Ochi and Maktouf (2023) explores of these three variables for developing countries. Hence, harmonizing investment policies and strengthening governance frameworks are critical for attracting FDI and boosting economic growth. Furthermore, the presence of solid governance indicators, in addition to natural resources, has a considerable beneficial impact on FDI. Overall, these findings emphasize the significance of strong governance in attracting FDI and its potential advantages for host countries. The dynamic interactions between FDI, economic growth, and governance are multifaceted and complex. For instance, sound governance measures help attract and retain FDI by lowering perceived risks and

improving the business climate predictability. In turn, FDI can help to boost economic growth by increasing domestic investment, stimulating knowledge transfer, and facilitating the development of competitive sectors.

The most important factors influencing FDI inflows are host-country regulatory and institutional variables, labor quality and wages (Hou et al., 2021), macroeconomic and open economy variables (Ghoshal et al., 2021), uncertainty and financial development (Bahri et al., 2019), and independent variables such as foreign exchange systems, political stability (Tian, Corlett, & Murray, 2017), or good governance, inflation, GDP, market openness, and ease of doing business. Countries with more efficient start-up legislation, stronger minority investment protection, and superior international trade procedures and infrastructure attract more FDI (Contractor et al., 2021). Wage effects on FDI inflows are nonlinear and dependent on worker quality (Hou et al., 2021). Ghoshal et al. remark that capital formation, GDP growth rate, economy size, foreign exchange reserves, and savings, as well as open economy characteristics like interest rate, debt, and inflation, all have a substantial impact on FDI inflows. Economic policy uncertainty deters FDI inflows, but more developed financial markets attract FDI (Nguyen & Lee, 2021). Good governance, GDP, market openness, and ease of doing business all have a beneficial impact on FDI inflows, whereas inflation has a negative impact (Khatabi et al., 2020). Thus, this thesis investigates the short-term dynamic effect of economic growth and governance quality on FDI inflows. In other words, the role of economic growth and governance in attracting FDI is evaluated.

FDI, economic growth, and governance are all intertwined. Economic and political governance, as well as overall good governance, are critical to encouraging economic progress (Khyareh & Amini, 2021). Economic governance, as measured by economic freedom, has a favorable impact on economic growth through investment. Hamida, Lassoued and Hadhek (2020), on the other hand, explore political governance and conclude that it appears to have no direct impact on economic growth, although it is critical for the development of good economic institutions. FDI inflows can boost economic growth by increasing capital stock, creating job opportunities, and promoting technological transfer. Increased economic growth attracts higher FDI inflows. Abdouli and Hammami (2017) posit that energy use is

also related to economic growth, with stronger economic growth necessitating increased energy consumption. Through industrialization and the development of the manufacturing sector, FDI inflows can stimulate energy consumption. Samarasinghe (2018) argues that corruption control is a vital aspect of economic growth, and efficiently managing corruption control and political stability is critical for achieving better economic growth. Accountability, openness, the rule of law, and regulatory excellence are also crucial concepts for economic growth.

1.1 Background of the Study

Asiedu (2002a) opines that although FDI has increased dramatically in poor countries during the last decade, Africa has not benefited from it despite efforts to attract it. Developing countries, therefore, have not been regarded as attractive FDI destinations in the same way that industrialized ones have been (Mottaleb & Kalirajan, 2010) Africa, a resource-rich continent (Veselinovic, 2015) and home to the poorest countries in the world, has a perplexing experience with inward FDI (Odusola, 2018). A prime example of this low influx of FDI financing in the Sub-Saharan African (SSA) region can be seen in the CEMAC economic sub-region. Arguably host to the uniqueness of Africa, with Cameroon often described as Africa's miniature, CEMAC countries have faced a similarly low share of the world's FDI inflows.

Despite the volume of research articles and studies attributing the growth of the economy to advanced technological infrastructure, diverse industrial and service sectors, quality healthcare, and a higher literacy rate, FDI inflows have had a tremendous impact in recent times. In addition to FDI, governance in developing countries plays a role in both attracting FDI inflows and improving economic growth. In most developing countries, the growth of GDP per capita seems to be a determining factor for attracting FDI financing. This suggests, in addition to GDP per capita, that developing countries are presented with institutional challenges such as governance and infrastructural development. This line of argument has not been explored in previous empirical studies.

The relationship between FDI and growth has been well-researched across developing, emerging and developed countries alike. Some of these empirical studies have shown evidence of a direct effect of FDI on growth without the influence of other variables, such as human capital (Aleksynska, Gaisford, & Kerr, 2003), and the idea that causality can run in both directions (Aleksynska, 2003). With these in mind, the fact that growth prospects may attract FDI financing for investors is evident. In addition, Aleksynska amplifies this by highlighting that unobservable indicators, such as macroeconomic stability, or unobservable factors connected to growth dynamics, and the host country's trade regime may have a stronger link to FDI than growth itself. Furthermore, attempts to assess the effect of economic growth on FDI inflows are mostly seen in bi-directional causality studies. In establishing a link between growth, FDI, and trade, Liu, Burridge and Sinclair (2002), for instance, found long-run bi-directional causal relationships between growth, FDI, and exports.

This research aims to identify and evaluate the role of GDP per capita and governance in attracting FDI financing to CEMAC countries. To accomplish this, this chapter will begin by explaining the retrospective of this study and its context, then move on to the research problem, the research aims, objectives, and questions, the significance, and, lastly, the limitations. Quite tersely, FDI involves the cross-border investment of capital, technology, and managerial talent, and its influence on the host country's economy is linked to the quality of governance mechanisms in place. Economic growth is a fundamental goal for countries seeking to improve their living standards, alleviate poverty, and increase overall prosperity. FDI is critical in this endeavor because it may bring in new money, introduce modern technology, encourage job growth, and foster innovation. However, the extent to which FDI results in concrete economic progress is dependent on the governing framework of the host country. Effective governance includes the rules, regulations, and institutions that steer economic activities, promote accountability, protect property rights, and foster a business-friendly climate.

The investigation into the relationships between FDI, economic growth, and governance delves into the mechanisms through which these variables interact and impact one another. It also looks at the role of governments in building a climate that welcomes FDI inflows, ensures equitable benefit distribution, and promotes long-term

economic growth. Understanding these links allows policymakers to devise strategies for leveraging FDI as a tool for boosting economic development while also strengthening governance institutions to maximize the benefits of FDI inflows.

This thesis investigates this reverse connection while examining the short-run dynamic and causal relationship between FDI, governance, and growth, as well as assessing the influence of seven exogenous variables for six CEMAC economies. The analysis enables panel VAR estimation and other related estimations such as panel structural and Bayesian VAR. The initiation of the latter two methods is to test the robustness of the results. Somehow, the prospect of using GDP or FDI as endogenous supports the use of instrumental variables, and model estimation often favors this method over OLS (Aleksynska, 2003).

Over the years, FDI or FDI financing has become almost ubiquitous. In other words, almost every country in the world can boast of investments from abroad. Surprisingly, most countries are yet to experience the benefits from the inflow of FDI. As demonstrated by several scientific studies, quality FDI that assists developing nations' indigenous companies in integrating into global supply-chain networks has proven to be a viable instrument for growth and development in these countries. In order to achieve their goal of establishing a strategy with Africa, the G20 countries, in collaboration with international organizations, should examine steps to convert FDI into quality FDI as one component of that strategy and should assist African countries' own efforts in this regard (Glitsch et al., 2020). As such, quality FDI brings benefits in economic growth and development through creating value-adding, decent jobs and also facilitates the transfer of technology to local firms.

Alfaro and Charlton (2013) found that when the quality of FDI is taken into consideration, the growth impacts of FDI rise using a new complete industry-level dataset of 29 countries. According to policymakers and scholars, Alfaro and Charlton (2006) argue, FDI can aid a host country's growth efforts. FDI may provide a source of important technology and know-how, as well as create links with local companies, which can assist in restarting an economy. Quality FDI is defined as the sort that would considerably expand employment, develop skills, and boost the competitiveness of local companies (UNCTAD, 2006).

The movement of capital across international boundaries for long-term investments or purposes, known as FDI, is one of the most debated concepts among researchers and academics. Other types of investments identified in Eiteman, Stonehill and Moffet (2010) in multinational business finance or specified by Buckley (2004) as part of the foreign expansion sequence possess the same cross-border nature and long-term potential for increasing foreign presence and foreign investment (Eiteman, Stonehill, & Moffet, 2010). Its characteristic of being a long-term investment sets it apart from other types of investments, such as foreign portfolio investment. It is uncommon to see an investor commit their time and money for reasons other than profit. However, this commitment is sometimes seen as a form of assistance to the host country in terms of employment, technology transfer, and other spillover effects. Empirical research has focused on investigating the impact of FDI on the host country's economy. If the view that FDI positively impacts the host economy is true, then policymakers must develop policies to attract FDI financing.

Over the last decade, the flow of FDI to Africa has changed as new sources of investment and new industries have emerged. FDI benefits host countries by increasing company productivity and integrating indigenous businesses into global markets (Qiang, Liu, & Steenbergen, 2021). FDI plays a critical role in facilitating Africa's economic growth and development. To achieve this, Qiang, Liu, & Steenbergen suggest that Africa must attract more FDI and ensure that it is directed towards sectors that are more employment-intensive, export-oriented, or environmentally friendly. Görg and Greenaway (2004) emphasize that governments worldwide provide substantial incentives to attract investment, driven by the expectation of spillover effects that will complement the core advantages of increased national revenue from new investment. Similarly, Ajayi (2008) argues that FDI is widely recognized as one of the most active international resource flows to developing nations. Because FDI represents a package of tangible and intangible assets, and the businesses that deploy it are significant actors in the global economy, it is particularly essential (Görg & Greenaway, 2004).

FDI, according to Ajayi (2006), is viewed as a growth engine because it provides much-needed cash for investment, enhances competitiveness in host-country sectors, and assists local businesses in becoming more productive by using more

efficient technologies or investing in human and/or physical capital. Because it is steadier than other kinds of capital flows, FDI makes a significant contribution to growth. FDI has a number of advantages, including serving as a source of money, creating jobs, allowing access to international markets, and causing technical and efficiency spillover to local businesses. He argues that FDI is supposed to increase the host country's integration into the global economy and encourage growth through giving access to foreign markets, transferring technology, and generally increasing capacity in host country businesses. Ajayi further holds that FDI is seen as a key engine of economic growth and development; and FDI not only increases capital formation but also improves capital stock quality.

Ajayi (2008) insists that there is substantial evidence that FDI may contribute to growth and development by complementing domestic investment and enabling commerce, knowledge, and technology transfer. The New Partnership for Africa's Development (NEPAD) recognizes the importance of FDI as a crucial resource for bringing NEPAD's vision of growth and development to life. This is because Africa, like many other developing areas across the world, needs a significant input of external resources to close savings and foreign exchange deficits, as well as to catapult itself to levels of sustainable growth, in order to eradicate its widespread poverty.

One of the most important sources of cross-border capital flow into developing nations is FDI. In the last decade, FDI has increased roughly six-fold in most African countries, where nations tend to have open laws promoting inward flows. In 2012, however, only 15 countries accounted for more than 80% of overall FDI flows into Africa. In addition, the biggest inflows are either in sectors where the area has a competitive advantage (such as natural resources and agriculture) or in sectors where there is a demand for investment and high returns (such as building) (WorldBank, 2014).

For a region with a relatively unique culture and people, different languages, huge income inequality, diverse foreign aid lenders, and being home to many natural resources but absent in most major world activities and markets, most SSA countries, or developing Africa, especially CEMAC countries, have undeniably been attracting FDI inflows. Despite this influx of FDI to this region, it remains one of the most

concerned regions in terms of poverty, growth, as well as governance. Although many researchers have linked FDI financing to growth, this region remains the most misunderstood in terms of what actually deters its growth despite continuous inward FDI. In a way, this region might not have enough inward FDI for economic growth. Hence, growth is seen as a determinant for more inward FDI into the region. This thesis, therefore, aims to investigate the conditions that affect the impact of inward FDI on economic growth in CEMAC (mediating and moderating effects), analyze and present a comparative analysis of FDI's impact on growth across regional organizations in CEMAC, as well as assess the role of income levels and lending organizations in the impact inward FDI has on growth in SSA.

Part of this dissertation is, therefore, based on the unsettled debate on the effect of FDI financing on growth, and most importantly, the condition that ties FDI financing to growth in CEMAC countries. It is unsettled because Narula and Driffield (2011) remark that inward FDI has been studied in a variety of contexts, including the relationship between inward FDI and new firm creation, development, innovation, exports, and competitiveness. No debate, however, has been as heated or as long as the one over the degree to which inward FDI promotes productivity growth in the host nation. While Narula and Driffield settle for the ambiguity, Alfaro (2003) pursues the linking concept between FDI financing and economic growth. The former view is investigated in this study and the latter view is what is commonly known as the mediating term. Though the terms; mediation, moderation, or interaction are often confused by researchers, this study will attempt to provide answers to these concerns.

Narula and Driffield's view is an amplified version of Wang (2009) who claims that previous analytical research on FDI and economic growth has yielded mixed results. According to Wang, the unclear findings may be due to the use of complete FDI. He looks at the various effects of different types of FDI inflows on the economic growth of the host nation. Wang used data from 12 Asian economies and found strong evidence suggesting that FDI in the manufacturing sector has a substantial and positive impact on host economies' economic development. Inflows of FDI into non-manufacturing sectors do not have a major impact on economic development. Like Wang presents his information differentiating the impact of FDI

between sectors, this dissertation examines the effect based on income levels as well as regional organization groupings.

1.2 Prior FDI-related Research

According to Odusola (2018), Africa faces an FDI paradox. This FDI paradox concept states that returns are anticipated to move from low-returning countries to high-returning countries. During the period 2006-2011, the area had the greatest rate of return on FDI (11.4%), compared to 9.1% in Asia and 8.9% in Latin America and the Caribbean. In comparison, the global average was 7.1 percent. Despite this, Africa's proportion of global net FDI has been relatively low in recent years. This means, he explains, in order to attract financial capital, Africa’s labor and natural resource endowments are insufficient; other endowments are considered. Low public capital (e.g., lack of energy, roads, trains, and airports); low human capital (e.g., lack of trained, educated, and healthy labor force); and low institutional capital are all important (weak security and judicial systems, weak property rights, and poor regulatory and standards). The excellent quality of these assets increases physical and financial capital productivity while lowering the cost of conducting business.

When investors give them directly, they act as levies on investment returns. Fragmented investment policies, information asymmetry (restricted access to investment possibilities by foreign investors), and high sovereign risks are all factors that contribute to the FDI conundrum (for example, low absorptive capacity, high corruption, political instability, weak capacity to manage shocks). All of these factors erode the government's ability to maximize social returns on investments that may complement and accelerate financial capital. Furthermore, Odusola argues that FDI inflows are hampered by financial intermediation costs (e.g., high brokerage, loan assessment, and agency charges, as well as contract enforcement), which are sometimes proxied by local lending rates (which are as high as 60% in Madagascar and 44% in Malawi). Eliminating the FDI conundrum in Africa requires addressing obstacles to public, human, and institutional capital, as well as lowering sovereign risks and intermediation costs and guaranteeing investment policy harmonization among African nations.

This view, according to Odusola (2018), is amplified in a UNCTAD (2019) report which narrates that Africa survived the worldwide decrease in FDI, with flows to the continent reaching US$46 billion in 2018, up 11% from the previous year. FDI flows to SSA and other southern African countries, for instance, increased by 13% to $32 billion, regaining ground after two years of decline. The largest reversal was in Southern Africa, where flows recovered to $4.2 billion following a net divestiture of $925 million the previous year. South Africa's FDI more than quadrupled to $5.3 billion, owing primarily to intracompany transfers by existing investors. Angola's balance of payments remained negative (-$5.7 billion), owing to oil and gas businesses moving cash to parent companies via intracompany loans (FDI to Africa defies global slump, rises 11%) (UNCTAD, 2019).

Recent studies that have addressed theories and studies on the determinants of FDI (Faeth, 2009; Kok & Acikgoz Ersoy, 2009; Lizondo, 1999) with most of these theories shedding light on FDI being the main drive for economic growth (Lenka & Sharma, 2014; Tsai, 1994). Expected relative returns, risk diversification, market size, technical advantage, market failure, oligopolistic rivalry, liquidity, currency strength, political instability, tax policy, and government restrictions are some of the variables identified and analyzed. While the majority of theories for FDI have some empirical validity, Lizondo argues that there isn't enough good evidence for any of them to rule out the others. However, taking a variable at a time, Borensztein, De Gregorio and Lee (1998) found that FDI is an essential route for knowledge transfer, contributing to growth at a higher rate than domestic investment. The increased productivity of FDI, on the other hand, is only true when the host nation possesses a certain level of human capital. As a result, FDI only helps to economic growth when the host country has a significant absorption capability of sophisticated technology. They used data on FDI flows from industrial nations to 69 developing countries during the previous two decades to assess the influence of FDI on economic growth in a cross-country regression framework.

Apart from the main determinants of FDI, such as economic growth and electricity consumption, Habib and Zurawicki (2002) investigated another variable used as a mediating variable in this research: corruption. They investigated the influence of corruption on FDI and concluded that the host country's level of

corruption is assessed, as well as the absolute difference between the host and home countries' levels of corruption. The findings show that foreign investors typically avoid corruption since it is seen as unethical and can lead to inefficiency in operations. Both have detrimental consequences, according to the research. In addition, Carkovic and Levine (2005) also evaluated the link between economic growth and FDI. Their study employed novel statistical approaches and two new databases. They found that the exogenous component of FDI does not have a significant, independent impact on growth after addressing the biases that plagued previous research.

In a study by Yasin (2005), FDI is thought to have a favorable impact on developing economies, but the factors that influence it are yet unknown. Using panel data from 11 countries in the SSA region, Yasin's study empirically analyzes the link between official development assistance (ODA) and FDI flows. According to the findings, bilateral official development aid has a considerable and beneficial impact on FDI flows. Trade openness, labor force growth, and exchange rates all have a favorable and substantial impact on foreign direct investment flows, according to the findings. Official development assistance is defined as government support that specifically and clearly aims to advance the economic development and well-being of developing countries. Now the main source of funding for development assistance, ODA was named the gold standard of foreign aid by the DAC in 1969 (OECD, 1992). Multilateral development aid, GDP per capita growth, the country's composite risk rating, and the political freedom and civil rights index, on the other hand, have no statistically significant impact on foreign direct investment flows. The positive and significant impact of bilateral official development assistance on foreign direct investment has policy implications for recipient countries, who must develop policies to improve their economic relationships with donor countries in order to attract more foreign direct investment from multilateral corporations based in these countries.

Until now, few researchers have used surveys and questionnaires to explain FDI. Bartels, Alladina and Lederer (2009) embarked on this journey by analyzing a survey of 758 foreign investors' attitudes, activities, and motives in ten SSA nations. Among the response rates for 10 SSA countries in this study, Cameroon is only CEMAC country present with a 36.4% response rate. Perhaps this is not worth

pursuing. However, they found that providing transaction cost-reducing information about sectors and markets, as well as utility services to investors, are important determinants before and after a firm's FDI decision. Political economy factors play a large role in FDI placement decisions in SSA. Variables in labor and manufacturing inputs have no bearing. Besides, the FDI proportion of SSA has consistently averaged 1% of global flows. As a result, policymakers may learn a lot from investors' location decisions and opinions.

OECD (2008) defines FDI as a type of cross-border investment. Known as FDI, it occurs when an investor from one country establishes a stake in and substantial degree of control over an enterprise located in another economy over time. An indication of such a link is when an investor in one economy owns 10% or more of the voting power in a business in another economy. Because it forges strong, enduring connections between economies, FDI is a crucial component of global economic integration. FDI can play a significant role in economic development and serves as a vital conduit for the transfer of technology between countries. It also facilitates international trade by providing access to foreign markets. Its indicators include industry and FDI restrictiveness, as well as inward and outward values for stocks, flows, and income, broken down by partner country (OECD, 2008).

Returning to the discussion on the movement of FDI financing, Cohen (2007) stresses that the seemingly straightforward explanation for why a corporation spends abroad—to make more money—is insufficient to offer much insight into the various rationales for forming international subsidiaries. As this chapter describes the main academic models and hypotheses as to why firms will consider the costs and uncertainties of continuing to compete in global markets of alien cultures, sometimes in direct rivalry with existing local rivals, the omnipresence of heterogeneity and uncertainty, as well as the need for disaggregation, reappear as underlying themes. Furthermore, Cohen opines that the majority of the chapter is dedicated to a comprehensive and unique list of real-world market and economic explanations why FDI is appealing to an increasing number of businesses in an increasing number of countries. The final part is a case analysis of the C.A.R. industry, which can be used to explain all of the arguments for doing so on a global scale that have already been addressed.

The destination of FDI financing and the reasons for a particular destination are worth mentioning. Cohen (2007) mentions that since even the largest MNCs cannot afford to invest in any region, the mechanism by which a country chooses where to locate its international subsidiaries is an essential step in the FDI cycle. Due to the diversity of market plans and priorities, there is no single rule for choosing suitable overseas sites for production and service firms. This chapter starts with a retrospective and prospective breakdown of MNCs' asymmetrical regional distribution, with a focus on their concentration in industrialized countries. Following that, the different positive factors that draw MNCs to specific countries, such as financial benefits, are thoroughly analyzed. A separate section looks at the different factors that deter FDI from entering the country. A recurrent trend is that those who believe MNCs are a disruptive influence on host countries will applaud government policies aimed at discouraging their admission or imposing comprehensive legislation, whereas proponents of private industry would value the reverse.

Delving a little further, Cohen (2007) stresses a central point that neither MNCs nor FDI have a "one size fits all" paradigm. He provides a detailed overview and explanation of the various forms they take. The imperatives, he states, of disaggregation and avoidance of generalizations are direct consequences of the lack of uniformity. The consequences of policymakers', the general public's, and most academics' failure to understand and consider heterogeneity should be addressed, with a focus on the inability to distinguish between costs and advantages, high-quality and low-quality FDI, and MNCs depending on which of the various types and behavior trends should be assumed by an individual. Cohen's work discusses by explaining that the various forms and behavior patterns are assumed by a single foreign subsidiary.

Going international has always been a resource and the idea behind every company seeking growth. It is, however, different depending on how effective it is to operate internationally based on different factors. In Vahlne and Johanson (2017), reference is made to critiques of the model they proposed in the 1970s, relating it to the Eclectic Paradigm Model and the literature on networking. Briefly, The OLI Model, or Ownership, Place, and Internalization Framework, is another name for the eclectic paradigm, which is an economic theory. It was created using the

internalization concept proposed by John H. Dunning and released in 1979. In the sense of internationalization, the principles of the advantage kit and the advantage loop are also implemented. Recall that Buckley and Hashai (2009) introduce a basic general equilibrium model based on a reconfiguration of principles from the recent classical economics literature that formalizes internationalization in the eclectic paradigm. In other words, they offer a straightforward general equilibrium model, based on a reorganization of ideas from the new classical economics literature, that formalizes internationalization in the eclectic paradigm. Through a series of mathematical inequalities, the model allows us to explore the role of ownership, location, and internalization advantages, as well as their interplay, in the creation of the multinational company (MNE) concurrently. Through a series of mathematical inequalities, the model allows one to discuss the importance of ownership, position, and internalization advantages, as well as their relationship, in the merger of MNEs. Their model bridges the gap between international trade economists' and international business academics' disconnected interpretations of MNEs and allows particular elements of the eclectic theory to be empirically tested.

Johanson and Vahlne (1977) and Luostarinen (1977) described the complex perception of corporate internationalization as a sequential process. In Buckley (2004), this is thought to start from the fact that it proceeds from selling to the establishment of an international distribution division, license arrangements, and other related contracts before investing in foreign manufacturing facilities. Given the relative uncertainty of operating in a foreign world, this evolutionary strategy can serve as a risk-mitigation mechanism. Through internationalizing in phases, the company eventually transitions from a low-risk, quickly reversible export-oriented approach to a higher-risk, less reversible strategy requiring manufacturing in other countries, whereas the benefit payoff multiplies.

Exporting to a global market is usually how a company with multinational aspirations begins its journey. Exporting has a number of benefits over full-fledged participation. The amount of capital required is negligible, the risk is limited, the decision can be quickly reversed, and the returns are instant. Exporting has a high learning curve impact in terms of the foreign country's ways and market community. This is particularly true in the fields of supply and demand, competitiveness, delivery

systems, payment conventions, and international financial institution processes. The company may extend its marketing organization internationally as a result of its export success. It is possible that it would stop using export agents and other related intermediaries and only negotiate directly with international agents and distributors. The company may develop its own distribution division and service facilities as expertise is gained from improved contact with customers. Regulation over one's own overseas delivery channel is often the result of this marketing extension.

A similar sequence is established by Pehrsson (2016), in which he argues that the expansion of a multinational corporation into a new market is a critical problem in international business. Pehrsson advocates for a better understanding of key drivers that will help companies evaluate different strategies for sequential expansion. Licensing, rather than establishing an overseas distribution subsidiary, is another choice for international expansion. Licensing involves a local corporation producing another company’s goods in exchange for royalty and/or other forms of compensation. The biggest benefit of licensing for a home-based business is the low initial investment. However, the resulting cash flow may be very poor. Maintaining quality levels can be challenging at times, and controlling shipments by an international licensee can be difficult. A license arrangement could, in fact, generate a competitor in certain markets, resulting in a loss of potential sales for the licensing company. Despite the risks, licensing often seems to be the preferred method of entering international markets independently. Note that some companies market technologies in exchange for shares in international joint ventures and dividend fees. This path to internationalization is a hybrid of licensing and building one's own overseas manufacturing facilities. It often leads to the formation of a global network of associate firms. Such companies grow into fully fledged multinationals with manufacturing plants in other countries without going through the licensing (or quasi-licensing) process.

Rather than presenting a generic model of internationalization, Eiteman, Stonehill and Moffet (2010) present a more detailed model of how Ganado, a leading commercial law firm that primarily serves international clients doing business through Malta, transitions from a domestic to an international trade phase. They go on to say that a successful company will go from basic international trading to a multinational

phase defined by production and investment both domestically and internationally. As the number of overseas subsidiaries grows, so do the currency risks and exposures. However, Eiteman, Stonehill and Moffet (2010) present a limitation in which the dual agency issues of corporate insiders and sovereign state rulers may restrict growth.

This limitation is, however, still a growing debate. For instance, Eiteman, Stonehill and Moffet (2010) assert that many insiders and rulers of organizations with worldwide companies are debating whether their activities are compatible with producing firm value or consistent with expanding their own personal stakes and authority. Further amplifying this problem, Stulz (2005) argues that if these powerful insiders prioritize their own riches over the firm's, capital will be unable to move freely across borders, currencies, and institutions, impeding the creation of a more open and integrated global financial community. In addition, from the early steps of exporting to becoming a global company, Vahlne and Johanson (2017) present a general model of the evolution of the international business enterprise, also known as IBE. The revised and expanded model describes IBE evolution in general, rather than only the features of the internationalization mechanism in a specific context. They assume the most recent version, which is based on process ontology, would be helpful in experimental scientific studies.

One of the drawbacks of both selling and licensing is the failure to fully understand a product's promise in a global market, and unless closely controlled, licensing can establish a major competitor in some markets. Setting up a company's own manufacturing plant outside of the country overcomes these disadvantages and allows the company to stay current with local market trends, adapting its goods, distribution, and selling practices to suit changing local demands and preferences while still offering improved after-sales support. Establishing local manufacturing plants, on the other hand, shows a stronger contribution to the local economy and a greater promise of supply continuity. Despite the ease and merits of other forms of foreign expansion and internationalization, MNCs are still motivated in FDI financing.

1.3 Problem Statement

Despite the volume of research articles and studies attributing the growth of the economy to advanced technological infrastructure, diverse industrial and service sectors, quality healthcare, and a higher literacy rate, FDI inflows have had a tremendous impact in recent studies. In addition to FDI, governance, especially in developing countries, plays a role in both attracting FDI inflows and improving economic growth. In most developing countries, GDP per capita seems to be a determining factor for attracting FDI financing. This suggests that developing countries are presented with institutional challenges such as governance and infrastructural development, in addition to GDP per capita. This line of argument has not been explored in previous empirical studies. While institutional factors (or governance quality) play a critically vital role in attracting FDI inflows (Aloui, 2019; Biro et al., 2019; Fazio & Talamo, 2008; Gani, 2007; Khan et al., 2019; Semenas, 2020; Zheng, 2014), the growth-enhancing impacts of FDI are felt more strongly in African economies (Aregbeshola, 2014; Behname, 2012).

Within the six CEMAC countries, there are three income levels, different sources of aid, developmental stages, two landlocked countries, as well as varying HIPC status. This presents a huge problem for generalizations made about a country's economic status, whether it is developed or developing, in the midst of countries with diverse economic characteristics. Thus, policy makers in developing countries are ill-equipped in terms of methodologies, and hence, constantly pursuing varying but non-specific strategies to attract FDI inflows. As such, the existing literature is inadequate in evaluating the roles of GDP per capita and governance elements in attracting FDI inflows, as well as income level differentials, HIPC status, and LDC stage.

1.4 Gap, Contribution, and Rationale of this Research

Despite extensive study on the links between FDI, economic growth, and governance, there are still significant research gaps that present potential for additional investigation. Tsai (1994) acknowledges the geographical differences in the impact of FDI inflow on economic growth. First, the relationship between FDI,

economic growth, and governance is still being debated. While existing research frequently focuses on the positive impact of strong governance on attracting FDI and fostering economic growth, more nuanced studies are required to determine whether FDI directly leads to changes in governance or vice versa. Untangling these causal strands can offer insights into successful policy sequencing.

Second, contextual factors such as the level of economic development (LDC), income classification of the country, HIPC status, political stability, cultural norms, and economy size can all have a significant impact on the linkages between FDI, economic growth, and governance. More research might be conducted to investigate how these contextual elements modulate the associations, assisting in identifying the exact settings during which some linkages are more prominent. In addition, in research, FDI, economic growth, and governance are frequently treated as unified ideas across countries, sectors, and regions. Thus, more comprehensive analysis is required to understand how these interactions fluctuate between countries, regional organizations, industries, as well as how sector-specific policies and regional inequities influence the linkages.

Third, many studies rely on cross-sectional or panel data analyses, which may be limited in their ability to establish causal links. Econometric advances such as instrumental variable approaches, quasi-experimental designs, dynamic models such as VAR, structural VAR or Bayesian VAR can provide more rigorous insights into the complicated linkages between FDI, economic growth, and governance. The latter analyses incorporate various economic, developmental, and classification-based differentials to provide a holistic understanding of FDI determinants. Harnessing a rich panel dataset encompassing CEMAC countries, this study employs a panel VAR framework to uncover the dynamic interactions among governance indicators, GDP per capita, and FDI inflows. Governance metrics encapsulate institutional strength, regulatory efficacy, and the rule of law, while GDP per capita signifies the economic prosperity of individual nations. The inclusion of FDI inflows offers insights into the role of international capital mobility in fostering economic development.

One distinctive feature of this research lies in the integration of categorical dummies, encompassing Highly Indebted Poor Countries (HIPC) and non-HIPC statuses, Least Developed Countries (LDC) and non-LDC classifications, and

variations in income levels. These dummies illuminate the nuanced impact of these differential characteristics on the dynamics between governance, GDP per capita, and FDI inflows. To ensure the robustness of our findings, we employ both Panel Structural VAR (PSVAR) and Panel Bayesian VAR (PBVAR) models. PSVAR provides insights into the causal relationships among variables, while PBVAR offers a Bayesian perspective that incorporates prior information and uncertainties. In addition, three forms of exogenous variables are introduced in the analysis: regular control variables (seven), year and income, HIPC, and LDC dummies, the as well as induction of two-and-three-way interactive (2WI-VAR(1,1) and VAR(1,7)) variables into the models. Last but not least, the results of two lag sets (1 and 2) based on AIC and SIC criteria will be compared.

Addressing these research gaps will not only improve our understanding of the complex relationships between FDI, economic growth, and governance, but will also provide practical guidance for policymakers and stakeholders seeking to leverage FDI for sustainable development while ensuring effective governance structures. Hence, this thesis contributes to theoretical and policy domains alike. By disentangling the interplay between governance, GDP per capita, and FDI inflows, we enrich the understanding of CEMAC countries' investment attractiveness and economic growth potential. Furthermore, our inclusive approach, considering various economic classifications and dummies, yields insights into the contextual drivers of FDI across diverse strata. The research yields policy insights, furnishing tailored recommendations for improving investment environments and promoting sustainable development in CEMAC countries. Our findings also underscore the significance of categorical differentials in shaping FDI patterns, aiding policymakers in designing targeted interventions.

Again, despite the bulk of research assessing similar macroeconomic variables, some have delved into examining the effect on VAR estimates from changes in the inclusion of variables in the model with few investigating how varying the lag structure in VAR models affects the estimation results and the interpretation of the relationships between FDI, governance, and growth. By exploring different lag lengths and their implications, this thesis would contribute to a deeper understanding of the dynamics among economic indicators, inclusion of variables, as well as provide

insights into the optimal lag structure for capturing meaningful interactions (see Hafer and Sheehan (1989)).

In sum, this dissertation employs panel VAR analysis to explore and provide a comprehensive understanding of the governance-GDP-FDI nexus in CEMAC countries from 1990 to 2019. By integrating categorical dummies for the heterogeneity across CEMAC countries, testing different lag selection criteria, and employing robust PSVAR and P-BVAR models, this study offers a comprehensive framework for analyzing FDI determinants, thereby enriching academic discourse and informing evidence-based policy formulation for inclusive economic growth.

1.5 Research Questions

The research questions for this dissertation investigating the dynamic linkages between FDI, growth, and governance are outlined as follows:

RQ1: What are the dynamic causal relationships among economic growth, governance, and FDI inflows?

RQ2: Is there a short-run and/or long-run relationship between FDI, growth, and governance dynamics?

RQ3: How does economic structure and market factors impact the estimation and interpretation of VAR models in the analysis of FDI, growth, and governance dynamics?

RQ4: How does economic freedom and market factors impact the estimation and interpretation of VAR models in the analysis of FDI, growth, and governance dynamics?

RQ5: How do variations in income and developmental stages, along with the progression through HIPC stages, influence the interactions among FDI, economic growth, and governance?

RQ6: What insights can be gained by employing dynamic modeling techniques to simulate the interactions between FDI, economic growth, and governance under different scenarios?

RQ7: What implications do the changing dynamics of FDI, economic growth, and governance have for policy suggestions aimed at fostering inclusive economic growth?

1.6 Research Objectives

The following objectives guide the research questions in order to explore the intricate connections between FDI, economic growth, and governance, shedding light on how these factors interact and impact a country's growth path.

1.6.1 The Impact of Growth on Attracting FDI

Although studies point to the benefits FDI adds to the economy of a country, whether developed, emerging, or developing (see Joshua, Mathew and Asumadu Sarkodie (2020)), Chowdhury and Mavrotas (2006) confirm the impact of economic growth on attracting FDI in a small panel study including Chile, Malaysia, and Thailand. The primary objective of this thesis is to examine how economic growth affects FDI inflows of a country based on its income grouping, HIPC status, LDC stage, or for CEMAC countries over time. This involves analyzing the short-term and long-term effects of, as in Ghoshal et al. (2021), various macroeconomic and economic indicators on attracting FDI inflow.

Understanding this relationship between the role of economic growth in attracting FDI is crucial for policymakers and investors (see Iamsiraroj and Doucouliagos (2015)). For instance, Shah, Arshad and Haque (2022) argue that sustainable economic growth has a positive influence on FDI inflow in both low-income and middle-income economies. Shah, Arshad and Haque (2022) further concluded that economic growth increases FDI inflow in these economies, while trade openness and exchange rates also have the potential to boost FDI inflow in low-income economies. In middle-income economies, the real growth rate and exchange rate are significant factors that attract FDI inflow, although inflation has a negative impact.

In addition, Iamsiraroj and Doucouliagos (2015) amplify this by concluding that economic expansion generally plays a significant role in determining FDI. The

association between growth and FDI is generally positive, and it is much stronger among single-country case studies than with cross-country analysis. Ghoshal et al. (2021) remark that creating a conducive business environment and implementing effective economic policies are important for attracting FDI inflows. Moreover, capital formation, GDP growth rate, size of the economy, foreign exchange reserves, and savings are found to cause FDI inflows into emerging economies. Interest rate, debt, and inflation also have a statistically significant effect on FDI inflows.

1.6.2 The Role and Impact of Governance on Growth and FDI Inflow

Saha, Sadekin and Saha (2022) examine the role of institutional factors in attracting FDI in lower-middle income countries and obtain different results based on the component of the institution. This second objective seeks to investigate the role of the same institutional factors, better known as governance, an aggregation of the six dimensions of governance, on economic growth and its influence on attracting FDI inflow. Thus, this thesis explores how good governance practices can enhance a country's ability to attract FDI and ensure that FDI contributes positively to sustainable economic growth or development.

1.6.3 FDI Inflow, Growth, and Governance

The third and more comprehensive objective involves studying the feedback loop between FDI inflow, economic growth, and governance. Hence, this objective entails examining how changes in economic growth and governance practices influence FDI decisions and vice versa. A typical question would be, “Does improved governance lead to increased FDI inflows, which then contribute to further improvements in governance and economic growth?” As such, understanding this dynamic relationship can provide valuable insights for policymakers on how to leverage FDI for sustainable growth and development.

1.7 Summary and Structural Outline

In summary, the context of this dissertation is summarized in this chapter, and the research aims, objectives and questions will be mentioned and elaborated in

different sections. Briefly, the significance and limitations of this dissertation have been and will also be examined. In chapter 2, a background, retrospective, prospective, and stylized facts, characteristics, and country-by-country analysis of the six CEMAC countries, CEMAC's institutions and relationship with other world organizations will be presented. Additionally, other important economic indicators affecting FDI financing in CEMAC countries will be discussed. The current literature will be discussed and recent developments in the field will be evaluated in Chapter 3. The theoretical and conceptual framework will be described in this chapter. In Chapter 4, the identification of the best-suited econometric approaches (PVAR, SVAR, or Bayesian VAR) and critical development of methodological underpinnings and strategies in modeling FDI inflow, growth, and governance will be explained. The use of panel data, panel/structural VAR with special emphasis on Bayesian VAR for robustness, will be explained. Furthermore, and the overall study design, including its limits, will be examined. Finally, results and discussions and conclusion will follow suit in Chapters 5 and 6, respectively.

CHAPTER 2

CEMAC COUNTRIES

A sub-regional economic organization dominated by French-speaking countries, referred to as CEMAC, or its English appellation the Central African Economic and Monetary Community, is frequently depicted as a relatively new organization, founded in 1994 and operating since all six members ratified the treaty in 1999. CEMAC is a Central African trade treaty that currently includes six countries. Often confused with the Economic Community of Central African States (ECCAS), CEMAC comprises just six countries within ECCAS. As such, CEMAC (6) is a subset of ECCAS (CEMAC countries plus Angola, Burundi, the Democratic Republic of the Congo, Rwanda, and São Tomé and Principe–11).

CEMAC is one of Africa's oldest regional organizations (WorldBank, 2018). Initially created as UDEAC in 1964 and transformed into CEMAC on March 16, 1994, with headquarters in Central African Republic's (C.A.R.) Bangui, CEMAC's goal is to foster peace and peaceful development among its member nations through the establishment of an economic and monetary union. According to Grimm et al. (2009), the member states seek to move from cooperation to union in each of these two sectors in order to complete the economic and monetary integration process and increase mutual aid to benefit less developed member states.

Inflows of FDI into CEMAC countries represent a complex interaction of factors relating to economic growth, natural resources, governance systems, economic diversification, regional integration, and global economic trends. Improving governance, addressing investment problems, and supporting sustainable development are critical for the region to attract consistent and impactful FDI inflows.

2.1 Background and Organization of CEMAC

UDEAC's Member States resolved to provide new momentum to their regional cooperation in 1994, in keeping with the overall rebirth of regionalization activities on the African continent. They agreed to start a reform process from the ground up. The CEMAC was established to replace and improve the customs union. The N'Djaména Treaty, which was approved in 1999, stated that the Community's principal goals were to converge and monitor national economic policies, coordinate sectoral policies, and gradually develop a single market. In July 1996, in Libreville, Gabon, an additional protocol to the treaty covering the Community's institutional and legal structure was signed (Haruna, 2022). Although other regional organizations such as ECOWAS and SADC have more structured and working organizational structures, the Executive Secretariat is CEMAC's principal managerial and administrative body.

The Heads of State resolved in 2007 to restructure the Secretariat into a Commission with the goal of making it a stronger and more autonomous entity. The Commission, like the European Union, is made up of an equal number of Commissioners from each Member State and is led by a President and Vice-President. The First Commission was established in June 2008, with four Commissioners in charge of several policy areas, including the single market, infrastructures and sustainable development, human rights and good governance, and economic and monetary policies. The Conference of Heads of State appoints commissioners for a four-year term, renewable for one term (Haruna, 2022).

A favorable tariff has been agreed for intra-ECCAS commerce, although it has yet to be implemented. As a result, all imports into CEMAC from outside ECCAS countries are still subject to the CEMAC–CET (Within CEMAC, there is intra-CEMAC free movement of products and a common external tariff (CET) on imports from beyond the common customs area, regardless of the destination market). However, one common characteristic of countries in Africa is the belongingness to different regional organizations. This multiplicity of membership may not be advantageous to both the region and country as most are presently without trade agreements. C.A.R. and Chad, for instance, in addition to CEMAC and ECCAS,

belong to CENSAD, which has no workable trade agreement among its member countries. However, no trade agreement exists between CENSAD nations at this time. CEMAC nations will negotiate as a Customs Union with a CET; however, Cameroon and C.A.R. have not yet accepted the AfCFTA (African Continental Free Trade Area). C.A.R., Chad, and Equatorial Guinea have also benefited from Morocco's unilateral preferential market access (TRALAC).

This overlap becomes more complicated when exploring CENSAD countries as mentioned in a TRALAC report,. However, it is very important in understanding the heterogeneity across CEMAC countries, as explained in the results section in Chapter 5. One such difference is that four CEMAC member countries (Cameroon, Equatorial Guinea, Gabon and the Republic of Congo) are not CENSAD members countries. (Note that CENSAD stands for the Community of Sahel-Saharan States). Despite overlapping with other African regional economic communities (RECs), all intra-Africa imports from outside CEMAC are subject to the MFN applicable tariff (CEMAC CET), as there is no trade agreement among CENSAD nations and the intra-ECCAS preferential tariff has yet to be introduced.

According to recent reports, the member countries have a combined territory of 3.02 million sq. km and a population of 56.95 million people. This represents 0.73 percent of the world's population and 2.00 percent of the world's livable land. They account for roughly 0.11 percent of the world economy, with an annual economic production of 89.54 billion US dollars. At the time of the last count, the total value of these six countries' exported goods was 10.72 billion US dollars each year (WorldData, 2020).

Detailing the definition, Spandler (2018) attributes regional organizations (ROs) as international organizations (IOs) that include worldwide membership and cover geopolitical entities that operate outside of a single sovereign state. However, their membership is determined by the boundaries and demarcations that form a defined and distinct geography, such as continents, or geopolitics, such as economic blocs. They were created to promote collaboration, political and economic integration, and discussion among nations or entities that are separated by a geographical or geopolitical barrier. They represent both similar patterns of growth and history developed after WWII's conclusion, as well as the fragmentation inherent in

globalization, which explains why their institutional traits range from informal collaboration to formal regional integration. While a regional organization is sometimes referred to as an international organization, in many cases it is more appropriate to use the term regional organization to emphasize the membership's more limited reach.

Regional organizations are formed not only for economic gains but for social and environmental concerns. One such concern is helping member countries curb the threat of terrorism and internal disputes. Plagued with seemingly unending crises, for instance, there are threats from Boko Haram, instability in the Cameroons, and the just-declared state of South Sudan with on-and-off power tussles in Sudan. In all of this, the role of regional groupings should not be undermined. Presenting a case for the role of regional organizations in Africa's security, Söderbaum and Tavares (2013) remark about the African continent being home to some of the world's most cruel and deadly wars. The state's ability to offer security and political stability to its inhabitants has changed at the same time as warfare. The significance of regional organizations in Africa's security is the subject of their book. Söderbaum and Tavares focus on three basic, yet frequently overlooked, questions: the benefits and drawbacks of African regional and sub-regional organizations in comparison to other security mechanisms; the official and unofficial reasons for intervening; and whether regional organizations' peacekeeping activities actually protect security.

CEMAC countries, like most African countries, are mired in instability, coups, as well as the struggle between the military and pro-democracy movements which sometimes result in large protests and assassinations. In an essay on the crisis situation in Africa, Mozaffar (1987) echoes the sentiment that a slew of political, social, and economic indices point to Africa's state crisis. However, the cause or reasons for such a scenario, as well as why and how such a situation has arisen, are not so apparent. He exhumes two different theories that have been proposed in the past. One explanation emphasizes in internal influences, and the other explanation focuses on external factors. The latter can be seen in events such as Western military and economic dominance of the modern international system; African dependency on Western aid; and Western countries' attempts to advance their imperialist interests in Africa by supporting corrupt and unpopular governments. The former, Mozaffar

argues, rests on African leaders' ineptitude and unwise policies; traditional African cultural norms, which supposedly foster backward attitudes judged inappropriate for a contemporary society; and the more objective issues of overcrowding, a shortage of trained workers, and limited natural resources.

Apart from settling disputes and facilitating cross-border movements and trade, the issue of belonging to all and being effective in none could be a problem in Africa's divided attention. Some countries belong to more than 10 regional organizations within the SSA region. As explained by Byiers (2017), the D.R. Congo belongs to 14 regional economic organizations, Burundi to 13, and Rwanda, to 11. These high numbers might simply be due to geography, as people in the center will always be on the edge of other arbitrary geographical boundaries. However, is this the sole factor? Byiers remarks that Kenya's membership in nine regional organizations shows the many advantages that various regional communities may provide. Kenya is protected from dumping under COMESA, which is not possible under the East African Community (EAC) (Selig & Preacher, 2009).

Similarly, Rwanda's return to the ECCAS in 2013 after quitting in 2007 to focus on integration with the EAC was more about politics, peace, and security than economic integration. Critical observers also point to the incentives generated by regional organizations' external financing, as most rely on considerably more on external money than member payments. As a result, having several memberships increases the number of project and funding options available, as well as personal advantages and patronage potential. Although the heterogeneity across groups and countries in SSA could be exposed with different opportunities, overlapping memberships in numerous organizations, some not properly run and respected by member countries could be the seed of slow policy implementation and growth. Recall that in a new interactive map (see Byiers (2017)), Byiers illustrates 39 African regional organizations produced by ECDPM.

The African Union (AU) has considered a 0.2 percent charge on all imports to fund a larger proportion of its expenditures, Byiers asserts, a strategy that has succeeded to some extent for ECOWAS but less well in central Africa, for example, and produces accumulation of levies for nations in various areas using the same instrument. Given the variety and complexity of challenges being addressed in various

locations, several memberships may be necessary. Some argue that the “Horn of Africa” requires not just a multilateral strategy but also a multilateral approach comprising numerous and overlapping multilateralism. There is no one regional peace and security forum that performs the uncontested role of custodian of norms, venue for conflict management, and adjudicator of disputes since there is no single agreed-upon regional peace and security forum. As a result, a variety of techniques may be useful in balancing power and interests.

Based on Byiers’ views, it is one thing to be a member of a regional organization, but it is quite another to follow through on regional promises. As a result, identifying similarities is simply a first step toward comprehending why nations join numerous organizations. However, if the politics of individual nations can be deciphered, policymakers may be able to predict what to anticipate from various countries in different groups. Furthermore, as a previous set of research on the political economy of the African Union (AU) and five distinct regional economic communities has shown, success is also dependent on how countries’ politics interact. Signing regional pledges gives a good indication of desire, but execution is frequently met with opposition.

Whatever occurs, the African integration tale is far from straightforward, with geopolitical and national political considerations influencing policy decisions and execution. Rather than obsessing over the intricacies of overlapping regional accords, it would be more beneficial to consider why nations want participation in these organizations in the first place, and how that membership might be utilized to achieve development goals. Just as a majority of ROs collaborate with well-established international organizations like the United Nations (see U.N.-General-Assembly (2005)), most ROs still remain functionally weak and disengaged from the continent’s mother organization, AU.

2.2 Characteristics of CEMAC Countries

FDI inflow, through the establishment of business operations and acquisitions, has had a huge impact on growth in the CEMAC countries during the last five decades. According to an executive board report from the International Monetary

Fund (IMF), growth slowed from 4.9% in 2014 to 1.6% in 2015, and this was attributed to falling investments in the region (IMF/WEO, 2016). The Monetary Policy Committee (CPM), a committee under the Bank of Central African Countries (BEAC) noted that the growth rate of this region, consisting of six countries, peaked at 2.8% in 2015, compared to 4.8% in 2014, representing a decrease of 2% (Business-in-Cameroon, 2016, March 23). As economic growth can mainly be explained by investments from abroad in the form of FDI inflow, countries are implementing measures to attract foreign investors, or multinationals companies. The effect of FDI on economic growth may vary from country to country, with a stronger impact on some countries than on others. On the other hand, the economic performance of a country may influence the influx of foreign investments.

Direct investment, as defined by the CEMAC Regulation, refers to shareholding equal to or exceeding 10% owned by a resident in a non-resident firm or by a non-resident in a resident company, which affords the holder significant control or influence in the company's management. Direct investments include real estate investments by individuals outside the CEMAC region or non-residents within the CEMAC, investments in a company indirectly managed or influenced by the investment company, sister companies, and loans. In a CEMAC report, de Longeaux, Montembault and Nicot (2019, October 10) define non-residents as natural or legal persons whose main residence or prevailing center of economic interest is outside the CEMAC. This includes companies and undertakings engaged in specific temporary activities within the CEMAC, unless they are registered in one of the CEMAC member states' trade registers, even if only temporarily.

CEMAC has had different regulation regimes, with the current regulations being more comprehensive than previous ones. For example, in Regulation No.02/00/CEMAC/UMAC/CM, de Longeaux et al. stipulate that under one of the previous regimes, only direct assets worth more than 100 million CFA Francs needed to be declared, whereas now all direct investments must be disclosed. This disclosure must be made to both the appropriate ministry responsible for money and credit, as well as the BEAC, whereas previously it was only made to the minister in charge of finance under the previous regime.

Inflows of direct investments from outside the CEMAC must be disclosed at least 30 days in advance to the competent ministry responsible for money and credit, as well as the BEAC. Within 30 days of the completion and liquidation of foreign direct investments within the CEMAC, the transaction is reported to the appropriate ministry responsible for money and credit, as well as the BEAC. As a result, both before and after the investment activity, incoming direct investments must be disclosed. Profits from the liquidation or assignment of an FDI must be reported to the competent ministry responsible for money and credit, as well as the BEAC, at least 30 days before the transaction is finalized.

According to World Data, this alliance of six countries in Central Africa covers a habitable surface area of 2% of the world percentage and 0.67% of the world's population. Founded in 1999, CEMAC is part of a larger ten-state union called the Economic Community of Central African States (ECCAS) that was inactive for some years. It was during this dormancy that six unique economies came together in 1999 to form CEMAC. CEMAC is unique because of its common currency (CFA) and almost common official languages, French (except for Cameroon, which has both English and French). Both ECCAS (established in 1983) and CEMAC were preceded by the Customs and Economic Union of Central Africa (UDEAC), which stood for free trade and a common external tariff between the five-member states. Note that UDEAC was formed by the Brazzaville Treaty of 1964 with today's CEMAC member states, except Equatorial Guinea.

It is not uncommon for governments to pursue a particular route to achieving economic success. This is due to the challenge that countries face, in which it is difficult, if not impossible, to concentrate on all available effects of GDP growth. It is therefore imperative for governments to choose the most salient route that will optimize their resources and achieve desirable economic prosperity. For instance, between 2000 and 2005, oil was seen as the big story behind growth in the CEMAC region (IMF, 2006). This fact is amplified by the IMF (2015, July 1) report, which says CEMAC economies are highly driven by the oil sector, with the exception of the C.A.R. This has led to rapid expansion in Equatorial Guinea's economy and massive contraction in Gabon's, especially in 1999. Despite the region's common currency and regional institutions for economic development, CEMAC's dependence on oil,

with significant differences in population size, income (or GDP), and oil exports and oil-GDP ratio, has led to improvements in macroeconomic balances.

Like CEMAC, every regional organization has challenges. These challenges include policy application and execution, instability, economic issues, exchange rate fluctuations, and the markets, all of which are inevitable. With diversity and unique country issues, a regional approach is necessary to combat the negative externalities or costs and maximize the benefits. One benefit is that of FDI inflow into a region or country, while the costs include the negative impact FDI has on the economy of a country or region. Electricity consumption also has both negative and positive effects. These externalities stem from the ability to manage policies and the markets. However, it is not yet clear whether the existence of many regional organizations is helpful to development. According to Stepak (2008, October), Africa is one with a multiplicity of regional organizations, with some countries belonging to more than one region-overlapping memberships. For instance, Chad belongs to CEMAC, ECCAS, and CENSAD. Figure 2.1 focuses on the location of CEMAC countries on the continent.

In Stepak (2008, October), the former Minister of Finance in South Africa, Trevor Manuel gave a balanced speech on the hope, concern and perspective of Africa. Manuel remarks that economic data trends keep Africa hopeful. Threats of wars and political instability, vulnerable economies and environmental threats place concerns. However, with complete involvement, Africa may gain in perspective and long-term growth. Concentrating on what supports growth can put any country on track. Some factors are responsible for the acceleration of economic growth. This thesis researches the role of the rise in FDI and electricity consumption on accelerating economic growth in CEMAC.

Again, one of the strong critiques for the slow economic prosperity of CEMAC has been attributed to the multiplicity of member countries belonging to other sub-regional unions. Mengistu (2016) compiled and concluded that Cameroon, for example, belongs to (2) ECOWAS and ECCAS; C.A.R., Chad, Congo (Rep.), Equatorial Guinea, and Gabon belong to 3, 3, 2, 2, and 2 different regional groups, respectively. Aryeetey and Oduro (1996) pronounce their skepticism in multiple regional memberships and conclude that it hinders regional economic integration.

Some have attributed slow growth to failed leadership from leading countries. Just as South Africa is economically leading SADC, Nigeria for ECOWAS, and many believe Cameroon has failed to step up to the plate over CEMAC to provide the leadership needed for economic and political transformation other sub-regions are enjoying.

The formation of CEMAC stems from other unions that had been in existence such as the free trade UDEAC, which was formed at the Brazzaville Treaty in 1964 but only became effective in 1966 with five member countries of CEMAC, excluding Equatorial Guinea (which later joined in 1983). One of the benefits of UDEAC was the signing of the treaty creating CEMAC, which aimed to establish a common currency – the CFA franc/XAF. CEMAC was preceded by the Economic and Monetary Community of Central Africa on March 16, 1994, in N'Djamena, the capital city of Chad, and the Economic Community of Central African States (ECCAS). which was established by UDEAC on October 18, 1983. ECCAS was part of a UDEAC plan to expand the union to include Sao Tome and Principe and the Great Lakes states. Note that Angola remained an observer until 1999 when it declared its full membership.

Without mincing or wincing words, CEMAC commonly referred to as the transformed UDEAC, has not achieved its objective of creating a customs union. This could be attributed to a myriad of reasons stemming from unclear objectives to conflicts of interest among heads of member states. For instance, ECCAS stands for socio-economic development among member states, but movement of people has not been respected, as well as slow economic integration. In addition, fostering unity and promoting peace was one of this region's objectives. This has proven otherwise, as this region has been home to terrorist activities and wars, especially in the D.R. Congo (DRC) and the Great Lake states. The war in the DRC saw Rwanda and Angola fighting on opposing sides.

A recent development was the integration of the African Economic Community with ECCAS in October 1999. This integration was a desperate need in the region due to the inactive nature of ECCAS since 1992. Integration or not, the fusion came at a time when leaders of CEMAC sat down to officially distance CEMAC from inactive members to form a clear union of six countries in 1999 with

headquarters in Bangui, C.A.R. Recent trends have seen the other countries clench to other unions other than CEMAC. Without digressing to discuss the other unions in central Africa, CEMAC member countries have stood firm on sub-regional integration and a common currency. The latter has been a tremendous success with the francs CFA (XAF) as the common currency of this sub-region. However, the former, socio-economic regional integration has not been a success as trade has not been the best, no genuine common market, less solidarity among peoples, and underprivileged countries. Note here that the six countries of CEMAC are placed under three world income level classifications. Based on the estimates of per capita gross national income using the World Bank Atlas (WBA) method, Gabon and Equatorial Guinea are grouped as upper middle income (Dumitrescu & Hurlin), Cameroon and Congo (Republic) are lower middle income (LMINC); and C.A.R. and Chad are lower income level (LINC) (WorldBank, 2016).

2.2.1 CEMAC Country-by-Country Analysis

With the supposedly large amounts of natural resources and water bodies to harness electricity from, most CEMAC countries still lack modern energy forms, and this, in turn, affects the health, economy, education and day-to-day livelihood of the people. The Lighting African website contains useful information on CEMAC as well as SSA countries. In the SSA, over 600 million people do not have access to electricity. The vast majority of them—around 80%—live in rural locations with no grid energy, making growth both financially and logistically impossible. The advantages of off-grid energy against the existing forms such as kerosene, candles and torches in this region include increased savings, low greenhouse gas emissions, a greater sense of security at night, expanded energy and economic opportunities as well as better health services (WB-IFC).

Central Africa received $8.7 billion in FDI, down 7% from the previous year. The decline in flows to DR Congo (9 percent to $1.5 billion) was a major feature in the subregion. The Netherlands has surpassed France as the largest stock investor. According to FDI stock statistics from 2018 to 2019, the Netherlands surpassed France as Africa’s greatest foreign investor. Due to profit repatriation and divestment, the investment stock of the United States and France in Africa has decreased by 15%

and 5%, respectively. In the meantime, the investment stocks of the United Kingdom and China both grew by 10% (UNCTAD, 2020).

In retrospect, CEMAC is a regional organization consisting of six member countries in Central Africa region. These six CEMAC countries are geographically diverse, with different income levels, HIPC status, LDC stage, source of aid, country position (landlocked), cultures, as well as economic activities contributing to the overall regional dynamics within CEMAC. Before delving into a brief description of each CEMAC country, the location of its countries is shown in Figure 2.1.

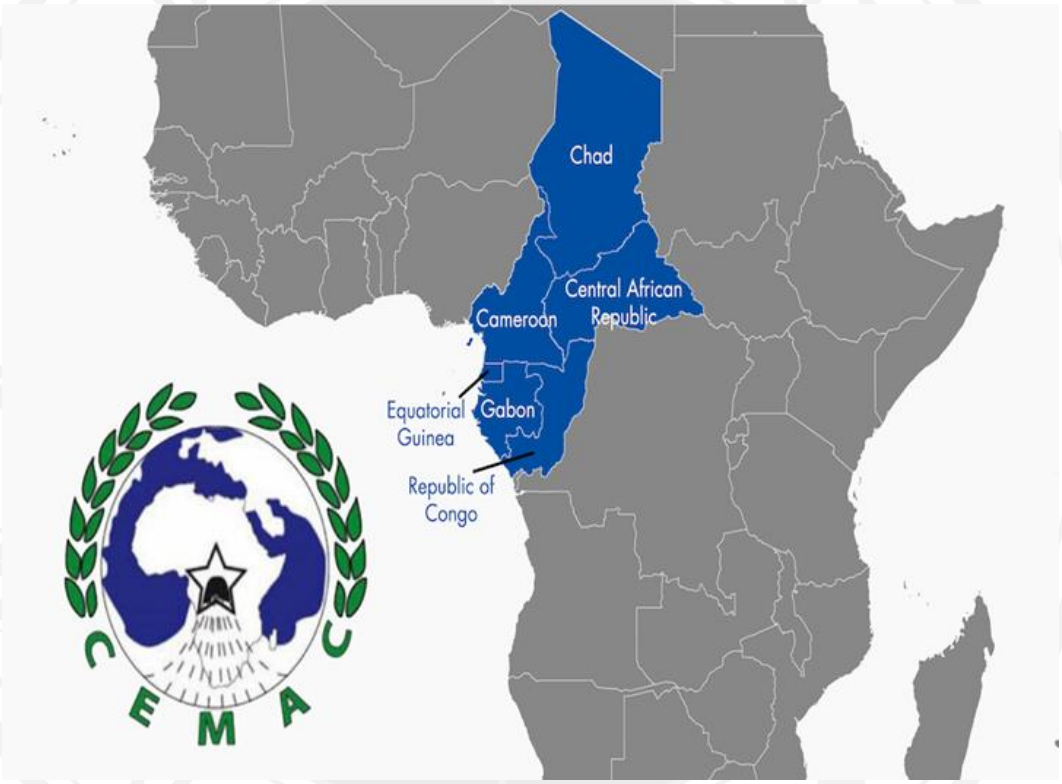

Figure 2.1 Location of CEMAC in Africa
Source: Institute for Security Studies by Akum and Donnenfeld (2018).

CEMAC is located in Central Africa with a small coastline along the Atlantic Ocean, and a portion of its territory is made up of landlocked landmass. Its member countries, shown in navy blue, are clustered in the central and western parts of the African continent. The organization aims to foster economic cooperation, monetary stability, and sustainable development in the region.

2.2.1.1 Cameroon

Speaking about CEMAC, one of its economic leaders is Cameroon, with a GDP, population, and FDI inflow much higher than the other three CEMAC countries. Due to the terms of the Structural Adjustment Program (Balasubramanyam, Salisu, & Sapsford, 1996), Cameroon began privatizing its parastatal organizations, revising its investment codes and laws, and relaxing its stringent import-export duties as well as reducing price controls. This is in accordance with international standards and gives investors the assurance of a favorable atmosphere for investment. One such law was the enactment in the 1990s of the complete elimination of regulations pertaining to technology transfer and geographic location. According to Cameroon's 1990 investment code, 2008 IBP law, and under the performance/incentives law, at least 35% equity ownership is required by a Cameroon national in small and medium-sized enterprises.

With the highest and fastest-growing population of 23.44 million (2016 World Bank estimates) in the CEMAC region, Cameroon, is a country located in the Gulf of Guinea and is known as "Africa in miniature" for its diversity in climate, geography, and over 250 ethnic groups. Cameroon's most recent GDP per capita was estimated at 24.2 billion USD (WorldBank, 2016). Despite experiencing slow GDP per capita growth, EUEI-PDF (2013) notes that its economic growth slowed down in 2009 but quickly regained momentum the following year in 2010. GDP per capita has also declined to 32.05 billion USD, 28.42 billion USD, and 24.2 billion USD in 2014, 2015, and 2016, respectively. Current GDP per capita growth is estimated at 5.927% (2014 est.).

Cameroon has declared a vision to become an emerging country, with one of its main aims being to achieve global access to electricity. Vision 2035 was developed in stages, with the first phase covering the years 2010-2020 and focusing on growth and employment strategies. Energy goals were included in this phase, with the target of achieving 3000 MW of hydropower by 2020. By 2030, the plan is to achieve 75% of total electricity and 20% rural electrification (EUEI-PDF, 2016). The government of Cameroon has approved measures to attract private investment in renewable energy.

In addition to other energy sources, energy consumption or use and electricity consumption in 2014 were 341.86 kg of oil equivalent and 6.08 billion kWh, respectively. Electricity is generated from various sources, including hydro, thermal and solar. This diversified portfolio of sources has kept Cameroon as one of the major countries in electricity reserves in Africa. The country has three large hydropower plants: Song Loulou, Edea, and Lagdo. According to the EUEI-PDF (2016) report, these three plants combined produce 73% of the total electricity, while thermal plants produce 10%. Hydroelectric power is preferred over thermal power due to lower costs. It requires higher generation costs to produce thermal energy compared to hydroelectric energy. Biomass residues account for 1072 GWh. Many stakeholders are involved in developing various energy reserves in Cameroon. Table 2.1 below shows the institutions and their roles in developing electricity in Cameroon.

Under the Industrial Free Zone (IFZ) regime established in 1990, a ten-year tax holiday and a 15% corporate tax the following year were instituted for enterprises that export more than 80% of the proceeds under the protection of the National Office for IFZ (NOIFZ). After a long struggle to keep things straight, the government finally established a total IFZ in Cameroon for enterprises that meet the above-mentioned export requirement. Despite the institution of IFZ, Cameroon has not been able to be a favorable destination for foreign investments. In 2002, Transparency International ranked Cameroon among the most corrupt countries, placing it in the 90th position among 102 countries and giving it a score of 2.2 on a scale of 10. Additionally, before June 2003, Cameroon had not been able to pay its creditors (external debts) for years. However, part of Cameroon's debt was paid by the Official Debt Assistance (ODA) scheme, as aid, from the World Bank in the form of buying back commercial debts and suppliers' credit at face value. As such, this could help Cameroon's credibility in the eyes of its creditors on the condition that this means of payment was acceptable to the creditors.

It is almost unbearable trying to obtain statistics on foreign investments from government institutions in Cameroon. Fortunately, FDI ranged from $30 million to $50 million between 1997 and 2000. Those years are within the scope of this study. Since then, there has been an upward trend of FDI inflows into the country. The UNCTAD estimated $75 million in 2001, with suspicion of a large chunk coming

from the sale of 56% of SONEL to the American company AES Sirocco. Apart from this great buy from AES, France has consistently remained the number one source of FDI into Cameroon, with the majority of shares in ALUCAM (a state aluminum complex), ORANGE (a telecom firm), and a host of others. Other investments have sprung from South Africa, seen in the Cameroon national rail way as well as MTN (telecom); Commonwealth Development Corporation with over $58 million in investments within this period, spread among firms such as CDC, HEVECAM, Printpak, SNEC, as well as SOCATRAL. All these investments were followed by the biggest of all, known as the Cameroon-Chad pipeline, which saw a $2.2 billion investment from different destinations: ExxonMobil, Petronas from Malaysia, Chevron Texaco, as well as the loan guarantees of $158 million provided by the US Export-Import Bank (UNCTAD, 2019). See Table 2.2 for general briefs on Cameroon.

Based on the data presented in Table 2.1 and an EUEI report, by 2030, the combined IFC-World Bank Lighting Africa initiative aims to provide clean, affordable, quality-verified off-grid lighting and energy products to more than 250 million people living without power in SSA. The goal of Lighting Africa is to catalyze the market via a variety of initiatives across the supply chain, including market intelligence, quality assurance, access to finance, consumer education, business development support, and regulatory and policy dialogue (EUEI-PDF, 2016).

The data and trend for Cameroon from 1970 to 2019 for FDI are shown in Figure 2.1. During the specified period, the average value for Cameroon was $0.21 billion US dollars, with a low of -$0.11 billion US dollars in 1990 and a high of $1.02 billion US dollars in 2019. The most recent valuation from 2019 is $1.02 billion USD.

Table 2.1 Cameroon Power Sector and Renewable Energy Potential

Institutions	**Role**
AES SONEL (or Eneo Cameroon SA)	Generation, transmission, and distribution or electrical energy
Ministry of Water and Energy (MINEE)	Policy formation, implementation and monitoring
Electricity Sector Regulatory Agency (ARSEL)	Monitors and implements national electrification programs and energy sector regulation
Rural Electrification Agency	Provision and management of rural energy funds
Electricity Development Corporation (EDC)	Management of public power infrastructure
Private Institutions	Kribi Power Dev. Company (KPDC), Mekin Hydroelectric Development Corporation (Hydro-Mekin), Dibamba Power Dev. Cprporation (DPDC), and AGGREKO.
Donors	AFD, GIZ, JICA, World Bank (WB), African Dev. Bank (AfDB), EU, UNDP, UNIDO and IFC (Lighting Africa).

Notes: MINEE is a French acronym for the Ministry of Water and Energy. MINEE offers data and statistics on the electricity and water industries.

Table 2.2 Cameroon Briefs (General 2016 est.) and Power Sector (2014 est.)

General[a]		**Power sector**[b]	
Surface Area (km^2)	475650	Energy usec (kg oil eq. per capita)	341.86
Population (millions)	23.439	Alternative & nuclear energy (% of c)	5.733
Population density (per km^2)	50.6	Electric power trans. & dist. losses (% of output)	9.824
GDP per capita (billion USD)	24.204	Access to electricity, rural (% of rural pop.)	22.169
Human Dev. Index–HDI (0-1)	0.518	Access to electricity (% of pop.)	56.8
Annual GDP growth (%)	4.491	Access to electricity, urban (% of urban pop.)	86.517
Stat. capacity score (total av.)	68.889	Electricity production, hydroelectric (% of total)	73.216
GNI per capita (000 USD)	1200	Electric prod., oil, gas and coal (% of total)	25.744
Inflation (%)	0.87	Electricity consumption (billion kWh)	6.08

Notes: [a]IBRD-IDA, World Bank and [b]World Statistics Pocketbook, UN data

2.2.1.2 Central African Republic

Between 1966 and 1967, Steinberg and Paxton (1969) estimated the area of C.A.R. at about 624,930 sq. km and a population of 1.466 million, with Bangui as the most populated city with 150,000 inhabitants, plus an influx of refugees from the neighboring Sudan (27,000) and Congo (16,000). Unlike the area, which has not changed, the population of C.A.R. has increased over the past few decades. As of 2016, over the past 5 decades, the C.A.R.'s population was estimated at 4.595 million and a GDP per capita of 382.21 USD, with an annual change in GDP growth rate of 4.5%. According to the World Bank (2017), in 1960 GDP stood at 112.2 billion USD and has been on an upward trend since then. It reached an all-time high in 2011 at 2.213 billion USD.

This is a landlocked country at the heart of Africa whose economy is backed by subsistence agriculture, forestry reserves, and mining. As remarked by Mobbs (1998), C.A.R. is an agrarian state where agriculture accounted for about 54% of the country's GDP as of the 1998 World Bank estimate. With respect to the forest reserves, Fay (1991) remarks that the C.A.R. constitutes mainly flat land covered with savanna woodland of Oubangui (Ubangi) pine. Amplifying Fay's remark, Schlüter (2006) argues that the geological landmass of C.A.R. can be stratified into two main units: the lower "Granitic-Gneissic Complex" with the Neoarchean age, gneiss-migmatite, granitic and amphibolitic rocks. In addition, the Central African region has been researched by prominent scholars such as Peach Brown. According to Brown (2011), the Congo Basin region is the second-largest contiguous rainforest in the world. Brown further holds that this is an important source of livelihood for millions of people in this region. As clearly summarized by Brown, measures against deforestation and forest degradation are to be properly implemented as this has a huge role to play in climate change.

Justice et al. (2001) made a similar contribution to Brown's work on forests, carbon emissions, and climate change. Tilting attention toward the forests of central Africa, Justice et al. mention agriculture and logging as the main factors affecting deforestation. Apart from mitigation policies against deforestation and climate change adaptation, Justice et al. advocated for effective monitoring and management of forests, as they are essential components for the economic

development of the Central African region. After studying the impact of the ecology and economics of the gorilla-based tourism in the Dzanga-Sangha region, Blom (2001) remarks that only a third of the protected area in the Congo Basin is effectively managed. Though the cost of protecting, managing, and maintaining the standards of the Congo Basin is high, developing tourism (such as Ape viewing) will help solve this problem.

Apart from the agricultural sector (and forestry), C.A.R. has plenty of resources, including large oil reserves. Genik (1993) holds that petroleum exploration of the rift basins in Niger, Chad, and C.A.R. has been done by Exxon and partners for decades (1969-1991). Despite the proliferation of resources, the central theme in most African countries is poverty, and tracing economic growth from every single angle leaves policymakers with very little option on what to pursue and what not to pursue. According to the U.S.Dept.of.State (2012) (the U.S Bureau of Economic and Business Affairs), more than two-thirds of the population of C.A.R. live in poverty, with less than half being literate, and an average life expectancy of 50 years, with a bulk of the population under 60 years (50% under 18 years old). The United Nations (2015) places C.A.R. at 0.35 points on a scale of 0 – 1 global ranking on the human development index (HDI). The HDI is a composite measure that includes life expectancy (at birth), educational attainment (mean and expected years of schooling), and income level (GDP per capita). As such, the HDI measures both income levels and the quality of life.

Economic growth trends in C.A.R. have been fluctuating. Between 1961 and 2016, according to The WorldBank (2018), the average growth value was 1.14%, with a maximum of 9.48% (in 1984) and an all-time minimum of -36.7% (in 2013). FDI financing is one such area where many African governments have turned to encourage because of the benefits it comes with, such as employment and technology. To encourage domestic and foreign investment, the government created a charter known as the Central African Investment Charter to stimulate private sector development. Despite these fluctuating economic trends, C.A.R. is not different from the other 5 CEMAC countries. The U.S.Dept.of.State (2012) established a fiscal and customs framework that limits value added tax barriers to exported goods among others. However, this section does not apply to the mining, forestry, and tourism

sectors. In addition to the charter, the C.A.R. government (C.A.R.G) has privatized many companies through a clear and transparent bidding process. The state-owned Electricity Company, ENERCA (Central-African Energy), and the French-owned SOCATEL (C.A.R.'s Telecommunication Society), with 40% stocks owned by France Cable and [radio] and 60% owned by C.A.R.G, have been privatized. No private company's practice can restrict foreign or domestic firms' control. ENERCA is moving from recovery to a sustainable strategy.

In addition to FDI financing, energy, coal, oil, and electricity play a vital role in the economy of C.A.R. EIA (2012) records that C.A.R. has hydroelectric potential capable of powering neighboring countries with power shortages. Going by the data put forth by the EIA (2012), hydroelectric production (hydroelectric generation excluding generation from hydroelectric pumped storage) in C.A.R. averaged 0.09 billion KWh between 1980 and 2014, with a minimum of 0.06 billion KWh (in 1985) and a maximum of 0.16 billion KWh (in 2012). Matching what is generated with what is used, total electricity net consumption in C.A.R., according to EIA (2015), between 1980 and 2014 was maximum in 2012 and minimum in 1981, with an average value of 0.11 billion KWh and maximum and minimum values of 0.17 and 0.06, respectively. In addition to the key indicators presented above, the presence of foreign firms in C.A.R. can be seen in the main industries in the country (C.I.A., 2017). Despite the abundance of inexpensive energy resources in the CAR, particularly its considerable solar potential (5 kWh/m2/day), Ngouagouni (2022, June 3) remarks that these resources are still in their infancy. Furthermore, COVID-19 has had a significant effect on the country's economy, and the lack of services necessary for human development, combined with years of fighting, has resulted in subpar human capital outcomes.

Table 2.3 Companies Present in C.A.R. as at 2004

Company	**Home economy**	**Industry**	**Founded**
ENERCA	France	Power Utility (electricity)	1963
BICA (or ECOBANK)	C.A.R.	Finance (banking)	1946
BPMC	Morocco	Finance (banking)	1991
CBCA	C.A.R.	Finance (banking)	1962
Groupe Kamach (KGROUP)	C.A.R.	Timber, Mines, Real estate	1972
SOCATEL	France	Telecommunications	1990

Notes: BICA stands for Banque Internationale Pour la Centrafrique – recently taken over by ECOBANK with a 72% controlling interest; BPMA for Banque Populaire Maroco-Centrafricaine; CBCA for Commercial Bank Centrafrique; and KGROUP is the largest private employer in CAR and its activities are in exploitation, services and distribution.

Source: CIA World Factbook, C.A.R.

Table 2.4 Key Economic Indicators of C.A.R., 2010–2014

Year	Population	GDPPC (2010)	FDI	ECON	HDI
2010	4.45	446.44	3.1	0.15	0.35
2011	4.48	458.33	1.67	0.16	0.36
2012	4.49	475.67	3.21	0.17	0.37
2013	4.50	300.48	0.12	0.14	0.34
2014	4.52	302.55	0.2	0.16	0.35

Notes: World Bank, EIA database, UN Population Division; GDPPC = GDP per capita and ECON = electricity consumption.

The trend and data for the Central African Republic from 1970 to 2019 for FDI inflows are shown in the appendix. During the specified period, the C.A.R.'s average value was 0.01 billion dollars, with a low of -0.01 billion dollars in 1992 and a high of 0.12 billion dollars in 2008. The most recent estimate for 2019 is 0.03 billion US dollars.

2.2.1.3 Chad

Like C.A.R., Chad is another landlocked country with an area according to the World Bank (2014), estimated at 1.284 million sq. km (495,800 sq. miles) and a population of 13,670,084 (2015 est.). This is another country that has experienced little or slow economic progress. It is largely a semi-desert country, rich in gold and uranium, and recently it has become one of the oil-exporting nations in the world. Chad became an oil-exporting nation in 2003 with the completion of its major project, a $4 billion pipeline linking its main oilfields to the greater Atlantic coast and the Cameroon-Chad pipeline. Since the French left in 1960, Chad has been marked by instability ranging from internal religious fights (the north inhabited by Arab-Muslims and the predominant Christian south) to rebel groups and threats from neighboring Nigeria and North Cameroon. In addition to military coups, internal political and economic instability, Chad suffers from poor infrastructure, poverty, poor health and

social conditions, placing it as one of the countries with the lowest life expectancies in the CEMAC region and the world (49 for men and 52 for women).

The energy sector of Chad has been plagued by corruption. Despite Chad's integration in the world oil market, Haken et al. (2012) ranks Chad as the seventh-highest score on the failed state index, and the situation has not improved to date. Its recent success in oil may have been a curse due to the amount of corruption plaguing the economy. TI-CPI (2011) named Chad among the 15 most corrupt countries in the world (with the lowest CPI score of less than 2.0 on a scale of 0–10), and things have not improved since then, with a rank of 167 out of 180 countries and a score of 19 out of 100 in 2022. Laoutoumai (2021) registers a corruption case involving STEE, a Chadian parastatal of Water and Electric Society. The report states that power is provided to only 15% of the citizens in the capital, who account for only 1.5% of the population, and also mentions that most Chadians burn biomass fuels such as wood and animal manure for power.

Table 2.5 Chad's Key Indicators

Key Indicators	**Amount**
Population (million)	13.57
GDP per capita (billion 2010 USD)	967.1
FDI, billion dollars	-0.68
Electricity Consumption (billion kWh)	0.19

Source: Prepared with material from World Bank (2014) and EIA (2014 est.)

The role played by international organizations such as the World Bank in revamping the economy of Chad has been seriously hampered by corruption charges and the suspension of loan programs, as well as ExxonMobil, which has led Chevron and Petronas in an investment of $3.7 billion in the development of oil reserves. The Chad–Cameroon pipeline was financed by the World Bank with conditions requiring 80% of oil revenues to be used for assisting developmental

projects and poverty reduction programs. The failure to meet this condition has led to the cause of the withdrawal of loans to Chad from some international bodies.

Apart from FDI in the energy sector, other areas attracting FDI financing are infrastructure development and the services sector. Foreign investors are from Nigeria and South Korea, involved in gold mining; France and the Netherlands, with the MSI cellular telephone services; Egypt, with the Orascom cellular telephone services; Sudan, with oil production and refining; Libya, with hotels and real estate investments; and the United Kingdom (Chad|Encyclopedia, 2018, August 13). In short, most of the aforementioned countries are investing in the telecommunications and banking sectors. Hunter (2015) offers a valuable contribution and an overview of Chad's economy: trade, population below the poverty line, the measure of economic growth, and FDI. Tordo et al. (2020) and the WorldBank (2019a) reports state that the petroleum sector is attracting the most ambitious FDI affiliates, with Exxon Mobil leading the chart, owning 40% of private equity; Chevron Texaco and Petronas Malaysia each owning 30%. Other players include the joint venture agreement between the China National Petroleum Company (CNPC) and the Chadian National Hydrocarbon Company, with 60% and 40%, respectively. Note that Elf and Shell backed off since 1999.

Like the other CEMAC countries, the data and trend for Chad from 1990 to 2019 for FDI inflows are shown in Appendix A. During the specified period, Chad's average currency value was 0.13 billion US dollars, with a low of -0.68 billion US dollars in 2014 and a high of 0.92 billion US dollars in 2002. The most recent estimate for 2019 is 0.57 billion dollars.

2.2.1.4 Republic of the Congo

Thomas (2002) narrates the history of Congo as a country that was placed in the hands of France after the Berlin Conference of 1884 just a year after it officially became a country. Brazzaville became the capital of French Congo in 1904 and the capital of French Equatorial Africa until 1960, with Gabon, C.A.R., and Chad ruled from Brazzaville. Congo is a central African state that was founded in 1883 but only gained independence from France in 1960 and has an area of 263.9 sq. km. The UN census shows that Congo has a population of about 5.4 million people (2017 est.), accounting for 0.07% of the world's population. The Central Intelligence Agency,

CIA (2017) report shows Congo as the third-largest oil producer in SSA and one of Africa's largest petroleum producers though with recent declining trends in production, it could be said to be reserving petroleum to sustain long term oil earnings. Wagner (2009) states that Congo Brazzaville joined OPEC as its fifteenth member in June 2018, making it the seventh African country overall. Natural resources present in Congo include timber, potash, lead, zinc, uranium, copper, phosphates, gold, magnesium, natural gas, and hydropower (C.I.A., 2017).

Being a largely peasant economy surviving on a mixture of subsistence farming and hunting, the industrial sector capitalizes on oil to support services and government spending. Due to low oil prices, the country continues to suffer from macroeconomic imbalances. The C.I.A. (2017) report registers GDP real growth rate at -2.8% as of 2016. Overall, there has been a significant drop over the past few years. For example, the GDP real growth rate for 2014, 2015 and 2016 stood at 6.8%, 2.6%, and -2.8%, respectively. Electricity production and consumption in 2015 were 1.676 billion kWh and 900.6 million kWh (2015 est.), respectively. Other forms of energy present in Congo include, but are not limited to, crude oil, refined petroleum products, natural gas as well as carbon dioxide emissions from the consumption of energy.

Between 1978 and 2015, according to the WorldBank (2023, September 29), FDI as a percentage of GDP averaged 7.52%, with a minimum of -4.84% (in 2001) and a maximum of 38.81% (in 2014). In addition to FDI, the average value of electricity consumption for Congo from 1980 to 2014 was 0.43 billion kWh, with a minimum and maximum of 0.1 billion kWh and 0.93 billion kWh in 2013. In recent years, FDI as a percentage of GDP, electricity consumption, and GDP per capita have been on an upward trend, with overall values of GDP per capita being 1430 USD and 3292.43 USD in 1960 and 1984, respectively. During the period from 1960 to 2016, the average value for GDP per capita was 2307.39 USD.

Table 2.6 Congo's Key Indicators

Key Indicators	**Amount**
Population (million)	4.871
GDP per capita (billion 2010 USD)	2,922.97
FDI, billion dollars	5.5
Electricity Consumption (billion kWh)	0.9

Source: Prepared with material from World Bank (2014) and EIA (2014)

The data and trend for the Republic of the Congo from 1970 to 2019 for FDI are shown in Figure 2.6. During that time, the Republic of the Congo's average currency value was $0.62 billion USD, with a low of -0.17 billion US dollars in 1998 and a high of $4.42 billion USD in 2017. The most recent valuation from 2019 is $3.37 billion USD.

2.2.1.5 Equatorial Guinea

A small, by population and surface area, partly inland and partly island country in the central African region. Population estimates include that of the WorldBank (2023, October 24) of 1.356 million people and 419,188 people in the 1990 estimate, an 86% increase over three decades. The growth has been slow and steady with the 2017 number estimated at 1.262 million people. However, the July C.I.A. (2017) World Factbook estimates show Equatorial Guinea's population at 778,358. The disparity between the World Bank's 2019 and CIA's 2017 numbers shows a 74% increase in just three years. Irrespective of the organization recording these estimates, Equatorial Guinea remains one of the smallest and least populated countries in CEMAC (and Africa).

Table 2.7 Equatorial Guinea's Key Indicators

Key Indicators	**Amount**
Population (million)	1.129
GDP per capita (billion 2010 USD)	15,851.14
FDI, billion dollars	0.32
Electricity Consumption (billion kWh)	0.09

Source: World Bank (2014) and EIA (2014).

However small, it is unique in many aspects. For instance, it is the only Spanish colony in Africa where Spanish is the official language. Oil is the main story behind Equatorial Guinea's economic thrive, but it places the economy in a tough situation because the oil exploitation companies rely largely on skilled labor from abroad. The booming agricultural sector stands as the main employer of the country. This may seem so easy to comprehend, but the unfortunate story is agriculture is deteriorating due to the migration of labor to urban areas. The C.I.A. (2017) estimates three-quarters of Gabon's population are below the poverty line. All this coupled with ethnic and regional violence, clinching to power (as the president took over from his cousin in a military coup), poor school attendance, and early school dropout, continues to present inequitable economic growth.

Growth and other indicators for this country are tracked and presented as follows. Equatorial Guinea's GDP per capita increase emerged after 1997. From 1980 to 1996, GDP per capita leveled out with the average GDP per capita being $7,403.28 USD, with a minimum and maximum of $486.98 USD (in 1991) and $20,333.94 (2008), respectively. Data are in constant 2010 USD (WorldBank, 2023, October 24).

France and Spain, Equatorial Guinea's colonizers, are the major aid donors working with the government of Equatorial Guinea. Nigeria and a number of other Western and Middle Eastern countries are among the other donors. In the latter part of the 1990s, there was a notable surge in foreign investment in the petroleum and timber sectors. In 1997, there was a 70% rise in the output of timber and 85,000

barrels per day of petroleum. Production from offshore drilling started in 2000. Equatorial Guinea's economy grew at the quickest rate in the world in 2001 as daily oil output topped 200,000 barrels, primarily from ExxonMobil. From an average of $22 million annually in 1997 and 1998 to an average of $120 million annually in 1999 and 2000, the amount of foreign direct investment (FDI) inflow surged. In 2001, FDI inflow totaled $88 million. On the other hand, FDI inflow averaged $1.14 billion annually between 2002 and 2004, according to UNCTAD data. With $1.66 billion, Equatorial Guinea ranked third in SSA for foreign direct investment in 2004. Being an oil-rich nation, ExxonMobil's presence in this region is imminent. They are the main producer of oil in Equatorial Guinea. In addition to the data presented in footnote 23, FDI as a percent of GDP averaged 19.1%, with a -4.02% (2008) and 161.82% (in 1996) in minimum and maximum, respectively, between 1981 and 2015 (UNCTAD, 2020).

Electricity is necessary to power the large oil refineries in the country. According to the Equatorial Guinea Energy Market Report (2017), the country's hydropower is estimated at 2600 megawatt, and the C.I.A. (2017) estimates electricity production at 425 million kWh and electricity consumption at 395.3 million kWh. The data and trend for Equatorial Guinea from 1978 to 2019 for FDI inflows are shown in Appendix A. Equatorial Guinea's average value for that time period was 0.37 billion US dollars, with a low of -0.79 billion US dollars in 2008 and a high of 2.73 billion US dollars in 2010. The most recent estimate for 2019 is 0.45 billion US dollars.

2.2.1.6 Gabon

Apart from the diversity in language and culture, Gabon is unique in the CEMAC region in that it has a small population (based on a World Bank estimate of Gabon's population in 2016 at 1.98 million), and the C.I.A. (2017) remarks that the availability of oil and mineral reserves has paved the way for Gabon to be one of Africa's wealthier nations. Gabon is known to be one of SSA's oil-producing giants and home to a diversity of energy sources and reserves. The Oil and Gas Journal, EnergyCapitalPower (2023, April 7), records an estimated 1.2 trillion cu ft in Gabon's natural gas reserves. Apart from natural gas, hydropower accounts for 76% of the output of Gabon's electric power. The production and distribution of electricity are

managed by the Energy and Water Company of Gabon (SEEG). Electricity consumption in Gabon, as estimated by the EIA (2014, May 7) between 1980 and 2014, averages 1.08 billion kWh, with 0.5 billion kWh and 2.1 billion kWh as yhe minimum and maximum, respectively.

Gabon has a track record of trade surpluses and a recent influx of private investment. Timber was Gabon's main export in the late 1960s. According to the Gabon|Encyclopedia (2023, October 12), the inflow of FDI financing has been centered on the development of petroleum resources. This report puts France at the lead, accounting for over 73% of FDI in Gabon, and 21% for the United Kingdom. Other sources of FDI in Gabon come from the US and other investment sources in the oil and mining sectors. Data provided by the Gabon|Encyclopedia (2023, October 12) and the World Bank (2017) show that from 1978 to 2015, the average value for FDI was 1.3 percent, with a minimum of -8.59 percent in 1996 and a maximum of 5.56 percent in 2014.

Table 2.8 Gabon's Key Indicators

Key Indicators	**Amount**
Population (million)	1.876
GDP per capita (billion 2010 USD)	9,508.15
FDI, billion dollars	1.01
Electricity Consumption (billion kWh)	2.1

Source: World Bank (2014) and EIA (2014).

The financial system of Gabon is quite strong and it is influenced by both the Central Bank of the region and international interests. Despite BEAC's role as the central bank of CEMAC UDEAC countries, commercial banking in Gabon is still largely controlled by France and other international interests. Gabon is home to many foreign banks (EIA, 2014, May 7). Recently, the Libreville Stock Market became effective, with recent pleas by COSUMAF (Central African Market Surveillance Commission) to merge or fuse the Libreville stock market with the

almost non-existent Douala Stock Market of Cameroon. Calls for merging may be due to the under performance of the Libreville stock market.

Though Gabon is bordered by Cameroon, Congo, and Equatorial Guinea, Gabon has an extensive coastline on the Atlantic Ocean with a plethora of hotels as well as pristine rain forest and biodiversity. However, it has experienced unstable growth in the past five decades. The French left Gabon in 1960 and the country has struggled for democracy with just three (3) presidents since independence and viruses. Grard et al. (2014) register the Zika virus as a new threat from Aedes Albopictus in Gabon. With the outbreak of dengue fever and Chikungunya viruses in 2007, the government of Gabon has had to combat this enemy of the state. Gabon|Encyclopedia (2023, October 12). The World Bank (2017) estimated the average GDP per capita at 9,928.78 USD between 1960 and 2016, with a minimum and maximum of 4,377.38 USD (in 1960) and 19492.8 (in 1976), respectively.

The data and trend for Gabon from 1990 to 2019 for FDI inflows are shown in Appendix A. During that time, Gabon's average currency value was 0.27 billion US dollars, with a low of -0.29 billion US dollars in 1996 and a high of 1.55 billion US dollars in 2019. The most recent estimate for 2019 is 1.55 billion dollars.

2.3 Stylized Facts about CEMAC

CEMAC is a market of 42.5 million people distributed across more than 3 million square kilometers, with vast natural resources. Cameroon is home to over half of the people and generates 28.6% of regional GDP. CEMAC is an area that is particularly well adapted to the development of agro-pastoral activities due to its diverse climate and plenty of land. With the exception of Chad, which is suffering from desertification and the drying up of Lake Chad, water and pasture space are plentiful. Furthermore, the Congo Basin woods, the world's second biggest tropical forest zone, encompass part of CEMAC, providing extraordinary ecological variety.

Oil, natural gas, gold, diamonds, manganese, and uranium are among the mineral reserves. Apart from oil and lumber, most natural resources have seen little or no utilization due to a lack of private investment. With the exception of the Central African Republic, crude petroleum is a vital resource for CEMAC countries: it

accounts for 86 percent of Community exports (mostly to Europe and Asia); the Congo relies on it for 61 percent of its GDP, Gabon for half, Chad for 40%, and Cameroon for roughly 10%. Timber is the Community's second-largest export product, and the other four nations, with the exception of Chad, receive a significant amount of money from it. Manufactured products account for the majority of imports, which come mostly from Europe, Africa, and Asia. Even when compared to the levels attained by other African economic groups, intra-community trading remains modest.

Despite the several documents established with the goal of establishing a customs union, with, of course, its free trade area component, CEMAC has yet to succeed in boosting commerce among its members, despite the fact that it has been in existence for what will soon be 20 years. Apart from supply-side constraints, this scenario may be ascribed to a lack of or in bad condition communication infrastructure (road, rail, and port networks), erratic energy supply and high costs, and funding that is rare and hence expensive. The CEMAC nations have admittedly made attempts to enhance the business climate through their membership in the Organization for the Harmonization of Business Law in Africa (OHADA), the simplification of some procedures, and the implementation of anti-corruption programs. These activities should be sustained, notably in the field of trade facilitation, in order to attract the investment that these nations so desperately require in order to fully realize their enormous potential.

Foreigners are welcome to invest in national investment regimes, and their companies, sometimes in partnership with the government, enjoy monopolies or exclusive rights in many areas, resulting in anti-competitive practices (including the abuse of a dominant position) and the continuation of price controls. Despite the CEMAC Community Investment Charter of 1999 and the existence of Community exemption provisions, the states retain a number of independent fiscal and customs rights that may be simplified.

In the previous six years, the economies of the five nations have diverged, partially as a result of the global economic crisis, which lowered foreign demand for certain exports. Following a recession in 2007, the Congo’s economy has grown rapidly (6.4 percent on average over the period 2007-2011). Cameroon is diversifying its economy in response to the increasing depletion of its petroleum resources, and its

growth rate has been moderate but consistent (3 percent on average over the period), allowing it to join the club of middle-income nations that also includes the Congo and Gabon. Over time, the latter's GDP increased at an average rate of 3%, with a peak of 5.3 percent in 2008, followed by low growth rates after 2009. In the C.A.R., growth rates fluctuated only slightly around an annual average of 2.5 percent, whereas in Chad, despite its oil earnings, growth rates were very weak (and even negative for two years), except in 2010, when strong growth of 13 percent pushed the average up to 3 percent over the period. The two countries are still LDCs in which socio-politico-military conflicts (especially in the C.A.R.) contribute to the continued sluggishness of the business climate, which has already had a negative impact. In general, the five nations have wealth redistribution issues, which are becoming increasingly significant in Gabon.

Inflation was kept below the Community norm of 3% thanks to the prudent monetary policy of the Bank of Central African States (BEAC), the issuing institution for the common currency, the CFA franc, which is pegged to the euro, after reaching relatively high levels in 2008 and 2009 due to the food crisis. The percentage of CEMAC nations' foreign exchange assets that the BEAC is required to deposit in the French Treasury's operational account in exchange for a guarantee of convertibility decreased from 65 percent to 50 percent in 2009. In addition, excessive taxes and various forms of red tape obstruct international and regional trade in general. Import and export processes for goods are still time-consuming and costly. The ensuing smuggling has a financial cost and creates a health risk, with essential needs including sugar, flour, pharmaceutical and petroleum goods, and cement being the most frequently affected by fraud and counterfeiting.

The trade regimes have remained largely unchanged at both the Community and national levels since the CEMAC nations' latest Trade Policy Reviews (TPRs), which were prepared separately or in pairs between 2006 and 2007. The adoption of ASYCUDA++ by Cameroon is one of the most recent customs initiatives, while ASYCUDA World is being installed in the Congo. The efforts to computerize customs and/or expedite clearance declarations are moving forward. However, getting the items released takes an average of five to six days after submitting the import declaration. When all of the extra requirements are included, the overall time to

import may be measured in weeks, especially for commodities passing via the port of Douala on their way to neighboring nations like the C.A.R. and Chad.

The nations, with the exception of Gabon, have maintained their pre-shipment inspection programs. Because it is necessary, this inspection raises the cost of imports by the amount of fees imposed on the importer (particularly the lump payment) and replicates (even magnifies) the task of Customs. For customs valuation reasons, all CEMAC nations that adopt it employ reference values. Furthermore, the absence of interconnection between inspection businesses and customs administrations in these nations makes completing the requirements difficult. The introduction of the electronic cargo tracking note (ECTN) has exacerbated the problem, not only in terms of documentation and procedures but also in terms of expenses. Furthermore, items imported from foreign countries are subject to the procedures, tariffs, and taxes applicable at each crossing of the Community's internal borders in the absence of proper free circulation (libre pratique) mechanisms.

The CEMAC common external tariff (CET) contains five rates (zero, 5%, 10%, 20%, and 30%), with an average of 18.1 percent (with no significant changes since 2006) and a coefficient of variation of 0.53, indicating modest rate dispersion. Agriculture (23.6%) is the most protected sector (ISIC, Rev. 2), followed by manufacturing (17.8%) and extractive industries (11.2%). Clothing (30%), coffee and tea (28.6 percent on average), drinks and tobacco (27 percent on average), and fruit, vegetables, and garden produce (27 percent on average) have the greatest tariff protection (26.4% on average). Furthermore, a 1% Community integration tax on imports from outside CEMAC, a 0.4 percent Community integration contribution on imports from outside ECCAS, and a 0.05 percent levy on imports from non-OHADA countries remain in effect, in addition to the internal taxes governed by Community provisions, such as VAT and excise duty. Fees for pre-shipment inspection and the electronic cargo tracking note are assessed at the national level (ECTN). National laws regulate the rest of the taxes and levies.

Overall, the CET exhibits mixed escalation, with negative escalation from raw to semi-finished items and positive escalation from semi-finished to completed products. The tariff exemptions that governments provide unilaterally to local production industries for certain of their imports are explained in part by this

arrangement. Furthermore, since 2007, the nations have enacted a number of suspension measures (related to customs fees and taxes, as well as domestic taxes) in order to keep the cost of essential goods from rising. These numerous metrics imply that the Community taxation system, as well as the tariffs and taxes imposed at the national level, should be revised.

Gabon has bound all of its tariff lines into the multilateral trade system, compared to 62.3 percent for the C.A.R., 17.4 percent for the Congo, 15.2 percent for Chad, and 14.9 percent for Cameroon. The CET rates exceed the rates bound by Gabon on 2,058 lines, the Congo on two lines, and the C.A.R. on one line. Furthermore, the Congo, the Central African Republic, and Chad impose greater customs and taxes than those imposed by the EU. Gabon has taken measures to renegotiate its tariff concessions following its latest TPR.

The CEMAC nations, with the exception of Chad, have updated their government procurement legislation since their last TPRs. In Cameroon, the formation of a Ministry solely dedicated to government procurement in 2012 is intended to enhance award procedures. This might result in a decrease in the percentage of contracts awarded through private agreements, which climbed dramatically between 2010 and 2012. Cameroon is still an observer in the WTO's Plurilateral Agreement on Government Procurement, whereas the other CEMAC nations are neither members nor observers.

The African Regional Intellectual Property Organization (ARIPO) provides a legislative framework for the protection of intellectual property rights to all CEMAC nations. Imports of counterfeit items, including medications for human and veterinary medicine and phytopharmaceuticals, are flooding the domestic markets of all member States due to a lack of resources allocated to increasing awareness of intellectual property rights and combating infringements. Cameroon has imposed a tax on intellectual works on media such as computer hard disks, mobile phones, printers, and memory sticks, assessed by customs at a rate of 5% of the f.o.b. import value, with the goal of remunerating the owners of the corresponding intellectual property rights.

The sanitary and phytosanitary measure and technical regulation regimes are not coordinated at the Community level, save from the passport and international transhumance certificate for cattle. These regimes are either non-operational at the

national level or operate simply to collect money for various entities without actually inspecting the items. Furthermore, Cameroon is the only country with an SPS enquiry point, which requires capacity improvement.

The agricultural, cattle, and forestry sectors, which provide the majority of employment and revenue for the populations of these nations, are constrained by a lack of an effective sanitary and phytosanitary system as well as excessive protection. The high level of protection shields the industry from foreign competition and does little to foster the pursuit of competitiveness. Increased intra-Community commerce in agricultural goods would result from the development of infrastructure (particularly rural infrastructure) and the removal of several obstructive processes at the internal borders. Furthermore, the successful implementation of a sanitary and phytosanitary regime would improve product quality and, when combined with a reduction in the huge number of levies (including at departure), would aid agricultural export promotion. Such measures would help to raise rural incomes and increase food security in the Community.

Private, especially international, investment in oilfield development is typically welcome. The other segments of the energy sector, on the other hand, are still dominated by monopolies and price controls, which have an impact on their performance and help to maintain a business environment that isn't particularly attractive to private investment, which is generally to the detriment of the manufacturing and service sectors.

BEAC is in charge of financial operations (including banking), which are controlled by the common banking laws established by the Central African Banking Commission (COBAC), the regulatory body. For both foreign and indigenous institutions, the prerequisites of establishment are the same. Although a few multinational corporations continue to dominate air and rail transportation, new local airline companies are emerging to provide their services. Despite the implementation of a facilitation program, road transport and transit continue to be hampered by bilateral, protectionist, and out-of-date laws.

Overall, the five countries will need to pursue their various reforms, particularly structural reforms, expand their multilateral commitments to the reformed regimes to ensure the latter’s credibility and predictability, and effectively apply the

measures collectively established at the Community level in order to realize their development ambitions and for regional integration within CEMAC to contribute to their success. Such changes would benefit from assistance provided under the Enhanced Integrated Framework in the case of LDCs, as well as Aid for Trade in general. The changes would aid in creating of a business-friendly climate and in attracting the investment that the countries so desperately require to fully realize their enormous potential.

2.4 CEMAC's Institutions

Regionalism or regional economic integration in Sub-Saharan Africa has a long history in Central Africa. In the WTO (2013, June 24) report, the Equatorial Customs Union was founded in 1959 by the Congo, Gabon, the Central African Republic, and Chad. Cameroon joined in 1962, and the five nations signed the Central African Customs and Economic Union Treaty (UDEAC) in Brazzaville in 1964. The objective of UDEAC was to create a common market and harmonize the economic and industrial strategies of its members. Equatorial Guinea became a member of the Union in 1984.

2.4.1 Central African Economic Union (UEAC)

Recall that the UEAC represents the economic branch of CEMAC. Its main role, as highlighted by Martor (2002), is the free movement of products, services, and money, as well as the coordination of national policies on issues such as the environment, transportation, industry, communications, and infrastructure, which are the core goals of UEAC. A more elaborate set of objectives of CEMAC's economic integration pillar by Hennis-Pierre et al. (2013) is as follows. First, it improves the competitiveness of economic and financial activities by harmonizing the rules that help to improve the business environment and govern business. Second, it ensures convergence on sustainable performance by coordinating economic policies and aligning national budgetary policies with the common monetary policy. Third, it establishes a common market based on freedom of movement for goods and services.

Finally, recall that the UEAC was set up to establish national sectoral policy coordination, implement common actions, and adopt common policies, especially in the areas of agriculture, livestock, fishing, industry, trade, tourism, transportation, community land use and large-scale infrastructure projects, telecommunications, information and communication technologies, social dialogue, gender issues, good governance, and human rights, energy, environment, and natural resources, research, and education.

As such, Martor (2002) reveals that the UEAC has taken a number of steps to boost economic competitiveness and move closer to a common market, including establishing a customs union with free trade inside the Union and a unified tariff on imports from outside. A common external tariff (TEC) and a generalized preferential tariff (TPG), that is, a zero percent charge on intra-Union trade, make up the customs system. Furthermore, an investment charter has been produced, outlining the basic investment framework as well as future actions to strengthen the institutional, financial, and tax environments.

This currently consists of generic pledges that will need to be supplemented by further legislation. The UEAC has also enacted competition law regulations, which cover merger control, misuse of dominant position, anti-competitive conduct, and public aid. UEAL is home to a number of specialized institutions, including technical educational institutions and the Development Bank of Central African States (BDEAC), whose mission is to promote the economic and social development of CEMAC member states, primarily through the financing of multinational and economic integration projects.

2.4.2 Other CEMAC Institutions, UMAC and other World Organizations

UMAC's main role is to strengthen monetary cooperation among CEMAC member states by establishing a common monetary and exchange policy and supervising its implementation. The Bank of Central African States (BEAC) implements UMAC's policy, and while it issues the CFA franc in the CEMAC region, the Central African Banking Commission (COBAC) is actually in charge of UMAC's policy. de Longeaux, Montembault and Nicot (2019, October 10) hold that COBAC

aids BEAC in monitoring the implementation of exchange control regulations and is responsible for overseeing approved intermediaries, including credit institutions, post administrations, as well as micro-finance institutions and authorized “bureaux de change” for manual foreign exchange transactions.

The WTO is one of the world organizations involved in trade policies and practices with CEMAC countries. According to the WTO’s trade policy review by Hennis-Pierre et al. (2013), out of the six CEMAC countries, five are WTO members: Cameroon, Congo, Gabon, the Central African Republic, and Chad. Equatorial Guinea has observer status in the WTO and sought membership in 2007. Recall that all the CEMAC countries are also members of the ECCAS, which was founded in 1983 but has taken a long time to integrate.

2.5 Heterogeneity across CEMAC Countries

The main goal of creating a taxonomy of FDI components and their determinants is to make understanding easier by exploring, expanding, and explaining the important aspects of FDI in CEMAC. To accomplish this, and in an effort to tackle the ambiguity in the definitions, impact, and determinants of FDI, we will explore and present a clear picture that differentiates the CEMAC sub-region from other regions in the world. We will also examine the role of income level, lending source, HIPC status, LDC stage, and regional economic organizations. In all of these, there is a common research interest with respect to empirical studies and FDI financing trends into CEMAC.

For the purposes of this thesis, codes and symbols will be used to identify levels and classes of variables. Although no codes will be provided for the definitions, impact and determinants, codes will be used for income group classification, HIPC initiative status, and development stage, represented by INC, HIPC, and LDC, respectively. However, this does not suggest that one income level, for instance, is better or higher than another, nor does it suggest any relationship among the levels and variables.

2.5.1 Income Classification (CEMAC-2-2-2)

Income categories are updated annually on July 1 and are based on the preceding year's GNP per capita in current USD (using the Atlas method exchange rates) (2019, in this case). By the way, the categories alter due to two factors. First, variables such as economic growth, inflation, exchange rates, and population increase all have an impact on GNP per capita in any nation. Revisions to national accounting techniques and data can potentially have an impact on GNP per capita.

Second, the income categorization levels are modified for inflation annually to maintain them constant in real terms. The Special Drawing Rights (SDR) deflator is used, which is a weighted average of China, Japan, the United Kingdom, the United States, and the Eurozone's GDP deflators. Although the World Bank details the classification criteria for income levels, Serajuddin and Hamadeh (2020) hold that the criteria change (rise) with respect to the changing inflation rate. The concept introduced here is that of CEMAC-*i* where *i* represents the number of countries in question. CEMAC-2-2-2-INC, for instance, means two countries in CEMAC are paired across 3 income levels. For a summary of this, see Table 2.9.

2.5.2 Heavily Indebted Poor Countries (HIPC Status) (CEMAC-4-2)

The combined IMF–World Bank comprehensive strategy for debt reduction is intended to ensure that no impoverished nation faces an unmanageable debt load. So far, debt reduction agreements authorized under the HIPC Initiative for 37 nations, 31 of which are in Africa, total $76 billion in debt service relief over time. Three more nations are eligible for support under the HIPC Initiative (IMF, 2021). The principal goal of the HIPC Initiative is to relieve the financial burden of countries for which traditional debt relief strategies like the Paris Club and international organizations have proven insufficient.

The HIPC Initiative, in particular, decreases a country's foreign debt burden to manageable levels. A country's foreign debt is considered sustainable if the net present value of debt to exports is less than 150%, or less than 250% for small open economies. To be eligible for debt relief under the program, a country must meet the following criteria. First, it must be eligible for concessional aid, with a per capita income of less than $885 in 1999 as the key criterion. Second, the country's debt

burden must be judged unsustainable, even after all other debt relief alternatives have been tried; and finally, the government must have established a track record of adhering to IMF and World Bank regulations (IMF, 2021).

As of February 2020, 39 countries were designated, qualified, eligible, or potentially eligible for HIPC assistance, with 37 having obtained post-completion point and 2 still pre-completion point. Asiedu (2013) provides a model that connects debt relief to the quality of a country's institutions. It finds that natural resources have an adverse effect on FDI and that the FDI-resource curse persists even after controlling for the quality of institutions and other important determinants of FDI. This points to one crucial finding: that a country must meet a certain level of institutional quality in order to benefit from debt reduction. Note that CEMAC-4-2 implies four countries are still under the HIPC initiative while two (Equatorial Guinea and Gabon graduated from this program). See Table 2.9 for details.

2.5.3 Least Developing Countries (LDC Stage) (CEMAC-2-4)

LDCs are low-income nations that confront major hurdles in developing a self-sustaining economy. There are now 46 LDC nations, the bulk of which are in Africa, with a smaller number in South America and Asia/Oceania. The UN HDI is one of the most regarded, at-a-glance indicators for measuring a country's degree of development. This global index measures and compares over 150 global variables, such as life expectancy, education, and per capita income, and then combines them to generate a single human development rating for over 150 nations worldwide. Each country is scored on a scale of 0 to 1 (with 1.000 being the best possible score and 0.000 being the worst possible score) and classified into one of four levels of human development: low human development (0-0.55), medium human development (0.55-0.70), high human development (0.70-0.80), and very high human development (0.80-1.0) (World-Population-Review[WPR], 2022).

In other words, income, human assets, and economic and environmental vulnerability are three main indications for identifying LDCs. The UN's Department of Economic and Social Affairs (UN-DESA) reports that countries that fulfill two of the three LDC requirements (income per capita, human assets, and economic vulnerability) become eligible for graduation, and those who do so in two consecutive

evaluations are eligible for graduation. They are also eligible if the country's GNP per capita reaches at least twice the graduation level ($2,484) in two consecutive evaluations. Equatorial Guinea graduated from the LDC category in 2017 (Adam & Minges, 2018). Like the other country characteristics, two of CEMAC's six countries are still LDCs. Hence, CEMAC-2-4 for four non-LDC CEMAC countries. See Table 2.9 and Figure 2.1 for details.

Table 2.9 Heterogeneity Across CEMAC Countries

Country	Income Class	Lending Source	HIPC	LDC	Landlocked
Central African Rep.	LI	IDA	Yes	Yes	Yes
Cameroon	LMI	Blend	Yes	No	No
Rep. of Congo	LMI	Blend	Yes	No	No
Chad	LI	IDA	yes	Yes	Yes
Equatorial Guinea	UMI	IBRD	No	No	No
Gabon	UMI	IBRD	No	No	No

Notes: LI, LMI and UMI stand for low-income economies, lower-middle income economies, upper-middle-income countries, respectively; IDA, IBRD and Blend stands for IDA-IBRD combined, respectively; HIPC stands for heavily indebted poor countries; LDCs stand for least developing countries. Landlocked refers to country position in the CEMAC zone.

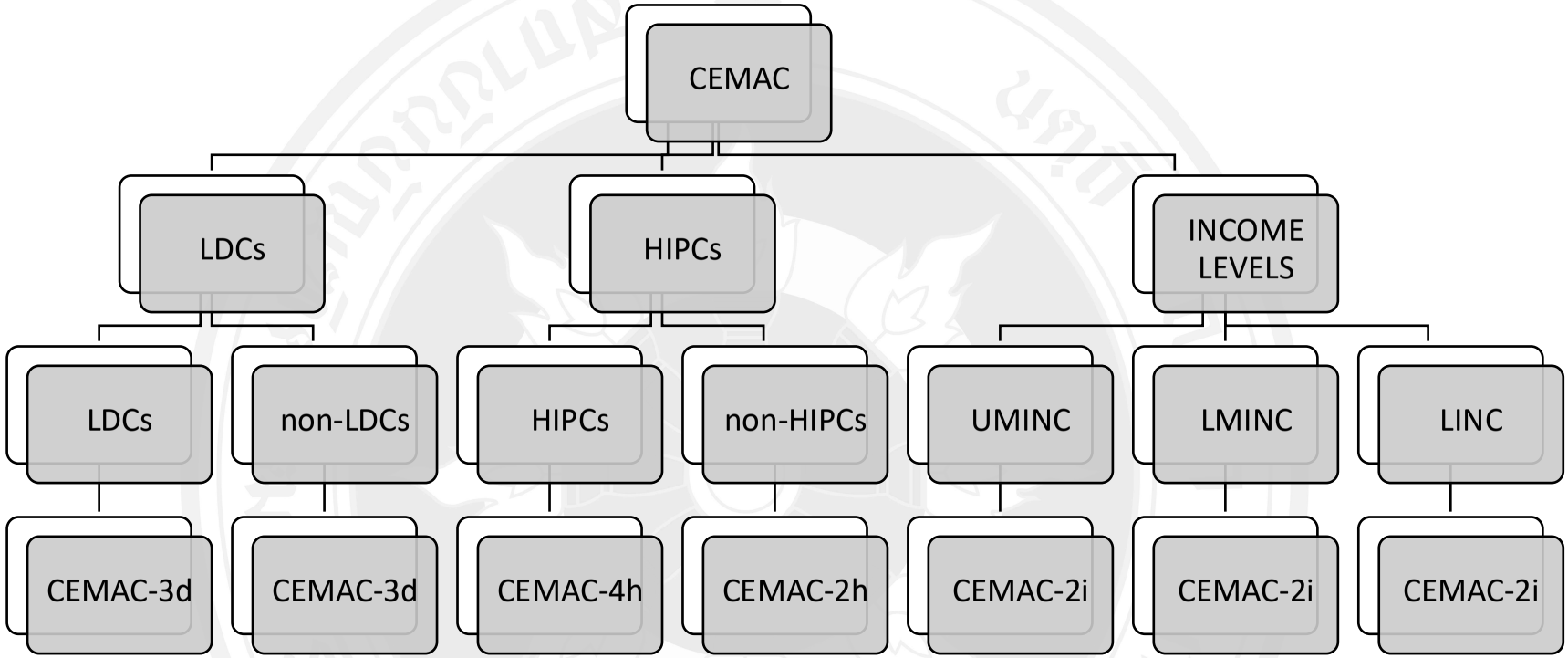

Figure 2.2 Heterogeneity across CEMAC Countries

Notes: LDCs are least developing countries; HIPCs stand for heavily indebted poor countries; UMINC, LMINC and LINC stand for upper-middle, lower-middle, and low-income levels, respectively. Lending sources include IDA and IBRD. Country position refers to landlocked countries in the CEMAC zone. CEMAC-n is the number of CEMAC countries in the category

CHAPTER 3

LITERATURE REVIEW

As investors move abroad to invest, the propensity is to move to countries that offer further growth, expansion, and investment prospects. So, it is no surprise that recent trends show FDI financing focused on established and emerging and developing economies (Jahan & Chandra Paul, 2021). The purpose of this research is to examine the key variables that make these countries interesting FDI destinations. Despite this dramatic increase in emerging and developing countries during the last decade, Asiedu (2002a) argues that most African countries have not benefited from it despite efforts to attract it. Developing countries, therefore, have not been regarded as attractive FDI destinations in the same way that industrialized ones have been (Mottaleb & Kalirajan, 2010).

Africa, known as a resource-rich continent (Veselinovic, 2015) and home to the poorest countries in the world, has perplexing experience with inward FDI (Odusola, 2018). CEMAC represents a region that reflects Africa in the absolute sense. A prime example of the low influx of FDI financing in developing countries, especially Africa, can be seen in the CEMAC economic sub-region. Arguably host to the uniqueness of Africa, with Cameroon often described as Africa's miniature version, CEMAC countries have faced a similarly low share of the world's FDI inflows. SSA, as a whole, faces a similar situation. Odusola records that between 2010 and 2016, SSA received 1.87% of global net FDI, compared to 30.34% for Europe, 26.45% for East Asia and the Pacific, 17.334% for North Africa, and 13.25% for Latin America and the Caribbean. Inflows of FDI fell from $71 billion in 2014 to $59 billion in 2016, and are predicted to grow to $65 billion in 2017—compared to $1.7 trillion globally.

Such a slow inflow of FDI has been attributed to many issues, ranging from low GDP per capita growth rates (3.7% in 2019, GDP Nominal and PPP Data, current

prices, IMF, 2018) to the role of governance. Many studies assert that countries with low growth rates (Abbes et al., 2015; Amavilah, 2000; Azam, Fosu, & Ndung'u, 2002; Collier & Gunning, 1999; Davis, 2012; Sachs & Warner, 1997) generally attract less FDI financing. Investors are more likely to finance projects in politically stable environments with every element of governance in place (Agyeman et al., 2022; Agyemang et al., 2020; Bannaga et al., 2013; Bellos & Subasat, 2012; Gani, 2007; Malesky, 2010; Méon & Sekkat, 2007; Subasat & Bellos, 2013). Several studies have emphasized the role and importance of governance infrastructure in attracting FDI (Globerman & Shapiro, 2002, 2003; Zheng, 2011, 2014).

This chapter provides a synoptic overview of the contributions to the relationship between FDI, growth, and governance in CEMAC. Yimer (2023) links FDI and growth in African economies based on how fragile or investment-driven the countries are. He concludes that the impact of FDI on economic growth is notably favorable in economies that rely on investments and factors for growth. Nevertheless, in such economies, he adds, the immediate or short-term impact of FDI is not significant. In contrast, both in the short run and long run, FDI's influence on growth remains inconsequential in economies classified as fragile. However, this synoptic overview narrates the possibilities that the effects of economic growth, governance, and FDI differ by country, income level, LDC, and HIPC status. This synoptic review will cover the conclusions of great minds, researchers, academics, and arguments of the contributions in the field. The arguments are based on the similarities or commonalities of prominent contributors, gaps between their studies or findings, and connections in empirical findings.

Until this section, FDI has been mentioned and presented as being used by empirical studies. The quality of FDI, though measured by its determinants, follows Moran et al. (2017) assumptions of quality FDI to developing countries. According to Moran, quality FDI is defined as contributing to the creation of decent and value-added jobs; improving the skill base of host economies; facilitating the transfer of technology, knowledge, and know-how; increasing the competitiveness of domestic firms and facilitating their access to markets; and operating in a socially and environmentally responsible manner. FDI in developing nations has a poor reputation and has been compared to postcolonial exploitation of raw commodities and cheap

labor in certain debates. However, current data suggests that FDI inflows to emerging countries' medium and high-skilled manufacturing sectors are growing, implying higher income levels. Furthermore, FDI flows have fueled the expansion of many emerging economies.

Although there is no complete consensus on the links between FDI and growth and on the determinants of FDI, this chapter attempts to identify the studies that are relevant to the study of FDI (Graham & Krugman, 1995; Moosa, 2002), FDI and growth (Balasubramanyam, Salisu, & Sapsford, 1996; Borensztein, De Gregorio, & Lee, 1998; Carkovic & Levine, 2005), and FDI and corruption (Habib & Zurawicki, 2002). Influential researchers who are considered giants whose studies have shed light on the FDI-growth nexus in developing Africa include Ajayi (2006, 2008), Adams (2009), and Kamara (2013). While Ajayi starts with the origins, objectives, effects, and potential of FDI, Kamara deals with FDI and growth, but Adams extends it to the effect of domestic investment.

The relationship between FDI and growth has been well-researched across developing, emerging, and developed countries alike. Some of these empirical studies have shown evidence of a direct effect of FDI on growth without the influence of other variables, such as human capital (Aleksynska, Gaisford, & Kerr, 2003), and the idea that causality can run in both directions (Aleksynska, 2003). With this in mind, the fact that growth prospects may attract FDI financing for investors. In addition, Aleksynska amplifies this by highlighting that for an unobservable indicator or factor such as macroeconomic stability connected to growth dynamics, the host country's trade regime may have a stronger link to FDI than growth itself. This thesis investigates this reverse connection while assessing the influence of mediating and moderating variables. Throughout this chapter, a review of FDI determinants, the links between FDI and growth, as well as spillover effects or synergies of other variables on the FDI-growth link, will be explored.

Briefly put, FDI is generally a financial investment made by a company or individual from one country into a company in another country. In similar terms, Buckley (2004) defines FDI as the purchase of physical assets such as plants and equipment outside of one's home nation, with operational control remaining with the

parent firm in the home country. Buckley further asserts that it can take a variety of forms, including:

1) establishing a new business in a foreign country, either as a branch or a subsidiary;

2) expanding an existing overseas branch or subsidiary; and

3) acquiring an overseas commercial company or its assets.

In other words, FDI is generally made where an investor conducts international business transactions or acquires foreign operating assets in a foreign company. Buckley argues that FDI is completely different from foreign portfolio transactions or investments where the holders passively own shares from a foreign country and is characterized by a permanent interest. The difference could also lie in the sphere of control. Control, as such, is critical to FDI. Control refers to the need to consciously manage, manipulate or influence the affairs of a foreign company. Therefore, acquiring a long-term stake or expanding one's business into a foreign country are also examples of FDI.

Irrespective of the form FDI takes, how and why it moves into and out of a country is what preoccupies researchers, macroeconomists, and policymakers alike. A myriad of determinants has been investigated by researchers for developing and industrialized countries. In developing countries, Nunnenkamp and Spatz (2002) and Nunnenkamp and Spatz (2003b) assert that traditional market-related determinants continue to be important, with only the availability of local talent obviously gaining prominence among non-traditional FDI variables. Nunnenkamp and Spatz (2002) argue that the tariff jumping motivation for FDI had lost most of its significance even before globalization became a fiercely disputed topic when it comes to the relationship between trade policy and FDI. Despite the presence of these factors, this thesis places emphasis on the role of economic growth in attracting FDI in all developing but income-diverse, economically different and multi-lending destination sub-regions in Africa.

3.1 Foreign Direct Investment

The cross-border flow of capital for the purpose of establishing or acquiring a lasting interest in foreign enterprises, has become a major driver of global economic integration (Brava, 2019; de Santis, 2012; Mahtab & Islam, 2015; Vukanović, 2016; Whyman et al., 2020; Whyman et al., 2017). The impact of FDI extends beyond mere financial transactions, as it is the main force behind growth (Türkcan, Duman, & Yetkiner, 2008) through technology transfer, enhanced productivity, and the promotion of the sharing of managerial expertise. As multinational corporations cross borders for investment opportunities, they not only infuse capital into host economies but also catalyze a dynamic exchange of goods, services, and knowledge. Hence, there is a the plethora of studies supporting the benefits of FDI in economic growth. In essence, FDI may offer financial stability, boost economic progress, and improve society's well-being with the correct policy framework (Christiansen, Oman, & Charlton, 2002; Mold, 2003; Nguyen, 2011).

Davies, Desbordes and Ray (2018) raise an important issue: FDI may take various forms, such as M&A or greenfield investments, with the latter being more impacted by cultural and regional barriers and displaying opportunistic behavior since it is more vulnerable to transient shocks like a currency crisis, financial crisis like the 2008 global financial crisis, coups, and political unrest (typical of developing Africa). In addition, when defining FDI, it is important to keep in mind that it is not the same as foreign portfolio investment (FPI) or depositing in a bank or government of another country in the form of buying convertible bonds. The difference, therefore, is the investment made in another country through the purchase of shares, a key aspect of FPI. FPI is mostly seen when compiling the balance of payments and/or one of its elements (for example, the financial account). FPI entails purchasing debt or paper assets such as stocks. Davies et al. then defines FDI as the funding of the operations of existing firms in developing countries and/or the start-up of new enterprises in developing countries. Davies et al.'s definition should not be understood merely as developed countries are big beneficiaries of FDI. In short, FDI refers to investment that entails establishing operations or purchasing physical assets, such as holdings in other firms, from one nation to another (usually by companies rather than

governments). The acquisition or creation of income-generating assets in a foreign country that includes operational or organizational control distinguishes FDI from FPI (the purchase of a country's securities by nationals of another country).

Again, many studies highlighting the role of multinational corporations in FDI inflow on the economic growth of developed and developing countries. Adusei (2009) adopts a critical and opposing stance on the function of FDI. As such, the role of FDI in the development of developing countries is still an ongoing concern. Just like FDI and multinational firms get tremendous benefits operating abroad, moving to developing countries comes with both costs and rewards. Trying to get an objective perspective might be challenging at times. The media tends to have a pro or anti-FDI/MNC attitude in its articles. In certain nations, the advantages exceed the disadvantages, whereas in others, the opposite is true. MNCs behave in a variety of ways depending on their level of participation in the host country's economy or society.

3.1.1 Determinants of FDI inflows

Although debatable, FDI has been known to be a very significant precursor for development in developing and emerging countries (Makki & Somwaru, 2004; Okwu, Oseni, & Obiakor, 2020; Ram & Zhang, 2002), particularly in developing Africa (Gui-Diby, 2014; Younsi, Bechtini, & Khemili, 2021), and in CEMAC countries (Akame, Ekwelle, & Njei, 2014; Emmanuel, 2014; Ibara, 2020; Nkoa, 2013, 2014). Instead of investigating the role of FDI in the development of a country, this subsection explores empirical studies that have examined the determinants of FDI financing for developing countries including SSA (Asiamah, Ofori, & Afful, 2019; Asiedu, 2002a, 2002b; Boğa, 2019; Gichamo, 2012; Jaiblai & Shenai, 2019; Moreira, 2009; Olatunji & Shahid, 2015; Rodríguez-Pose & Cols, 2017; Schneider & Frey, 1985; Shamsuddin, 1994). Most of these studies exploring FDI determinants have one thing in common: developing countries in Africa's record in attracting FDI is inadequate in comparison to other regions of the world. Therefore, it is important for policymakers to identify significant drivers of FDI financing. This subsection explores the identification of FDI influx factors in developing countries with a special emphasis on CEMAC.

More specifically, the factors that influence FDI inflows into CEMAC countries are not too different from those of other developing countries, and there are many and varying factors. Although there are many factors determining FDI inflows into developing countries (see Moreira (2009)), specific ones seen researched over the years include market size and growth, trade openness, natural resources availability, population size, human capital availability and costs, infrastructure, political and economic uncertainty, quality of institutions, international treaties, return on investment, and investment regulation (Agodo, 1978; Akin, 2009; Asiedu, 2002a, 2002b, 2006, 2013; Aziz & Makkawi, 2012; Basu & Srinivasan, 2002; Bende-Nabende, 2002; Bhattacharya, Montiel, & Sharma, 1996; Bhinda et al., 1999; Dupasquier & Osakwe, 2006; Elbadawi, 1997; Fedderke & Romm, 2006; Lemi & Asefa, 2003; Morisset, 2000; Onyeiwu, 2004; Petrović-Ranđelović, jankovic-milic, & Kostadinović, 2017; Yasin, 2005). Most of these determinants affect FDI in different ways, with some having a moderating effect and some at a lower or higher magnitude. Apart from this, at least some factors are said to be recurrent in many studies. For example, Chakrabarti (2001, 2003) shows that the single most widely acknowledged predictor of FDI inflow has been market size.

Countries have gone further by encouraging investors to visit for investment and tourism. Thus, the ability for a country to lure or promote investments from abroad is crucial for both developing and industrialized countries alike (Dupasquier & Osakwe, 2006; Morisset, 2003). Other factors attracting FDI inflow include FDI, tax and fiscal incentives (Appiah-Kubi et al., 2021; Blomström, Kokko, & Mucchielli, 2003; Cleeve, 2008; Nuţă & Nută, 2012), policies (Morisset, 2000, 2002), promotion agencies (Morisset & Andrews-Johnson, 2004) and privatization (Batana, 2011) (also see Blomström, Kokko and Mucchielli (2003); Schoeman and De Wet (2000) Schoeman and De Wet (2000); Bhinda et al. (1999); Martin and Rose-Innes (2003); Fedderke and Romm (2006), regional integration (Te Velde & Bezemer, 2006), government policies (Te Velde, 2001, 2003). Just unusual for Te Velde and Bezemer (2006) to have used “0/1” dummy variables to identify factors influencing FDI inflows. They argue that participation in a region leads to additional extra-regional FDI inflows, but the kind of regional provisions matters; and the position of nations within a region matters. Without known direct quantitative variables, Billington

(1999) argues that the bigger the total wealth and development potential of the host area (country, region, and subregion), the greater the quantity of FDI investment. Te Velde and Bezemer, the position of a country in the CEMAC region such as being landlocked or not is beyond the scope of this thesis as only income, HIPC, and LDC country differences will be considered.

Moreira (2009) offers an overview of research that looks at the numerous characteristics that attract or prevent FDI in Africa, in order to answer the following question: What factors influence or obstruct FDI to Africa? To that purpose, he conducted research using papers from all economic journals in the Econlit database from January 1969 to May 2007. The search terms “foreign direct investment” and “Africa” turned up 10 publications on FDI Determinants in Africa, the subject of this research. Factors such as market size and growth, trade openness, natural resources availability, population size, as well as human capital availability and costs were some of the common determinants found to influence FDI inflows into Africa.

A panel data analysis by Boğa (2019) for yearly data from 23 nations from 1975 to 2017 concluded that GDP growth, trade openness, domestic credit, natural resources, and communications infrastructure are all identified to be long-term drivers of FDI inflows in SSA nations, according to the PMG estimator results. However, this is not the same for the short period as Boğa concludes only GDP growth and trade openness determine FDI inflows in the near short-run. Mistura and Roulet (2019) detail the determinants of FDI with respect to statutory restrictions. The future costs in terms of foregone investments are discussed by Mistura and Roulet. They calculate the elasticity of bilateral FDI positions and cross-border M&A behavior to FDI restrictions as determined by the OECD FDI Regulatory Restrictiveness Index using an augmented gravity model that covers 60 advanced and developing countries from 1997 to 2016. According to their findings, changes that loosen FDI restrictions by about 10%, as calculated by the Index, could boost bilateral FDI in stocks by 2.1% on average. While the effects of FDI in the services sector are smaller, the general restrictiveness of countries has a negative impact on manufacturing industries, which are usually exposed to FDI.

Empirical evidence on the determinants of FDI is plentiful. A study by Tsai (1994) treats FDI determinants and outcomes separately in empirical investigations.

He further asserts that ignoring the simultaneity of FDI's determinants and repercussions is very certain to provide incorrect results. Thus, his study explicitly considers the simultaneity problem by using a simultaneous equation model. This has made it impossible to capture all the factors in one study even with multiple models. This is mentioned in Ngo et al. (2020), in which their empirical results reveal that market size, infrastructure, labor quality, institutions and policies, and agglomeration are key factors of FDI inflows. While Ngo et al. used six factors in two models, in Kumari and Sharma (2017), seven explanatory variables were included (market size, trade openness, infrastructure, inflation, interest rate, R&D, and human capital). As a result, Ngo et al. argue that a review of empirical research on FDI drivers reveals some inconsistency, and it is unlikely to represent the norm for all nations or areas, making it difficult for academics to unify the variables influencing current FDI inflows.

While a plethora of empirical research focuses on the impact of FDI on economic growth, it is uncommon to find direct plain studies investigating the role of economic growth in attracting FDI inflows. Tsai asserts that domestic market size and trade balance are proven to be two crucial predictors of FDI, albeit economic growth and labor cost are also significant. However, Tsai argues that while there are regional variances in the impact of FDI on the economy (for example, the impact of CEMAC on Cameroon's economy), empirical evidence does not support either modernization justifications or dependency assertions. Lim (2001) covers current arguments and data on two elements of FDI: its relationship with economic development and the factors that influence it. The first section focuses on current research on positive spillovers from FDI, while the second section discusses the factors that influence FDI. While there is strong support for positive spillovers from FDI, there is no agreement on causality, according to the report. The study indicates that market size, infrastructure quality, political/economic stability, and free trade zones are major predictors for FDI, but the relevance of fiscal incentives, the business/investment climate, labor costs, and openness is mixed.

Between the supposedly globalization-induced changes in worldwide competition for FDI and current empirical research on the relative significance of FDI drivers in poor countries, there is a striking disparity (Nunnenkamp & Spatz, 2002).

Nunnenkamp and Spatz argue that, surprisingly, little has changed since the late 1980s, as they illustrated. In addition, traditional market-related determinants continue to be important, only the availability of local talent has obviously gained prominence among non-traditional FDI variables. In support of this argument, Nunnenkamp finds that the tariff jumping motivation for FDI had lost most of its significance even before globalization became a fiercely disputed topic when it comes to the relationship between trade policy and FDI.

Demirhan and Masca (2008) uphold this line of research by investigating the determinants of FDI inflows in developing countries from 2000 to 2004 using a cross-sectional econometric model. The research is based on panel data from 38 developing countries with the average value of all data. With variables such as the rate of per capita GDP growth, inflation, telephone main lines per 1,000 people measured in logs, labor cost per worker in the manufacturing business measured in logs, degree of openness, risk, and corporate top tax rate as all independent factors; the primary model's growth rate of per capita, telephone main lines, and degree of openness all exhibit positive signs and are statistically significant, according to the econometric data. Their results further show that the rate of inflation and the rate of taxation both have a negative sign and are statistically significant. And, the cost of labor is positive, whereas the risk is negative, with both being insignificant.

When economists talk about FDI, they look into various combinations of elements (Tocar, 2018). According to Tocar, they frequently place a premium on the economic ones while downplaying the others. As such, there are various issues in identifying important non-economic FDI determinants among the non-economic elements. Tocar provides a complete assessment of the elements that are thought to influence FDI attractiveness, as well as identify key FDI determinants. Tocar identified eleven types of FDI drivers based on the range of parameters cited in the specialized literature with a thorough analysis of categorical and methodological interferences among the identified parameters, as well as prospective working hypotheses for future study in the subject. The production of a synthesis or interaction of the variables affecting FDI was the core of Tocar's evaluation.

Like Demirhan and Masca (2008), Nonnemberg and de Mendonça (2004) used an econometric model based on panel data analysis to look at 38 developing

nations (including transition economies) from 1975 to 2000. In support of the factors that influence FDI in developing countries, Jun and Singh (1996) and Nonnenberg and Mendonça (2004) connect FDI with the level of education, the economy's degree of openness, risk, and factors related to macroeconomic performance such as inflation, risk, and the average rate of economic growth, to name a few important results. Nonnemberg and de Mendonça's findings reveal that FDI has a strong correlation with stock market performance with evidence of a causation between FDI and GDP from GDP to FDI but not the other way around. According to Dellis, Sondermann and Vansteenkiste (2017), the function of economic structures as factors of FDI inflows is investigated in the current literature by focusing on advanced countries, depending on a range of indicators that proxy the strength of a country's economic institutions, and utilizing a newly accessible measure of FDI that cleans the data from statistical aberrations, such as financial round tripping. Their findings reveal that the quality of a host country's economic systems has an empirical relationship with FDI inflows. These hold up across a variety of economic conditions and are reinforced when we limit our sample to euro area nations exclusively.

Another panel data analysis including the pooled ordinary least square technique, fixed effects, and RE approaches for 14 countries in developing Africa by Gichamo (2012) revealed that trade openness, GDP, inflation, and FDI lag are the most important drivers of FDI inflows. Jaiblai and Shenai (2019) argue that more FDI inflows in proportion to GDP appear to have been drawn to countries with stronger infrastructure, smaller markets, and lower income levels, as well as economies with higher openness and exchange rate depreciation, but the coefficients of the last two factors are not significant. Jaiblai and Shenai exhume the same argument raised many times in this thesis that for emerging economies, FDI is a vital source of funding. As such, in their study, FDI contributed 39% of external finance for emerging economies on average between 2013 and 2017.

Instead of assessing the role of macroeconomic factors in FDI financing, Rodríguez-Pose and Cols (2017) assessed the quality of local institutions, which they allege has received less attention. Within developing countries, there are well-to-do countries, or commodity-rich countries as well as very poor countries. The FDI that SSA draws is concentrated in a few commodity-rich nations. They suggest that the

major drivers of FDI have always been natural resources and the size of national markets. They analyzed institutional data from 22 states to show that governance quality has a significant and long-term impact on FDI distribution in SSA. This is similar to the study by Boğa (2019) in which long-term and short-term drivers of FDI are assessed. Rodríguez-Pose & Cols assess political stability, government efficacy, decreased corruption, voice and accountability, and the rule of law, and conclude that they are proven to be not only more important drivers of FDI than the size of local markets but also have a long-term impact on African countries' ability to attract FDI. With a single SSA country in line, Asiamah, Ofori and Afful (2019) assessed the co-integration of FDI and its drivers for Ghana between 1990 and 2015 and revealed statistically significant negative impacts in both the long term and the short-term consequences of inflation, currency rate, and interest rates on FDI; whereas FDI had positive effects on GDP, electricity production, and telephone use.

It seems logical, however, to argue that FDI may provide host nations with major advantages. The study by Olatunji and Shahid (2015) indicates that FDI flows into conflict-free SSA economies and political stability exceed crisis economies. For countries to attract desired FDI levels, FDI must flourish in countries with good economic policies and make investors friendly. Olatunji and Shahid thus suggest that the policy must be stable, economically sound, and the infrastructure must be adequately built. Early studies of FDI research have managed to explore developing and developed as well as emerging countries alike. Some of such studies have highlighted the benefits of FDI to the host economy, while some have based their argument on the ambiguity of previous research. One of such mixed sentiments has been exhumed in studies by Asiedu (2002a, 2002b, 2006, 2013) in which one of her studies focused on investigating the determinants of FDI for SSA and non-SSA countries. Asiedu (2002a) shows that variables driving determinants of FDI affect FDI flows to the SSA differently. In particular, FDI supports non-SSA nations with infrastructure development and greater returns on capital; and these factors do not affect FDI to SSA, by comparison. Instead, openness to trade encourages both SSA and non-SSA FDIs. However, Asiedu argues that with SSA's suggestion that trade liberalization would lead to greater FDI to non-SSA countries than SSA countries, the marginal advantage is less for SSA-intensive.

Wahid, Sawkut and Seetanah (2009) recount the obvious sentiment about FDI in most developing African countries in which the volume that flows into Africa is relatively very low as a share of the total global flows and as a share of FDI flows into all developing countries. More alarmingly, they argue, the African share of FDI inflows has been on a steady downward trend for the last three decades. Asiedu (2002a) pins this on an adverse regional effect for some African countries because of the geographic position of a country in SSA, which results in receiving less FDI. Asiedu concludes by saying that these findings indicate that Africa as a whole is distinct. It is a little hard to assess the satisfaction of FDI inflows on the lives of the SSA people using time series data. Satisfaction is normally approached using a questionnaire of items for cross-sectional data. Nonetheless, the role or importance of FDI cannot be overemphasized as Buckley (2004) argues that international business should see cross-border financial management as a tool. Given this context, the aim of this section is to partly summarize perspectives on the role and importance of international corporate expansion in the form of FDI.

Organizations seeking to engage in international ventures, either in the form of exporting, licensing, or overseas production, are faced with the daunting task of internalization or an open market. Buckley (2004) compares cash inflows and outflows from a project as part of analyzing capital spending decisions. He agrees with the initial idea that capital budgeting is a concept used to describe investment valuation processes that rely on anticipated incremental cash flows associated with a project. He then stipulates that the definition of these flows for an international project presents the same challenges as a domestic capital project, but international project research is much more complicated. Although the basic trend is similar to that proposed by corporate financial theory, global companies must consider aspects unique to foreign activities. These distinctions cannot be overlooked, and this section focuses on the major tenets of internalization and places emphasis on the role and importance of FDI financing. It is worthy to note here that the global enterprise’s life, or internalization and operation, is explained by internalization theory. According to Rugman and Verbeke (2008), it aids in the comprehension of the global enterprise's borders, interface with the external world, and internal organizational architecture. Unfortunately, much study in the international strategic management sphere has not

taken internalization theory thinking into account, and as a result, it lacks the lessons offered by this comparative systemic approach. Rugman and Verbeke's study simply illustrates how applying an internalization theory lens to well-known international strategic management frameworks can enrich them and change their normative implications.

3.2 Theories Sustaining Governance, Economic Growth, and FDI Inflows

With more work done on FDI, Denisia (2010) echoes the sentiment that theoretical research on FDI has contributed to a greater knowledge of the economic mechanism and the behavior of economic agents, both at the micro and macro levels, allowing new fields of study in economic theory to emerge. Despite the proliferation of studies linking FDI and growth, researchers have sought to a third component affecting the relationship. Some of such components include inflation, exchange rate, market size or population, as well as governance, with the latter being a longstanding area for researchers. Note that the growth-governance-FDI nexus or relationship is a complex and multifaceted one; several theories outlined here provide insights into the causal and dynamic interaction of these variables. More precisely, the following subsections hereunder outline and explain prominent theories investigating the effect of governance and economic growth on FDI inflows. These theories range from institutional, market-and resource-seeking, technology transfer and absorption, political risk, as well as complementarity relationship. The latter spells out how these three macroeconomic variables complement each other. Some connections and theories will not be detailed in this thesis and some parts of this have been covered in earlier sections. For instance, details of the effect of governance on growth can be seen in Fayissa and Nsiah (2013) and Mengistu and Adhikary (2011).

Recall that FDI is generally an investment (in the form of monetary or other physical assets) made by a company or individual from one country into a company in another country. FDI is generally made where an investor conducts international business transactions or acquires foreign operating assets in a foreign company. FDI is completely different from foreign portfolio transactions or investments where the holders passively own shares from a foreign country and is characterized by a

permanent interest. The difference could also lie in the sphere of control. Control as such is critical to FDI. Control refers to the need to consciously manage, manipulate, or influence the affairs of a foreign company. Therefore, acquiring a long-term stake or expanding one's business into a foreign country are also examples of FDI.

A study by Elo (2007) examines how capital controls affect FDI decisions and how the effect of these restrictions varies by the level of risk in the region. He constructed an FDI decision model based on Dunning's eclectic theory paradigm, with true choices to emphasize economic volatility and country risk. The numerical results of the model are expressed as efficiency statistics that reveal the fundamental dynamics embedded in the aggregate data that are responsible for the poor performance of recent empirical studies. At each level of country risk, he found that increasing capital controls reduce the life of FDI investments and increase the ability of foreign investors to share risk. He discovered a large relationship between capital controls and country risk, leading to a nonlinear relationship between these two variables and the volatility and volume statistics. He computed a typical cross-sectional model that supports our theoretical conclusions.

Extending Elo's argument, Peng (2012), in the FDI legitimacy and control of MNC subsidiaries using a sample of Japanese MNCs, examines the role of FDI legitimacy in assessing subsidiary ownership and expatriate staffing and was able to provide empirical evidence. This adds to the literature on subsidiary management or control. His research considers the conflict between legitimacy and competitive pressures using organizational ecology theory (OET). This is a big step away from institutional philosophy, which only allows for the first type of pressure. He found that there is a relationship between subsidiary size and FDI credibility with both subsidiary ownership and expatriate staffing levels. Smaller subsidiaries tend to increase their ownership and expatriate staffing levels as FDI credibility increases, while larger subsidiaries tend to decrease their ownership and expatriate staffing levels. The results are consistent across countries and over time.

Theoretically and practically, his observations are important. When deciding on the management or control mechanisms of subsidiaries, multinationals should pay close attention to the dual pressures of legitimacy and rivalry. Caution should be exercised in applying the recommendation, based on institutional theory, that MNCs

should adopt higher ownership stakes and higher numbers of expatriates in their subsidiaries as FDI credibility increases. The controlling ownership of a commercial enterprise in one country by a person resident in another country is defined as FDI, a branch of foreign capital or factor movements. The regulation factor distinguishes FDI from foreign portfolio investment, which is a passive investment in another country's securities, such as public stocks and bonds. Standard concepts of ownership use the globally accepted 10% voting share criterion, but there is a gray area and often a smaller block of shares provides control of commonly owned companies. In addition, de facto control can be achieved through the use of technology, managers, and even critical inputs.

In absolute terms, FDI refers to the equity sources of direct investment in the reporting economy. This includes the sum of equity, profit reinvestment and other capital. Direct investment is a form of cross-border investment in which a person from one country has influence, or the ability to exercise significant influence, over the management of an enterprise in another country. The nature of a direct investment partnership is determined by a lasting interest, which in turn is determined by ownership of 10% or more of the voting common stock, although this is not always the case.

3.2.1 Theories on Governance and FDI

The role of governance in attracting FDI is paramount, just like the role of capital flows in shaping governance measures, especially in developing countries. Governance and FDI ideas have been studied in a variety of domains and are linked in what is known as the institutional quality theory. Institutional, in this context, refers to the six dimensions or elements of governance. Mengistu and Adhikary (2011) and Mengistu (2012) amplify this relationship with other control variables, including infrastructure and economic growth. They conclude that good governance significantly influences the inflow of FDI, with some governance dimensions being more likely than others. In short, the general notion about institutional theory is that governance has grown in prominence because it encompasses the wide variety of organizations and interactions involved in regulating society (Katsamunska, 2016). In addition, Parvinen (2003) argues that governance theories of the company have been

incorporated in the field of mergers and acquisitions (M&A) to comprehend the structure of the M&A discourse and its interlinkages with governance.

Apart from Parvinen's view, Sabharwal and Singh (2020) posit that theories have been created in the context of FDI to explain the motives and mechanisms of FDI inflows, with a focus on microeconomic and macroeconomic perspectives. Furthermore, Fischer (2000) offers more traditional economic theories that stress the necessity of international commerce in economic integration, as well as the value of a lean state in promoting commercial connections. Even though these theories seek to provide different perspectives on the motives of FDI flows, similar views are specifically seen in emerging countries. Kurul and Yalta (2017) argue that major policy problems include the role institutional quality plays and which institutional determinants influence FDI flows. They revisited the relationship between several institutional characteristics and FDI flows for a panel of 113 developing countries from 2002 to 2012. Kurul and Yalta's findings show that not all metrics of institutional quality in developing nations have a substantial impact on foreign investors' decisions. Controlling corruption, government effectiveness, and having a voice and responsibility all have considerable beneficial effects on FDI flows, according to our findings. Their study suggests that lowering corruption and excessive bureaucracy, as well as improving the political system and politicians' transparency and accountability, leads to an increase in FDI inflows and encourages corporations to invest in developing countries.

Furthermore, Kurul and Yalta (2017) support policies that boost citizen participation in a political system, such as allowing voters to choose their government and protecting civil rights, may increase FDI flows. These findings lead us to the conclusion that countries with weaknesses in corruption control, effective government, transparency in government policies, accountable bureaucracy, and trust and participation in the political system should begin reforming their institutional policies and arrangements in order to attract more FDI. Improving institutional variables to create a positive investment climate should be a top priority for policymakers in developing countries.

The impact of institutions on FDI flows is the subject of a growing corpus of empirical research. There are three threads to the literature on this topic. One body of

research focuses on determining the impact of a certain institutional feature on FDI, such as corruption and political regime. For example, according to Wei (2000), corruption has a detrimental impact on multinationals' FDI location preferences by raising the cost of conducting business and creating uncertainty. According to Jensen (2003) and Ahlquist (2006), democratic countries attract more FDI than authoritarian countries because democratic regimes lower political risks of nationalization and expropriation and boost the host country's credibility among foreign investors. In contrast, Li and Resnick (2003) found that democracy in a host nation has a negative influence on FDI inflows due to the effects of lower-cost labor, labor union suppression, entry deals, and operation affordance in authoritarian regimes. According to Mohammed (2022), minimizing the level of corruption will definitely attract foreign investments.

The second body of research looks at the relative importance of various aspects of institutional excellence. Low levels of corruption, nationalization risk, and significantly stronger contract enforcement, according to Gastanaga, Nugent and Pashamova (1998), led to an increase in FDI inflow. Inefficient institutions, such as corruption, a lack of the rule of law, and political instability, hinder FDI inflows (Asiedu, 2006). In addition, Daude and Stein (2007) examine which dimensions of the quality of governance institutions affect foreign investors' investment decisions by testing a set of institutional variables and find that unpredictable policies, excessive regulatory burden, and a lack of government commitment discourage FDI inflows. According to Gani (2007), advances in corruption control, political stability, regulatory quality, and government effectiveness have a beneficial impact on FDI inflows for various Latin American countries.

The effect of a composite institutional indicator, which is built by integrating multiple aspects of institutional variables, is explored in the third strand of research. For example, Wheeler and Mody (1992) concluded that a composite index that covers a broad dimension of institutions, such as bureaucratic red tape, corruption, political instability, and the performance of the judicial system, had no impact on US corporations' location decisions. Control of corruption, rule of law, regulatory environment, and political stability were used to create a composite score by Globerman and Shapiro (2002) and Buchanan, Le and Rishi (2012), who concluded

that the index of governance infrastructure has a favorable effect on FDI flows. Similarly, Buchanan, Le and Rishi (2012) claim that while the institutional quality index promotes FDI flows, it has a negative impact on FDI volatility. Asiedu (2013) recently found evidence of FDI risk components, which include contract viability, profit repatriation, and payment delay indicators, having no substantial impact on the volume of FDI flows.

Even though academics see governance as an abstract unobservable term, researchers have a long-standing way of quantifying it. As earlier mentioned, it is an aggregation of different dimensions, with Kaufmann, Kraay and Mastruzzi (2011) specifying six dimensions. One of such unlikely Kaufmann et al. dimensions, but quite related variable, is introduced in Felix Ayadi et al. (2014). Felix Ayadi et al. introduced the degree of transparency in an economy as another variation of governance affecting FDI inflow. Their findings show that the level of transparency and the size of FDI inflows into SSA countries have a long-run equilibrium relationship, and MNCs increase the levels of corruption in host SSA countries. Overall, there is a large body of research that links the quality of institutions to FDI inflows. The dynamic relationship between institutions and FDI flows, on the other hand, has received insufficient attention. In the following sections, we fill this vacuum in the literature by empirically examining the relationship between institutional characteristics and FDI flows.

3.2.2 Theories on Economic Growth and FDI

FDI and economic growth are inextricably linked, despite the cry for ambiguity among the studies. Part of the mix of results could be approached from the question posed by Chowdhury and Mavrotas (2006): “Which one causes which?” Both terms have been researched by many across different regions and countries. FDI and growth are linked in many ways, one of which is the market-seeking potential of the host or destination country. Wadhwa and Reddy (2011) outline the role of market-seeking, resource-seeking, and efficiency-seeking factors of FDI inflow. As such, the market-seeking theory is one theory that explains the influence of growth on FDI inflow. Economic expansion in an FDI host nation, according to this notion, boosts its desirability as a market for products and services. This allure drives international

investors to establish a presence in that country in order to tap into the rising consumer base. According to the market-seeking theory, economic development encourages FDI inflows because corporations desire direct access to increasing markets.

According to Amal (2016), FDI is seen as a critical source of investment, knowledge transfer, and GDP growth. Across different studies, on one hand, both are intricately related, also known as a bidirectional relationship; on the other hand, growth is considered a key predictor of FDI. Iamsiraroj and Doucouliagos (2015) is one such study professing a positive relationship between growth and FDI. Also, the importance of absorptive ability in influencing the impacts of FDI on economic growth cannot be overstated (Fischer, 2000). Classical economic theories highlighted the importance of foreign commerce as a driving force behind economic internationalization and integration, producing local wealth through specialization and comparative advantages (Sengupta & Sengupta, 2005). Thus, Krajcsik (2015) argues that growth theory emphasizes major growth causes and their social and economic consequences, especially in market-based systems experiencing technological transition and global competition. Economic growth or development analysis has progressed from early models based on homogeneous elements of production to modern models that consider human capital growth and development, as well as the influence of international commerce and labor distribution.

Over the years, FDI has been researched as the main driver behind growth. As such, FDI has become a critical component of economic development or growth in less developed countries. Based on the assessment by Umer Chhapra, Sheikh and Gudaro (2012), FDI allows for the transfer of technologies, increases competition in the domestic input market, and leads to the growth of human resources. Profits generated by FDI also add to the host country's corporate tax revenues. Tsatsaridis (2017) provides a theoretical and methodological investigation into how FDI influences the development of GDP in SSA countries. In search of a difference in the effect of FDI between two groups of countries based on their educational attainment, Tsatsaridis still holds that there is a lack of clarification in this field of research. The study's approach was focused on OLS regressions with country fixed effects and series cointegration checks. The empirical findings support a statistically significant

effect of FDI inflows on GDP growth, as well as a negative relationship between education and FDI inflows.

Like other regions of the world, FDI is thought to have a favorable influence on CEMAC's development. Divergent empirical data have encouraged various scholars to seek reasons for these apparent discrepancies in observed results. Some preliminary findings support this viewpoint. For example, according to the primary regression finding of Borensztein, De Gregorio and Lee (1998), FDI has a positive overall effect on economic development. However, the degree of this benefit is dependent on the stock of human capital available in the host nation. However, because of the way FDI interacts with human capital, the direct effect of FDI is negative for nations with very low levels of human capital. Using cross-country regressions, Borensztein, De Gregorio and Lee (1998) also reveal that FDI has a beneficial, albeit not substantial, impact on domestic investment, owing to the attraction of complementing activities outweighing the displacement of local rivals. Because FDI functions by pulling in other sources of investment, this is an indirect effect of FDI on growth. The goal of their study was to look at the influence of FDI on the diffusion of technology and economic growth in developing nations. It was inspired by an endogenous growth model in which the pace of technical advancement is the primary predictor of long-term income growth rates.

The discussion on the unidirectional relationship from FDI to growth is still ongoing, and Lumbila (2005) further adds a voice by simply to the discussion by investigating the influence of FDI on economic growth based on the limited empirical evidence available. Additionally, it identifies elements that amplify the influence of FDI on growth in a way that differs from past research. This study expands on Borensztein, De Gregorio and Lee (1998) and by incorporating infrastructure, risk, and corruption, in addition to education, as determinants of FDI's influence on African growth. The method used to estimate the influence of FDI on growth in Africa was cross-country regression analysis using panel data, and the study encompassed 47 African countries. The regression findings show that corruption is irrelevant in the case of FDI. As a result, even countries with a high perception of corruption gain from the good impact of FDI on GDP. However, the Hausman test performed on the data used in the research was unable to detect a systematic

difference, due to the presence of both heteroskedasticity and autocorrelation in the tested data.

Asiedu (2002a) investigated the variables that influence FDI in developing countries, with the goal of determining if these factors varied among countries in SSA. The study's reasoning was based on the assessment of risks related to venturing FDI and the findings of Jaspersen, Aylward and Knox (2000), as well as Fernandez-Arias and Hausmann (2000). Cross-sectional data was used for analysis, and cross-sectional regression and sub-period panel regression were employed as methods of analysis. The regression results indicate that higher returns on investment and improved infrastructure have a beneficial influence on FDI in developing Africa. However, there is no discernible effect on FDI according to these studies, but trade openness encourages FDI into developing Africa making FDI flow in this region unique. This confirms the assertion that different policies that have worked well in other places may not work as well in Africa.

The research conducted by Asiedu (2006) assesses how natural resources, market size, physical infrastructure, human capital, host country investment policies, legal system dependability, and political stability affect FDI flows. Panel data was used in the study, which was based on growth theories. The study used the fixed effect panel estimation technique of analysis. According to the findings, large local markets, natural resource endowment, solid infrastructure, low inflation, an effective legal system, and a robust investment environment all encourage FDI. On the other hand, corruption and political instability, have the opposite impact. The study concludes that an increase in FDI does not always imply economic development, but policies that encourage FDI have a direct and long-term influence on economic growth. However, the empirical study's conceptual underpinning, was not explicitly described explicitly. For improved findings, the number of years and nations under study might be increased.

Similarly, Asiedu and Lien (2011) sought to determine the effects of democracy on FDI and whether natural resources in host countries modify the connection. The linear dynamic panel data model was used with panel data. The analysis employed the GMM estimator and regression analysis. The results also demonstrate that democracy encourages FDI only when the percentage of minerals

and oil in overall exports is less than a critical level. According to their findings, the impact of democracy on FDI is determined by the number of natural resources rather than the type of natural resources. However, while the number of years and countries under observation is not sufficient, the analysis technique can be improved to produce a more precise conclusion and, as a result, better policy implementation.

Trade openness has been used as a mediating factor to assess the FDI-growth nexus or causation, and similar studies show the positive effect of trade openness on the relationship, consistent with Basu, Chakraborty and Reagle (2003) and Trevino and Upadhyaya (2003). Both studies emphasize the significance of a free and competitive economic environment for profitable investment. The negative interaction impact of the rule of law suggests that FDI can play a positive role in an institutional context that otherwise limits investment efficiency. In the face of more political rights and a more restricted rule of law in the host nation, the FDI model, which indicates a positive and substantial influence of economic growth on FDI inflow, is found to be stronger. However, while political rights have a detrimental impact on FDI inflows, domestic rule of law has a beneficial impact. This shows that FDI has flowed more freely in the sample region when authoritarian regimes exist. This might be due to a higher level of stability, whereas market-driven FDI favors political competition in the host country.

Ayanwale (2007) investigated the link between FDI influx and Nigerian economic growth, thereby addressing the country's unique perspective on the FDI issue. In terms of the number of years and the influence of the main components of FDI on economic growth, the research covered a greater area than earlier research. It took use of the chance to gain insight into the influence of oil FDI and non-oil FDI on Nigeria's economic growth. The research also looked into the empirical link between non-extractive FDI and economic growth in Nigeria, as well as the causes of FDI. The enhanced growth model was calculated using the ordinary least square and 2SLS methods of analysis. The study discovered that openness has a negative relationship with FDI influx. Infrastructure and returns on investment are both positively related to FDI; however, the latter is not statistically significant. Inflows of foreign direct investment, inflation, and government size all have a positive association. In contrast, FDI influx, human capital, and political stability all have a negative association. In

this neighboring country to CEMAC, FDI is said to contribute to the country's economic growth. Although FDI's total influence on economic growth may be small, the components of FDI have a favorable influence.

The communication industry has the biggest potential for economic growth, with FDI inflows that are multiples of those in the oil industry. FDI in the manufacturing sector has a negative impact on the economy, reflecting the country's weak business climate. The study may have conducted additional comparisons with other African countries and even other developing countries throughout the world, despite the fact that the number of years was sufficient for the research. A more advanced method of analysis could have also been utilized to better measure probable shocks and their impact on the economy, resulting in more relevant conclusions.

However, Fortanier (2007) focused on the effect of one specific FDI characteristic: the transnational corporations' (TNC) place of origin. The TNC's home country's market circumstances, business systems, and institutions have an impact on a wide variety of strategic and organizational features, such as the degree of intra-company sales, industry specialization, and human resource management methods. This study contributes to the debate by examining the differences in the growth consequences of FDI from various countries of origin, using a dataset on bilateral investment stocks of six major outward investor countries in 71 host countries. Out of these 71 host countries, 49 were developing countries, and the study estimates were analyzed using panel data analysis. With the exception of institutions, the study revealed that the key independent factors are highly correlated with the dependent variable, GDP. There are significant connections between the independent variables, particularly between education, institutions, and initial GDP.

FDI values of an individual investor of a country are connected with overall FDI and, to a lesser extent, with each other, as one might assume. Nonetheless, the coefficients are small, and the values of the correlation coefficients between individual investors' FDI and the other variables in the model appear to vary significantly. These are the first indications of FDI variations by nation of origin. Although the maximum values for trade openness and other FDI variables are relatively high, the descriptive statistics do not indicate the presence of influential outliers. The inclusion of Hong Kong and Singapore in the sample is the primary

reason for this. While these findings did not have a major impact on the estimated results in most cases, they were troublesome when looking at the relationship between trade openness and FDI.

The findings show that the growth consequences differ based on the country of origin, and that these countries of origin also change based on the features of the host country. As a result, it may be argued that FDI has a negative impact on growth in nations with a low stock of human capital, are relatively closed to trade, or have low-quality institutions. In nations that score well on these criteria, however, FDI has a beneficial impact on growth. However, it was highlighted that while the number of nations under observation was adequate, the number of years employed for the analysis was insufficient, given the nature of the test and the impact sought to be examined by the study.

The research by Ojo and Alege (2010) looked at the policy implications of the present global financial crisis, as well as the consequences of the boom-bust on FDI flows, financial growth, and regional development. It provided an expanded Solow-type model in the spirit of endogenous growth, and it was based on International Trade, New Growth, and Financial Theories. In order to capture the dynamic impact of FDI inflows for policy analysis utilizing impulse response functions, the panel vector autoregression approach was utilized. GDP growth was shown to have a substantial positive coefficient in the regression, indicating that as economic activity in Africa grows, so will FDI inflows.

Changes in FDI are elastic in relation to changes in GDP, as seen by the size of the coefficient. At the 1% level, the coefficient of degree of openness is statistically significant and differs from zero. The elasticity of OPN, in particular, is almost unitary. These findings support the theory that increased economic activity and trade liberalization boost FDI inflow to developing Africa (Chakrabarti, 2001). However, even at 10%, the exchange rate and interest rate coefficients were not significant, showing that changes in these factors do not significantly explain changes in FDI. Although, the number of countries under consideration might be expanded in order to conserve data, it could also be to extend the period of observation to a greater number of years in order to reach a more compelling result.

Unlike earlier studies, Ayadi (2010) looked at the long-term link between corruption and FDI flows in SSA nations. Some frameworks utilize panel data in which preliminary data diagnosis such as panel unit roots and panel co-integration are used as the analytical approach. The results revealed a long-run equilibrium link between the amount of transparency and the magnitude of FDI inflow. The two variables now move in lockstep rather than drifting apart. As a result, in order for most African countries to attract FDI, they must first change their political and economic environments. The number of years and nations studied might, however, be increased to produce more reliable results in the study. Other than SSA or CEMAC countries, Yucel (2014) holds that FDI is still found to have a positive effect on economic growth in Baltic countries (Estonia, Latvia, and Lithuania).

More factors are recurrently mentioned in studies, and this points to the importance of such factors. Institutions, market size as earlier mentioned, as well as income distribution, have been investigated in recent studies (Kohler, 2013; Kohler, 2010). Note that the behavior of multinational companies (MNEs) operating in host countries with poor institutional environments. The revelation principle and the Cournot Nash equilibrium framework were used in conjunction with the correlation analysis technique of estimation. The findings revealed that weak institutions are an obstacle to FDI. In addition, an unstable climate, local bureaucracy, and corruption all act as roadblocks to FDI flows to host nations with weak institutions. However, the research failed to account for the fact that local governments are encouraged to hold a competition among foreign investors in order to increase the amount of corruption. The type of data used in the study was also not stated.

Returning to the original thesis of this dissertation which focuses on the linkages between FDI inflow, governance and economic growth. Flows of foreign capital to developing countries have increased in recent decades, while the share of capital flowing to developing Africa has decreased in contrast to other developing countries, despite the region’s steady improvement in the rate of return on investment. Capital flows, particularly FDI to developing nations, enhance openness to international financial transactions while sacrificing local sovereignty in the pursuit of a greater quality of living. Additionally, the removal of barriers should result in increased investment opportunities in the country, as well as a series of tangible

transformations such as physical investment, education, human capital development, and high productivity even among local firms in developing countries, all of which are sure traditional catalysts for economic growth and development.

Again, Jaspersen, Aylward and Knox (2000) argue that developing countries have low per capita income and, consequently, low savings, which translates to restricted domestic investment. This explains the investment shortfall, as savings are inadequate to fulfill demand. For emerging nations, high skill and technology are equally lacking elements of production, limiting investment capacity and, as a result, the ability to achieve the requisite degree of economic growth. A foreign exchange gap is created by an unfavorable balance of payment position caused by an excess number of imports relative to exports. Because of the skills and savings gap, as well as the foreign exchange gap, inflows of external resources are required to supplement the constraints of inputs of production.

3.2.3 Theories Sustaining the Governance, Economic Growth, and FDI

Based on empirical findings, FDI, economic growth, and governance are interconnected and almost inseparable in the real sense. According to Habibi (2018), economic freedom has a beneficial influence on economic growth, which attracts more FDI. The quality of a host country's governance institutions and the amount of economic growth are important drivers of FDI inflows. The rule of law, property rights protection, openness, lack of corruption, and effective regulatory frameworks are all examples of institutional excellence. In other words, countries with well-developed legal systems, low levels of corruption, and strong property rights protection have effectively attracted FDI through a combination of solid governance and vigorous economic growth. Countries with poor governance frameworks, on the other hand, frequently struggle to attract FDI despite their economic development potential, hence the governance-growth-FDI theory.

In like fashion, a hypothesis that emphasizes the relevance of governance quality in supporting economic growth argues that it improves the "helping hand" of authority while weakening the "grabbing hand", resulting in a beneficial influence on FDI. Furthermore, the influence of governance on FDI and economic growth differs depending on the country's stage of development. Entrepreneurship, for example, can

boost economic growth in nations that value invention, but not in ones that value factors and efficiency (Khyareh & Amini, 2021). Furthermore, the interplay of governance and FDI can result in positive and improved growth, underlining the need for African countries to strengthen their governance structures in order to attract more FDI and improve growth (Adeleke, 2014). Overall, these theories underscore the complicated link between governance, economic growth, and FDI with governance quality playing a critical role in recruiting and encouraging FDI.

According to Shittu et al. (2020), there is a direct correlation between political governance, globalization and economic progress. The authors discovered that while there have been conflicting findings about the relationship between FDI and growth, FDI promotes sub-regional growth and political governance amplifies FDI's beneficial effects on economic growth. The other growth-related determinants are government size, labor, and capital, which have positive, negative, and negative effects on growth, respectively. In addition, Kottaridi (2005) favors a bipolar EU in which core countries concentrate the highest value-added activities. She contends that in order for peripheral economies to enhance their internal characteristics—such as by broadening their foundation in human capital—and remain competitive, they must reevaluate the governance that currently exists.

3.2.4 Theories Sustaining the Importance of FDI Financing

This subsection aims to explore theories and concepts associated with FDI financing and economic growth. This will be achieved by examining the role of growth, labor force, education, electricity consumption, as well as the financial impacts of governance on FDI activities. To begin with, prior to Stephen Hymer's hypothesis (see Hymer (1982); Hymer (1960)) about direct investment in the 1960s, neoclassical economics focused on macroeconomic concepts. Ietto-Gillies (2012, 2015) provides explanations for FDI and global companies as demonstrated by neoclassical economics. Both ideas were based on the classical theory of exchange, which stated that trade was motivated by differences in the costs of producing products between two countries, with the low cost of production serving as the primary motivation for a firm's international action.

According to Hymer's hypothesis, emerging countries have a low per capita income and hence a high rate of return on investment. This is because income per capita and the rate of return on investment have an inverse connection. This always attracts foreign investment to developing economies with high rates of return on investment. Because domestic savings are low at this stage of growth, additional capital is required. As development progresses, the requirement for capital decreases, and domestic savings grow. Hymer's significance, as recounted in the field of international business and FDI by Dunning and Pitelis (2008), stems from his position as the first to theorize about the existence of MNEs and the reasons for FDI outside of macroeconomic principles, as well as his influence on later scholars and theories in the field, such as John Dunn's OLI (ownership, location, and internalization) theory. Furthermore, two other significant scholarly advances in the 1990s: resource-based and evolutionary theories bolstered the efficiency-value production aspect of FDI and MNE operation.

The theory of location-specific advantages of FDI is also known as the internalization theory and it encompasses resource endowments, cost factors, market access, and trade agreements. Briefly, after WWII, Denisia (2010) recalls that FDI began to play a larger part in the global economy. Theoretical experiments on FDI have resulted in a greater understanding of the economic system and the actions of economic agents at both the micro and macro levels, enabling new fields of research in economic theory to emerge. To better understand this, Denisia posits that it is necessary to first comprehend the fundamental reasons that drive a company to invest abroad rather than sell or outsource production to domestic companies. The aim of this research is to recognize the major developments in FDI theory and to explain how these hypotheses were developed, as well as the reasons that contributed to the need for new methods to enrich FDI economic theory. Despite the fact that many scholars have attempted to understand the concept of FDI, we cannot conclude that there is a widely agreed explanation because each recent piece of proof adds new elements and critique to the previous ones.

In a study on FDI theories by Dunning (2009), MNE's location decisions are influenced by the relative location advantages of different countries for specific operations. Locations rich in specific resources will draw MNEs whose activities

heavily rely on these resources. Another theory of FDI is the Heckscher-Ohlin (H-O) theory. It asserts that items that need a large amount of (abundant factors of production) and a small amount of (scarce factors) are exported in exchange for items that need the opposite proportion of elements. As a result, factors in plentiful supply are indirectly exported, while factors in short supply are imported. The H-O hypothesis predicts that nations would export items that heavily utilize their plentiful factors and import items that heavily utilize their scarce resources or factors. If a country's labor-to-other-factors ratio is higher than the rest of the world, it is considered relatively labor-rich. If labor costs account for a higher percentage of a product's value than the value of other items, the product is said to be labor-intensive.

Physical capital (non-human capital) and highly trained labor (human capital) are abundant in industrialized nations, according to the factor endowment hypothesis. In industrialized nations, however, unskilled labor is scarce. This means that emerging countries have the reverse pattern of physical capital abundance and labor scarcity; highly skilled labor and unskilled labor. As a result, physical capital, technology, and trained human capital are in short supply in emerging countries. Almost four decades ago, the new growth theory was brought to the limelight and explained the role of FDI in promoting growth and technological progress in host countries**.** Romer (1986) sparked the new growth theory, which stresses technological development as a function of investment rate, capital stock size, and human capital stock. It takes a two-pronged approach to the economy: first, it sees technology growth as a byproduct of economic activity. Previously, technology was assumed to be a given or a result of non-market causes. Because it incorporates technology into a model of how markets work, the new growth theory is commonly referred to as "endogenous" growth theory. Second, unlike physical goods, knowledge and technology are defined by increasing returns, and these growing returns fuel the growth process, according to the new growth hypothesis.

Interest in economic growth has revived, especially in long-term convergence in per capita incomes and output between countries. Endogenous growth theory has important regional implications, but also major limitations when applied to a regional context (Martin & Sunley, 1998). Even with this, new perspectives are introduced such as the new growth theory's central premise that information propels growth. We

can amass an unlimited number of ideas since they may be shared and repurposed indefinitely. They aren't affected by what economists refer to as "diminishing returns". Increasing returns to knowledge, on the other hand, drive economic growth. The new growth theory explains how we are transitioning from a resource-based to a knowledge-based economy. It emphasizes the importance of economic processes that develop and disseminate new information in determining the progress of nations, communities, and individual businesses.

Solow's approach depicts technology as a continuous, ever-expanding body of knowledge that emerges naturally over time, rather than as a product of economic factors. Because technology is supposed to be driven by factors outside the economy, this simplification allows economists to continue modeling the economy using declining returns, but at the cost of removing technology from the economic model itself. The Solow model is often referred to as an "exogenous" growth model. On the other hand, according to neoclassical theory, emerging countries' low capital-labor ratio guarantees an extraordinarily high rate of return on investment. According to them, national market liberalization attracts additional local and international investment, resulting in increased capital accumulation. The consequent increase in Gross National Product is comparable to an increase in domestic savings rate, which improves the capital-labor ratio and per capita incomes in capital-poor countries.

Clearly outlining the differences in these theories, we begin with the new growth theory, which rejects the neoclassical assumption of diminishing returns to capital investment, allowing for increased scale in production aggregation. It also emphasizes the role of externality in determining the rate of return on investment, assuming that public and private investments in human capital generate external economies that offset the natural tendency of diminishing returns to capital investment. According to the new growth economists, external economies are important for capital accumulation because they can keep the marginal product of physical or human capital above the interest rate indefinitely, preventing diminishing returns from causing stagnation and resulting in long-term growth patterns in developing countries.

The neoclassical paradigm is challenged in many ways by the new growth theory, which is a crucial component of developing development theory. Solow

(1957) and other neoclassical researchers established exogenous growth models that did not attempt to explain what caused technology to advance over time. Assuming that technology "just happened," capital accumulation and labor force improvement were emphasized as sources of growth. The traditional notion that we may get wealthy by amassing more and more physical capital, such as forklifts, is just incorrect (Romer, 1986). The basic reason is that all forms of physical capital eventually experience declining returns; economies cannot expand by simply adding more of the same type of capital.

The new growth theory resurrected an old tradition of considering the consequences of growing returns. Economists, at least in the early twentieth century, were fairly comfortable discussing growing returns as a real and theoretical possibility (Buchanan, Le, & Rishi, 2012). However, when economists placed a greater focus on theoretical formulations, no one had the mathematical skills to describe scenarios with growing returns. Economic models based on decreasing returns could be solved using calculus techniques, and their systems of equations settled down to a single, stable equilibrium. When growing returns were assumed, the equations blew up, destroying the majority of mathematical economics. As a result, economists focused on declining returns, which did not have any abnormalities and could be thoroughly studied (Arthur, 1989).

Due to the complementarities of investments, particularly in new technology, and the cyclical nature of R&D expenditures, corporate growth expectations are likely to be self-fulfilling. Economic growth is triggered and sustained when economies spend more on research and development and invest more. The rising profits associated with new technologies may be able to assist in making this process self-sustaining. If they are pessimistic, on the other hand, they may reduce research and development expenditures and invest less, leading to or exacerbating an economic downturn (Evans & Honkapohja, 1996). According to Bluestone and Harrison (2001), it is assumed that because of the link between growing returns, expectations, and the possibilities for sustained growth, macroeconomic policy should clearly strive to attain and sustain greater levels of growth. A high-growth plan will push countries to increase their research and development spending. It will also increase investments in

productive new capital, improving the economy's rate of productivity growth and, as a result, improving earnings, wages, and living standards.

In the framework of FDI impacting the livelihoods and wellbeing of communities in host countries in a bid to achieve sustainable development, the sustainable livelihood theory was born. The idea was defined as the integration of people, resources, environment, and development in four aspects: population stabilization, migration reduction, core exploitation prevention, and long-term sustainable resource management. As an integrative idea, the Imperatives (1987) were created. Livelihood refers to having enough food and currency on hand to fulfill basic requirements; security refers to having secure ownership of, or access to, resources to meet eventualities; and sustainability refers to the long-term preservation or increase of resource production.

Adaptive strategies and abilities create and sustain means of subsistence, as well as improve the well-being of current and future generations. They constitute a constant shift in community strategy, structure, and organizational processes; these abilities depend on the availability, stability, and accessibility of ecological, sociocultural, economic, and political possibilities. They are based on equality, resource ownership, and participatory smart decision-making - concepts like sustainable human development and sustainable livelihood that take change and uncertainty into account (Imperatives, 1987).

The model describes the contact between the numerous aspects that directly contribute to the synergy that improves the sustainability of livelihoods. They are divided into the following groups: Human capital, natural capital, physical/material capital, and social capital (which refers to its elements: socio-political, psychological, organizational, cultural, and spiritual capital) are all examples of capital production and accumulation. Planning aids include: multi-track communications for participatory policy, institution, and strategy analysis, as well as program evaluation. Resilience, ability to recover from stresses/shocks, economic efficiency, social equity, ecological sustainability, as well as processual and strategic factors that determine the character of agency, are all SL standards. Ideologies, on the other hand, are preconditions, readiness, participation as well as smart decision-making, livelihood

resource production and availability, livelihood resource access and control, stability, and sustainability.

The capital approach to sustainable development stresses and ensures that per capita national wealth does not decline by protecting sources of wealth such as stock-produced human capital, social capital, and natural capital. According to Turner (1988), an optimum (sustainable growth) strategy would attempt to maintain an appropriate rate of increase in per capita real incomes without diminishing the national capital asset pool or natural environmental asset stock. Sustainable development, according to the Imperatives (1987), is defined as meeting current demands without jeopardizing the capacity of future generations to fulfill their own. The obligation of sustainability, according to Solow (1993), is to equate the posterity of endowment with whatever it takes to attain a quality of living at least as excellent as theirs, while also considering their future generations. Additionally, Anand and Sen (1994) defined sustainable development as the extension of people's substantive freedom today while avoiding substantial jeopardization of future generations. This is quite close to the concept of development objectives in the UNDP (1994): preserving the freedom and capacities that enable people to live meaningful lives through sustainable freedom and equitable development. Note that the sustainable livelihood hypothesis highlights the importance of capital generation and accumulation in host countries' domestic investments for long-term sustainability.

Domestic investment efficiency is important because it leads to a greater equilibrium level of per capita income, more employment, and a double advantage of greater production input and connections for domestic enterprises. This is achieved through a diffusion process that stimulates healthy competition and, as a result of the influx of foreign capital, improves the efficiency of local investment. This direct contribution to synergy improves productivity and increases economic effectiveness, resulting in a permanent improvement in the host country's growth rates. This refers to the long-term preservation and development of resource production, as well as adaptive techniques and abilities to create and sustain their means of subsistence, and to improve their well-being and that of future generations.

3.2.5 More Empirical Literature on FDI Financing

Business organizations such as multinationals have strategies that aid in the accomplishment of their goals and objectives. Financial management, as a discipline, is always at the center of the formulation of these strategies for multinationals wishing to exploit new markets and ventures abroad. In financial management, therefore, the task is how to formulate these strategies to fit both domestic and international business objectives. It is for this reason that this chapter will attempt to summarize the motive behind international corporate expansion albeit briefly and attempt to establish the connection between international investments and the economic growth of CEMAC countries as hosts. In addition to FDI, the impact of electricity consumption on economic growth will be assessed. Though FDI and electricity consumption remain the two main predictors in this study, the methodology section will establish factors containing predictors grouped to predict economic growth. Furthermore, this chapter explores the theories by detailing the theoretical framework sustaining economic growth, FDI, and electricity consumption, as well as empirical underpinnings.

According to an IMF (1992) report, annual world exports doubled to a total value of $3,500 billion between 1980 and 1991. While world exports increased tremendously over a decade, further results obtained by the Organization for Economic Co-operation and Development report, OECD (1992), elaborate on the statistics by stating that FDI by the twelve leading OECD countries quadrupled over the ten years to 1990, reaching $193.55 billion. This shows that the world is internationalizing and, apart from involving in FDI arrangements, firms can go international either by exporting and importing, licensing, sale of technology, foreign management contracts, selling turnkey projects, or undertaking portfolio investment. This type of international investment should be differentiated from FPI, whereby investments are made and a stake is taken in an international business without operational control, with the aim of acquiring an income flow through dividends, capital gains, or maybe through enhanced business links. Simply put, this study looks at FDI and not FPI where investments are made in stocks and securities. FDI trends have been on the increase over the past few decades with countries like China greatly benefiting from it, also known as the China experiment. Many reasons account for

this rapid rise in FDI, although it varies across countries and regions, often presenting inconsistent results, hence often disputed.

To further understand the role of FDI in sustainable development, Moran (2009) argues that TNC-related UN initiatives, as well as the individuals who supervised, staffed, and advised them, had a significant impact on our current understanding of the connection between FDI and broadly based sustainable development. Foreign investment is mentioned in most studies as the driving force behind development. Upreti (2015) examined factors influencing economic growth in developing countries and found that factors such as high volume of exports, natural resources, longer life expectancy and higher investment rates had a positive impact on economic growth. Many studies indicate that FDI has become one of the most powerful tools for economic growth. However, this impact largely depends on the motives and activities of the foreign company. Therefore, the relationship between FDI and economic growth is said to be influenced by other factors.

Valid results have been obtained not only across countries or sequences of years, but also across sectors in the economy. Alfaro (2003) researched the connection between FDI and economic growth across different sectors and concluded that the impact of FDI on growth varies with respect to the sector. In addition, Alfaro argues that the primary sector has a negative impact on growth, while investment into the manufacturing sector has a positive effect. Although this is quite revealing, understanding how investment in the service sector affects growth is somewhat complex. Another study on the allocation of investments to achieve desired goals clearly holds that FDI's impact on domestic firms and hence economic development might vary across sectors (Hirschman & Sirkin, 1958). It is clear here that all sectors have the ability and capacity to absorb new skills and technology. Without this ability to absorb foreign ways, FDI would play a minimal role in the growth of the economy. For instance, Hirschman and Sirkin (1958) identify the inability of the mining and agriculture sectors to spur economic growth. This could partially be explained by the fact that products from these sectors could easily be smuggled out of the country without being accounted for. Multinationals could use products from the primary sector for further production, which might partially explain the positive effect of this sector on the economy.

Linkages between macroeconomic variables are not new but quite complicated to deal with because sometimes a researcher has to pick pairs of variables to evaluate at a time and in some cases introduce mediating as well as moderating factors. As mentioned earlier in the introduction, some of the mediating factors in the FDI-growth link include trade openness, governance, electricity consumption, household consumption, as well as the size of the market. Still on the determinants of FDI, Nunnenkamp and Spatz (2002) assess FDI inflow and remark on the following determinants: size of the market, human capital, trade openness, and cost factors. Other researchers advocate economic growth, trade openness, and information and communication technology as the main determinants of FDI, especially in developing countries (Addison & Heshmati, 2003). Apart from Nunnenkamp and Spatz's study, Kang and Bell (2011) shed light on this view by stipulating that FDI is generally positively linked to economic growth. Using the case of Cameroon, they found that the impact of FDI and foreign aid exerts a greater impact on economic growth than domestic investment. They approached this from both ends, that is, how FDI affects economic growth and vice versa. As will be seen in Chapter 4, research in this area hardly exists without the application of either econometric modeling or some growth model. Like previous work done in this area, Kang and Bell conducted a regression analysis of FDI (which until now researchers consider a great force behind globalization) against GDP in Cameroon between 1980 and 2009.

Apart from FDI flows and governance, other factors are examined with equal interest. In examining the effects of human capital on economic growth in the CEMAC region, Nkoa (2014) postulates that secondary education, the health system, and knowledge gained on the job affect the productivity of workers. Hence, they found that accumulated human capital has a significantly positive effect on the development of this region. Since the 1800s, growth has been captured by two main elements: accumulated capital and efficiency. According to Ndeffo (2010) estimated the impact of FDI inflows on human capital development in 32 SSA countries over the period 1980-2005 and concluded that FDI has a positive impact on the percentage of children in full-time education in primary and secondary schools. Originally, Mincer (1994) approached this as the accumulation of individual human capital pushes economic growth at an individual or micro level. Meanwhile, human capital is

incorporated with physical capital to produce the production function at a macro level. It seems Mincer did connect economic growth and demographic transition in the sense that irrespective of the location, the diffusion of human capital produces economic growth. Furthermore, human capital stands as a very important factor too. While physical capital measures the tangible assets, human capital is intangible yet as important as physical capital. Human capital is the capital that is represented by the people in the economy. It takes a lot of investment to produce human capital. Here the years of education will be used to measure human capital.

While many developed economies are stable and slow in terms of growth, some developing countries have shown the fastest growth rate over the past few years. According to a World Economic Outlook report by the IMF/WEO (2016), developing countries are among the fastest growing economies in the world. It should be noted that countries that have been poor, with low levels of capital accumulation and low efficiency growth, experience very slow growth rates. However, a slow growth rate does not necessarily indicate low efficiency and capital accumulation. For example, New Zealand and the United States have had a very slow growth rate in the past few years, which can be attributed to the diminishing marginal returns of capital accumulation and efficiency. The peculiar thing about these economies with slow growth rates is that they are among the richest and best-managed economies in the world. Despite this, developing countries have experienced rapid growth especially countries in Southeast Asia and some Latin American countries.

Since the industrial revolution, most of economic growth can be explained by capital accumulation in the form of physical and human capital as well as other factors. Therefore, less of the growth can be solely attributed to capital. Bob Solow initially captured this idea and revealed the role of capital and innovation/technology in economic growth. However, besides capital, growth is also influenced by other factors. In an economy, it is always crucial to know the main source of economic growth. Usually, past research studies have not been able to target this line of discussion partially due to various undisclosed reasons, but possibly because these factors contribute to growth unequally. Instead, researchers have sought to determine the main variable responsible for economic growth. For instance, the growth in GDP per capita in an economy is generally a result of either capital accumulation or

efficiency growth. It is rare to see a country whose growth is entirely attributable to capital accumulation or efficiency growth, despite the assumption that there is a variable responsible for economic growth. Therefore, income per capita and efficiency growth can be considered together as a starting point. Over the years, additional variables have been integrated into the growth model. At this stage, these variables can be referred to as residuals. Therefore, let us begin with the basic idea that growth is greatly influenced by capital, which includes physical and human capital.

A myriad of studies have also linked economic growth to health, especially in developing Africa. This was a “hot topic” during the peak days of the AIDS pandemic in Africa. As such, economic growth was found to be significantly affected by health capital ((Cooray (2013); Dixon, McDonald and Roberts (2001); McDonald and Roberts (2006)), and Van Zon et al. (2005)). All of these studies likened slow growth to the spread of the virus. According to McDonald and Roberts, when building a Solow growth model, health capital must be included. Failure to do so leads to misspecification biases. This argument stems from the fact that human capital is, somewhat, a subtle component that is not limited to knowledge capital.

Recall that economic growth generally comes from two main sources accumulated capital and growth efficiency. Capital accumulation is the combination of physical and human capital. The owners of capital who invest in Cameroon reap all the benefits of their investments, but this direct benefit also impacts the people and the environment. The measurement of these benefits to the people, known as externalities enjoyed by the people, has transformed the economy of Cameroon to what it is today. With a large share of capital accumulation, economic growth can be said to be explained, to some extent, by capital.

All the studies discussed prove that the positive role of FDI spillover in economic growth has been somewhat uncertain. This ambiguity in the FDI-economic growth has been revealed by many researchers’ interpretations and attempts to establish a causal relationship between FDI and economic growth, but in which no consensus has been reached. According to Lim (2001), despite the positive spillover of FDI, there was no evidence linking FDI to economic growth. In his research, he found that the size of the market, quality of infrastructure, political and economic

stability, as well as free trade zones, are factors that favor FDI, while there are inconclusive results regarding fiscal incentives, the investment environment, openness, and labor costs. Additionally, Chakrabarti (2001) argues that the literature on determinants of FDI is extensive but inconsistent, although he found a correlation between FDI and market size. He also found that the relationship between FDI and other factors such as wages, taxes, openness, exchange rates, tariffs, growth and trade balance was controversial.

3.3 Empirical Studies on Economic Growth

It is the goal of every government or policy maker to achieve great levels of growth. Like FDI or governance, the determinants of economic growth are somewhat feasible but hardly attainable for most developing African countries. Growth has been marred by poor performing macroeconomic indicators to political crises including wars, coups and instability. Economic growth is thus affected by several factors some of which are macroeconomic factors like Fischer (1993) risk factors and productivity of firms (Liew & Vassalou, 2000), inequality of the distribution of income (Kuznets, 2019) or output and production structure (Kuznets, 1971), leadership (Brady & Spence, 2010), as well as accumulation of human and physical capital, and living standards (Barro, Mankiw, & Sala-i-Martin, 1992). Barro et al. assessed the assertion that the rate of growth in poor countries is faster than rich countries using an augmented Solow model and concluded that it is linked to living standards.

Economic growth is generally the sustained increase in a country's production of goods and services over time. It is not uncommon to hear that a country's prosperity and development are fundamentally seen as indicators of wealth and progress. Thus, economic growth reflects improvements in living standards, employment opportunities, and overall well-being. It is affected by factors such as technological advancements, efficient resource allocation, investment in human capital, and supportive government policies that play crucial roles in fostering it. If sustainable, economic growth can bring long-lasting benefits to the economy of a country. In other words, sustainable economic growth is essential for addressing

various societal challenges, reducing poverty, and achieving long-term stability and prosperity for both current and future generations.

Other discussions on economic growth can be found in North (1989) who posits that population and savings are the main determinants of economic growth and Soubbotina (2004) who argues that the concept of sustainable development is a step ahead of economic growth. Roe (2003) presents his work as a "watershed" in that it maybe the first to show empirical support for conditional convergence of real per capita income across a wide number of nations. More importantly, his findings support recent advances in growth theory, which define economic growth as the rise in the inflation-adjusted market value of an economy's goods and services over time. Statisticians commonly use the percent rate of increase in real GDP to calculate such growth.

Based on Bjork (1999), U.S. growth and intensive growth are described by economists as an increase in economic growth induced by more efficient use of inputs. Inputs here refer to increased labor productivity, physical capital productivity, energy productivity, or material productivity. Often referred to as GDP growth, Bjork argues that it is triggered solely by changes in the number of inputs available for use (for example, increased population or new territory) and is referred to as extensive growth. Moreover, the impact of inflation on growth cannot be underestimated, as Bjork advocates that in minimizing the distorting effect of inflation on the prices of goods produced, growth is normally measured in real terms–that is, inflation-adjusted terms. National income accounting is normally used to calculate economic growth. Hence, inflation stands as the main worry when assessing the growth of a country. However, before delving into other determinants of economic growth, a simple definition as found in the study by Bjork (1999) which says economic growth is the annual percent change in gross domestic product (GDP), and it includes all the benefits and drawbacks associated with that metric. Countries' economic growth rates are often compared using the GDP to population ratio (per-capita income).

Finally, growth represents the total market value of all final goods and services produced within a country in a given period. Hence, GDP growth simply refers to the percentage change in real GDP, which corrects the nominal GDP figure for inflation. With respect to purchasing power parity, GDP per capita also written as

GDP per capita is defined by the World Bank as gross domestic product translated to foreign dollars using purchasing power parity rates. The purchasing power of a foreign dollar is equal to that of the US dollar in terms of GDP. It is worth noting that GDP at purchasing prices is the amount of gross value added by all resident producers in the economy, plus any product taxes, minus any subsidies not included in the product value. It is measured without considering the depreciation of manufactured assets or natural resource depletion and degradation.

3.3.1 Measuring Economic Growth

It is not uncommon to see piles of research work using real gross domestic product or real GDP or GDP after adjusting for inflation or more commonly GDP per capita (PPP). GDP and economic growth are, therefore, used interchangeably to mean the economic performance of a country. Countries have been ranked solely based on the performance of GDP per capita PPP. With 181 countries world Purchasing Power Parity GDP per capita for the last 3 decades (1990–2019) averaging 21,915.19 in 2019. Macao had the highest value of $123,965.29, and Burundi had the lowest of $751.66. In Europe, the average for 2019 was $40,245.33, based on 42 countries. Luxembourg had the highest value at $114,323.41, while Ukraine had the lowest value at $12,810.29. In SSA, PPP GDP per capita estimate for 2019 was $5,380.77, based on 45 countries (WorldBank, 2019b).

The highest amount was $29,223.46 in the Seychelles, and the lowest was $751.66 in Burundi. With respect to The WorldBank (2019b) regional and continental GDP per capita (PPP) data from Asia to Latin America, SSA is experiencing the slowest growth. This and many research articles show how powerful and widely used this indicator has been as a proxy for growth or economic prowess. Using GDP per capita (PPP) as the measurement of economic prowess, Stiglitz, Sen and Fitoussi (2009) narrate that politicians are tasked with directing society's collective activities, whether by legislation, taxation, or spending. All of this aims to raise GDP growth. However, they are advised to pay attention to various aspects of quality of life, including social justice and community infrastructure, as well as noise, air, and water pollution. At times, the two can appear to be incompatible; pursuing social goals can seem incompatible with pursuing economic goals. However, this should not always be

the case. They hold that economic activities are a means to an end–higher living standards–rather than an end in themselves. If our measures indicate that taking steps to improve living conditions, generally described, has a negative impact on the economy, the issue could be with our economic measurements.

Stiglitz, Sen and Fitoussi (2009) further remark that the apparent inconsistency between social goals and economic prowess is as old as the post-WWII National Accounts scheme. As economies are becoming more dynamic, measurement of non-market phenomena in particular, the increased provision of public goods and services by the government, has become more necessary for a fair accounting of economic activity. However, just because the public discourse and a few comments in this review favor welfare calculation as a primary goal does not mean we recommend abandoning macroeconomic accounting. We believe that the role of accounts in macroeconomic management is, has been, and will continue to be critical. Indeed, the first section of this Report, in which we explore how we can improve the calculation of economic performance, is titled “Classical GDP issues”.

In line with these remarks, Stiglitz, Sen and Fitoussi (2009) present a series of analogies to support the aforementioned discussion. They argue that it is become a cliché to say that tracking and evaluating results are critical, whether it is for companies, countries, or individuals. This is particularly true as our cultures have become increasingly performance driven. Whether it is from our bosses, employees, or lawmakers, we all desire success. Individual incentives are usually focused on efficiency, and incentive programs must be metric-based. What we calculate influences what we do, and what we calculate is influenced by what we are looking for individually or collectively. There is a complex relationship between goals, measures, and behavior. In other words, the relationship between these concepts is intricate. Percentage variations in GDP at stable prices from year to year. The base year varies by region. Total final spending at purchasers’ cost, plus the f.o.b. value of exports of products and services, minus the f.o.b. value of imports of goods and services, is referred to as expenditure-based GDP. The collection provides real and forecast values for the current and next few years, as well as true historical values for previous years.

3.4 Definitions of Governance Dimensions and Institutional Factors

Governance refers to all government, market, or network processes, whether by a family, tribal or informal organization or territory, and whether they are carried out by legislation, standards, authority, or language. Governance is less focused on the state and its institutions and more on social behaviors and activities (Bevir, 2012). The system of institutions and cultural norms through which authority is applied for the good of everyone at all levels, from local to global, is the essence of governance. There are three dimensions to governance in general: The political dimension entails the selection, monitoring, and replacement of persons in positions of authority. The economic dimension is the process of properly managing public resources and implementing appropriate policies. With special emphasis on institutional factors, Bailey (2018) documents political stability, democracy, rule of law, corruption, tax rates, and cultural distance as measures of institutional factors. As institutional quality factors in a country, Kurul and Yalta (2017) mention control of corruption, government effectiveness, political stability and absence of violence, regulatory quality, rule of law, and voice and accountability. Kurul and Yalta reckon that these institutions are the major source of empirical research and note that these are Kaufmann, Kraay and Mastruzzi (2011)'s six dimensions of governance known as governance indicators.

According to Kaufmann, Kraay and Mastruzzi (2011), the traditions and structures through which a country's authority is exercised are referred to as governance. This encompasses the process of selecting, monitoring, and replacing governments; the government's ability to devise and implement sensible policies; and the people and the state's respect for the institutions that control economic and social relations between them. Nonetheless, in order to promote accountability, transparency, responsiveness, the rule of law, stability, equity and inclusivity, as well as empowerment and wide-ranging involvement, governance has been defined. Governance also symbolizes the standards, principles and rules of the game through which public matters are conducted in an inclusive, transparent and responsive manner. It can thus be subtle and not immediately observed. Governance in a broad sense concerns the cultural and institutional framework in which people and

stakeholders engage and participate in public affairs. It is more than just the officials and branches of government. The six governance dimensions based on Kaufmann et al. are defined hereunder.

3.4.1 Control of Corruption

Perceptions of the extent to which public power is used for private gain, including both petty and grand forms of corruption, as well as the capture of the state by elites and private interests, are encompassed by the term "control of corruption."

3.4.2 Government Effectiveness

This term refers to people's impressions of the quality of government services, the quality and independence of the civil service from political constraints, the quality of policy formation and implementation, and the government's credibility in adhering to its policies.

3.4.3 Regulatory Quality

Regulatory quality pertains to public perceptions of the government's ability to establish and enforce sound rules and regulations that facilitate and support private sector development.

3.4.4 Rule of Law

The term rule of law refers to people's perceptions of the extent to which they trust and comply with the laws of society, including the quality of contract enforcement, property rights, the police, and the courts, as well as the presence of crime and violence.

3.4.5 Absence of Violence/Terrorism

Political stability and the absence of violence/terrorism assess public perceptions of political instability and/or politically motivated violence.

3.4.6 Voice and Accountability

Voice and accountability refer to citizens' perceptions of their ability to participate in the election of their government, as well as freedom of expression, association, and the press.

3.5 The Growth-FDI or FDI-Growth Nexus and other Determinants

Over the years, FDI has been researched as the main driver behind growth. As such, FDI has become a critical component of economic development or growth in less developed countries. Based on Umer Chhapra, Sheikh and Gudaro (2012)'s assessment, FDI allows for the transfer of technologies, increases competition in the domestic input market, and leads to the growth of human resources. Profits generated by FDI also add to the host country's corporate tax revenues. Tsatsaridis (2017) provides a theoretical and methodological investigation into how foreign direct investment influences the development of gross domestic product in SSA countries. In the search for a difference in the effect of FDI between two groups of countries based on their educational attainment Tsatsaridis still holds that there is a lack of clarification in this field of research. The study's approach was focused on OLS regressions with country fixed effects and series cointegration checks. The empirical findings support a statistically significant effect of FDI inflows on GDP growth, as well as a negative relationship between education and FDI inflows.

FDI inflow is thought to have a favorable influence on the development of most African countries. This might not be the case for every African country. Divergent empirical data has encouraged various scholars to seek reasons for these apparent discrepancies in observed results. Some preliminary findings support this viewpoint. For example, according to the primary regression finding of Borensztein, De Gregorio and Lee (1998), FDI has a positive overall effect on economic development. However, the degree of this benefit is dependent on the stock of human capital available in the host country. Nevertheless, because of the way FDI interacts with human capital, the direct effect of FDI is negative for countries with very low levels of human capital.

Although most of this has been covered in earlier sections, this subsection presents a summary of a few empirical studies, particularly in developing Africa and CEMAC countries. Jaspersen, Aylward and Knox (2000) argue that developing countries have low per capita income and, consequently, low savings, which translates to restricted domestic investment. This explains the investment shortfall, as savings are inadequate to fulfill demand. For emerging nations, high skills and technology are equally lacking elements of production, limiting investment capacity and, as a result, the ability to achieve the requisite degree of economic growth. A foreign exchange gap is created by an unfavorable balance of payment position caused by an excess number of imports relative to exports. Because of the skills and savings gap, as well as the foreign exchange gap, inflows of external resources are required to supplement the constraints of inputs of production.

As earlier stated, foreign capital flows are increasingly recognized as a source of economic development, modernization, income growth, and employment in African nations in transition. To encourage investment, countries have liberalized their international capital flow regimes and adopted various initiatives. They have looked at how to effectively pursue domestic policy in order to maximize the benefits of foreign investment in the home economy. This is accomplished by concentrating on the overall impact of capital flows on macroeconomic growth and other welfare-enhancing processes, as well as the channels through which these benefits are realized by developing the economy and contributing to higher economic growth, which is the most effective tool for alleviating poverty in developing countries.

The rate of return on investment, the degree of domestic investment, the openness to trade, the availability of money, and other favorable socio-economic circumstances are all factors that influence FDI net inflow. Return on investment influences where money flows, which is why Africa, like other emerging countries throughout the world, is predicted to have significant capital flows. FDI is also predicted to reduce the gap between insufficient inputs of production and raise overall output, resulting in a progressive increase in per capita income. This progressively enhances limiting factors, which in turn raises domestic investment, necessary for improved national production and economic development. In a globalized world economy, a cross-country analysis of the impact of net inflow FDI on economic

development might possibly show a wide range of natural variance in experiences. However, the impact that FDI net inflow is predicted to have on the growth of domestic investment as a primary tool for economic growth is a significant factor to examine. Additionally, the stability of other social and economic indicators, particularly during moments of financial crises, is critical for the African area to achieve the anticipated expectations of foreign capital flow, as it does in other emerging areas of the globe.

The other seven control variables in this dissertation are hardly discussed in research articles. One of these key determinants between FDI-growth nexus is economic freedom. Levina (2011) concludes that FDI and economic freedom positively influence economic growth. In line with Levina, Dkhili and Dhiab (2018) argue that greater levels of economic freedom support higher rates of economic growth. Tag and Degirmen (2022) found that there is a substantial and positive correlation between FDI and the general degree of economic freedom. Furthermore, they show that a subset of the institutions of economic freedom—the rule of law, unrestricted international trade, and reasonable and effective market regulations—are responsible for this effect. Other important factors of FDI include trade openness, natural resources, first lag of FDI, ROI, urban population, and corruption (Ambaye, 2016). Tsai (1994) argues that in addition to economic growth and labor cost, market size and trade balance are key determinants of FDI inflow.

3.6 Conceptual Framework and Path Diagram

This section presents a textual or visual depiction of the dynamic interaction of FDI, growth, and governance. Throughout this chapter, a review of the literature on current research and ideas on these variables has helped shape the construct of a suitable conceptual framework. Generally, Rowley and Slack (2004) stress the need for a conceptual framework and argue that it can aid in the development of a thorough grasp of a subject. According to Miles and Huberman (1994), a conceptual framework includes how the most important items, constructs, or variables relate to each other. Many recent studies have focused on either the effects of FDI or FDI financing and governance on economic growth and/or the role of economic growth and governance

in attracting FDI inflows. Whichever direction of impact has been considered by previous studies, few if any have assessed or provided a comprehensive and combined effect of governance on the growth and FDI relationship, as well as the role of currency devaluation, GFC, as well as the moderating role of income class, HIPC status, and LDC stage.

Several criteria may be used to provide a conceptual framework for the dynamic interaction between FDI inflows, economic growth and the quality of governance. Accountability, transparency, the rule of law, corruption control, regulatory quality, government efficacy, equality, and inclusivity all play important roles in supporting economic growth (Al-Naser, 2019), as well as attracting FDI. The influence of FDI inflows on economic growth differs by country. Increased FDI inflows have been observed to have a positive influence on Ghanaian economic growth but a negative impact on Nigerian economic growth, while negative FDI inflows have the reverse effect (Amaefule, 2020). Furthermore, Zhuo et al. (2021) indicate that governance indices such as the rule of law, corruption control, and voice and accountability have a direct influence on economic growth in developed nations, while government effectiveness, political stability, and regulatory quality have an indirect impact. Finally, Raza, Shah and Arif (2021) advise researchers to consider examining the lag effects of FDI inflows on economic growth or growth on FDI flows, since previous inflows can have a major impact on present growth levels.

The design here will be based on the linkages between governance, FDI inflow, and economic growth (core variables) and seven other control variables. Governance is considered both a core and mediating variable. Moderating effects are seen at the country differential level and the effects of the 1994 CFA currency devaluation and the 2008 global financial crisis. Recall that country differentials are based on income levels, HIPC status, and LDC stage. Figure 3.1 presents a conceptual framework analyzing the complex and developing relationships between FDI inflows, economic growth, and governance dynamics, showing how these three variables plus seven other control variables and moderating variables (INC, HIPC, LDC, the 1994 FCFA devaluation, the 2008 GFC, and coups and instability) affect one another through time and contribute to larger growth outcomes. Meanwhile, Figure 3.2 shows the conceptual path diagram of a trilateral causality model for panel VAR(1).

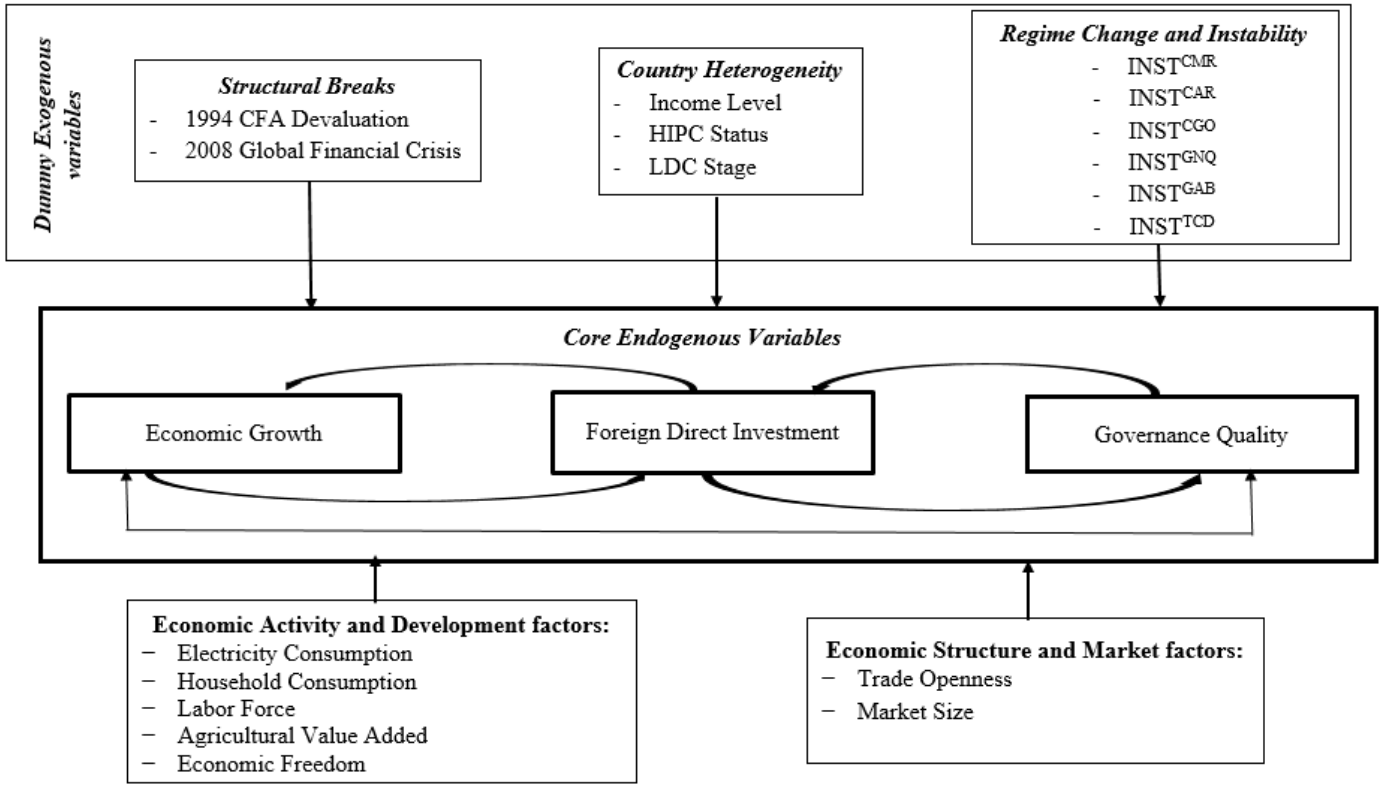

Figure 3.1 Conceptual Framework

Notes: $INST^{i}$ represent coups and periods of instability in CEMAC countries. The three core variables are FDI inflows, economic growth, and governance. The feedback loops represent the interaction between the core variables and the entire model evaluated by a dynamic panel VAR.

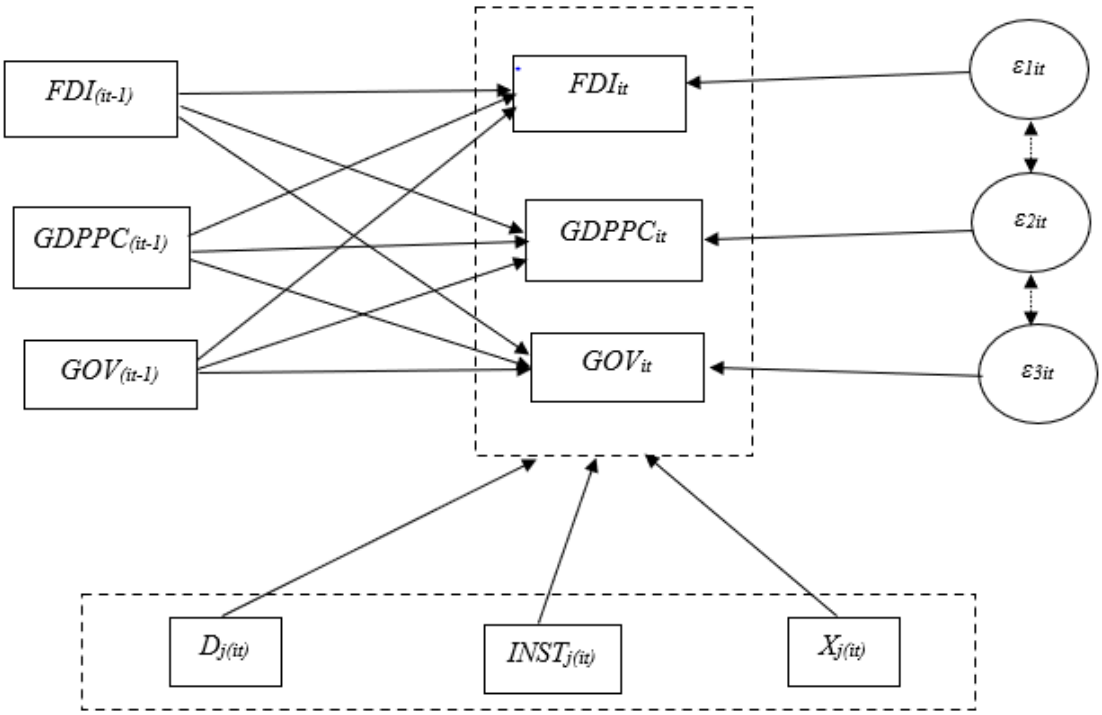

Figure 3.2 Conceptual Path Diagram of a Trilateral Causality Model

Notes: Each of the error terms does not have serial correlations; $X_{j(it)}$, $D_{j(it)}$, and $INST_{j(it)}$ stand for exogenous terms for weak endogenous, dummy for 1994 currency devaluation, 2008 GFC, income levels, HIPC, and LDC, and coups and instability dummy variables, respectively.

Assumptions of the path diagram corresponding to Equation (4.4) are:

1) unidirectional causality from GDPPC to FDI, unidirectional causality from GOV to GDPPC, unidirectional causality from GOV to FDI;

2) unidirectional causality from FDI to GDPPC, unidirectional causality from GDPPC to GOV, unidirectional causality from FDI to GOV;

3) feedback or bilateral causality; and

4) Independence or no causality. For details, see (Gujarati, 2003).

3.7 Overview of Theoretical Hypotheses

3.7.1 Institutional Hypothesis

According to North (1989), the “institutions hypothesis” suggests that if strong organizations within a community are not properly constrained, they would influence their nation's economic institutions in their own interests, potentially harming economic progress. The main focus is on institutions that describe and enforce contracts and property rights in order to reduce transaction costs. Powerful groups hinder the enforcement of property rights and, as a result, investment in innovative technologies, in order to protect their economic rents. Societies can only achieve technological advancements by overcoming these organizations. Poor institutions can benefit certain groups through rent, nut institutions can also provide a comparative advantage in trade, as shown by research on the relationship between economic institutions and international commerce.

Therefore, the impact of institutional comparative advantage on welfare is sometimes unclear. Some literature examines the interaction between international commerce and political institutions, including the effects of democratic institutions’ restrictions on the executive branch of government. Countries where the administration cannot monopolize the benefits of trade (Jarupasin, 2018, 2019) are shown to have greater trade and growth.

3.7.2 Convergence Hypothesis

The concept of convergence, also known as the catch-up effect, is the hypothesis that per capita incomes in poorer economies will grow faster than those in richer economies. In the Solow growth model, economic growth is driven by the accumulation of physical capital until the “steady state” which is the optimum level of capital per worker, is reached. When the amount of physical capital per capita is low, the model predicts faster growth, often referred to as “catch-up” growth. As a result, all economies should eventually converge in terms of per capita income. Developing countries, where diminishing returns are not as significant as in capita-rich countries, have the ability to expand at a quicker rate. Additionally, poorer countries can adopt developed-country manufacturing processes, technology, and institutions.

The term convergence has two meanings in economic growth and development literature. The first, known as sigma-convergence, refers to a reduction in the dispersion of income levels among economies. On the other hand, “beta-convergence” occurs when impoverished countries grow faster than affluent economies. Economists define conditional beta-convergence as beta-convergence that occurs when economies experience “beta-convergence” only if other factors such as the investment rate and population growth rate, remain constant. They argue that “unconditional beta-convergence” or “absolute beta-convergence” happens when an economy's growth rate slows as it approaches its steady state. According to Korotayev, Goldstone and Zinkina (2015), the great divergence peaked before WWI and continued until the early 1970s. After two decades of fluctuations, in the late 1980s, it was replaced by the Great Convergence as most least developing countries achieved significantly higher economic growth rates than most advanced countries. Galor (1996) further categorizes convergence into three categories: absolute convergence, conditional convergence and club convergence. In the case of absolute convergence, a lower initial GDP leads to higher average growth rate.

The assumption is that poverty will eventually disappear on its own. However, this does not explain why certain countries, such as those in SSA, have had zero growth for decades. Conditional convergence occurs when a country’s income per worker converges to a country-specific long-run level determined by the country’s structural features. This suggests that structural features, rather than initial national wealth, determine long-run GDP per worker levels. Therefore, foreign aid should focus on improving structure, infrastructure, education, and the financial system, rather than simply transferring revenue from wealthy to poorer countries. Lastly, for club convergence, Durlauf and Johnson (1995) propose that different “clubs” or groups of countries with similar growth trajectories can be observed. Interestingly, some low-income countries also have poor growth rates. This implies that foreign aid should include income transfers and that initial income does play a role in economic growth.

3.7.3 Unified Growth Hypothesis

In response to the view on absolute convergence in Galor (1996), Galor (2011) argues that the world's economies were divided into three distinct growth regimes due to considerable cross-country variances in the timing of transitions from stagnation to sustained economic development. This sentiment is shared by Galor (2005), and to begin with, in the Malthusian regime, one group of economies has an extremely slow growth rate. A second group of economies is developing gradually in the sustained-growth regime, while a third group of economies is transitioning from the Malthusian to the contemporary growth regime. Furthermore, unified growth theory argues that observed convergence clubs may be a transient phenomenon, with convergence across all economies taking place in the long run as economies in the Malthusian regime take off. According to Galor (2011), the evolution of unified growth theory was motivated by the idea that knowledge of the current growth process would be restricted and skewed unless growth theory was founded on micro-foundations that reflected the qualitative characteristics of the growth process as a whole. The obstacles faced by LDCs in achieving sustained economic growth, in particular, would remain obscured unless the origins of the transition of currently developed economies into sustained economic growth were identified, and its implications were modified to account for the additional economic forces faced by less developed economies in an interdependent world.

In sum, Galor (2011) develops a coherent theory of economic growth from the start of civilization to the present. He goes on to describe the current global inequalities in living conditions and population. His study also gives a thorough review of the three stages of the development process. He investigates ideas of demographic transition and their empirical importance, as well as the relationship between economic growth and human evolution, while examining the Malthusian hypothesis and its empirical validity.

Table 3.1 Summary of Some Relevant Empirical Literature

Context	**Author(s)**	**Research Finding(s)**
Impact of FDI on economic growth	Pegkas (2015)	Stock of FDI is a significant factor that positively affects economic growth
	Popescu (2014)	Significance of FDI for the economic growth; the influence of FDI on productivity growth
	Wang (2009)	FDI in manufacturing sector has a significant and positive effect on economic growth
	de Mello Jr (1997)	impact of FDI on output growth in the recipient economy depends on the scope for efficiency spillovers to domestic firms
	Borensztein, De Gregorio and Lee (1998)	FDI contributes to economic growth only when a sufficient absorptive capability of the advanced technologies
	Almfraji and Almsafir (2014)	FDI-EG relation is significantly positive with mediating factors such as human capital and open trade regimes
	Emmanuel (2014)	FDI affects economic growth
	Sindze, Nantharath and Kang (2021)	FDI net inflows may have contributed to the improvement of the GDP per capita
	Ibara (2020)	FDI-economic growth relationship is improved by human capital
	Koc and Adassoukhi (2018)	Positive relationship between FDI and Growth

Context	Author(s)	Research Finding(s)
	Blomström and Kokko (1998)	FDI positively affects economic growth through new capital goods, intermediate goods and technologies, human capital formation, management skills and marketing
	Crepin (2016)	FDI is found positive and significant on economic growth
	Ajayi (2006)	FDI positively affect growth
	Kamara (2013); Kamara (2014)	Impact FDI flows on welfare depends on the level of welfare already attained
	Aleksynska, Gaisford and Kerr (2003)	FDI stimulates economic growth beyond the current year.
	Yucel (2014)	FDI has a positive effect on economic growth
	Tsai (1994)	FDI is the means by which LDCs can achieve reasonable levels of economic growth
	Lenka and Sharma (2014)	Economic growth is the main determinant of FDI inflow
Economic growth as a determinant of the stock of FDI inflow	Mottaleb and Kalirajan (2010); Mottaleb (2007)	larger GDP and high GDP growth rate and business friendly environment with abundant modern infrastructural facilities attract FDI inflow
	Gichamo (2012)	GDP and lag of FDI are some of the most important determinants of FDI inflow
Governance and	Habib and Zurawicki	Corruption is a serious hindrance to

Context	Author(s)	Research Finding(s)
FDI	(2002)	FDI inflow
	Biro et al. (2019)	Governance affects FDI inflow
	Mohammed (2022)	Minimizing the level of corruption in order to attract foreign investments
	Mengistu and Adhikary (2011)	Political stability and absence of violence, government effectiveness, rule of law, and control of corruption are the key determinants of FDI inflows
Governance and growth	Fayissa and Nsiah (2013)	Governance makes a difference in the development of African countries; the role of governance in economic growth depends on the level of income.
	Mengistu and Adhikary (2011); Mengistu (2012); Mengistu and Adams (2007)	Institutional infrastructure is positively and significantly correlated with economic growth
	Azam (2022)	Increasing corruption discourages growth, while political stability and government effectiveness encourage the process of economic growth
	Azam, Fosu and Ndung'u (2002)	Bad policies, lack of social capital and deficient political institutions slow growth in Africa
FDI, governance, and economic growth	Adeleke (2014)	Governance was interacted with FDI, it brought about positive and increased growth
	Adams and Opoku	Interaction of governance and FDI

Context	Author(s)	Research Finding(s)
	(2015)	has a significant positive effect on economic growth
	Mengistu and Adams (2007)	FDI is positively and significantly correlated with economic growth; institutional infrastructure aids growth
	Raza, Shah and Arif (2021)	Good institutional quality the influences economic growth and the FDI inflow
	Bouchoucha and Yahyaoui (2019)	Good governance is needed to attract more FDI and improve economic growth
	Shittu et al. (2020)	Political governance enhances the positive impact of FDI on economic growth
	Kottaridi (2005)	Governance is key to enlarging human capita and attracting and maintaining FDI
FDI, growth, and other determinants	Levina (2011)	FDI and economic freedom positively influence economic growth
	Tag and Degirmen (2022)	Substantial and positive correlation between FDI and the general degree of economic freedom.
	Dkhili and Dhiab (2018)	Greater levels of economic freedom support higher rates of economic growth
	Ambaye (2016)	Trade openness, natural resources, first lag of FDI, ROI, Urban Population, and corruption are the

Context	Author(s)	Research Finding(s)
	Tsai (1994)	most important determinants of FDI In addition to economic growth and labor cost, market size and trade balance are key determinants of FDI inflow.

CHAPTER 4

METHODOLOGY

A dynamic approach to analyzing the linkages between governance, economic growth, and FDI considers the changing character of these components over time, as well as their interdependencies. This viewpoint acknowledges that governance frameworks, economic conditions, and FDI flows are not static or contemporaneous; their interactions vary with changing circumstances. Dynamic relationships between variables are new and more robust ways of approaching complex data. Throughout this chapter, econometric models are introduced to set the pace for the results and discussions in Chapter 5. Different econometric models have been used to analyze the dynamic interrelationships among multiple variables observed across different countries over time. One such model is traditional VAR (vector autoregressive) models that handle time series data for a single country. With the possibility of other models such as autoregressive distributed lag (ARDL) models and general dynamic models, this dissertation applies panel VAR models to suit data for six CEMAC countries over a span of 30 years each.

Note that in a panel VAR model, each variable is regressed on its own lagged values as well as lagged values of other variables in the system–a form of simultaneous models with lags. This allows for the examination of how shocks to variables affect the system. In addition, panel VAR (PVAR) models can capture both short-term and long-term dynamics, providing insights into the complex interactions among variables in a panel dataset. Other merits of using PVAR models are the ability to control for country-specific effects, capture heterogeneity across countries, and handle dynamics and feedback mechanisms within and across the six CEMAC countries. PVAR models are widely used in various fields to analyze the dynamic behavior of economic and financial variables for panel data (Atems & Jones, 2015;

Bayraktar-Sağlam & Sayek Böke, 2017; Canova & Ciccarelli, 2013; Comunale, 2022; Grossmann, Love, & Orlov, 2014; Jawadi, Mallick, & Sousa, 2016; Koutsomanoli-Filippaki & Mamatzakis, 2009; Magazzino, 2014, 2017; Ouyang & Li, 2018; Trung, 2019). Comunale (2022) used PVAR to assess how current account misalignments react most strongly to real effective exchange rate misalignments. In discussing PVAR models, Canova and Ciccarelli (2013) explain how shock identification is performed and how structural time variation can be dealt with.

4.1 Data, Definition of Variables and Hypotheses

This research is based on data for the six CEMAC economies that have data available for the years 1990 to 2019. The data comes from the World Bank database, which allows data collection to combine cross-sectional and time series data to look for any endogenous interactions between institutional factors, growth, and FDI.

4.1.1 Data Sources

In applied research, Abrigo and Love (2016) argue that PVAR models are becoming more popular. Despite the fact that most statistical packages have algorithms specifically tailored to fit time-series VAR models as standard features, PVAR model estimation and inference are frequently done with general-purpose methods that require considerable programming skill. Abrigo and Love briefly cover model selection, estimation, and inference of homogeneous PVAR models in an extended method of moments framework in their paper, and they provide a collection of tools to run them. The three main variables in this analysis are: FDI, growth, and aggregate governance.

This dissertation provides data for specific variables on FDI (foreign direct investment financing or inflows, billion dollars), GDP (economic growth, as measured by GDP per capita, PPP, constant 2011 dollars), GOV (governance elements, as measured by the six dimensions of governance index from -2.5 to 2.5), HCON (household consumption measured in billion dollars), and LAB (labor, as measured by labor force participation in percent). These data are available annually (for the period of 1990–2019) across six countries or 180 observations.

With special emphasis on institutional factors, Bailey (2018) documents political stability, democracy, rule of law, corruption, tax rates, and cultural distance as measures of institutional factors. As institutional quality factors in a country, Kurul and Yalta (2017) found that control of corruption, government effectiveness, political stability and absence of violence, regulatory quality, rule of law, and voice and accountability. Kurul and Yalta consider these institutions as the major source of empirical research, and based on Kaufmann, Kraay and Mastruzzi (2011), six dimensions of aggregate governance. Table 4.1 shows the composition and other characteristics of the CEMAC zone and the effects of FDI financing on growth with respect to income level differentials, LDC status, and HIPC stage. The sample composition is mostly influenced by the availability of sufficiently long series, among other things, to ensure that the panel dataset is well-balanced with a cross-section of countries (N) and a sufficient number of years (T) to allow for significant econometric analysis.

Table 4.2 lists the data characteristics and sources for the variables, along with their proxies (or measurements), gathered from publicly available databases such as the World Bank, U.S. Energy Information Administration, Heritage Foundation, Swiss Institute of Technology, and OECD. Estimates of FDI financing and GDP per capita (PPP) are mainly based on the World Bank Group, with data from the other mentioned sources used to supplement or replace unavailable or shorter series. Similarly, the other databases have been used to double-check or supplement data from the World Bank Database for all variables.

Table 4.1 List of Variables and their Measurements

Abbreviation	Variable	Measurement
FDI	Foreign direct investment	inflow, in billion US dollars
GDPPC	Economic growth	GDP per capita (constant 2010 USD)
GOV	Governance	aggregate governance (index, aggregation (Kaufmann et al. (2011)
ECON	Electricity consumption	electric power consumption (real value, kWh)
HCON	Household consumption	billion USD
LAB	Labor force	million people
AGRICVA	Agricultural value added	natural resources (value added in agriculture, industry and services)
EFREE	Economic freedom	overall economic freedom index, 0-100
TOP	Trade openness	trade percent of GDP
MSIZE	Market size	real value, GDP/cap 2010 USD
CDEV	1994 CFA devaluation	1 for CDEV and 0 otherwise
GFC	2008 Global financial crisis	1 for GFC and 0 otherwise
$INST^i$	Coups and instability	1 for coups and instability and 0 otherwise
INC	Income level	1 for UMINC and 0 otherwise (LMINC and LINC)
HIPC	Heavily indebted poor countries	1 for HIPC and 0 otherwise (non-HIPC)
LDC	Least developed countries	1 for LDC and 0 otherwise (non-LDC)

Table 4.2 Sample and Characteristics

Sample	**Countries included (ISO 3166; Alpha-3)**	**Data Period**
1. CEMAC sample	Cameroon (CMR), the Central African Republic (CAF), Chad (TCD), the Congo (COG), Equatorial Guinea (GNQ), Gabon (Nguyen & Lee).	1990 – 2019
2. HIPC[a] sample	HIPC (CMR, CAF, COG, TCD); non-HIPC (GNQ, GAB)	1990 – 2019
3. LDC[b] sample	LDC (CAF, TCD); non-LDC (CMR, COG, GNQ, GAB)	1990 – 2019
4. INC[c] sample	Low Income (CAF, TCD); Lower-middle Income (CMR, COG); Upper-middle Income (GNQ, GAB)	1990 – 2019

Notes: [a]IMF (Debt relief under the HIPC initiative); [b]UN (Office of the High Representative for the Least Developed Countries, Landlocked Developing Countries and Small Island Developing States); [c]World Bank (The world by income).

4.1.2 Definition of Variables

This thesis considers 10 variables, including FDI, governance, and economic growth, plus seven other macroeconomic variables directly affecting FDI financing. Each variable's measurement and role will be defined and classified hereunder. The operational definitions and their proxies (for the analysis in Chapter 5) are stated. Note that these definitions are specific, terse, and clear enough, with the exception of empirical backups (for more details on these variables, see Chapter 3 on literature review).

Tersely, FDI inflow refers to flows in the reporting economy of direct investment equity. In other words, it is the amount of equity, income, and other capital reinvestment. Here, direct investment is an investment type linked with a resident in one economy having control or a substantial impact on the management of a company that resides in another. The 10% or more ownership of the ordinary voting shares is the basis on which a direct investment relationship exists to be established. Simply put, FDI is defined as the long-term investment in a business residing in a country other than the foreign direct investor (FDI company, affiliate, or foreign affiliate) representing a permanent stake and control by a resident enterprise inside one country.

Economic growth (GDPPC) is measured as GDP per person based on the purchasing power parity (PPP), which translates the gross domestic product into international currencies. It is defined as the total of the additional gross value for purchaser prices, plus all product taxes and any subventions otherwise not included in the value of goods by all resident producers in the economy. It is computed without deducting manufactured asset depreciation or depletion and deterioration of natural resources. International dollars remain unchanged in 2011. Although this definition is still traced from the World Bank, a more formal definition provided in collaboration with the OECD clarified the computation. According to the World Bank and OECD, GDP is a gross domestic product per capita divided by the population in the middle of the year. GDP is the total of the additional gross value for purchaser prices, plus all Product Taxes and any subventions otherwise not included in the value of goods by all resident producers in the economy. It is computed without deducting manufactured

asset depreciation or depletion and deterioration of natural resources. The data in local currency remains constant.

In addition, GDP, whether as a measure of progress, growth, or development, has been a topic of debate and controversy among politicians and economists alike. Dynan and Sheiner (2018) highlight that while this new focus is welcome, economists and others who participate in the discussion do not always start from the same place. A lack of knowledge of how statistics are defined and limited, both in terms of the concept and how they are computed given the concept, stymies discussions. We look at the fundamental economics of GDP measurement, with a special focus on whether GDP should be considered a measure of overall economic well-being. While GDP, as currently defined, is not a comprehensive measure of welfare or even economic well-being, our research implies that the GDP concept—along with the parts of GDP available through national accounts—is important in and of itself and should provide a wealth of data on welfare.

While GDP, as currently defined, is not a comprehensive measure of welfare or even economic well-being, Dynan and Sheiner (2018) argue that the GDP concept—along with the parts of GDP available through national accounts—is important in and of itself and should provide a wealth of data on welfare. There is one notable exception to our finding that changes in real GDP do a reasonable job of capturing changes in economic well-being. We suggest that the exclusion of non-market activities that affect economic well-being deserves more study, especially given the potential for changes in the prominence of such activities over time to alter the degree to which GDP changes reflect changes in well-being.

Electricity consumption (ECON) is a type of energy consumption that uses electricity. The current demand for power from the existing electricity supply is electricity consumption. It is calculated as the total net power consumption, which is the sum of net power generation, net trade (imports - power exports), and power transmission and distribution losses; and measured in billion kilowatt-hours. Net consumption excludes the energy used by the producing units.

The labor force (LAB) is composed of persons aged 15 and above who work for a set period to produce goods and services. This includes employees and those who are unemployed but seeking employment, as well as those who are seeking work

for the first time. However, not everyone who works is included. Unpaid employees, family members, and students are often excluded, and there are countries that do not register military personnel. Throughout the year, the size of the labor force varies with entries and exits. All those who meet the inclusion criteria for employment (civilian jobs plus military forces) or unemployment are considered part of the labor force. They are classified as individuals who work at least one hour per week for pay or profit, or who have a job but are temporarily not working due to illness, leave, or industrial activity. The armed forces consist of individuals from the metropolitan area who work in the Armed Forces, whether on the metropolitan territory or elsewhere, during the period under consideration. The unemployed are described as those who do not have a job, but are actively searching for one. This indicator is seasonally adjusted and measured in individuals.

Aggregate governance (GOV) refers to all government, market, or network processes, whether by a family, tribal, or informal organization or territory, and whether they are carried out by legislation, standards, authority, or language. Governance is less focused on the state and its institutions, and more on social behaviors and activities (Bevir, 2012). The system of institutions and cultural norms through which authority is applied for the good of everyone at all levels, from local to global, is the essence of governance. There are three dimensions to governance in general: The political dimension entails the selection, monitoring, and replacement of persons in positions of authority. The economic dimension is the process of properly managing public resources and implementing appropriate policies. The institutional component refers to the procedures by which people and the state respect society or public institutions. According to Brenner and Cochran (1991), the Governance Working Group of the International Institute of Administrative Sciences (GWGIIAS) defined governance as the process through which members of society exercise their authority and power, influence, and enact laws and decisions pertaining to public life, as well as economic and social development. According to this concept, Kakabadse and Kakabadse (2001), governance encompasses more than just government and includes interactions between official institutions and civil society organizations (GWGIIAS, 1991).

With special emphasis on institutional factors, Bailey (2018) documents political stability, democracy, rule of law, corruption, tax rates, and cultural distance as measures of institutional factors. As institutional quality factors in a country, Kurul and Yalta (2017) mention control of corruption, government effectiveness, political stability and absence of violence, regulatory quality, rule of law, and voice and accountability. Kurul and Yalta reckon that these institutions are the major source of empirical research, and note that these are Kaufmann et al.'s six dimensions of governance, known as governance indicators.

According to Kaufmann, Kraay and Mastruzzi (2011), the traditions and structures through which a country's authority is exercised are referred to as governance. This encompasses the process of selecting, monitoring, and replacing governments; the government's ability to devise and implement sensible policies; and people's and the state's respect for the institutions that control economic and social relations between them. Nonetheless, in order to promote accountability, transparency, responsiveness, rule of law, stability, equity, and inclusivity, as well as empowerment and wide-ranging involvement, governance has been defined. Governance also symbolizes the standards, principles, and rules of the game through which public matters are conducted in an inclusive, transparent, and responsive manner. It can thus be subtle and not immediately observed. Governance, in a broad sense, concerns the cultural and institutional framework in which people and stakeholders engage and participate in public affairs. It's more than the government's bodies.

Many studies represent governance dimensions as institutional factors (Grabowski & Self, 2020, 2021; Groznykh, Drapkin, & Mariev, 2019). While some aspects of institutional factors intersect with elements of governance, Ray (1998) mentions governance factors such as political stability and corruption in his institutional framework for developing countries. Since governance is measured by six broad dimensions or individual indicators, its combined or aggregate value is obtained using the principal component analysis (PCA) method. According to Jolliffe and Cadima (2016), PCA is a method for reducing the dimensionality of such datasets, enhancing interpretability while minimizing information loss. Before Jolliffe and Cadima, Harold Hotelling proposed PCA as a method for discovering factors

using statistical learning techniques when exogenous factors are unavailable, as well as, again, a system for reducing the dimensionality reduction of a set of data. Since Hotelling's work, recent modifications in PCA can be seen in Pöge and Reinecke (2021). Anyway, it accomplishes the reduction of dimensions by generating new uncorrelated variables that optimize variance in a sequential manner. PCA is an adaptive data analysis approach because it simplifies finding new variables, the principal components, to solving an eigenvalue/eigenvector problem, and the new variables are specified by the dataset at hand, not a priori. It is adaptable in another way, too, because several variations of the approach have been developed for different data types and architectures.

Although Jolliffe and Cadima (2016) begin by outlining the fundamental concepts of PCA, as well as what it can and cannot perform through a few different types of PCAs, and how they may be used, Jaadi (2021) narrates five steps of PCA, explaining what PCA is doing and simplifying mathematical topics like standardization, covariance, eigenvectors, and eigenvalues without going into how to calculate them. Most of Jaadi's steps are clearly summarized in Kaufmann et al.'s WGI aggregation methodology.

With respect to the computation of governance, consider

$$\boldsymbol{C} = \boldsymbol{V}\boldsymbol{\Lambda}\boldsymbol{V}' = \sum_{i=1}^{p} \lambda_i \boldsymbol{v}_i \boldsymbol{v}_i' \qquad (3.1)$$

where C is the $p \times$ p correlation matrix to be analyzed, v_i (usually > 0) are eigenvectors or principal components, λ_i eigenvalues and C is the eigen decomposition.

$$\boldsymbol{v}_i' \boldsymbol{v}_j = \delta_{ij} \qquad (3.2)$$

with $\lambda_1 \geq \lambda_2 \geq \cdots \geq \lambda_p \geq 0$ and δ_{ij} orthogonality.

Market size (MSIZE) is another important variable mentioned in the FDI literature and, by default, considered as the size of a country's population. Although GDP is an accurate approximation for market size, it is insufficient to account for population size. For example, a country with a low GDP now may have a high GDP in the future due to income and population growth. Population represents bright potential in this scenario (Akin, 2009; Artige & Nicolini, 2010). In poor nations, absolute GDP may be deceptive. A huge but failing economy might result in extremely low demand for particular sectors (Chakrabarti, 2001). It is thus justified to add GDP per capita to the analysis. However, it may be useful to link both measures in studies on developed economies. This dissertation uses per capita GDP as a proxy for market size. Other measures of market size include assessing the demand ability. In turn, demand is proxied by the population growth or size of a region or country.

Economic freedom (EFREE) is measured as the overall economic freedom index, which contains 10 components in four major areas: rule of law, limited government, regulatory efficiency, and open markets. The overall economic freedom ranges from 0 to 100, with 100 being the maximum. The Fraser Institute, a Canadian think tank organization, conducts an annual survey on economic freedom (Stansel & Tuszynski, 2016). The poll aims to determine the degree of economic freedom in each country, and it has been employed in peer-reviewed research that has discovered a variety of positive consequences of greater economic freedom (De Vanssay & Spindler, 1994). This index is very important for tracking the amount of FDI inflows in CEMAC and is also known for indicating progress. According to The Index of Economic Freedom, IEF (2022), it has been measuring the impact of liberty and free markets throughout the world for the past twenty-eight years, and the 2022 Index reaffirms the powerful positive association between economic freedom and growth.

Share of industry (used as a proxy for economic structure) complies with divisions 10-45 of the ISIC and comprises production (ISIC divisions 15-37). It includes added value in mining, production, building, power, water and gas (also reported in a distinct subgroup). The net output of a sector is the additional value after all outputs have been added and intermediate inputs subtracted. It is computed without deducting any manufacturing asset depreciation or depletion and natural

resource deterioration. The origin of the added value is established by revision 3 or 4 of the International Standard for Industry (ISIC).

Heavily indebted poor countries (HIPC), least developed countries (LDCs), and income level (INC) are included in the analysis to account for country, income, and debt stage heterogeneity. First, HIPCs are a group of thirty-nine developing countries with a high level of poverty and debt overhang that qualify for the IMF and World Bank. In retrospect, the Debt Relief Initiative was launched by the international community in 1996 (HIPC I). It strengthened this effort in 1999, renaming it the Enhanced HIPC Initiative (HIPC II). Martin (2004) evaluates the Initiatives' accomplishments and examines the potential role of debt relief in supporting the millennium development goals (MDGs), which seek to halve global poverty by 2015, by comparing it to other sources of MDG financing and determining whether the Initiatives have met this potential.

HIPC and its associated multilateral debt relief initiative (MDRI) have repaid more than $100 billion in debt to 37 participant nations. To date, 37 countries, 31 of which are in Africa, have received debt relief under the HIPC Initiative and the MDRI. However, ensuring that debt burdens do not return to unsustainable levels is a concern. Note that among the six CEMAC member countries, four (Cameroon, Central African Republic, Congo and Chad) were under the HIPC initiative during the period considered in this research. That is, whether at the decision or completion point, the HIPC Initiative and the MDRI have qualified the following nations for debt reduction (WorldBank, 2018).

As a reminder, a country must meet the following criteria to be eligible for the HIPC Initiative: (i) It must be in an unsustainable debt situation after exhausting all standard debt reduction measures (such as the application of Naples terms under the Paris Club agreement). (ii) It must only be eligible for highly concessional support from the International Development Association (IDA) and the Poverty Reduction and Growth Trust of the International Monetary Fund (IMF-PGRT). (iii) It must have created a track record of reform and effective policy through IMF and World Bank-supported projects. (iv) It must establish a reform track record and create a Poverty Reduction Strategy Paper (PRSP) with civil society participation. This study uses dummy HIPC for heavily indebted poor country; 1 if the country is HIPC, 0 if not.

LDCs are low-income countries that face significant structural challenges to long-term development. They are extremely sensitive to economic and environmental shocks, and their human capital is limited. According to the UN-DESA (2022), the Committee for Development Policy (CDP) reviews list of LDCs every three years and presently has 46 nations on it. Additionally, in UN-DESA, LDCs enjoy priority access to some foreign aid programs, particularly in the fields of development and trade. Among the 46 countries, 70% are from SSA, with just C.A.R. and Chad from the CEMAC region.

In other words, Jeníček and Grófová (2014) summarize the meaning of LDCs as weak human and institutional capacities, poor and unequally distributed income, and a paucity of domestic financial resources defining their low socioeconomic growth or overall slow progress. They are frequently affected by governance crises and political instability. A vicious circle of low productivity and poor investment plagues their mostly rural economies. Jeníček and Grófová write that they are very exposed to external terms-of-trade shocks because they rely on the export of a few core commodities as their principal source of export and fiscal profits. Only a few have succeeded in diversifying into manufacturing, but with a restricted variety of products in labor-intensive industries such as textiles and garments. These limits are to blame for the LDCs' poverty trap, which includes limited domestic resource mobilization, low economic management capacity, flaws in program design and execution, persistent external deficits, large debt loads, and significant reliance on external finance.

More formally, if a country meets three requirements, it is designated as one of the LDCs: First, poverty or a low-income level is a criterion that may be adjusted depending on GNI per capita averaged over three years. To be featured on the list in 2018, UN-DESA documents state that a country's GNI per capita must be less than US$1,025 and must be more than $1,230 to graduate from it. Second, a paucity of human assets or a shortage of human resources (based on indicators of nutrition, health, education and adult literacy) presents a strong case for food insecurity for LDCs. Finally, the economic and environmental vulnerability of the economy is an accumulation of instability in agricultural production, instability in exports of goods and services, the economic importance of non-traditional activities, merchandise

export concentration, the handicap of economic smallness, and the percentage of the population displaced by natural disasters. Poverty in the LDCs is characterized by its pervasiveness and persistence: in 2007, 53 percent of the population lived on less than $1.25 per day, and 78 percent on less than $2 per day. This means that 421 million people in the LDCs were living in extreme poverty that year. Extreme poverty was found in 59 percent of African LDCs, compared to 41 percent in Asian LDCs. However, the disparity was less pronounced when it came to the $2-a-day poverty line: 80 percent in African LDCs and 72 percent in Asian LDCs. By 2015, it is anticipated that there would be 439 million extremely poor people living in LDCs, compared to only 255 million if the MDG target is met (UNCTAD, 2020).

As documented in UNCTAD (2020), different thresholds are utilized to designate states for inclusion on the list and states recommended for graduation for each of the three criteria. A country is eligible for membership if it meets all three requirements and has a population of fewer than 75 million people. If a nation meets the graduation standards under at least two of the three criteria over the period covered by at least two consecutive reviews of the list, it is typically eligible for graduation from least developed country status. However, if a least developed country's per capita gross national income has increased to at least twice that of the graduation criterion, the country is considered eligible for graduation regardless of its performance under the other two criteria (the income-only graduation rule). The study used a dummy for development level (1 = for LDC, least developed countries; 0 otherwise).

Finally, INC is also known as income classification and generally classifies countries into low, lower-middle, upper, and high-income groups. Low-income economies have a GNI per capita of $1,045 or less in 2020, calculated using the World Bank Atlas method; lower middle-income economies have a GNI per capita between $1,046 and $4,095; upper middle-income economies have a GNI per capita between $4,096 and $12,695; and high-income economies have a GNI per capita of $12,696 or more. Baiashvili and Gattini (2020) investigated the effects of FDI inflows on growth and the influence they have on growth through income levels and institutional quality. In particular, the interaction of low, middle, and high-income economies with FDI. The study assigned a dummy for income level (1 = if country is

LINC for low-income country; 0 otherwise, MINC for middle lower-income country and HINC for Upper-middle-income country. It is argued that LINC countries attract less FDI than the other income groups.

While direct proxies for FDI financing and economic growth, such as FDI inflows and GDP per capita, are known, some variables considered in the general analysis of this thesis are not clear unless a breakdown of their measurement is made known. For instance, governance is an abstract variable that explains how institutions are managed. Therefore, the measurement of governance for each country in the sample is a combination of its six dimensions. In econometric terms, the six aggregate measures that capture various dimensions of governance are collapsed to measure governance. In the social sciences, such a variable is known as a latent variable. By the way, new evidence by Kaufmann, Kraay and Zoido (1999) suggests that this aggregated measure of governance has been found to have a substantial causal association between improved governance and improved development outcomes. Meanwhile, some abstract variables such as economic freedom and economic structure (measured as a percent of GDP), termed structural and external variables, are combined or aggregated measures. The globalization index measures the overall score (0-100; with 100 indicating a more globalized and interconnected country or greater globalization indicated by higher values) of globalization composed of economic, social, and political components.

4.1.3 Research Hypotheses

Understanding the dynamic relationship between FDI inflows, economic growth, and governance is a critical area of interest in contemporary economic research. This dissertation aims to investigate the complex relationship between these factors and unravel the evolving dynamics that shape their interactions over time across six CEMAC countries. By exploring how FDI influences growth and governance, and how governance, in turn, affects FDI and growth, this research seeks to provide valuable insights into the multifaceted and dynamic nature of these essential components in CEMAC. Note that although these hypotheses form one of the central parts of this dissertation, they represent another way of stating research

questions and objectives (see Section 1.6). Thus, they represent tested research objectives.

Table 4.3 Summary of Research Hypotheses

Number	Research Hypothesis
H1	Governance and GDP per capita have a statistically significant short-term impact on FDI inflow across CEMAC countries.
H2	Governance has a statistically significant short-term impact, but varying, on FDI inflow and economic growth based on economic activities and development.
H3	Governance has a statistically significant short-term impact, but varying, on FDI inflow and economic growth based on economic structure and market.
H4	The impact of governance on both economic growth and FDI inflow varies significantly across income groups (low-income, lower-middle income, and upper-middle income).
H5	The impact of governance on both economic growth and FDI inflow varies significantly across HIPC status (HIPC and non-HIPC).
H6	The impact of governance on both economic growth and FDI inflow varies significantly across LDC stages (LDC and non-LDC).
H7	The dynamic impact of the 1994 CFA currency devaluation and 2008 global financial crisis on FDI inflow and economic growth significantly differ between periods before and after the structural break (a shift in the relationship).
H8	Coups, instability and political crises have had a significant impact on the short-term dynamics of governance on FDI inflow and growth dynamics.
H9	Two-way and three-way interactions significantly impact the short-term dynamics of governance, FDI inflow, and economic growth.
H10	Economic growth has a contemporaneous effect on FDI inflow even after controlling for the influence of governance.
H11	Governance has a contemporaneous effect on FDI inflow even after

Number	Research Hypothesis
	controlling for the influence of economic growth.
H12	There is substantial heterogeneity in the impact of governance on FDI inflow and economic growth across CEMAC countries.
H13	Governance policy changes have significant impact on the short-run dynamics of FDI inflow and economic growth across CEMAC countries.
H14	There is a short-run equilibrium relationship among FDI inflow, GDP, and governance.
H15	There is a long-run equilibrium relationship among FDI inflow, GDP, and governance.

Notes: H1–H13 are the tested hypotheses designed to answer the major research questions based on the core and seven other variables. H14–H15 are for short and long run relationships between the core variables, and H16-H18 are discussed in Chapter 6.

4.2 Model Specification

This section sets the pattern for the estimation in Chapter 5. Here, VAR models used to analyze the nexus and short-run dynamic interactions between governance, economic growth and FDI inflows.

$$Y_t = \alpha + \Pi_1 Y_{t-1} + \Pi_2 Y_{t-2} + \cdots + \Pi_p Y_{t-p} + \varepsilon_t \qquad (4.1)$$

4.2.1 VAR Models

Consider a general VAR model with three variables ($x_t, w_t,$ and z_t):

$$Y_t = (x_t, w_t, z_t)' \qquad (4.2)$$

for

$$Y_t = \alpha + \sum_{j=1}^{p} \Pi_j Y_{t-j} + \varepsilon_t \qquad (4.3)$$

Thus, the representation of a VAR model for a system of K variables with p-lags is given by:

$$Y_t = \alpha + \Pi_1 Y_{t-1} + \Pi_2 Y_{t-2} + \cdots + \Pi_p Y_{t-p} + \varepsilon_t$$

with the following pair of regressions for more specific variables:

$$FDI_{it} = \alpha_1 + \sum_{j=1}^{p} \Pi_{1j} FDI_{it-j} + \sum_{k=1}^{p} \Pi_{1k} GDPPC_{it-k} + \sum_{s=1}^{p} \Pi_{1s} GOV_{it-s} + \varepsilon_{1it}$$

$$GDPPC_{it} = \alpha_2 + \sum_{j=1}^{p} \Pi_{1j} FDI_{it-j} + \sum_{k=1}^{p} \Pi_{1k} GDPPC_{it-k} + \sum_{s=1}^{p} \Pi_{1s} GOV_{it-s} + \varepsilon_{2it}$$

$$GOV_{it} = \alpha_3 + \sum_{j=1}^{p} \Pi_{1j} FDI_{it-j} + \sum_{k=1}^{p} \Pi_{1k} GDPPC_{it-k} + \sum_{s=1}^{p} \Pi_{1s} GOV_{it-s} + \varepsilon_{3it}$$

Also represented as:

$$\begin{pmatrix} FDI_{it} \\ GDPPC_{itt} \\ GOV_{it} \end{pmatrix} = \begin{pmatrix} \alpha_1 \\ \alpha_2 \\ \alpha_3 \end{pmatrix} + \begin{pmatrix} \Pi_{11} & \Pi_{12} & \Pi_{13} \\ \Pi_{21} & \Pi_{22} & \Pi_{23} \\ \Pi_{31} & \Pi_{32} & \Pi_{33} \end{pmatrix} \begin{pmatrix} FDI_{it-j} \\ GDPPC_{it-k} \\ GOV_{it-s} \end{pmatrix} + \begin{pmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \\ \varepsilon_{3t} \end{pmatrix}$$

(4.4)

for a VAR model with three variables and lag of 1. Now consider more specific VAR(p) model p-lags with k-variables:

$$Y_t = (y_{1t}, y_{2t}, \ldots, y_{kt})' \in \mathbb{R}^k \qquad (4.5)$$

for a k-dimensional vector, with the VAR(p) model defined properly as:

$$Y_t = \alpha + \Pi_1 Y_{t-1} + \Pi_2 Y_{t-2} + \cdots + \Pi_p Y_{t-p} + \varepsilon_t,\ \varepsilon_t \sim \text{i.i.d.}\, N(0, \Omega) \qquad (4.6)$$

where Y_t = *k*-dimensional vector at time *t*; *t* = 1, 2, …, *T*; ε_t = *k*-dimensional vector of error terms or residuals at time *t*, and it is serially correlated and Ω symmetric and positively definite; α = constant or intercept vector: α and ε_t are (*k* x *1*) vectors; Π_j = (*k* x *k*) matrices of coefficients representing the contemporaneous effects of the lags; and Y_{t-j} are lags of the variables, *j* = 1, 2, …, p.

The VAR model allows us to capture the dynamic interactions among the variables over time and analyze how shocks or changes in one variable can affect the other variables in the system. Different variations of VAR models exist, with VAR models also being called VAR forecasting algorithms. A simplification of a VAR model is that it explains the endogenous variables solely by their own history, apart from deterministic regressors (Pfaff, 2008). In the analysis process, VAR, SVAR, and SVEC represent functions for estimating models. Meanwhile, other important functions, for example, necessary for VAR models, include functions for diagnostic testing, estimation of restricted models, prediction, causality analysis, impulse response analysis, and forecast error variance decomposition (Pfaff, 2008). This thesis has 10 variables and this presents the problem of degrees of freedom resulting from larger VAR models. Details of the solution to this dimensionality and degrees of freedom problems will be shown in later subsections in this chapter. To quickly simplify the VAR process, Lutkepohl (2011) or Lütkepohl (2013) offers a simple roadmap to VAR, and Figure 4.1 shows the main steps of the VAR modeling approach.

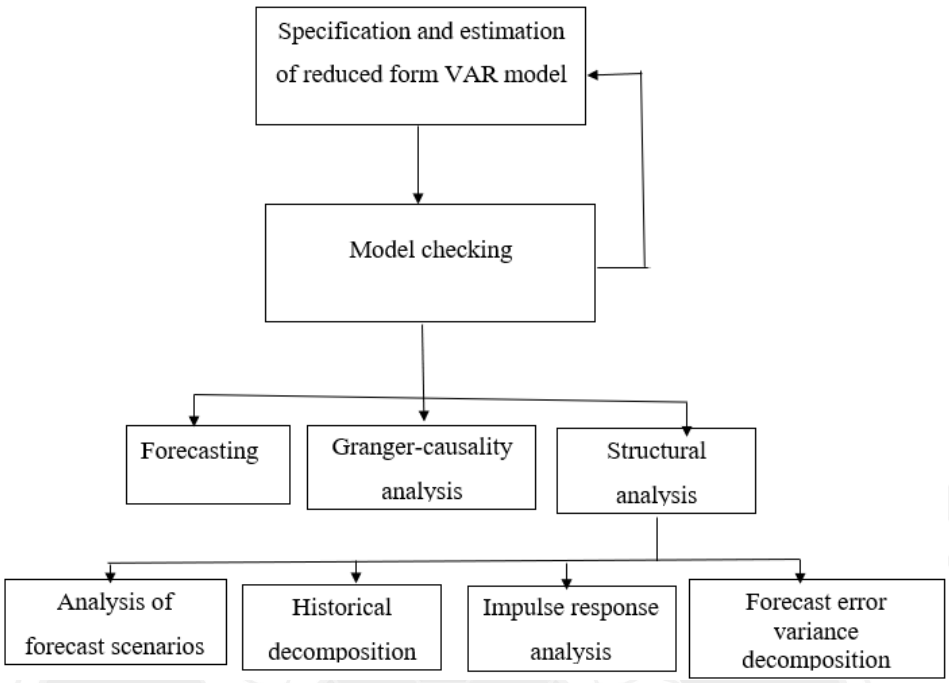

Figure 4.1 Estimation Steps of VAR Modeling

Notes: Main steps of VAR modeling approach (Lutkepohl, 2011; Lütkepohl, 2013).

4.2.2 Panel VAR Models

Like the VAR model, the panel VAR (PVAR) is an extension of the VAR that allows for the analysis of time series data across multiple cross-sectional units, such as countries, regions, or firms. In a PVAR model, each cross-sectional unit has its own time series, and the model captures both the within-unit dynamics (autoregressive relationships within each unit) and the between-unit dynamics (interactions across different units). More research work on VAR models is being extended to include cross sections of firms or countries. This is known as Panel VAR models and is used in several papers (Hovhannisyan & Sedgley, 2019; Miranda & Muinelo-Gallo, 2019; Comunale, 2022; Tuğan, 2021; Sahul Hamid & Ibrahim, 2021). Hovhannisyan and Sedgley (2019) employ a panel VAR methodology to investigate the role of direct and indirect knowledge spillovers. Miranda and Muinelo-Gallo estimate cereal export demand using a panel data model with autoregressive vectors (P-VAR). Comunale applies a Bayesian panel VAR to investigate the interactions across current account misalignments, real effective exchange rate misalignments, and

financial gaps within EU countries. Tuğan studies a homogeneous panel VAR model with interactive fixed effects, allowing for dynamic and simultaneous interactions among macroeconomic variables. Sahul Hamid and Ibrahim investigate the dynamic relationship among competition, diversification, and bank performance using data for 18 countries with a dual banking system, but the specific use of a panel VAR model is not mentioned in the abstract.

The general form of a Panel VAR model for p lags (PVAR(p)) with N cross-sectional units and T time periods can be represented as follows:

$$Y_{i,t} = \alpha_i + \Pi_1 Y_{i,t-1} + \Pi_2 Y_{i,t-2} + \cdots + \Pi_p Y_{i,t-p} + \varepsilon_{i,t},\ \varepsilon_{it} \sim \text{i. i. d.}\ N(0, \Omega) \quad (4.7)$$

where Y_{it} = k-dimensional vector for cross-sectional unit i at time t; t = 1, 2, …, T; ε_t= k-dimensional vector of error terms or residuals at time t, and it is serially correlated and Ω symmetric and positively definite; α_i = constant or intercept vector for cross-sectional unit i; Π_j = (k x k) matrices of coefficients representing the contemporaneous effects of the lags specific to cross-sectional unit i; and $Y_{i,t-j}$ are lags of the variables for cross-sectional unit i, j = 1, 2, …, p. The model has $(p + kp^2)$ parameters in the conditional mean and $p(p+1)/2$ parameters in the symmetric covariance matrix, Ω.

In case exogenous variables are added, the PVAR(p) becomes PVARX(p).

$$Y_{i,t} = \alpha_i + \Pi_1 Y_{i,t-1} + \Pi_2 Y_{i,t-2} + \cdots + \Pi_p Y_{i,t-p} + \phi X_t + \varepsilon_{i,t} \quad (4.8)$$

for X_t is a matrix of exogenous variables for cross-sectional unit i and ϕ is a (k x m) matrix or a vector of coefficients for the exogenous variables. And, total number of coefficients in this panel VAR system is given by $k(kp + m)$. The Panel VAR model allows us to analyze the interactions between variables within each cross-sectional unit and the spillover effects across different units. It is particularly useful when dealing with datasets that have both time series and cross-sectional dimensions, as it can capture the heterogeneity across units and the common dynamics shared by all units. Like VAR models, PVARs study the behavior of multiple cross-sectional units

over time and understand how different variables interact both within and across units. They provide valuable insights into the dynamic relationships in complex datasets. But unlike VARs that estimate the coefficients (Π_j) of and the intercept (α) using OLS or MLE, PVARs (Π_j, β) and (α_i) use GMM or MLE. Going the framework by Canova and Ciccarelli (2013) framework, Models 2 and 3 are tested based a PVAR with respect to heterogenous polynomials (Π_i and ϕ_i) across countries.

$$Y_{i,t} = \alpha_i + \Pi_1 Y_{i,t-1} + \Pi_2 Y_{i,t-2} + \cdots + \Pi_p Y_{i,t-p} + \phi_i X_t + \varepsilon_{i,t}$$

α_i = all deterministic components (constant, seasonal dummies, and deterministic polynomial in time). For details, see Comunale (2022).

Table 4.4 Summary of Selected Methodology (VAR) Citations

Author(s)	Major Variables	Methodology	Sample
Liu & Lee (2020)	FDI and growth	VAR	1981-2018, China
Hua (2018)	FDI and growth	VAR	1988-2017, Vietnam
Ludoșean (2012).	FDI and growth	VAR	1991-2009, Romania
Ibara (2020).	FDI, growth & human capital	VAR	1970-2019, CEMAC
Emmanuel (2014)	FDI and growth	Two Least Square & GMM	1980-2010, CEMAC
Ayenew (2022).	FDI and growth	PMG/ARDL	1988-2019, SSA (22)
Rafat (2018).	FDI and growth	VAR	1991-2014, Iran
Fambon (2013)	FCI & growth	ARDL/co-integration	1980-2008, Cameroon
Sindze et al. (2021)	FDI and growth	Paired t-test	2007-2017, CEMAC
Abbes et al. (2015)	FDI and growth	Co-integration & PGC	1980-2010, World (65)
Antwi & Zhao (2013)	FDI and growth	Co-integration	1980-2010, Ghana
Jamal & Bhat (2019)	Growth, FDI and trade	Co-integration & VAR	1980-2017, India
Abu & Karim (2016)	FDI, DI, DS and growth	VAR/GC	1981-2011, SSA (16)
Numbu & Belyaeva (2021)	FDI and growth	Correlation & SLR	2000-2020, Cameroon
Forgha & Mbella (2013)	PE & PI	VAR	1980-2012, Cameroon
Skare & Cvek (2020).	FDI & competitiveness	VAR/GC	2002-2017, Turkey
Guefano et al. (2020)	GDP and others	VAR	1994-2014, Cameroon

Author(s)	Major Variables	Methodology	Sample
McCloud & Kumbhakar (2012)	FDI, growth & institutions	Bayesian analysis	Developing countries
Abrego & Österholm (2008)	GDP growth & ME	Bayesian VAR	1995-2007, Colombia
Dhannur & John (2021)	FDI & export	Hierarchical Bayesian VAR	2004:4-2018:7
Cao & Jariyapan (2012)	FDI, growth & human capital	VECM/Panel DOLS	1996-2010, China
Raza, Shah & Arif (2021)	FDI, growth & governance	FE model/GMM estimator	1996-2013, OECD
Fayissa & Nsiah (2013)	Growth & governance	RE, FE & Arellano-Bond	African countries
Ofori & Asongu (2021)	FDI, institutional quality	IV method	2002-2012, World (110)
Kumari & Sharma (2017).	MS, TOP, human capital, etc.	FE, RE and Hausman	1990-2012, SE/SEA

Notes: PGC stands for panel Granger causality; FCI for foreign capital inflows which include FDI and foreign aid; DI, DS, PE and PI are domestic investment, domestic savings, public expenditure and private investment, respectively; ME for macroeconomic environment; IV for instrumental variable. SE/SEA for South East and South East Asia.

4.2.3 Restricted panel VAR Models

Given a VAR (1) model for three variables:

$$FDI_{i,t} = \alpha_{1i} + \Pi_{11}FDI_{i,t-1} + \Pi_{12}GDP_{i,t-1} + \Pi_{13}GOV_{i,t-1} + \varepsilon_{1i,t}$$
$$GDPPC_{i,t} = \alpha_{2i} + \Pi_{21}FDI_{i,t-1} + \Pi_{22}GDP_{i,t-1} + \Pi_{23}GOV_{i,t-1} + \varepsilon_{2i,t}$$
$$GOV_{i,t} = \alpha_{3i} + \Pi_{31}FDI_{i,t-1} + \Pi_{32}GDP_{i,t-1} + \Pi_{33}GOV_{i,t-1} + \varepsilon_{3i,t} \quad (4.9)$$

is transformed to the system below with linear restrictions:

$$FDI_{i,t} = \alpha_{1i} + \Pi_{11}FDI_{i,t-1} + \Pi_{12}GDP_{i,t-1} + \Pi_{13}GOV_{i,t-1} + \varepsilon_{1i,t}$$
$$GDPPC_{i,t} = \alpha_{2i} + \Pi_{21}FDI_{i,t-1} + \Pi_{22}GDP_{i,t-1} + \Pi_{23}GOV_{i,t-1} + \varepsilon_{2i,t}$$
$$GOV_{i,t} = \alpha_{3i} + \Pi_{33}GOV_{i,t-1} + \varepsilon_{3i,t} \quad (4.10)$$

for the restrictions set at $\Pi_{31} = \Pi_{32} = 0$, in which GDP per capita contemporaneously affect FDI inflow but not governance. In like manner, to test whether governance contemporaneously affect FDI inflow but not GDP per capita, we get:

$$FDI_{i,t} = \alpha_{1i} + \Pi_{11}FDI_{i,t-1} + \Pi_{12}GDP_{i,t-1} + \Pi_{13}GOV_{i,t-1} + \varepsilon_{1i,t}$$
$$GDPPC_{i,t} = \alpha_{2i} + \Pi_{22}GDP_{i,t-1} + \varepsilon_{2i,t}$$
$$GOV_{i,t} = \alpha_{3i} + \Pi_{31}FDI_{i,t-1} + \Pi_{32}GDP_{i,t-1} + \Pi_{33}GOV_{i,t-1} + \varepsilon_{3i,t} \quad (4.11)$$

where $\Pi_{21} = \Pi_{23} = 0$.

4.3 VAR Diagnostics

Irrespective of the test or methodology, it is always important to validate results with appropriate diagnostic tests. Thus, diagnostic tests are critical for assessing the quality of a VAR model, ensuring that it meets the required assumptions, and determining the adequacy of VAR models. First, VAR diagnostic tests are a group of procedures used to evaluate the performance and correctness of VAR models. These tests are critical for identifying potential problems and enhancing the dependability of VAR models. In econometrics, many research articles provide

information on many areas of VAR diagnostic tests. Hence, several ways for diagnostic checking VAR models have been proposed in the literature. Several studies present diverse methodologies and strategies for diagnostic testing of VAR models, providing insights into the evaluation and improvement of these models (Abdallah et al., 2020; Abdullah, 2022; Ahlgren & Catani, 2017; Ng, Li, & Yu, 2016).

To address the issue of critical value misspecification in multivariate portmanteau tests for VAR models with uncorrelated but not independent innovations, Li and Zhang (2022) offer a random weighting bootstrap approach. The local influence method is used to establish normal curvature diagnostics for VAR models with Student's t-distributions. Metsileng, Moroke and Tsoku (2018) use the VAR model to examine the BRICS exchange rates and determine their linear relationship. Dash (2021) suggests a VAR form for the market model and demonstrates its significance in the Indian stock market for IT sector equities. VAR models and Granger causality, a test used to determine the direction of causality in VAR models, are explained by Akkaya (2021).

Other sensitive issues presented in several studies focus on VAR diagnostic tests employing multivariate portmanteau tests, although these tests can be oversized due to critical value misspecification (Li & Zhang, 2022). An alternative to Li and Zhang's multivariate portmanteau tests could be employing the local influence method, which has been used on VAR models with various perturbation strategies. Alexandru, Caragea and Dobre (2013) use simulation studies and empirical data analysis to assess the efficacy of these diagnostics. Furthermore, although the "vars package" in R includes functions for VAR model diagnostic testing, estimation, prediction, causality analysis, and more, this thesis uses EViews (and in some cases, STATA) to run the tests in the analysis section (see Chapter 5).

Common diagnostic tests for VAR models include testing for serial correlation or autocorrelation with Ljung-Box test and Portmanteau; normality and heteroskedasticity (Jarque-Bera and ARCH-LM), unit root and stationarity, cointegration, information criteria (AIC and SIC), Granger causality (see subsection 4.4.1), impulse response functions (see subsection 4.4.2), and forecast error variance decomposition (see Subsection 4.4.3). Table 4.4 presents a summary of panel VAR and diagnostic tests from empirical studies. No single test should be used to evaluate

the quality of a VAR model in isolation. Instead, a mix of testing and in-depth analysis is advised. Diagnostic tests assist you in identifying model flaws, guiding model improvement, and ensuring that the assumptions of your VAR model are met for reliable inference and forecasting.

First, serial correlation in VAR models has received a lot of attention in the literature. To test for serial independence of innovations in VAR models, various approaches have been presented, including L2-type criteria based on the joint empirical characteristic function and the product of related marginals (Ren & Barnett, 2020). Furthermore, the research on mixed VAR models has gained popularity, with additions that include periodic correlation and time-varying coefficients (Gambetti, 2020). Furthermore, the use of portmanteau test statistics for VAR models with exogenous variables has been broadened, allowing for the testing of model adequacy in cointegrated VARX models (Meintanis, Ngatchou-Wandji, & Allison, 2018). These developments in testing and modeling methodologies help us comprehend serial correlation in VAR models better.

Second, in VAR models, other extensions and structural results are important for a clear picture and interpretation of the results. Structural results include Granger causality, impulse responses and variance decompositions. While Lütkepohl and Netšunajev (2017) elaborate on testing for identification using heteroskedasticity, Lütkepohl, Staszewska-Bystrova and Winker (2020) explain constructing joint confidence bands for VAR models. Both are Wald-type tests that only need an estimate of the unrestricted model, including the volatility state covariance matrices (Lütkepohl et al., 2021; Taşpınar, Doğan, & Bera, 2019). The model's residuals are considered to be from the elliptical distribution class, which includes Gaussian models (Lütkepohl & Netšunajev, 2017). The test statistics' asymptotic null distributions have been constructed, and simulations have been used to investigate their small-sample features. In standard VAR models, heteroskedasticity can be utilized to identify more shocks than variables. Different heteroskedasticity or conditional heteroskedasticity models have been proposed and used in VAR analysis applications to recognize structural shocks.

Third, although Trapani (2021) explains that stationarity is assumed in VAR models, which indicates that the roots of the characteristic equation are outside the

unit circle, Heaps (2020) remarks that the geometry of the stationary zone of VAR models is complex, making it difficult to establish a prior distribution. To address this, Kheifets and Saikkonen (2020) posit that an unconstrained reparameterization of the stationary VAR model with partial autocorrelation matrices as new parameters is presented. This reparameterization results in a more readable and readily defined prior distribution (Grynkiv & Stentoft, 2018). The presence of a stationary solution in smooth transition autoregressive (Luostarinen, 1977) models is also discussed, with the critical requirement being that the joint spectral radius of certain matrices is less than 1 (Kheifets & Saikkonen, 2020). This finding allows computational mathematics methods to be used to test the stationarity and ergodicity of vector STAR models.

Fourth, cointegration is a notion in VAR models that allows for the examination of long-term correlations between nonstationary time series variables. It provides a framework for estimating the link between several variables with unit roots and effectively modeling their dynamics. Granger's invention of cointegration changed the formulation of empirical models in macroeconomics, allowing the creation of statistically sound and economically meaningful models with rich dynamics among connected variables (Lin & Tu, 2021). Franchi and Paruolo (2020) hold that cointegration in VAR models provides a versatile method for capturing nonlinear interactions via monotonic modifications of the dependent variable. Furthermore, Das (2019), Das and Das (2019), and Jordan and Philips (2018) argue that it enables the modeling of common stochastic trends as well as the identification of cointegrating spaces, even in infinite-dimensional separable Hilbert spaces. Franchi and Paruolo further argue that cointegration estimates and testing in VAR models are critical for understanding the long-term behavior and interdependence of economic variables. Cointegration and long-term relationships are not prioritized in this thesis. Rather, they are just shown as part of the VAR process and not stated in the conclusions.

Finally, the lag order p is particularly significant when developing a VAR model, and it is controlled by both the number of observations and the number of equations. Sometimes, the lag length may correspond to the data. For example, quarterly data has 4 lags, monthly data has 12 lags, and so on. In addition, the test can be sensitive to the lag length of the VAR when estimating VARs or doing Granger

causality tests. The Akaike information criterion (AIC) or Schwarz-Bayesian information criterion (SBIC) provide a more thorough technique to calculate the ideal lag duration. In practice, determining the best lag order *p* is done by fitting the model with increasing lag orders iteratively and selecting the model with the lowest AIC score. The other measures (BIC or SIC) can be used to pick models, but the AIC score is considered the best approach (Shibata, 1981, 1989) with the optimal lag lengths for VAR models (Scott Hacker & Hatemi-J, 2008; Toda & Yamamoto, 1995; Zivot & Wang, 2006). However, because estimations are sensitive to the presence of autocorrelation, if there is any indication of autocorrelation after using information criteria, more lags are added, above the number specified by the information criteria, until the autocorrelation is eradicated.

Whether it is for PVARs or Granger causality, lag length selection is a very sensitive topic. Since estimations are sensitive to the existence of autocorrelation, if there is any indication of autocorrelation after using information criteria, more lags are added, above the number specified by the information criteria, until the autocorrelation is eradicated. These information criteria work on the premise that adding additional lags to a model will result in two competing components. More lags lower the RSS, but they also reduce the number of degrees of freedom (a cost for adding more lags) (Ding, Tarokh, & Yang, 2018). By introducing an additional lag, the goal is to reduce the information criteria; however, the model will only gain if the decrease in RSS overcomes the loss of degrees of freedom. In general, the SBIC has a stronger penalty term than the AIC, indicating that a sparse model is preferable. AIC and SBIC can be expressed as follows:

$$AIC = \ln(\hat{\sigma}^2) + \frac{2k}{T} \quad \text{and} \quad SBIC = \ln(\hat{\sigma}^2) + \frac{k}{T}\ln(T) \qquad (4.12)$$

where $\hat{\sigma}^2$ is for residual variance, k for number of parameters and T for sample size. AIC is generally better if the aim is prediction. BIC (and its variations such as Schwarz) is preferred for selection, inference, or interpretation (Ding et al., 2018). More advanced multivariate AIC/SBIC information criteria are:

$$MAIC = \log|\hat{\Sigma}| + \frac{2k'}{T} \text{ and} \quad MCBIC = \log|\hat{\Sigma}| + \frac{k'}{T}\log(T) \qquad (4.13)$$

where $\hat{\Sigma}$ is the variance-covariance matrix for the residuals, T for number of observations or sample size, and k' for total number of regressors in all the equations.

Going by the system of equations in (4.12) and (4.13), the formula for SBIC is similar to the AIC formula, but with a different penalty for the number of parameters. The penalty with AIC is *2k*, but the penalty with SBIC is *k**ln(T). Anderson, Burnham and White (1998) compare AIC to BIC, with additional comments, and show that AIC may be calculated using the same Bayesian framework as BIC, with the exception of the prior probabilities. However, each candidate model has a prior probability of *1/R* in the Bayesian derivation of BIC (where R is the number of candidate models). The authors also give a few simulation results that demonstrate AIC has practical and performance advantages over BIC. Although SIC is insufficient in many ways, Diebold and Lopez (1995) recommend the SIC as it is very consistent. This is because the more favored AIC is not always consistent, resulting in an overly big model. AIC is, however, more efficient and produces models with high dimensionality than the SBIC.

Table 4.5 Summary of VAR Methods and Associated Diagnostic Tests

Authors	**Method**	**VAR Diagnostic tests**
Naushan (2022)	VAR	information criteria
Li and Zhang (2022)	VAR	random weighting bootstrap
Akbar et al. (2021)	PVAR	GMM estimation
Dash (2021)	VAR	common diagnostics
Akkaya (2021)	VAR	direction of causality
Lin and Tu (2021)	VAR	cointegration
Lütkepohl et al. (2021)	VAR	heteroskedasticity
Trapani (2021)	VAR	stationarity
Ren & Barnett (2020)	VAR	serial correlation
Franchi and Paruolo (2020)	VAR	cointegration
Gambetti (2020)	VAR	serial correlation

Authors	Method	VAR Diagnostic tests
Kheifets and Saikkonen (2020)	VAR	stationarity
Lütkepohl (2020)	VAR	heteroskedasticity
Bruns & Stern (2019)	VAR	information criteria
Abdallah et al. (2020)	VAR	Alternative/ robust solution
Gambetti (2020)	SVAR	structural shocks
Taşpınar et al. (2019)	VAR	heteroskedasticity
Meintanis et al. (2018)	VAR	serial correlation
Grynkiv & Stentoft (2018)	VAR	Stationarity
Das and Das (2018)	VAR	cointegration
Jordan and Philips (2018)	VAR	cointegration
Metsileng et al. (2018)	VAR	common diagnostics
Nasir & Du (2018)	PVAR	IRFs
Christou et al. (2017)	BPVAR	SSSS prior
Liu et al. (2017)	VAR	student's t-distribution
Lütkepohl & Netšunajev (2017)	VAR	heteroskedasticity
Koop & Korobilis (2016)	PVAR	BM averaging/selection
Atems & Jones (2015)	PVAR	Cumulative IRFs
Liu et al. (2015)	VAR	likelihood approach
Alexandru et al. (2013)	PVAR	all VAR diagnostics in R
Canova & Ciccarelli (2013)	PVAR	Compared with different approaches
Calomiris et al. (2013)	PVAR	IRFs
Ursu & Duchesne (2009)	VAR	portmanteau test statistics
Wu and Zhu (2010)	VAR	goodness-of-fit
Kim & Lee (2008)	PVAR	IRF
Ursu & Duchesne (2008)	PVAR	portmanteau test statistics

Authors	Method	VAR Diagnostic tests
Love & Zicchino (2006)	PVAR	OIRFs
Canova & Ciccarelli (2004)	BPVAR	Forecasting

Notes: PVAR here stands vector periodic autoregressive time series models, SVAR for structural VAR models, SSSS for stochastic search specification selection, BM for Bayesian model, IRF for impulse response functions, and SVM for support vector machines.

4.4 Causality and Structural Analyses

4.4.1 Panel Granger Causality

The relationship between FDI inflows and GDP has attracted attention from policymakers and academics. While FDI is thought to be the main driver of an economy's growth, GDP per capita is viewed as one of the factors attracting FDI inflows. However, FDI and GDP might be highly correlated but not necessarily causally correlated, possibly due to some other influence. For instance, the high correlation between these variables might stem from governance. As such, both variables may be related to governance in the CEMAC region. Everything being equal, good governance, breeds better living conditions and development, and good governance such as low corruption levels, political stability and high levels of accountability, encourages inflow of investment. Alternatively, as the economy is boosting, more investments flow in allowing for better management of affairs and hence good governance.

While Granger causality tests can determine if changes in one variable of interest precede changes in another, it is a frequent misconception that these tests are sufficient to rule out endogeneity (Charemza & Deadman, 1997). Taking into consideration other factors attracting FDI, this section explores the interdependencies between the variables using Granger causality. Given a two-variable VAR(p, q) model for y and x:

$$y_t = \alpha + \beta_1 y_{t-1} + \beta_2 y_{t-2} + \cdots + \beta_p y_{t-p} + \gamma_1 y_{t-1} + \gamma_2 y_{t-2} + \cdots + \gamma_q y_{t-q} + \varepsilon_t$$

(4.14)

where α is the intercept of the VAR(p, q) process; p and q are the longest lag lengths; $\beta_1, \beta_2, \ldots, \beta_p$ and $\gamma_1, \gamma_2, \ldots, \gamma_q$ are parameters to be calculated.

Granger causality is defined as whether previous values of x help in the prediction of y_t, assuming that the effects of past values of y on y_t have already been accounted for (and perhaps of past values of other variables). If they do, the x is said to "cause" the y. So, the foundation of VAR is that each time series in the system affects each other. The Granger test employs the Student's t-statistic and F-statistic tests to determine whether or not the values of variable x give statistically significant information on the development of future values of variable y (Profillidis & Botzoris, 2018). Assume y and x are two variables with stationary time series of data or observations. To test the null hypothesis that x does not Granger-cause y, we first select the suitable p and q lagged values of y to include in a VAR process of y (the order p of the VAR(p, q) process). Note that only statistically significant lagged values of variable X are preserved (according to their t-statistic test), given that all of them contribute to the explanatory ability according to the F-statistic test. When no lagged values of variable X are preserved after applying the t-statistic and F-statistic, the null hypothesis that variable X does not Granger-cause variable Y is accepted. Otherwise, we reject the null hypothesis in favor of the alternative, and we infer that variable X Granger-causes variable Y, and so variable Y's future values are dependent on variable X's current values (Profillidis & Botzoris, 2018).

Generally, when looking at directional connectivity, Granger causality is ideal. Recall that the Granger causality test is a statistical hypothesis test for detecting if one time series is useful in forecasting another. Granger causality is based on the AR modeling framework, and as such Lütkepohl (2005) advises that the most common method for performing multivariate Granger causality analysis is to fit a VAR to the time series. Recently, Granger causality tests have become extensively recognized and employed in panel econometrics (Bayraktar-Sağlam & Sayek Böke, 2017). However

recent, it has become popular among econometricians, and it is determined by fitting the following VAR model with *L*-th order or *L* time lags:

$$X(t) = \sum_{\tau=1}^{L} A_\tau \cdot X(t-\tau) + \varepsilon(t) \qquad (4.15)$$

where $X(t) \in \mathbb{R}^{d\times 1}$ for *t =1, ..., T* is a *d*-dimensional multivariate time series (or *d*-variate); $\mathbb{R}^{d\times T}$ or $\varepsilon(t)$ white Gaussian random vector or model residuals; and the matrix for every τ is represented by A_τ for $A_\tau \in \mathbb{R}^{d\times d}$.If at least one of the factors $A_\tau(j,i)$ for =1,..., *L* is significantly larger than zero, a time series X_i is considered a Granger cause of another time series X_j (in absolute value) (Lütkepohl, 2005). Equation (4.15) could be simply written as the response of FDI to changes in GDP per capita:

$$FDI_{it} = \sum_{j=0}^{\infty} \alpha_j \cdot GDPPC_{it-j} + \varepsilon_{it} \qquad (4.16)$$

Here, big coefficients for α_j indicate economic stimulations for greater growth rates are desirable.

Granger Causality is, therefore, a general notion based on the premise that the cause comes before the consequence. The principle of predictability is one attempt to quantify this concept: If knowledge of *x*'s past enhances the forecast of *y*, variable *x* Granger-causes another variable *y* in the same multivariate process (Granger, 1969, 1988; Seth, 2007). Note here that Granger causality neither implies nor requires causality or causal interactions. This means Granger causality can be present in a relationship between two variables without actually having causal interactions. Cochrane (2005) amplifies this correction by stating that Granger causality is not causality in a more fundamental sense. In a bivariate system, for example, if *x* leads to *y* with one lag but to *z* with two lags, *y* will Granger cause *z*, and *y* will assist in forecasting *z* since it gives information about the "real cause" *x*. However, just because you modify *y* (via policy action), does not mean *z* changes.

To avoid this misunderstanding, "Granger prediction" is a more accurate term for Granger causality. To better understand this and for the sake of this thesis, given FDI and GDP, suppose we want to predict FDI inflows for 2019 based on GDP values in previous years ($GDP_{it-1,}GDP_{it-2}, \dots, GDP_{it-p}$). This assumption is assumed to be better than knowing previous values for FDI ($FDI_{it-1,}FDI_{it-2}, \dots, FDI_{it-p}$) vice versa. If this condition holds, then we say GDP Granger causes FDI inflows. If the reverse is not true, we say FDI does not Granger cause GDP per capita. Consider a system of 2-variable univariate of *p*-order AR(*p*) model for FDI and GDP:

$$FDI_{it} = \alpha_1 FDI_{it-1} + \alpha_2 FDI_{it-2} + \cdots + \alpha_p FDI_{it-p} + e_{1it}$$
$$GDP_{it} = \beta_1 GDP_{it-1} + \beta_2 GDP_{it-2} + \cdots + \beta_p GDP_{it-p} + e_{2it} \qquad (4.17)$$

Same could be done for a bivariate of *p-order* AR(*p*) model for FDI and GDP:

$$FDI_{it} = \alpha_1 FDI_{it-1} + \cdots + \alpha_p FDI_{it-p} + \beta_1 GDP_{it-1} + \cdots + \beta_p GDP_{it-p} + \epsilon_{it} \qquad (4.18)$$

This is what this thesis is definitely investigating. The variances of the error terms for (4.17), (4.18) and (4.19) are crucial in assessing if GDP Granger causes FDI. Thus,

$$Granger\ Causality = \log\left(\frac{Var[e]}{Var[\epsilon]}\right) \qquad (4.19)$$

Granger causality only makes sense in circumstances where variables can be characterized as having random variations—i.e., as stochastic—because it is based on model error comparisons. Another crucial assumption is that the data are (weakly) stationary, which indicates that the variables' means and variances remain constant over time. For identical error terms, the Granger causality indicates no correlation between FDI and GDP. But for small error terms approaching zero, the Granger causality value might be positive or negative. This will depend on whether $Var[e]$ is greater or less than $Var[\epsilon]$. Negative Granger causality might, however, be an indication of a problem in the data. Granger parameters are affected by two main variables: the time span and the model order represented by *p* in the equations above.

In reality, calculating and comparing two VAR models given a collection of time-series data is the computational technique for executing Granger causality analysis. Different from Cochrane's narrative is that assuming the same three variables, note that *x*, *y*, and *z*, and we want to measure the flow of information from *x* to *y*. First, all of the variables are estimated in a full VAR model. As a result, each variable in the set has its own prediction or estimation error. After that, a second "reduced" VAR model is estimated, omitting the likely cause (*x*, in the example above). For each remaining variable, this results in a second set of prediction errors. They state that *x* Granger causes *y*, conditioned on *z* if the prediction error for *y* is much lower for the full regression (containing *x*) than for the reduced regression (without *x*). (Note that the Granger causality from *x* to *z* conditioned on *y* is also derived from the same models). The ratio of the variances of the prediction-error terms for the reduced and full regressions determines the extent of Granger causality.

The majority of publications that employ the panel Granger-causality paradigm look at the relationship between specific factors and growth. For instance, Granger causality has been used in many studies connecting macroeconomic variables, and for example, FDI and economic growth (Abbes et al., 2015). Using co-integration and panel Granger causality tests in panel data, Abbes et al. examine the relationship between FDI inflows and economic development in 65 countries. Although their findings reveal a discrepancy in the link between the panel study's co-integration, it showed a one-way causality between FDI and GDP, which could be a useful tool for prioritizing resource allocation across sectors to boost FDI.

So far, VAR assumptions do not indicate the direction of the effect; so, there is hardly a way of knowing whether it is positive or negative. In addition, it does not specify how long the impact will persist, and it does not say whether or not this effect is direct or indirect. However, Granger causality in this thesis is utilized to support the results from the PVAR estimates, confirm the reaction to shocks of the responses, and determine the nature of the causal link between FDI, GDP per capita, and governance. In sum, the trivariate linear AR model for FDI, GDP per capita, and governance would be:

$$FDI_{it} = \sum_{j=1}^{p} \alpha_{1,j} FDI_{it-j} + \sum_{j=1}^{p} \alpha_{2,j} GDP_{it-j} + \sum_{j=1}^{p} \alpha_{3,j} GOV_{it-j} + e_{1it}$$

$$GDP_{it} = \sum_{j=1}^{p} \beta_{1,j} FDI_{it-j} + \sum_{j=1}^{p} \beta_{2,j} GDP_{it-j} + \sum_{j=1}^{p} \beta_{3,j} GOV_{it-j} + e_{2it}$$

$$GOV_{it} = \sum_{j=1}^{p} \gamma_{1,j} FDI_{it-j} + \sum_{j=1}^{p} \gamma_{2,j} GDP_{it-j} + \sum_{j=1}^{p} \gamma_{3,j} GOV_{it-j} + e_{2it} \qquad (4.20)$$

4.4.2 Impulse Response Functions (IRFs) and Structural VAR Models

It is generally known by researchers that interpreting the constants and the coefficients in a VAR model is tricky and even hard sometimes. An alternate way of interpreting these coefficients then is through the use of graphs called impulse response functions (IRFs). By analyzing the IRFs, great insights into how the system responds to specific shocks over time are gained, revealing the dynamic interactions between the variables. Simply put, IRFs are a key tool in analyzing the dynamic effects of shocks in a vector autoregressive model (Suliman & Mollick, 2009). They show how the variables in the system respond to a one-time unit shock to one of the endogenous variables while holding all other variables constant. The response is traced over time, indicating the impact of the shock on each variable at different time horizons.

The impulse response function is derived from the estimated VAR model. For simplicity, consider the basic reduced form trivariate VAR(p) model with three variables (see (4.6) and (4.7)), in which the contemporaneous effects are captured in Ω. The sense behind the IRFs is making a shock to Ω and looking at the dynamic propagation based on the MA representation of AR models:

$$Y_t = \varepsilon_t + \varphi_1 \varepsilon_{t-1} + \varphi_2 \varepsilon_{t-2} + \cdots + \varphi_p \varepsilon_{t-p} + \alpha_0 \qquad \text{(see (4.1))}$$

and differentiating with respect to ε_t:

$$\frac{\partial Y_t}{\partial \varepsilon_t'} = I_k, \quad \frac{\partial Y_{t+1}}{\partial \varepsilon_t'} = \varphi_1, \quad \frac{\partial Y_{t+2}}{\partial \varepsilon_t'} = \varphi_2, \ldots, \quad \frac{\partial Y_{t+p}}{\partial \varepsilon_t'} = \varphi_p \qquad (4.21)$$

for IRFs in the form of *k* x *k* graphs. I_k is the identity matrix.

A slight modification of the IRFs is the similar structural VAR model. Since this dissertation uses panel data, details on the panel form of structural VARs are necessary. Panel SVAR (PSVAR) is an econometric technique used to analyze the relationships between multiple time series variables in a panel dataset. Panel data is characterized by observations on multiple countries over time. The structural VAR model extends the standard VAR model by allowing for the identification of causal relationships among the variables. The general form of a Panel Structural VAR model for a panel of N individuals and T time periods can be represented as follows (see (4.8)):

$$Y_{i,t} = \Pi_1 Y_{i,t-1} + \Pi_2 Y_{i,t-2} + \cdots + \Pi_p Y_{i,t-p} + \phi X_{it} + \varepsilon_{i,t}$$

where $Y_{i,t}$ = *m* x 1 vector of endogenous variables, Π_j = *m* x *m* matrices of AR coefficients, *j* = 1, 2, …, p, X_{it} = *k* x 1 vector of exogenous variables, ϕ = *m* x *k* matrix of coefficients for exogenous variables, and $\varepsilon_{i,t}$ = vector of error terms.

4.4.3 Forecast Error Variance Decomposition (FEVD)

After fitting a VAR model, a variance decomposition or forecast error variance decomposition (FEVD) is employed to aid in understanding (Lütkepohl, 2007). The variance decomposition shows how much information each variable contributes to the other variables in the autoregression. It determines how much of the prediction error variation for each variable can be explained by external shocks to the other variables. FEVD is a structural analysis technique that breaks down prediction error variation into components from individual exogenous shocks.

FEVD is intuitively useful because it: shows the importance of a shock in explaining the fluctuations in the variables of the model; and demonstrates how that significance changes over time. For example, some shocks may not be responsible for short-term changes but may generate longer-term oscillations. FEVD can be used to explain how much different shocks, such as supply and demand shocks, technological shocks, or monetary policy shocks, contribute to business cycle fluctuations or long-term economic development. FEVDs, like IRFs, are typically graphically represented

as bar graphs or area graphs. The graph illustrates the distribution of the error variance across shocks to all variables at each time period. The FEVD of a multivariate, dynamic system indicates the relative importance of a shock to each innovation in altering the forecast error variance of all variables in the system. Therefore, the FEVD indicates the relative importance of each innovation in influencing the forecast error variance of all response variables in the system.

On the other hand, the IRF traces the impact of an innovative shock to one variable on the reaction of all variables in the system. Consider a VAR(p) model for the multivariate response variable y_t:

$$y_t = v + A_1 y_{it-1} + \cdots + A_p y_{t-p} + \epsilon_t \qquad (4.22)$$

with a VAR(1) matrix form: $Y_t = V + A y_{t-1} + U_t$ (4.23)

where y_t, v and u are *k*-dimensional column vectors. The mean squared error of the *h*-step forecast of variable *j* is:

$$\mathbf{MSE}\left[y_{j,t}(h)\right] = \sum_{i=0}^{h-1}\sum_{l=1}^{k}(e_j'\Theta_i e_l)^2 = \left(\sum_{i=1}^{h-1}\Theta_i\,\Theta_i'\right)_{jj} = \left(\sum_{i=0}^{h-1}\Phi_i\,\Sigma_u\Phi_i'\right)_{jj} \qquad (4.24)$$

and where e_l is the *j*th column of I_k and the subscript *jj* refers to that element of the matrix (selection vector of length); $\Theta_i = \Phi_i P$, where *P* is a lower triangular matrix obtained by a Cholesky decomposition of Σ_u such that Σ_u=PP', where Σ_u is the covariance matrix of the errors u_t; $\Phi_i = JA_iJ'$, where $J = [\mathrm{I}_k \quad 0 \quad \ldots \quad 0]$ so that *J* is a k by kp dimensional matrix.

The amount of forecast error variance of variable *j* accounted for by exogenous shocks to variable l is given by $\omega_{jl,h}$,

$$\omega_{jl,h} = \sum_{i=0}^{h-1}(e_j'\Theta_i e_l)^2 \Big/ MSE\left[y_{j,t}(h)\right] \qquad (4.25)$$

Here in equation (4.2.23), with m periods for the future for a one standard deviation innovation shock to y_{jt}, j stands for j variables, h for periods.

4.4.4 Panel Structural VAR

Although VAR models are simply used to analyze relationships between variables, they have developed into different techniques to provide insights into different issues. Panel structural VAR is one of those techniques and differs from the regular PVAR discussed throughout this thesis. Without indicating a causal framework, PVAR captures the short-term fluctuations and contemporaneous interactions between variables. PVAR assumes that the variables in the system are connected and have a direct impact on one another. It makes no mention of any specific causal connections between the variables. PVAR may or may not shed light on the causal connections between variables. Correlations and time lags form the basis of the relationships that were collected. IRFs, which display how one variable's shock impacts other variables in the system over time, can be produced through PVAR analysis. These answers, however, cannot be used to infer causal linkages directly. In short, PVAR models can only model a univariate variable and are used to examine the dynamic interactions between a set of macroeconomic variables.

PSVAR models, on the other hand, address the issue of structural analysis by allowing for the investigation of dynamic and concurrent interactions among a group of macroeconomic variables. They can consider observable regressors that might be general or individual-specific, as well as any lag length. Tuğan (2021) supports the use of structural analysis to PVAR models is made possible by the inclusion of interactive fixed effects in PVAR models. PSVAR models also make it possible to investigate problems like endogeneity, volatility, and changes in the direction of policy. This sentiment is shared by Pacifico (2019) in modeling endogeneity and volatility issues empirically applied to different economies.

Bilgili et al. (2021) hold that PSVAR offers a framework for analyzing how shocks affect different system variables and enables the separation of shocks into common and composite shocks. PSVAR expands the SVAR idea to a panel data context. It tries to reveal structural dynamics and causal links between variables in a panel dataset. PSVAR searches for these structural linkages while presuming that the

variables are impacted by underlying structural shocks. It entails giving the links among variables causal explanations. PSVAR seeks to pinpoint the underlying causal connections and offers perceptions into how variables react to structural shocks. This enables a subtler knowledge of the system dynamics. PSVAR analysis offers IRFs that depict how variables react to recognized structural shocks. These reactions can be understood as having a causal effect (Canova & Ciccarelli, 2013; Pedroni, 2013).

4.5 Panel Bayesian VAR Models

P-BVAR is a statistical model that extends the PVAR by incorporating Bayesian methods for parameter estimation and inference. Bayesian VAR models are particularly useful when dealing with limited data and parameter uncertainty. In a Panel BVAR, we assume a prior distribution for the parameters, and this is updated with the observed data to obtain the posterior distribution, which represents our updated beliefs about the parameters. The general form of a Panel Bayesian VAR (P-BVAR(*p*)) model for *p* lags with *N* cross-sectional units and *T* time periods can be represented as follows (see (4.8)):

$$Y_{i,t} = \alpha_i + \Pi_{1,i} Y_{i,t-1} + \Pi_{2,i} Y_{i,t-2} + \cdots + \Pi_{p,i} Y_{i,t-p} + \phi X_i + \varepsilon_{i,t}$$

where Y_{it} = K vector of endogenous variables for cross-sectional unit *i* at time *t*; *t* = 1, 2, …, *T*; ε_{it}= *K*-dimensional vector of error terms or residuals at time *t*, and it is serially correlated and Ω symmetric and positively definite; α_i = constant or intercept vector for cross-sectional unit *i*; Π_j = (*K*×*K*) matrices of lag coefficients (representing the contemporaneous effects of the lags specific to cross-sectional unit *i*); $Y_{i,t-j}$ are lags of the variables for cross-sectional unit *i*, *j* = 1, 2, …, p; and X_i is a matrix of exogenous variables for cross-sectional unit *i* and ϕ is a vector of coefficients for the exogenous variables.

$$y_{it} = \delta_0 + \sum_{j=0}^{p} \mathrm{A}_j y_{it-j} + \gamma X_t + \varepsilon_{it};\ \ \varepsilon_{it} \sim N(0,\ {\sigma_i}^2)\ or\ \varepsilon_{it} \sim N(0, \Sigma) \qquad (4.26)$$

Equation (4.26) is the general initial framework of Bayesian VARs and the introduction of the priors is based on the multivariate normal assumption on the ε_{it} which leads to a multivariate normal distribution for the matrix form of y_{it} (Y). Suppose:

$$y = vec(Y) \text{ and } \beta = vec(B),$$

Then $$vec(XB) = (I_M \otimes X)\beta \text{ and } (y|\beta, \Sigma) \sim N(I_M \otimes X)\beta, \Sigma \otimes I_T) \quad (4.27)$$

In the Bayesian framework, prior distributions are specified for the parameters, and the posterior distribution of the parameters is obtained by combining the prior information with the observed data. Markov Chain Monte Carlo (MCMC) methods, such as Gibbs sampling or the Metropolis-Hastings algorithm, are commonly used to draw samples from the posterior distribution. Bayesian VAR models offer several advantages, including the ability to handle small sample sizes, incorporate prior information, and quantify parameter uncertainty through credible intervals. Note that the specifics of the prior distributions, prior hyperparameters, and the MCMC algorithm used for estimation depend on the researcher's choice and the characteristics of the data. Bayesian VAR models have gained popularity in various fields, including economics, finance, and political science, where researchers seek robust and flexible methods for analyzing complex panel data.

The difference between standard VAR models and the Bayesian VAR is mainly the introduction of priors in the latter method. Some of the popular priors include the Litterman/Minnesota prior, Normal-Flat prior, Normal-Wishart prior, Independent Normal-Wishart prior, Sims-Zha priors, Giannone, Lenza, and Primiceri (GLP) prior. Based on Equations (4.26) and (4.27), the Litterman/Minnesota prior, for instance, is the normal prior on β with a fixed variance covariance (Σ). Doan, Litterman and Sims (1984); Litterman (1986) follow that the normal-Flat prior is a normal prior on $\beta|\Sigma$ and an improper prior for Σ; the normal-Wishart prior is a normal prior on $\beta|\Sigma$ and an inverse Wishart prior on Σ; the independent normal-Wishart prior is also a normal prior on β and an inverse Wishart prior on Σ. The Sims priors are of structural VAR equivalence in which Sims-Zha normal-flat is of the normal flat while

Sims-Zha normal-Wishart is of the normal-Wishart prior. Finally, the Giannone, Lenza and Primiceri prior is a prior that treats the hyperparameters as parameters that can be selected through an optimization procedure (Belmonte, Koop, & Korobilis, 2014; Giannone, Lenza, & Primiceri, 2015).

Table 4.6 Summary of Recent Articles Using Panel VAR Methodology

Authors	**Method**	**Insights**
Comunale (2022)	Bayesian PVAR	Macro-financial imbalances in EU countries
Tuğan (2021)	PVAR	PVAR model with interactive fixed effects that allows for dynamic and simultaneous interactions among macroeconomic variables
Miranda & Muinelo-Gallo (2019)	PVAR	Effect of exchange rate uncertainty on cereal exports using panel VAR
Chabeb & Boubaker (2021)	PVAR	Estimated the IRFs of liquidity on the Tunisian Stock Exchange (TSE)
Balcilar et al. (2021)	PVAR	Real housing prices and economic policy uncertainty
Albuquerque & Rajhi (2019)	PVAR	Effect of banking system stability on the sustainability of selected developing countries using panel data analysis
Polemis (2021)	PVAR	Economic growth and environmental degradation using a panel of US regions
Hovhannisyan & Sedgley (2019)	PVAR	The role of direct and indirect knowledge spillovers in 14 U.S. manufacturing industries
Poumie & Guivis (2021)	PVAR (GMM)	Energy transition, industrialization, and employment
Zhang (2019)	PVAR (PCBE)	Developed the PCBE method for PVAR models, which accounts for the international linkages between macroeconomic variables.

Notes: GMM stands for general moment method; PCBE for partial-correlation based estimation.

CHAPTER 5

RESULTS AND DISCUSSION

This chapter presents the empirical findings and analytical interpretations of the investigation of the dynamic linkages between FDI flows, economic growth, and governance. By synthesizing empirical results with theory, this chapter critically evaluates the identified interaction, offering valuable explanations into the linkages shaping CEMAC countries. To achieve this, this dissertation mainly uses the PVAR model (and Bayesian VAR model) for panel data of six countries over the period of 1990-2019. Panel SVAR and panel Bayesian VAR models are introduced as robust estimation methods for clearer interpretation of VAR estimates. Both robustness tests seek to fix problems encountered in standard VAR models. They are deemed necessary, although not sufficiently enough for VAR models. Hence, this thesis does not cover other robustness checks such as the reweighted multivariate least trimmed squares and the multivariate MM-estimation, which are meant to solve issues of outliers (Chang & Shi, 2022).

Other robustness measures are introduced differently throughout this chapter. For example, country income groups (INC), HIPC status (HIPC), and LDC level (LDC) are evaluated within the VAR analysis to explore variations in the dynamic relationships among the three core variables. Generally, anything that enables a researcher to assess the significance of one of your assumptions for an analysis is a robustness test. This is not just limited to “fancy” tests; this thesis considers adding exogenous/control variables and/or dummy variables, as well as testing for different lags as part of the robust modeling process. Miranda and Muinelo-Gallo (2021) use PVAR to investigate the effect of exchange rate uncertainty on cereal export flows by studying different sub-clusters based on high and low real effective exchange rate volatility, high and low levels of cereal export volume. Still using panel VAR,

Gourène and Mendy (2017) analyze the effect of financial inclusion on growth using two proxies for final inclusion.

5.1 Preliminary Results

5.1.1 Data, Sources and Sample Characteristics

This subsection of the analysis is composed of a panel dataset for a sample of six low, lower-middle, and upper-middle-income, HIPC and non-HIPC, and LDC and non-LDC CEMAC countries covering an interval of 1990-2019 at an annual frequency. With six cross-sections ($N = 6$) and a time dimension of a 30-year period ($T = 30$), the panel dataset still proves to be strongly balanced and hence suitable for a sensible econometric analysis. Sample characteristics are listed in Table 5.1. The specific countries in this sample are Cameroon, the C.A.R., Chad, Congo (Rep.), Equatorial Guinea, and Gabon. Data is available for these countries during the aforementioned period, and the study is based on the regional (Central Africa) organization's impact, determinants, and flow of FDI.

The data sources include the World Bank, the U.S. Energy Information Administration, the Heritage foundation, and the United Nations Population Division. Some measurements and proxies are direct, for example, FDI and GDP per capita, but governance is aggregated and a little complicated. Governance, for instance, is proxied by aggregating six other sub-dimensions. More complicated ones include debates about the exact measurement or representation of indicators such as GDP per capita for economic growth and population size for international market attractiveness (or market size). This thesis, however, maintains the variables as used in previous research journals and does not cover the debates on the representation of such variables. Just like the latter, introducing interaction terms in PVAR models is uncommon. This thesis delves into and explores the impact of the exogenous interaction effects of GDP per capita (growth or development) and population size (market size). This line of research has been recently explored by Di Serio (2018) and Zhang and Zhang (2022), especially using the PVAR methodology.

Only CEMAC countries were considered for this research, making a total of 180 observations across six countries over the span of 30 years each. Ten variables

altogether are included in this analysis, plus moderating (INC, HIPC, and LDC) and shock variables (1994 CFA devaluation and 2008 GFC). Only FDI flows, GDP per capita, and governance in the CEMAC sample were included in the main analysis (core model). Meanwhile, the subsamples such as income groups, LDC stage, and HIPC status were used for comparability of results, and the other seven variables were included for further exploration of the dataset such as unit root and serial correlation of panel dynamic OLS. Meanwhile, panel fully modified OLS (PDA, PDOLS, and PFMOLS, respectively) are also important but not covered in this thesis.

Details with respect to the core variables in this dataset include FDI inflow (FDI), economic growth (GDPPC), and governance (GOV). The aggregate governance variable includes indexes for the rule of law, government effectiveness, control of corruption, regulatory quality, voice and accountability, and political stability, all measured from -2.5 to 2.5, representing weak to strong, respectively. Population size is used here as a proxy for market size (MSIZE). This proxy is so far the most used for international market attractiveness, in other words, the market capacity to absorb demand for goods and services. Two kinds of dummy variables are utilized in the models. Income level, HIPC status, LDC development, and landlocked are dummies developed to evaluate the impact of graduating from HIPC, for instance, on the flow of FDI into the economies of CEMAC. Another similar variable, LDC, assesses the impact of country position or the level of development on the flow of FDI. With respect to the coding of INC (income level), for example, upper-middle-income countries receive a value of 0, and 1 for otherwise (lower-middle and low-income countries). Like INC, HIPC, and LDC take 0 for the variable and 1 for otherwise (low-lower-middle-income, non-HIPC, and non-LDC).

Table 5.1 Panel Dimensions and Time Periods

Sample	Period	N	T
CEMAC	1990 - 2019	6	180
LINC	1991 - 2019	4	60
LMINC	1992 - 2019	2	60
UMINC	1993 - 2019	2	60
HIPC	1990 - 2019	6	120
Non-HIPC	1991 - 2019	4	60
LDC	1992 - 2019	2	90
Non-LDC	1993 - 2019	3	90

Notes: T and N stand for the number of observations and cross-sectional dimension, respectively.

One more important aspect is the exploration of transforming the variables. This helps to eliminate exponential variance in the data. According to Lütkepohl and Xu (2012), transformations are frequently used in time series analysis to stabilize the variation of a series. They further argue that log transformation, in particular, stabilizes the variance of the underlying series, and using logs might be detrimental to forecast precision if a stable variance is not achieved. Although taking logs may be the first solution, it should be noted that some observations for FDI and all for governance (GOV) could be negative. Therefore, while some data for FDI is lost, all data for GOV is lost if direct logarithmic transformations are applied. Fortunately, Busse and Hefeker (2007) propose a way to transform such variables. FDI and GDPPC are transformed using natural logarithms, while GOV values are aggregated without logs. Table 5.2 presents a summary of the variables (and their sources) associated with the model.

5.1.2 Descriptive Statistics

Table 5.2 presents the summary statistics for the six CEMAC countries over the period of 1990-2019. The average for FDI based on all six countries for 1990-

2019 was $0.382 billion (*M = 0.382, SD = 0.75*); the maximum and minimum values were $4.42 and -$1.43 billion, both in the Congo (2017 and 2019), respectively. The average for GDPPC based on all six countries for 1990-2019 was $3,134.748 (*M = 3134.748, SD = 4594.81*); the maximum and minimum values were $22,942.60 and $166.18, in Equatorial Guinea (2008) and Chad (2000), respectively. The average for GOV based on all six countries for 1990-2019 was -1.1 points (*M = -1.1, SD = 0.3*); the maximum and minimum values were -0.2 points and -1.7 points, Gabon (2000) and Central African Republic (2014), respectively. All normal, log transformed and first difference GOV variables are positively skewed while first differenced log variables are negatively skewed.

Table 5.2 Descriptive Statistics of Core Variables

	Mean	**Std. Dev.**	**Max.**	**Min.**	**Skewness**	**Kurtosis**	**J-Bera**	**Prob.**	**Obs.**
Panel A: Untransformed variables									
FDI	0.382	0.75	4.42	-1.43	2.95	14.89	1321.17	0.000	180
GDPPC	3134.748	4594.81	22942.60	166.18	2.38	8.74	417.70	0.000	180
GOV	-1.077	0.30	-0.17	-1.71	0.89	3.40	24.94	0.000	180
Panel B: Transformed variables									
LnFDI	0.302	0.49	2.19	-1.16	1.40	6.12	131.87	0.000	180
LnGDPPC	7.204	1.29	10.04	5.11	0.42	2.15	10.68	0.005	180
LnGOV	-	-	-	-	-	-	-	-	-
ΔLnFDI	0.011	0.50	2.14	-3.33	-1.45	18.83	1877.87	0.000	174
ΔLnGDPPC	0.032	0.19	0.60	-0.63	-0.15	4.37	14.27	0.001	174
ΔGOV	-0.005	0.11	0.34	-0.34	0.15	4.77	23.34	0.000	174

Notes: While Table 5.1 shows the descriptive statistics of all 10 variables, the Mean, Standard Deviation, and Min and Max values are all in terms of units presented in Table 5.2. *Ln* and *D* is the abbreviation for natural logarithm and first difference.

5.2 Unit Root and Stationarity

It is critical to employ appropriate statistical procedures when dealing with seasonality in panel data in order to achieve trustworthy estimates and avoid drawing wrong conclusions. Thus, the choice of our methodology in Chapter 4 depends on the nature of our data, the research hypotheses, and the research questions outlined in Chapter 1. Seasonality in a time series means the presence of a unit root. Although removing a unit root is a precondition to most regression analyses, there are many complexities to deal with, especially when used in estimating short and long-term relationships. Vinod and Rao (2020) suggest that to address the issues posed by this underlying macroeconomic time series' likelihood of nonstationary, VAR models frequently differentiate or detrend their variables. Furthermore, for short time series, these models frequently produce inconsequential results. The lack of significance, however, could be a statistical artifact that prevents the identification of helpful economic signals important for short-term policy objectives.

It is generally the struggle by econometricians to create strategies to deal with issues brought on by nonstationary data. For instance, differencing the nonstationary data to establish stationarity is required for VAR. As a result, Vinod and Rao (2020) remark that pretesting for unit roots is necessary because differencing is only valid if the data have unit roots. It is common knowledge that any pretesting has an impact on the scope and strength of any subsequent statistical conclusion. Toda and Yamamoto (1995) made an effort to solve these issues. This section presents the results of the analysis of the dynamic relationships between FDI inflows, GDP per capita, and governance through the following process outlined for building the models: tests for unit root, VAR model order selection, cointegration tests, PVAR model estimation and diagnostics tests, and model robustness tests such as panel Bayesian VAR and panel structural VAR.

5.2.1 Stationarity and Trends in the Data Series

Seasonality in panel data refers to the presence of systematic patterns or fluctuations that occur at specific time intervals within each country over time. The presence of seasonal patterns can have a significant impact on the analysis of panel

data, and understanding and accounting for seasonality is crucial for accurate modeling and interpretation of results. Depending on the frequency of data, seasonality can manifest in various ways. This thesis presents annual patterns (with results of quarterly patterns shown only for VAR analysis).

As earlier remarked, time series data either show the presence of seasonality, cyclicality, or trend, or trend plus seasonality. Buteikis (2018; 3) holds that time series data are frequently guided by a (deterministic) trend and may have (deterministic) cyclical or seasonal components in addition to an irregular/remainder (stationary process) component. The ideal situation is to have no trend or deterministic component in the data. Most regression analyses, including VAR, for time series data require a stationary process. Figures A5.1-A5.8 show panel data for CEMAC countries for three core variables at levels, log and first differenced log transformed.

5.2.2 Test of Stationarity (panel unit root tests)

Also known as the smoothing test (Zhang & Zhang, 2022), unit root is a necessary precondition for the establishing PVAR models. Remember that it is necessary to check a priori for the presence of unit roots in panel data because the presence of unit roots in time series can lead to misinterpretation of estimated results. Adding the cross-section dimension to the time series dimension improves the power of tests for nonstationarity and cointegration since the cross-section enhances the data set used in these tests. However, the cross-section dimension raises some new issues, particularly the existence of cross-section dependency, which might bias traditional panel data unit root test results in small samples. Barreira and Rodrigues (2005) include a survey of panel unit root tests that demonstrate the most recent breakthroughs in the field, including those that account for the presence of contemporaneous cross-correlation as well as heterogeneous serial correlation.

Although EViews (2020) highlights a well-known challenge of many popular univariate unit root tests, namely as a lack of statistical power in the presence of small to medium-sized samples, numerous economic time series have short samples but are observed across many cross-sections. Therefore, multivariate unit root tests that combine results from different cross-sections or series offer improved statistical power compared to their univariate counterparts. However, Barreira and Rodrigues

(2005) note that cointegration tests have also received a lot of attention alongside the introduction of panel unit root testing. We provide a brief overview of the most commonly used cointegration tests. When a panel consists of both stationary and nonstationary time series, the standard battery of panel unit root tests appears insufficient.

Table 5.3 presents three (3) unit root tests (IPS, Fisher-ADF, and Fisher-PP), without and with trend, for the yearly panel of six countries from 1990-2019. Only the three main exogenous variables are shown in this section, with tests for the other seven (7) variables and sub-analysis for quarterly data for CEMAC presented in the appendix section. Table 5.7 also presents a panel unit root test, but it is more robust and reliable because of the presence of cross-sectional dependencies across the countries (see Table 5.5). For a theoretical understanding of both first and second generations of panel unit root tests (Hurlin & Mignon, 2007). In Tables 5.6 and 5.7, the variables FDI, GDPPC, and GOV were random walk processes and were all stationary at levels but stationary when differenced, both with constant and constant plus trend. The other tests for unit root on level and log-transformed data are shown in Appendix B.

Table 5.3 Panel Unit Root Tests (with constant and trend)

Sample	Variable	IPS	Fisher-ADF		Fisher-PP		Decision
			Fisher χ^2	Z-stat	Fisher χ^2	Z-stat	
CEMAC sample	ΔLnFDI	-8.339***	77.958***	-7.114***	829.046***	-25.546***	stationary
	ΔLnGDPPC	-4.179***	38.400***	-4.107***	73.712***	-6.579***	stationary
	ΔGOV	-6.024***	55.172***	-5.546***	675.444***	-22.490***	stationary
INC sample	ΔLnFDI	-5.496***	29.710***	-4.517***	361.458***	-18.085***	stationary
	ΔLnGDPPC	-2.311***	12.117***	-2.316***	18.348***	-3.265***	stationary
	ΔGOV	-3.739***	19.615***	-3.439***	245.288***	-13.044***	stationary
HIPC sample	ΔLnFDI	-6.327***	48.249***	-5.518***	467.588***	-18.499***	stationary
	ΔLnGDPPC	-3.483***	26.282***	-3.392***	55.364***	-5.749***	stationary
	ΔGOV	-4.734***	35.558***	-4.360***	430.156***	-18.321***	stationary
LDC sample	ΔLnFDI	-5.433***	36.042***	-4.731***	204.197***	-12.124***	stationary
	ΔLnGDPPC	-2.429***	16.027***	-2.464***	30.836***	-4.081***	stationary
	ΔGOV	-3.823***	24.955***	-3.547***	393.468***	-17.923***	stationary

Notes: INC stands for income groups, HIPC for heavily indebted poor countries, LDC for least developing countries.

5.2.3 Panel Unit Root Test (second generation)

In Table 5.4, stationarity of the series for economic growth (GDPPC), FDI inflows (FDI), and governance (GOV) is examined both with and without a linear trend. While the results for t_{HS} and t_{DH} are dependent on whether the series are detrended or centered by removing the first observation (only for the intercept scenario), t_{HMW}'s results are more dependable because it is quite likely that the series have nonzero linear trends and are heteroskedastic. In Table 5.4, a summary of the 'xtpurt' command (Demetrescu & Hanck, 2012; Herwartz, Maxand, & Walle, 2019; Herwartz & Siedenburg, 2008) for panel unit root test on STATA, the results for t_{HS}, t_{DH} and t_{HMW} suggest failing to reject the null hypothesis at the 5% significance level. This implies that FDI, GDPPC, and GOV have a unit root. Thus, FDI, GDPPC, and GOV are trend stationary for CEMAC countries during 1990 to 2019.

Table 5.4 Panel Unit Root with Three Heteroskedasticity-Robust PURTS

	Intercept			**Intercept and trend**		
	FDI	**GDPPC**	**GOV**	**FDI**	**GDPPC**	**GOV**
t_{HS}	-0.734	-0.341	-0.098	-0.464	0.733	0.213
t_{DH}	-0.917	0.308	0.201	-2.053*	1.716	0.133
t_{HMW}				-0.228	1.514	0.571

Note: t_{HS} and t_{DH} are not robust to heteroskedasticity with trend; *5% sig. level.

However robust the PURTS may seem, more popular and clearer alternatives exist, especially consider the presence of cross dependence in the panels. Recall that according to recent research, unit root tests based on panels have greater power than those based on individual time series. Although EViews has five (different independent cross-section) types of panel unit root tests (Breitung & Das, 2005; Choi, 2001; Hadri, 2000; Im, Pesaran, & Shin, 2003; Levin, Lin, & Chu, 2002; Maddala & Wu, 1999), this section uses the LL, IPS and MW panel unit root tests for all the variables including FDI inflows (FDI), Governance (GOV) and GDP per capita (GDPPC). Note that cross-sectional independence is necessary for all of these tests

(EViews, 2020). The EViews users guide still remarks that although these tests are frequently referred to as panel unit root tests, they are actually just multiple-series unit root tests that have been applied to panel data structures (where the existence of cross-sections produces many series from a single series). As a result, EViews supports these tests in scenarios involving several series; as a series view, a group view, or a pool view (if the Workfile is panel structured). The results for the other 7 variables are shown in Appendix B.

Table 5.5 presents the second-generation unit root test for the three main variables. The results show that the CIPS statistic values for the logs and first difference log variables far below the critical values at the 10%, 5%, and 1% significance levels. Thus, the null hypothesis of a unit root process for the variables is rejected for the first difference log variables and failed to reject for the log variables (at levels), considering cross section dependence.

Table 5.5 Panel Unit Root Test Assuming CSD

		CIPS				
		Constant			**Constant & trend**	
		critical values	**CIPS statistic**		**critical values**	**CIPS statistic**
LnFDI	1%	-2.570	-3.658	1%	-3.100	-3.904
	5%	-2.330		5%	-2.860	
	10%	-2.210		10%	-2.730	
LnGDPPC	1%	-2.570	-1.673	1%	-3.100	-1.659
	5%	-2.330		5%	-2.860	
	10%	-2.210		10%	-2.730	
GOV	1%	-2.570	-2.331	1%	-3.100	-2.432
	5%	-2.330		5%	-2.860	
	10%	-2.210		10%	-2.730	
Δ*LnFDI*	1%	-2.570	-5.930***	1%	-3.100	-6.088***
	5%	-2.330		5%	-2.860	
	10%	-2.210		10%	-2.730	
Δ*LnGDPPC*	1%	-2.570	-5.121***	1%	-3.100	-5.656***
	5%	-2.330		5%	-2.860	
	10%	-2.210		10%	-2.730	

	CIPS					
		Constant			Constant & trend	
		critical values	CIPS statistic		critical values	CIPS statistic
Δ*GOV*	1%	-2.570	-5.936***	1%	-3.100	-6.042***
	5%	-2.330		5%	-2.860	
	10%	-2.210		10%	-2.730	

Notes: CIPS stands for Pesaran's PURT or cross sectionally dependent PURT; CIPS assumes cross-section dependence is in the form of a single unobserved factor; H0 (homogeneous non-stationary): b*i* = 0 for all *i* (series is I(1)); chosen deterministic components are both constant and constant with trend.

5.2.4 Correlation Matrix

In addition to Subsection 5.2.2 on cross-sectional dependence, it is vital to assess the correlation among countries and between variables. Recall that this study investigates the determinants of FDI inflows in six CEMAC countries during 1990-2019. The correlation between these variables is done for the log variables and the first difference variables. For the logs, all variables are in logs except governance (GOV). Table 5.6 presents the correlation results with the VIF statistics for variables at level, log, and first difference-log shown in three panels. Panel B evaluates the null hypothesis of no correlation among countries. Going by Panel B, LM, LM adj*, Pesaran, Ullah and Yamagata (2008), and LM CD* *cannot* reject the null hypothesis of "no correlation among the countries" for all *t* at the 1% level of significance (Pesaran, Ullah, & Yamagata, 2008), and xtcsi test on STATA (H_0: $Cov(\mu_{it}, \mu_{jt}) = 0$ for all *t* and $i \neq j$).

With respect to the correlation between variables, Yameogo, Omojolaibi and Dauda (2021) reiterate that the correlation analysis is performed to avoid multicollinearity among the variables, which may result in erroneous results. The Variance Inflation Factor (VIF) was also used as a correlation test to confirm the results of the previous test. The computed VIF value is 1.45 for the log variables and 1.57 for the first difference variables, both of which are quite low. This suggests that there is no multicollinearity among FDI, GDPPC, and GOV. The correlation results show a positive association between LnFDI, LnGDPPC, and GOV, and GOV and LnGDPPC; and among DLnFDI, DLnGDPPC, and DGOV; and DGOV and DLnGDPPC. Furthermore, DLnFDI and DGOV show a moderate association. See Table A5.6 for the correlation between the core variables and seven other variables.

Table 5.6 Correlation Matrix and VIF Statistics

Panel A	**LnFDI**	**LnGDPPC**	**GOV**		**ΔLnFDI**	**ΔLnGDPPC**	**ΔGOV**
LnFDI	1			ΔLnFDI	1		
LnGDPPC	0.402***	1		ΔLnGDPPC	0.135*	1	
GOV	0.125*	0.559***	1	ΔGOV	0.049	0.602***	1
VIF		1.45	1.45			1.57	1.57
Mean VIF		1.45				1.57	

Notes: *, **, *** denote 10%, 5%, 1% significance levels, respectively; See Panels B and C in Table A5.13 in the appendix for the Bias-adjusted LM test of error cross-section independence where ¡ stands for two-sided test.

5.2.5 Westerlund Panel Cointegration Test

This subsection simply tests for a linear relationship between FDI, GDP per capita, and governance. Panel cointegration techniques are used to test for long-run relationships among integrated variables with both time-series and cross-sectional dimensions. The most influential theoretical contributions within this category are those of (Pedroni, 1999, 2004). Despite several tests, including the Westerlund cointegration test designed for this purpose, Pedroni (1999, 2004), Kao (1999), and Johansen-Fisher cointegration tests do not account for cross-sectional dependency among the cointegration tests. However, Westerlund Error Correction does. Westerlund (2007) presents new cointegration tests for time series and analyzes their asymptotic properties. It also presents a Monte Carlo study and an empirical application.

This thesis, therefore, opted to utilize this test since it accounts for cross-sectional dependence. The application of this test is also possible when there is no cross-sectional dependency. The bootstrap distribution is used when there is cross-sectional dependency in the series, while the ordinary normal distribution is used when there is not. Additionally, note that if the series is integrated at the $I(1)$ level, this test is appropriate. Westerlund (2007) identifies and explains four (Gt, Ga, Pt, and Pa) panel cointegration tests. The fundamental notion of these tests is to check whether or not cointegration exists by identifying whether or not each panelist is error-correcting. The short-run component of the error-correction model can be determined from the data, so the researcher is not forced to make any difficult decisions. The command, xtwest, is very flexible and permits an almost entirely heterogeneous specification of both the long-run and short-run components. “xtwest” also includes a bootstrap(n) option to prevent incorrect inference in case of cross-member correlation (Persyn & Westerlund, 2008; Westerlund, 2005, 2007). Westerlund (2005) has a set of VR test statistics that were constructed for the null hypothesis of no cointegration. The default test employs a model whose alternative hypothesis is that the series in part of the panels is cointegrated, and whose AR parameter is panel-specific.

Westerlund (2005) argues that the results of a test, in which the alternative hypothesis is that the series in all the panels are cointegrated, are obtained by using

the all-panels option. For this test, a model is used in which the AR parameter is constant across the panels. One lead, q*i* = 1, is used and the Westerlund-based panel cointegration tests with lags 1-3 (h*i* = 1 to 3). In addition, the width for the Bartlett kernel window is set to 3 ($4(T/100)^{2/9} = 3.061 \approx 3, \text{where } T = \text{number of years}$). The minimum AIC was used to determine the lead and lag orders. Cointegration tests are run with a trend and a constant, a trend but no constant, and a constant alone. After testing for cross-sectional dependence among the residuals, the robust *P*-values obtained after bootstrapping using 800 replicates (although some STATA versions take no more than 400) can be taken into consideration. The STATA code used to test this begins with "xtwest". Note that the Stata command "xtwest" is not official (Persyn & Westerlund, 2008).

In Table 5.7, the Gt, Ga, Pt, and Pa test statistics do not show that the null hypothesis can be rejected (fail to reject "no cointegration"). Thus, the *P*-values indicate that the null hypothesis (no cointegration) cannot be rejected, at least for the majority of the tests ($P > 0.01$), for the FDI inflows (LnFDI), GDP per capita (LnGDPPC), and governance (GOV) equations. All of these are estimated in all three scenarios: without constant and trend, with constant, and with constant and trend. The introduction of the two latter terms still makes the test statistics non-significant at the 1%, 5%, and 10% levels. The Westerlund cointegration test, shown in Table 5.7, fails to reject the null hypothesis that there is "no cointegration" between FDI inflows, GDP per capita, and governance for all the statistics once it has been established that the variables are I(1). When considering cross-dependence in the panel, regardless of the specification of the deterministic component, the conclusion is that there is "no long-run equilibrium relationship" between the variables.

Apart from the Westerlund test for cointegration, the Johansen test is also is widely used and considered in this section. Like Menegaki (2019), a number of non-stationary time series data are tested for panel cointegrating relationships using four different methods, namely: the Kao, the Pedroni, the Johansen, and the Westerlund test. Although the Johansen method has been developed to the Johansen-Fisher method, developed by Maddala and Wu (1999), the most recent Westerlund and the simple Johansen are applied here. The Johansen test allows for more cointegrating relationships than the Engle-Granger test does. Unlike the Engle-Granger test, which

is based on the Dickey-Fuller (or the enhanced) test for unit roots in the residuals from a single (estimated) cointegrating connection, this test allows for more than one cointegrating relationship and is therefore more broadly applicable (Davidson, 2002; Davidson, Thornton, & Hashimzade, 2013). So, for robustness, this subsection implements both the Johansen and Westerlund cointegration tests (Table 5.7).

Table 5.8 shows the Johansen's trace and maximum eigenvalue cointegration test, with the null representing "no cointegration." These trace and max tests statistic show three hypotheses with statistic, critical, and *p*-values. In the first hypothesis, $r = 0$, there is strong evidence not to reject the null hypothesis of no correlation at the 5% level of significance for two lags (k = 2). Likewise, for the second and third hypotheses, $r \leq 1$ (at least one cointegrating relationship) and $r \leq 2$ (at least two cointegrating relationships), there is insufficient evidence to reject the null hypothesis of no correlation at the 5% level of significance. In other words, there is no cointegrating relationship between LnFDI, LnGDPPC, and GOV. Therefore, it is possible to have linear cointegration with all three variables to form a cointegration relationship. Table 5.9 is based on the Johansen's trace and max eigenvalues tests. The results here reveal the absence of cointegration between the three variables at the 5% level of significance.

Table 5.7 Westerlund Tests for Panel Cointegration

Model/Equation	Test/Statistic	No constant & no trend			Constant			Constant & trend		
		Value	Z-value	P-value	Value	Z-value	P-value	Value	Z-value	P-value
LnFDI	*Gt*	-1.968	-1.370	0.085	-2.088	-0.142	0.444	-2.535	-0.018	0.493
	Ga	-6.115	-0.131	0.448	-5.905	1.257	0.896	-1.896	1.562	0.941
	Pt	-3.265	-0.730	0.233	-6.337	-2.073	0.019	-5.943	-0.377	0.353
	Pa	-6.955	-2.227	0.013	-11.034	-2.264	0.012	-12.431	-0.704	0.241
LnGDPPC	*Gt*	-0.664	1.677	0.953	-2.424	-1.034	0.151	-2.210	0.927	0.823
	Ga	-1.426	1.970	0.976	-4.691	1.731	0.958	-3.937	3.239	0.999
	Pt	-2.348	-0.040	0.484	-3.135	1.028	0.848	-4.409	1.324	0.907
	Pa	-1.193	0.653	0.743	-2.508	1.471	0.929	-3.256	2.621	0.996
GOV	*Gt*	-1.139	0.567	0.715	-2.056	-0.055	0.478	-2.865	-0.982	0.163
	Ga	-2.838	1.337	0.909	-4.996	1.612	0.947	-6.238	2.471	0.993
	Pt	-1.976	0.240	0.595	4.006	0.184	0.573	-5.732	-0.141	0.444
	Pa	-1.773	0.363	0.642	-5.831	0.015	0.506	-8.799	0.612	0.730

Notes: Westerlund ECM panel cointegration tests: Gt, Ga, Pt, and Pa; H0: no cointegration; “xtwest” test for cointegration, using the AIC to choose the optimal lag and lead lengths for each series (With 6 series and 2 covariates; Average AIC selected lag length: 1.5; Average AIC selected lead length: 1). The STATA codes for the Westerlund tests are as follows: xtwest lnfdi lngdppc gov, lag (1 3) leads (1) lrwindow(3).

Table 5.8 Johansen Cointegration Test

	Hypothesis	**Eigenvalue**	***J trace***	***J max***	**Result**
Cameroon	$r = 1$	0.412	24.141	14.328	
	$r \leq 1$	0.260	9.813	8.143	VAR
	$r \leq 2$	0.060	1.670	1.670	
C. A. R.	$r = 1$	0.540	28.023	20.994	
	$r \leq 1$	0.207	7.029	6.278	VAR
	$r \leq 2$	0.027	0.751	0.751	
Chad	$r = 1$	0.480	27.464	17.671	
	$r \leq 1$	0.286	9.793	9.099	VAR
	$r \leq 2$	0.025	0.694	0.694	
Congo, Rep.	$r = 1$	0.551**	30.737**	21.649**	
	$r \leq 1$	0.279	9.088	8.836	VECM
	$r \leq 2$	0.009	0.253	0.253	
Eq. Guinea	$r = 1$	0.634**	33.721**	27.145***	
	$r \leq 1$	0.134	6.576	3.872	VECM
	$r \leq 2$	0.095	2.704	2.704	
Gabon	$r = 1$	0.187	8.266	5.589	
	$r \leq 1$	0.094	2.678	2.664	VAR
	$r \leq 2$	0.000	0.013	0.013	

Notes: *p*-values in parentheses; trace and maximum eigenvalue statistics for country-by-country; and lags interval: 1 to 2.

Table 5.9 Johansen Cointegration Test for the Core Variables

Hypotheses	**Eigenvalue**	***J trace***	***J max***
$r = 0$	0.118	24.384	20.257
		(0.185)	(0.066)
$r \leq 1$	0.014	4.127	2.282
		(0.893)	(0.983)
$r \leq 2$	0.011	1.845	1.845
		(0.174)	(0.174)

Notes: *p*-values in parentheses; significance at 5%; trace and maximum eigenvalue statistics (unrestricted cointegration rank test) statistics; and lags interval: 1–2. Asteriou and Hall (2021) argue that although popular selection approach favors selecting AIC as the suitable model, by calculating the number of delays recommends using the SBC criterion with both SIC and AIC still considered as both criteria different lags (Dolado, Jenkinson, & Sosvilla-Rivero, 1990).

5.2.6 Lag Order Selection Criteria from PVAR Model

Selecting the appropriate lag length in a VAR model is essential to ensure accurate and reliable results. Although there are several criteria commonly used for VAR lag length selection, only four are presented here: FPE, AIC, SC, and HQ (Bierens, 2004). First, the AIC considers the goodness of fit of the model and penalizes for the number of parameters estimated. The VAR model with the lowest AIC value is preferred. Second, the Bayesian Information Criterion, BIC, balances the model fit and complexity but penalizes more heavily for the number of parameters. It is also known as the Bayesian Schwarz criterion (BSIC), derived from the Bayesian framework. In both the AIC and BIC, the VAR model with the lowest value is favored. Third, the Hannan-Quinn Information Criterion (HQIC) is a modification of AIC that penalizes differently for the number of parameters. It typically falls between AIC and BIC in terms of the degree of penalty. Finally, the Final Prediction Error,

FPE, considers model fit and penalizes for the number of parameters. It is based on the variance of the forecast errors and aims to minimize the prediction error.

Apart from these four tests (all easily provided in EViews), sequential testing approach which involves estimating VAR models with different lag lengths and then conducting statistical tests (e.g., likelihood ratio tests) to determine the most appropriate lag length. In addition, visual inspection by plotting the autocorrelation and partial autocorrelation functions of the residuals can also provide insights into the appropriate lag length. The lag length at which the correlations are no longer significant can be a candidate for the optimal lag length. Knowing that our variables are $I(1)$, assessing the models is ideal and fair under the unit root or stationarity condition. In the computation of the information criteria, the VAR models are estimated using mostly two lags and one lag based on AIC-FPE and SIC-HQ conditions, respectively. In Section 5.4, the results for some models will be shown across samples for CEMAC, HIPC, LDC, and INC. The modeling process starts with the selection of lag order to include in the VAR system. The results show that a panel VAR of order one appropriate based on the SIC-HQ criteria (see Table 5.10).

These differences in lag orders for the models using the four criteria lag selection criteria are not new. Ivanov and Kilian (2001) amplify this sentiment by presenting a study that addresses the problem of deciding the lag order of the VAR model. According to Ivanov and Kilian, dealing with this issue is critical because it may have an impact on the substantive conclusions reached from empirical VAR investigations. This and many other properties qualify a lag order to be selected. Lütkepohl (2005) highlights that a needlessly large value for p will lower the predicted VAR(p) model's forecasting accuracy. Lütkepohl also outlines propositions for investigating the consistency criteria for lag order determination (Hannan & Quinn, 1979; Paulsen, 1984; Quinn, 1980). Thus, based on the argument and propositions in Lütkepohl, HQ and SIC are two consistent criteria. In fact, HQ-SC model is more parsimonious than the AIC model. For more on information criteria, see Bierens (2004).

It is essential to consider multiple criteria while selecting the lag length to avoid choosing a model that overfits the data or underutilizes relevant information. The selected lag length should strike a balance between model complexity and

capturing the underlying dynamics of the data. Automatic model selection procedures, such as the "VARselect" function in statistical software packages like R or Python, can help efficiently explore various lag lengths and identify the most suitable one based on the chosen criteria. Additionally, subject-matter knowledge and economic theory can also guide the selection process by providing insights into the underlying relationships and dynamics among the variables in the VAR model.

In Table 5.10, the values of all our main criteria (FPE, AIC, SIC, and HQ) for FDI inflows, GDP per capita, and governance are reported. Both the AIC and FPE criteria in the range of 2–7 lags minimum for two ($\hat{p}(AIC) = \hat{p}(FPE) = 2; 7$) and both SIC and HQ reach their minimum for two lags, that is, $\hat{p}(SIC) = \hat{p}(HQ) = 1$. Although SIC often underestimates the true VAR order, Lütkepohl and Saikkonen (1997, 2000) argue that the forecasts with the SIC models are generally the best, especially for T = 30. With this long and difficult choice, this study suggests performing analyses based on both sets of criteria, that is, two lags from the FPE and AIC and one lag from the SIC and HQ criteria and compare the estimates obtained for both PVAR and Bayesian VAR. To settle this argument, this dissertation further examines the sensitivity of panel VAR estimates using different lag structures (Hafer & Sheehan, 1989). However, only estimates of VAR with one lag are shown in the main results section with those for two and seven lags in Appendix B.

Table 5.10 Estimation of the VAR Lag Order

Model	Sample	Selection criteria				Lag selection
		FPE	AIC	SC	HQ	
Model 1	CEMAC	2	7	1	2	1, 7
	LDC	7	7	1	2	1, 7
	HIPC	7	7	2	2	1, 7
	INC	2	2	2	2	1, 2
Model 2	CEMAC	2	2	1	2	1, 2
	LDC	7	7	1	7	1, 7
	HIPC	3	8	1	2	1, 8
	INC	5	5	1	5	1, 5
Model 3	CEMAC	1	1	1	1	1
	LDC	5	5	1	5	1, 5
	HIPC	2	5	1	1	1,5
	INC	4	4	1	4	1, 4

Notes: Lags for Models 4–18 are not shown here; 162 observations included; * and values in bold indicate the minimum lag order selected by the criterion; LR, FPE, AIC, SC/SBIC, and HQ stand for sequential modified LR test statistic, final prediction error, Akaike information criterion, Schwarz information criterion, and Hannan-Quinn information criterion, respectively.

5.2.7 Cross Sectional Dependence

Every country is unique in its own way. Menegaki (2019) amplifies this view by arguing that each economy's structure is unique, as is its level of growth, flow of FDI, and governance structures. Although pertaining to the energy-growth nexus, Menegaki warns that the similarities and homogeneity that exist among the countries should not be overlooked or taken for granted. Hence, Tugcu (2018) and Menegaki and Tugcu (2017) argue that panel unit root and cross-sectional dependence are the most significant diagnostics that a researcher should evaluate before conducting a panel data analysis.

A cross-sectional dependence test assisted in determining whether to utilize first-generation or second-generation panel unit root tests. All four tests performed in EViews were applied here, *viz*: Breusch-Pagan LM, Pesaran scaled LM, Bias-corrected scaled LM, and Pesaran CD. Table 5.11 presents the results of cross-sectional dependence and the results suggest rejection of the null hypothesis. Recall that the null hypothesis states that there is "no cross-sectional dependence" or "cross-section independence", and the results show otherwise. There is cross-sectional dependence among FDI, GDPPC, and GOV at the 1% significance level for the Breusch-Pagan LM, Pesaran scaled LM, and Bias-corrected scaled LM (and Pesaran CD, except DGOV) tests.

This indicates that there is some dependency among CEMAC countries, validating the suitability of the first-generation panel unit root tests for this study. In other words, the null hypothesis is rejected, and this implies that data are correlated across countries. With this in mind, the second-generation panel unit root tests (see Table 5.4), instead of the usual first-generation tests (see Table 5.3), are needed to proceed to the core analyses. However sophisticated the second-generation tests are, this section will present both panel unit root tests. Note again that both generations of tests are presented for the CEMAC sample and the sub-samples. The exceptions in Table 5.3 are the absence of the other seven variables. Hence, only the three endogenous variables were presented for log and first differences of the variables. In both Tables 5.3 and 5.4, all the variables, both for the full sample and the sub-samples, were presented. The results in Table 5.6 show that all the log variables were nonstationary at levels and constant plus trend. Meanwhile, the first difference

variables were all stationary with a constant and constant plus trend. The analysis for trend was tested just because of the nature of time series data. Fortunately, both all proved to be stationary. See Section 5.2.2.

5.2.8 PVAR Residual Serial Correlation using LM Test

This subsection starts with the estimation of a small model for three variables, namely: foreign direct investment inflows (FDI), gross domestic product per capita (GDPPC), and governance (GOV). The objective here is to assess the model's attributes and consistency with empirical evidence. As such, the description of the model's behavior in response to FDI, economic growth, and governance is detailed here. Data on these variables and seven (7) others for CEMAC countries from 1990-2019 were used for the main analyses. Although the consequences of underestimating the VAR lag order is more serious than over-estimating it (Ivanov & Kilian, 2001), this subsection proceeds with the investigation of the presence of serial correlation using a PVAR(1) and PVAR(2; 7). Table 5.12 reports the results of the LM test for values of h and (h+1). All the p-values in this table exceed 5%, meaning neither of the tests finds strong evidence for remaining residual autocorrelation. One thing to note about the lag order selection, as recommended by Ouliaris, Pagan and Restrepo (2016), is that a VAR(2) in the case of FPE and AIC can collapse to a VAR(1) only if errors in the system have serial correlation.

Table 5.11 Cross Section Dependence

CEMAC sample	Breusch-Pagan LM	Pesaran scaled LM	Bias-corrected scaled LM	Pesaran CD
LnFDI	46.866***	5.818***	5.714***	5.595***
LnGDPPC	310.168***	53.890***	53.787***	17.315***
GOV	82.858***	12.389***	12.286***	3.195***
ΔLnFDI	43.888***	5.274***	5.167***	-2.646***
ΔLnGDPPC	134.110***	21.746***	21.639***	11.141***
ΔGOV	117.978***	18.801***	18.694***	0.654***

Notes: *** represents statistical significance at the 1% level; the cross-section test for dependence is abbreviated CD test.

Table 5.12 Autocorrelation Tests (PVAR(1))

Test	**LRE test**			**Rao F-test**		
Panel A: Null hypothesis - No serial correlation at lag h						
h	**test value**	**df**	**p-value**	**test value**	**df**	**p-value**
1	12.451	9	0.189	1.394	(9, 365.2)	0.189
2	15.121	9	0.088	1.699	(9, 365.2)	0.088
3	15.647	9	0.075	1.759	(9, 365.2)	0.075
4	15.930	9	0.068	1.792	(9, 365.2)	0.068
5	12.758	9	0.174	1.429	(9, 365.2)	0.174
6	15.218	9	0.085	1.710	(9, 365.2)	0.085
7	5.781	9	0.762	0.641	(9, 365.2)	0.762
8	25.962	9	0.002	2.960	(9, 365.2)	0.002
Panel B: Null hypothesis - No serial correlation at lags 1 to h						
h+1	**test value**	**df**	**p-value**	**test value**	**df**	**p-value**
1	12.451	9	0.189	1.394	(9, 365.2)	0.189
2	21.612	18	0.250	1.209	(18, 416.3)	0.250
3	40.748	27	0.044	1.537	(27, 421.2)	0.044
4	62.817	36	0.004	1.804	(36, 417.3)	0.004
5	80.293	45	0.001	1.863	(45, 410.7)	0.001

Test	LRE test			Rao F-test		
Panel A: Null hypothesis - No serial correlation at lag h						
h	**test value**	**df**	**p-value**	**test value**	**df**	**p-value**
6	91.161	54	0.001	1.767	(54, 403.1)	0.001
7	95.088	63	0.006	1.570	(63, 394.9)	0.006
8	116.042	72	0.001	1.701	(72, 386.4)	0.001

Notes: This table shows serial correlation for lag 1 (SIC) and lag for AIC criteria. A probability of less than 5 represents the presence of serial correlation; 162 observations included; * in LRE stat indicates the Edgeworth expansion corrected likelihood ratio statistic.

Table 5.12 shows the test of serial correlation for the residuals. The computed VAR model's residuals are subjected to the serial correlation LM test in order to determine whether the lag length is sufficient. It is often advised to start with the largest lag length and then reduce it by removing the smaller lags. The smallest lag length is 1 and, as shown in Table 5.12, the probability value of lag 1 is greater than 0.05. Thus, we fail to reject the null hypothesis of "no serial correlation" in the residuals at the 10%, 5%, and even 1% significance levels. For lags 2 and 3, the probability value is less than 0.05. Therefore, reject the null hypothesis and accept the presence of serial correlation in the residuals at the 10% significance level. Therefore, the determined lag length is one (1) and it is statistically sufficient.

The serial correlation is removed with the first and second lags. Figure 1.1 shows the stability of the PVAR(1) model for FDI, GDPPC, and GOV. Recall that for a process to be stable, the eigenvalues must have a modulus less than one. Eigenvalues have modulus less than one ($A_1 < 1$) where $\det(I_k - A_1 z) \neq 0$ for $|z| \leq 1$. The roots of the reverse characteristic polynomial were obtained by finding the roots for the determinant det L = $L = (I_k - A_1 z)$. The process would be stationary if $|z| > 1$ all roots (see Sharp (2010)). This condition means that the process is stable if the reverse characteristic polynomial has no roots in or on the complex unit circle (Lütkepohl, 2005). If all of the roots of the reverse characteristic polynomial were greater than unity, the VAR(1) process was stationary. According to Sharp (2010), it is then necessary to assess the process's reverse characteristic polynomial in order to ascertain whether or not the process was nonstationary. Based on these assumptions, the PVAR(1) process is a stable process.

5.3 PVAR Model Estimation

This section uses the VAR model to capture the interdependencies and dynamic relationships among 10 variables over the period of 1990−2019. The introduction of the VAR framework by Sims (1980) has presented an alternative to the regular macro-econometric analyses (Lütkepohl, 2005). With the strengths of the VAR over other methods, the VAR class of models presents a different challenge in its interpretation. This subsection presents and interprets the PVAR and the Bayesian

VAR systems. Although the consequences of underestimating the VAR lag order are more serious than overestimating it (Ivanov & Kilian, 2001), this subsection proceeds with the estimation of Model 1 and the investigation of the presence of serial correlation using a PVAR(1) and PVAR(2). Table 5.12 reports the results of the LM test for values of *h* and (*h+1*). All the *p*-values in this table exceed 5%, meaning neither test finds strong evidence for remaining residual autocorrelation. One thing stressed by Ouliaris, Pagan and Restrepo (2016) is that a VAR(2) in the case of FPE and AIC can collapse to a VAR(1) only if errors in the system have serial correlation. However, as part of the model specification robustness test, Table 5.10 shows only results for both lag one and lag 2 based on the FPE and AIC, as well as SC and HQ outcomes, respectively, with those for other subsamples shown in the appendix.

The risk in this section is getting too much into the multiplicity of possible or infinite number of VAR models from the three endogenous and seven exogenous variables. Agung (2009) opines that the possible models could range from considering all 10 variables as endogenous to different transformations such as natural logarithms, first differences, first difference of logs, and the lagged exogenous variables. Anyway, Agung cautions that it is important to be cautious of the unpredictable statistical outcomes when utilizing many or a high number of independent variables in any model, including VAR models. The following models will be compared for the most preferred model to be used for subsequent tests such as impulse responses, variance decompositions, and forecasting.

5.3.1 Baseline Model

Table 5.13 shows the results of the baseline model (Model 1) applied to the CEMAC sample and PVAR for subsamples (INC, HIPC, and LDC), indicating the varying impacts of lagged variables across the equations for FDI, GDP per capita, and governance. The lagged FDI and GDP per capita play a significant role in influencing FDI and GDP per capita equations, while lagged GDP per capita and governance significantly affect the governance equation. These findings provide valuable insights into the interplay of these variables within the VAR system. To put it quite clearly, the significant coefficient of 0.379 means a significantly positive relationship between FDI_{it} and FDI_{it-1}, and this suffices a rise in the inflow of FDI in the previous year

leads to more FDI inflow in the present year. Note that onwards, the models are numbered based on the CEMAC sample with those of the subsamples seen as sub-models under the main model. For instance, Table 5.13 shows just one model (Model 1) for the CEMAC sample and this model will be compared with subsequent models for model stability, normality, as well as serial autocorrelation in order to choose the best model for further analysis.

Hypothesis 1 (see Section 4.3.1) suffices changes in a country's governance quality (or GDP per capita) are found to have a statistically significant effect (at least in the short-term) on a country's economic impact measured by GDP per capita and its ability to attract FDI. The results show that the response of GDP per capita to FDI inflow is positive and statistically significant ($\beta_{12} = 0.113$, $p < 0.000$). FDI and economic growth are interdependent and determinants of each other with an endogenous relationship between them. Similar results are obtained by Türkcan, Duman and Yetkiner (2008). In addition, economic growth is a significant determinant of governance but not the reverse. The same result for growth and FDI holds for upper-middle-income countries, but not for HIPCs and LDCs in which economic growth is a significant predictor of FDI but not the reverse.

Table 5.13 Baseline Model Estimates Across Different Samples

	CEMAC			INC			HIPC			LDC		
	ΔLFDI	**ΔLGDP**	**ΔGOV**	**ΔLnFDI**	**ΔLGDP**	**ΔGOV**	**ΔLFDI**	**ΔLGDP**	**ΔGOV**	**ΔLFDI**	**ΔLGDP**	**ΔGOV**
$\Delta LnFDI_{(t-1)}$	0.379***	0.056*	-0.024	0.3***	0.16***	-0.050	0.300***	0.033	-0.007	0.24**	0.022	0.017
	(0.075)	(0.034)	(0.02)	(0.133)	(0.071)	(0.036)	(0.099)	(0.039)	(0.03)	(0.120)	(0.044)	(0.028)
$\Delta LnGDP_{(t-1)}$	0.113***	0.975***	0.014*	0.1***	0.92***	0.007	0.222***	0.964	0.026	0.2***	0.974***	0.023
	(0.034)	(0.015)	(0.01)	(0.049)	(0.026)	(0.013)	(0.070)	(0.028)	(0.02)	(0.079)	(0.029)	(0.019)
$\Delta GOV_{(t-1)}$	-0.156	0.039	0.9***	-0.195	-0.022	0.93***	-0.032	0.051	0.793	0.279	0.037	0.624***
	(0.130)	(0.059)	(0.03)	(0.162)	(0.086)	(0.043)	(0.243)	(0.096)	(0.06)	(0.381)	(0.140)	(0.090)
Constant	-0.78***	0.24*	-0.2***	-0.76*	0.67***	-0.100	-1.31***	0.304	-0.419	-0.879	0.228	-0.63***
	(0.335)	(0.153)	(0.09)	(0.456)	(0.243)	(0.122)	(0.632)	(0.250)	(0.16)	(0.791)	(0.289)	(0.186)
R^2	0.279	0.978	0.876	0.280	0.969	0.910	0.301	0.953	0.701	0.288	0.957	0.499
Adj. R^2	0.267	0.977	0.874	0.240	0.967	0.905	0.282	0.952	0.693	0.262	0.956	0.481
F-stat	22.0	2496.7	400.6	7.0	563.6	181.3	16.1	763.8	87.7	11.2	622.4	27.6
Obs.	174			58			116			87		
Coeff.	12			12			12			12		

Notes: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$; Robust standard errors in parenthesis; the baseline model for CEMAC sample in Model 1 follows the methodology of the most basic form of a VAR model.

Each sample comprises three equations: FDI inflow (ΔLnFDI), economic growth (ΔLnGDPPC), and governance (ΔGOV), in which they represent dependent variables in columns one, two, and three, respectively. For the overall CEMAC sample, the first lags of FDI ($\beta_{11} = 0.379$; $p < 0.001$) and economic growth ($\beta_{12} = 0.113$; $p < 0.001$) exhibit significantly positive impacts on FDI at the 1% level, FDI ($\beta_{21} = 0.056$; $p < 0.1$) and economic growth ($\beta_{22} = 0.975$; $p < 0.001$) exhibit significantly positive impacts on economic growth at the 10% and 1% levels, respectively. Economic growth ($\beta_{32} = 0.014$; $p < 0.1$) and governance ($\beta_{33} = 0.905$; $p < 0.001$) exhibit significantly positive impacts on governance at the 10% and 1% levels, respectively. This means that FDI inflow and GDP per capita in the last period (or year) have a stronger positive effect on FDI inflow and GDP per capita, while economic growth and governance in the last period (or year) have a stronger positive effect on governance in the CEMAC region.

Similarly, for the income classification sample, the first lags of FDI ($\beta_{11} = 0.340$; $p < 0.001$) and economic growth ($\beta_{12} = 0.102$; $p < 0.001$) demonstrate very strong and positively significant effects on FDI at the 1% level. FDI ($\beta_{21} = 0.158$; $p < 0.001$) and economic growth ($\beta_{22} = 0.919$; $p < 0.001$) demonstrate very strong and positively significant effects on economic growth at the 1% level, but neither FDI, economic growth, nor governance has a significant effect on governance. Again, this means that FDI inflow and economic growth in the last period (or year) have a very strong and positive effect on FDI inflow and economic growth, but no effect of FDI, economic growth, and governance in the last period (or year) on governance in the upper-middle income countries.

For the HIPC sample, the first lags of FDI ($\beta_{11} = 0.3$; $p < 0.001$) and economic growth ($\beta_{21} = 0.222$; $p < 0.001$) demonstrate very strong and positively significant effects on FDI at the 1% level. Economic growth ($\beta_{22} = 0.964$; $p < 0.001$) demonstrates a very strong and positively significant effect on economic growth at the 1% level. Governance ($\beta_{33} = 0.793$; $p < 0.001$) has a strong and positively significant effect on governance at the 1% level. This means that FDI inflow and economic growth in the last period (or year) have a very strong and positive effect on FDI inflow. Economic growth in the last period (or year) has a very strong and positive

effect on economic growth. Governance in the last period (or year) has a strong positive impact on governance in the HIPC countries.

Finally, for the LDC sample, the first lags of FDI ($\beta_{11} = 0.235$; $p < 0.05$) and economic growth ($\beta_{12} = 0.221$; $p < 0.001$) demonstrate very strong and positively significant effects on FDI at the 5% and 1% levels, respectively. Only economic growth ($\beta_{22} = 0.974$; $p < 0.001$) demonstrate a very strong and positively significant effect on economic growth at the 1% level. Governance ($\beta_{33} = 0.624$; $p < 0.001$) has a strong and positively significant effect on governance at the 1% level. This means that FDI inflow and economic growth in the last period (or year) have a very strong and positive effect on FDI inflow. Economic growth in the last period (or year) has a very strong and positive effect on economic growth. Governance in the last period (or year) has a strong positive impact on governance in the LDC countries. Note that the interpretation of VAR models or results estimates comes at a cost and must be interpreted cautiously. As such, Lütkepohl (2011a, 2011b) argues that model checking typically concentrates on reduced models because every structural form has a reduced form underneath it. Thus, any structural form built on a particular reduced form model cannot accurately describe the data generating process (DGP) if the DGP is not well represented by the model. For more details, see Section 5.4, and for other diagnostic checks (Lütkepohl, 2005).

5.3.2 PVAR with Economic Activity and Development

The following sections (5.3.2–5.3.6) will present panel VAR models with different classes of exogenous variables (panel VARX). Table 5.14 presents estimates for Model 2 in which core variables are affected by their own lag values and exogenous factors. Here, the exogenous factors are five variables (electricity consumption, household consumption, labor force, agricultural value added, and economic freedom) categorized under economic activity and development. This model aims to understand how FDI, GDP, and governance respond to changes in the five exogenous variables. As proposed by (Agung, 2011), exogenous variables can be the following: “time t, pure exogenous variables, the lags of exogenous variables, the environmental variable, and dummy variables.”

The results show no significant change from Model 1, especially in the FDI equation for CEMAC sample. For example, the first lags of FDI ($\beta_{11} = 0.302$; p < 0.000) and GDP per capita ($\beta_{21} = 0.212$; p < 0.000) have a significant impact on the FDI equation. The major changes are in the GDP or growth equation in which only the lagged value for FDI impacts GDP at a 5% level of significance ($\beta_{21} = 0.067$; p < 0.05) and the governance equation in which only governance is significant at a 1% significance level ($\beta_{33} = 0.772$; p < 0.000). The significant coefficient of 0.302 means a positively significant relationship between FDI*it* and FDI$_{it-1}$, and this suffices to say that a rise in the inflow of FDI in the previous year leads to more FDI inflow in the present year. The results Hypothesis 2 (see Section 4.3.1) propose that the addition of exogenous variables such as economic activity and development can affect the strength of the impact of governance on both economic growth and FDI inflow.

The results of the exogenous variables show all are significant in the FDI equation for the CEMAC sample, except economic freedom, meanwhile economic freedom is the only significant variable in the GDP equation, and economic freedom and electricity consumption for the governance equation. Although significant at 5% and 10%, electricity consumption and agricultural value added are negative. This is unlikely in theory, which generally would show increasing agricultural value added and electricity consumption attributed to more inflow of FDI. Adding the first five exogenous variables slightly increased the R^2 from 27.9% to 32.1%. The other diagnostics for model acceptance are summarized in Section 5.4.

Table 5.14 PVAR(1) with Economic Activity and Development

	CEMAC			INC			HIPC			LDC		
	ΔLFDI	**ΔLGDP**	**ΔGOV**	**ΔLFDI**	**ΔLGDP**	**ΔGOV**	**ΔLFDI**	**ΔLGDP**	**ΔGOV**	**ΔLFDI**	**ΔLGDP**	**ΔGOV**
$\Delta LnFDI_{(t-1)}$	0.30***	0.067**	-0.011	0.089	0.2***	-0.030	0.20***	-0.06**	0.013	0.071	-0.1***	0.03
	(0.079)	(0.035)	(0.020)	(0.139)	(0.078)	(0.040)	(0.106)	(0.034)	(0.025)	(0.138)	(0.043)	(0.032)
$\Delta LnGDPPC_{(t-1)}$	0.21***	0.96***	-0.02	0.29***	0.97***	-0.053	0.148	0.59***	0.068*	0.072	0.62***	0.087*
	(0.065)	(0.029)	(0.017)	(0.137)	(0.077)	(0.039)	(0.187)	(0.060)	(0.044)	(0.233)	(0.072)	(0.054)
$\Delta GOV_{(t-1)}$	0.098	-0.005	0.77***	-0.386	-0.238	0.6***	0.304	0.33***	0.5***	0.536	0.35***	0.5***
	(0.207)	(0.091)	(0.052)	(0.394)	(0.222)	(0.112)	(0.388)	(0.124)	(0.091)	(0.465)	(0.143)	(0.109)
ΔLnECON	-0.138**	-0.026	0.040***	-0.38***	-0.095	0.063	-0.16**	0.012	0.036**	0.040	0.069	0.020
	(0.069)	(0.030)	(0.017)	(0.161)	(0.091)	(0.046)	(0.088)	(0.028)	(0.021)	(0.192)	(0.059)	(0.045)
ΔLnHCON	0.161***	0.085***	0.002	0.165	-0.21*	-0.054	0.53***	0.69***	-0.088	0.486	0.62***	-0.106
	(0.066)	(0.029)	(0.017)	(0.238)	(0.134)	(0.068)	(0.268)	(0.086)	(0.063)	(0.339)	(0.104)	(0.079)
ΔLnLAB	0.252***	-0.009	-0.037	0.88*	0.214	-0.002	-0.185	-0.76***	0.16***	0.000	-0.61***	0.18*
	(0.105)	(0.046)	(0.027)	(0.518)	(0.292)	(0.148)	(0.333)	(0.107)	(0.079)	(0.449)	(0.138)	(0.105)
ΔLnAGVA	-0.18***	-0.059	-0.006	0.139	0.035	-0.010	-0.27***	-0.12***	-0.041	-0.28***	-0.12***	-0.038
	(0.091)	(0.040)	(0.023)	(0.311)	(0.175)	(0.089)	(0.124)	(0.040)	(0.029)	(0.142)	(0.044)	(0.033)
ΔLnEFREE	0.126	0.396***	0.26***	1.55*	0.601	0.61***	0.331	0.033	0.190	1.066	0.350	0.130
	(0.424)	(0.187)	(0.107)	(1.014)	(0.571)	(0.289)	(0.601)	(0.193)	(0.142)	(0.844)	(0.260)	(0.197)
Constant	-2.132	-1.378*	-1.10***	-7.91**	-1.808	-2.15*	-2.227	3.01***	-1.8***	-3.999	1.650	-1.79**
	(1.879)	(0.829)	(0.476)	(4.340)	(2.444)	(1.237)	(3.195)	(1.024)	(0.753)	(3.966)	(1.222)	(0.926)
R^2	0.321	0.980	0.884	0.468	0.974	0.924	0.348	0.971	0.749	0.350	0.972	0.550
Adj. R^2	0.289	0.979	0.879	0.382	0.970	0.911	0.299	0.969	0.730	0.283	0.970	0.503

	CEMAC			INC			HIPC			LDC		
	ΔLFDI	**ΔLGDP**	**ΔGOV**	**ΔLFDI**	**ΔLGDP**	**ΔGOV**	**ΔLFDI**	**ΔLGDP**	**ΔGOV**	**ΔLFDI**	**ΔLGDP**	**ΔGOV**
F-statistic	9.8	1030.4	157.6	5.4	232.9	74.2	7.1	455.0	39.9	5.2	344.3	11.9
No. of obs.		174			58			116			87	
No. of coeff.		27			27			27			27	

Notes: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$; Robust standard errors in parentheses. The estimates for CEMAC model for the CEMAC sample represent Model 2. Model 2 follows the methodology of the most basic form of a VAR model with exogenous variables.

5.3.3 Panel VAR with Economic Structure and Market

Like Subsection 5.4.2, Table 5.15 presents estimates for Model 3 in which core variables are again affected by their own lag values and exogenous factors. Here, the exogenous variables are trade openness and market size, categorized under economic structure and market. This model aims to understand how FDI, growth, and governance respond to changes in the two new sets of exogenous variables. Still, the results show no significant change from Model 1 with respect to the lagged endogenous terms, especially in the FDI equation for the CEMAC sample. For example, the first lags of FDI ($\beta_{11} = 0.313$; $p < 0.000$) and economic growth ($\beta_{12} = 0.112$; $p < 0.000$) have a significant impact on FDI inflow. The major changes are in the GDP equation in which only the lagged value for economic growth impacts economic growth at a 1% level of significance ($\beta_{21} = 0.951$; $p < 0.05$) and the governance equation in which only governance is significant at a 1% significance level ($\beta_{33} = 0.906$; $p < 0.000$). The significant coefficients of 0.313 and 0.112 for FDI and economic growth, respectively, mean a positively significant impact of FDI_{it-1} and $GDPPC_{it-1}$ on FDI_{it}, and this suffices a rise in the inflow of FDI and economic growth in the previous year leads to more FDI inflow in the present year.

The results of the new set of exogenous variables show all are significant in the FDI equation for the CEMAC sample, but only trade openness is a significant variable in the GDP equation, and none significant in the governance equation. Both trade openness and market size are positively significant on FDI at 5% and 10%, respectively. Trade openness is also positive and statistically significant at the 5% significance level on growth. This is in line with theory because a bigger market and more trade-open economies attract more FDI, and hence increased growth. Again, adding the other two exogenous variables slightly increased the R^2 from 27.9% to 30.3%, but less than that of Model 2. Hypothesis 3 (see Section 4.3.1) suggests that the addition of exogenous variables such as economic structure and market can affect the strength of the impact of governance on both economic growth and FDI inflow.

Table 5.15 PVAR(1) with Economic Structure and Market

	CEMAC			INC			HIPC			LDC		
	ΔLFDI	**ΔLGDP**	**ΔGOV**	**ΔLFDI**	**ΔLGDP**	**ΔGOV**	**ΔLFDI**	**ΔLGDP**	**ΔGOV**	**ΔLFDI**	**ΔLGDP**	**ΔGOV**
$\Delta LnFDI_{(t-1)}$	0.31***	0.054	-0.024	0.23**	0.15***	-0.06*	0.28***	0.010	-0.006	0.19*	0.009	0.026
	(0.08)	(0.036)	(0.02)	(0.136)	(0.072)	(0.04)	(0.102)	(0.040)	(0.025)	(0.125)	(0.045)	(0.029)
$\Delta LnGDPPC_{(t-1)}$	0.12***	0.95***	0.013	-0.076	0.899***	-0.010	0.19***	0.94***	0.028	0.23***	0.9***	0.001
	(0.037)	(0.016)	(0.01)	(0.089)	(0.047)	(0.03)	(0.076)	(0.030)	(0.019)	(0.094)	(0.034)	(0.022)
$\Delta GOV_{(t-1)}$	-0.123	0.056	0.9***	-0.312	0.17*	0.9***	-0.042	0.064	0.8***	0.461	-0.033	0.5***
	(0.130)	(0.058)	(0.03)	(0.219)	(0.115)	(0.06)	(0.262)	(0.102)	(0.065)	(0.424)	(0.152)	(0.098)
Constant	-1.63***	0.085	-0.21*	-4.29*	-2.66**	-0.421	-1.7***	0.014	-0.5***	-0.951	-0.171	-0.8***
	(0.508)	(0.228)	(0.131)	(2.699)	(1.417)	(0.753)	(0.726)	(0.282)	(0.180)	(0.920)	(0.328)	(0.211)
ΔLnTOP	0.166**	0.087***	0.005	1.056	0.79***	0.097	0.111	0.10***	-0.008	-0.001	0.13***	0.06**
	(0.097)	(0.044)	(0.025)	(0.682)	(0.358)	(0.190)	(0.111)	(0.043)	(0.028)	(0.155)	(0.055)	(0.036)
ΔLnMSIZE	0.092***	-0.022	-0.001	0.95***	0.151	0.088	0.061	0.040	0.014	0.149	0.016	-0.05**
	(0.040)	(0.018)	(0.010)	(0.402)	(0.211)	(0.112)	(0.070)	(0.027)	(0.017)	(0.112)	(0.040)	(0.026)
R^2	0.303	0.979	0.876	0.351	0.973	0.911	0.309	0.956	0.705	0.303	0.960	0.532
F-statistic	14.6	1584.2	237.6	5.6	372.4	106.1	9.8	474.8	52.5	7.1	392.2	18.4
No. of obs.		174			58			116			87	
No. of coeff.		18			18			18			18	

Notes: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$; Robust standard errors in parentheses; the estimates for the CEMAC sample represent Model 3. Model 3 follows the methodology of the most basic form of a VAR model with exogenous variables

LDC stage, while the second set is based on dummies for the 1994 currency (CFA) devaluation and the global financial crisis (GFC) of 2007 – 2008. This latter set is different from structural break dummies as in Subsection 5.4.5. In addition to just adding the second set of exogenous factors, lags of the two variables are added in the panel VARX model. All these are done in search of the model that best fits our data. While Table 5.16 shows the summary estimates of each of these models, Table 5.17 indicates that PVARX(1) neither improves upon nor worsens on previous models, but with further smaller AIC/SC values for the models.

The inclusion of the 1994 CFA currency devaluation and 2008 global financial crisis reveals substantial effects on the dynamics of FDI inflow, economic growth, and governance before and after the period of the structural breaks. Countries exposed to these events may have experienced long-lasting slowdown in economic progress, governance trajectories, and their ability to attract more FDI inflow. This is very peculiar to most CEMAC countries who depended largely on countries hit by the 2008 GFC. Hypotheses 5-8 (see Section 4.3.1) posit that categorizing countries based on income groups, HIPC status, or LDC stage will reveal distinct patterns in the relationship between FDI, economic growth, and governance. Figure 5.1 shows the trends and breakpoints in FDI, GDP per capita, and governance.

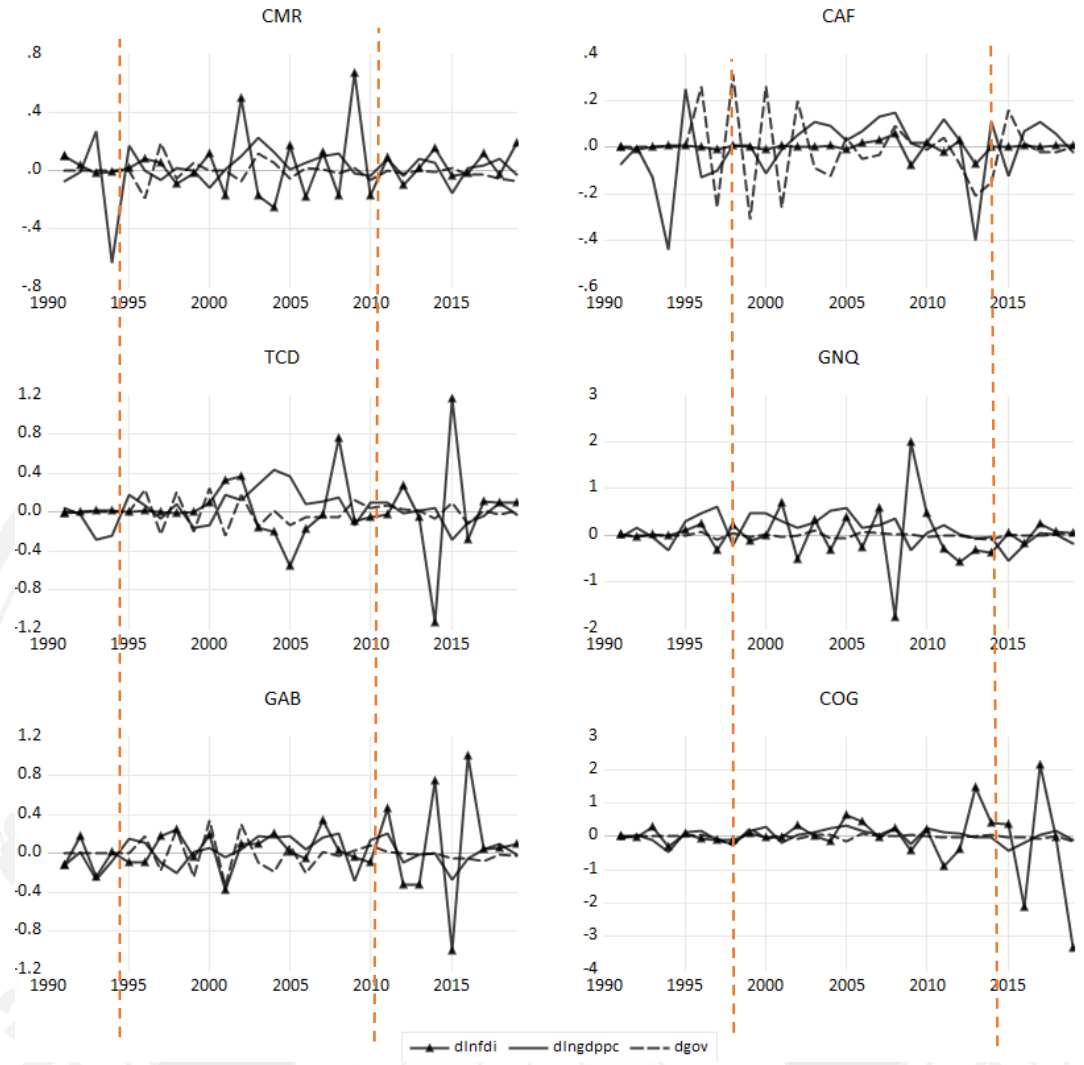

Figure 5.1 Trends in Core Variables with Structural Breaks

Notes: Data here are first differences of log FDI, first differences of log GDP per capita, and first differences of governance for all six CEMAC countries. The thick horizontal lines represent known break points.

Table 5.16 Panel VAR Model for Structural Breaks

	Model 4			Model 5			Model 6		
	ΔLnFDI	ΔLnGDPPC	ΔGOV	ΔLnFDI	ΔLnGDPPC	ΔGOV	ΔLnFDI	ΔLnGDPPC	ΔGOV
$\Delta LnFDI_{(t-1)}$	0.375***	0.044	-0.024	0.379***	0.058**	-0.024	0.375***	0.046*	-0.024
	(0.075)	(0.032)	(0.019)	(0.075)	(0.034)	(0.019)	(0.076)	(0.031)	(0.019)
$\Delta LnGDPPC_{(t-1)}$	0.111***	0.970***	0.014**	0.114***	0.969***	0.014*	0.112***	0.965***	0.014*
	(0.034)	(0.014)	(0.009)	(0.034)	(0.015)	(0.009)	(0.034)	(0.014)	(0.009)
$\Delta GOV_{(t-1)}$	-0.151	0.053	0.905***	-0.157	0.056	0.905***	-0.152	0.069	0.905***
	(0.131)	(0.055)	(0.033)	(0.131)	(0.059)	(0.033)	(0.132)	(0.054)	(0.034)
CDEV	-0.162	-0.416***	0.007				-0.162	-0.408***	0.007
	(0.179)	(0.075)	(0.046)				(0.179)	(0.074)	(0.046)
GFC				-0.008	0.157***	-0.001	-0.013	0.146***	0.000
				(0.129)	(0.058)	(0.033)	(0.129)	(0.053)	(0.033)
Constant	-0.757***	0.308***	-0.202***	-0.786***	0.285**	-0.201***	-0.760***	0.350***	-0.202***
	(0.337)	(0.141)	(0.086)	(0.339)	(0.151)	(0.086)	(0.340)	(0.140)	(0.087)
F-statistic	16.7	2207.2	298.7	16.4	1945.1	298.7	13.3	1835.0	237.5
No. of obs.	174			174			174		
No. of coeff.	15			15			18		

Notes: *** p < 0.01, ** p < 0.05, * p < 0.1; Robust standard errors in parenthesis; CDEV stands for currency devaluation and GFC for global financial crisis. Models 4 – 6 follow the methodology of the most basic form of a VAR model with structural breaks.

Table 5.17 PVAR Model for Income, HIPC, and LDC

	Model 7			Model 8			Model 9		
	ΔLnFDI	**ΔLnGDPPC**	**ΔGOV**	**ΔLnFDI**	**ΔLnGDPPC**	**ΔGOV**	**ΔLnFDI**	**ΔLnGDPPC**	**ΔGOV**
$\Delta LnFDI_{(t-1)}$	0.377***	0.068***	-0.021	0.353***	0.084***	-0.021	0.372***	0.069***	-0.020
	(0.076)	(0.033)	(0.019)	(0.077)	(0.034)	(0.020)	(0.076)	(0.034)	(0.019)
$\Delta LnGDPPC_{(t-1)}$	0.122***	0.931***	0.004	0.146***	0.940***	0.010	0.121***	0.961***	0.009
	(0.043)	(0.019)	(0.011)	(0.040)	(0.018)	(0.010)	(0.036)	(0.016)	(0.009)
$\Delta GOV_{(t-1)}$	-0.135	-0.065	0.881***	-0.111	-0.009	0.900***	-0.118	-0.026	0.884***
	(0.145)	(0.063)	(0.037)	(0.134)	(0.059)	(0.034)	(0.145)	(0.065)	(0.037)
INC	-0.023	0.115***	0.027*						
	(0.069)	(0.030)	(0.017)						
HIPC				0.143*	-0.152***	-0.017			
				(0.098)	(0.043)	(0.025)			
LDC							0.054	-0.093***	-0.030
							(0.090)	(0.041)	(0.023)
Constant	-0.801***	0.323***	-0.181***	-1.060***	0.533***	-0.167**	-0.827***	0.313***	-0.176***
	(0.340)	(0.149)	(0.086)	(0.384)	(0.170)	(0.098)	(0.344)	(0.154)	(0.087)
R^2	0.280	0.980	0.878	0.288	0.979	0.876	0.280	0.980	0.878
F-statistic	16.4	2025.9	303.6	17.1	2000.5	299.6	16.4	2025.9	303.6
No. of obs.		174			174			174	
No. of coeff.		15			15			15	

Notes: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$; Robust standard errors in parenthesis; Models 7 – 9 follows the methodology of the most basic form of a VAR model with heterogenous dummy variables.

5.3.4 Panel VAR with Coups and Political Crises

Although structural breaks can introduce complexities into the modeling process, and the choice of how to handle them can impact the results and policy implications, the effects of the 1994 currency (CFA) devaluation, political instability (coups), and the global financial crisis (GFC) of 2007-2008 on FDI, growth, and governance dynamics in CEMAC countries cannot be ignored. This thesis introduces three sets of breakpoints: the 1994 currency (CFA) devaluation, political instability, coups, and the GFC. This subsection examines the former two breakpoints for the effect of the 1994 currency (CFA) devaluation and political instability (coups), on the FDI, growth and governance dynamics in CEMAC countries, while the latter is examined in Subsection 5.4.5. The dummy variables for both breakpoints are given by $D1994_t$, ${D^{INST}}_t$, and $D2008_t$ where $D1994_t$ is defined as a dummy equal to zero before 1994 and unit from 1994, ${D^{INST}}_{it}$ represents coups and instability in respective countries (in Appendix B for a list of these coups and unstable periods), and $D2008_t$ is a dummy equal to zero before 2008 and unit from 2008.

Table 5.18 shows the impacts of the 1994 currency devaluation and coup events (coup attempts and crises; in Appendix B) on FDI, GDP per capita, and governance in CEMAC countries. Note that only the global (CEMAC) sample is tested. Again, the GFC, arguably, caused investment behavior to be greatly affected as investments shifted in many sectors as well as geographic preferences in FDI flows meaning that countries that could not offer a quick-fix investment suffered. This subsection introduces GFC into the core model and assesses the impact in the model on the endogenous variables. Hence, this section includes the structural change dummy (*D2008t*) into the baseline model. Table 5.18 contains the results for this model across the CEMAC, INC, HIPC, and LDC samples.

The global financial crisis has a variety of effects on FDI inflows (Bhattacharyya, 2017; Castro & Campos, 2017; Suzuki, 2017; Thimmaiah, 2013). Castro and Campos (2017) found that the crisis had a detrimental impact on FDI stocks in Asian and Latin American countries, with Asia experiencing a higher decline than Latin America. However, Suzuki (2017) holds that the crisis provided possibilities for post-crisis FDI development in both regions. Furthermore, the crisis had a time lag in affecting FDI inflows, and the impact was greater in countries that

were more strongly integrated in the global economy, particularly EU member countries. Thimmaiah (2013) examines the impact of the global financial crisis on FDI inflows and concludes that emerging regions are strengthening their economic standing in terms of FDI inflows. In addition, Bhattacharyya (2017) holds that the influence of the crisis on FDI inflows was also investigated in the context of individual countries such as India and Bangladesh, both of which demonstrated resilience in the face of the crisis while maintaining a high growth rate. Overall, the global financial crisis had a mixed influence on FDI inflows, with both negative and positive effects reported in various regions and nations.

Another level of complexity is identifying the exact date of the structural breaks due to these uncertainties. This is important because it can affect the interpretation of the results. Also, unit root tests ensure stationarity of the data while structural breaks ensure the model fits the dynamics of the data. Enders and Lee (2004) and Perron and Vogelsang (1992) argue that unit root tests are better suited "if the date of the break is uncertain." Shrestha and Chowdhury (2005) contend that, in the situation of a structural break, the Perron-Vogelsang unit root test outperforms the Zivot-Andrews test in terms of testing power. Using unit root tests that allow for the possibility of a structural break prevents generating a test result that is potentially skewed towards non-rejection, as Perron (1989) hypothesized. However, Parpiev (2016, September 21) remarks that many studies, including Zivot and Andrews (1992) and Perron (1997), proposed determining the break point 'endogenously' from the data. The panel VAR results with the effect of GFC on the dynamic system are reported in Table 5.16.

Hypothesis 9 (see Section 4.3.1) refers to the inclusion of coups, instability and political crises revealing substantial effects on the dynamics of FDI inflow, economic growth, and governance. Countries exposed to these events may experience long-lasting slowdown in economic progress, governance trajectories, and their ability to attract more FDI inflow. This is very peculiar to most CEMAC countries which is home to the long serving dictators in the world and host of many political crises and coups.

Table 5.18 PVAR(1) with Structural Breaks (Regime Change and Instability)

	Model 10			Model 11			Model 12		
	ΔLnFDI	**ΔLnGDPPC**	**ΔGOV**	**ΔLnFDI**	**ΔLnGDPPC**	**ΔGOV**	**ΔLnFDI**	**ΔLnGDPPC**	**ΔGOV**
$\Delta LnFDI_{(t-1)}$	0.380***	0.06**	-0.024	0.37***	0.071**	-0.032*	0.37***	0.058**	-0.03*
	(0.075)	(0.034)	(0.019)	(0.079)	(0.036)	(0.020)	(0.080)	(0.033)	(0.020)
$\Delta LnGDPPC_{(t-1)}$	0.114***	0.976***	0.014**	0.104***	0.965***	0.02**	0.102***	0.96***	0.016**
	(0.034)	(0.015)	(0.009)	(0.036)	(0.016)	(0.009)	(0.036)	(0.015)	(0.009)
$\Delta GOV_{(t-1)}$	-0.160	0.028	0.904***	-0.151	0.061	0.89***	-0.147	0.072	0.89***
	(0.131)	(0.059)	(0.033)	(0.137)	(0.062)	(0.034)	(0.137)	(0.057)	(0.035)
Regime change	-0.079	-0.19***	-0.020				-0.160	-0.42***	-0.001
	(0.178)	(0.080)	(0.045)				(0.180)	(0.075)	(0.045)
$INST^{CAR}$				-0.088	-0.111	-0.1***	-0.097	-0.135*	-0.1***
				(0.198)	(0.090)	(0.050)	(0.199)	(0.083)	(0.050)
$INST^{CMR}$				0.302	-0.035	-0.028	0.298	-0.047	-0.028
				(0.219)	(0.100)	(0.055)	(0.220)	(0.091)	(0.055)
$INST^{COG}$				-0.028	-0.097	-0.015	-0.034	-0.113	-0.015
				(0.217)	(0.099)	(0.055)	(0.218)	(0.091)	(0.055)
$INST^{GAB}$				0.475	-0.071	0.004	0.475	-0.071	0.004
				(0.435)	(0.198)	(0.110)	(0.436)	(0.182)	(0.110)
$INST^{GNQ}$				0.233	0.147	-0.072	0.229	0.138	-0.072
				(0.267)	(0.121)	(0.067)	(0.267)	(0.111)	(0.067)
$INST^{TCD}$				-0.024	0.118	-0.100	-0.032	0.097	-0.100
				(0.311)	(0.141)	(0.078)	(0.312)	(0.130)	(0.079)
Constant	-0.79***	0.23*	-0.2***	-0.72***	0.33***	-0.2***	-0.69**	0.4***	-0.2***
	(0.336)	(0.151)	(0.086)	(0.358)	(0.163)	(0.090)	(0.360)	(0.150)	(0.091)

	Model 10			Model 11			Model 12		
	ΔLnFDI	**ΔLnGDPPC**	**ΔGOV**	**ΔLnFDI**	**ΔLnGDPPC**	**ΔGOV**	**ΔLnFDI**	**ΔLnGDPPC**	**ΔGOV**
R^2	0.280	0.979	0.876	0.297	0.978	0.881	0.300	0.982	0.881
F-statistic	16.4	1927.8	299.0	7.7	827.1	135.2	7.0	886.7	120.9
No. of obs.		174			174			174	
No. of coeff.		15			30			33	

Notes: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$; Robust standard errors in parenthesis. $INST^n{}_{it}$ represents coups and instability in respective countries (see Appendix B for a list of these coups and unstable periods). Models 10-12 follow the methodology of the most basic form of a VAR model with regime change and instability variables.

5.3.5 Continuous PVAR Models: Two-and-Three-Way Interaction VAR

This subsection presents a Two-Way interaction VAR (2WI-VAR) and a Three-Way interaction VAR (3WI-VAR) model with all three (core) endogenous variables. In addition, the exogenous variables considered in this model are variables that are highly correlated with FDI inflow, such as electricity consumption, household consumption, and trade openness. Table 5.19 presents both models, which are obtained by inserting the interactions. The results show that the two-way interaction ΔLnHCON*ΔLnTOP has a positively significant adjusted effect on FDI flows ($\beta_{12}^{*} =$ 0.026; p < 0.000) and GDP per capita ($\beta_{22}^{*} = 0.011$; p < 0.000), but it has an insignificant effect on governance. Also, ΔLnTOP*ΔLnECON has a significant negative effect on GDP per capita ($\beta_{23}^{*} =$ -0.014; p < 0.000). For the three-way interaction in Table 5.18, ΔLnECON*ΔLnHCON*ΔLnTOP has a significant negative adjusted effect on GDP per capita ($\beta_{24}^{*} =$ -0.005; p < 0.000), but it has an insignificant effect on FDI inflow and governance. In addition, ΔLnHCON*ΔLnTOP has a significant positive adjusted effect on FDI inflow (0.020; p < 0.000). Hypothesis 10 (see Section 4.3.1) refers to the inclusion of two-way and three-way interaction terms revealing substantial interdependence and mutual reinforcement between the core variables. They play a meaningful role in adjusting the simultaneous dynamics of the core variables.

Recall that the main objective of this section was to run panel VAR tests for different adjustments or situations in order to find the model that improves the panel VAR estimates of the baseline model involving the three core variables as endogenous components. To test the adequacy of the models, Section 5.4 presents the diagnostic tests of these models, including the test for stability. So far, based on the stability and AIC/SIC criteria, the best model is Model 4 with the panel VAR effect of the 1994 CFA currency devaluation on the dynamic relationship between FDI, GDP per capita, and governance. Despite the robustness of Model 4, Table 5.19 shows little significant difference between the two models or even Model 1. As such, for simplicity reasons, the baseline model (Model 1), with the optimal lags and proper diagnostics, will be used in Section 5.5 for further investigation of the relationships.

Table 5.19 Continuous PVAR(1) Models: 2–and 3–Way Interaction VAR

	Two-Way Interaction			Three-Way Interaction		
	ΔLnFDI	ΔLnGDPPC	ΔGOV	ΔLnFDI	ΔLnGDPPC	ΔGOV
$\Delta LnFDI_{(t-1)}$	0.326***	0.051*	-0.025	0.329***	0.055*	-0.025
	(0.078)	(0.034)	(0.020)	(0.078)	(0.035)	(0.020)
$\Delta LnGDPPC_{(t-1)}$	0.125***	0.989***	0.011	0.100***	0.972***	0.014
	(0.040)	(0.018)	(0.010)	(0.034)	(0.015)	(0.009)
$\Delta GOV_{(t-1)}$	-0.140	0.130***	0.894***	-0.179	0.098*	0.901***
	(0.140)	(0.062)	(0.036)	(0.135)	(0.060)	(0.035)
ΔLnECON*ΔLnHCON	0.040	0.005	-0.003			
	(0.033)	(0.015)	(0.009)			
ΔLnHCON*ΔLnTOP	0.026***	0.011***	-0.001	0.020***	0.005	0.000
	(0.011)	(0.005)	(0.003)	(0.009)	(0.004)	(0.002)
ΔLnTOP*ΔLnECON	-0.019	-0.014***	0.003			
	(0.016)	(0.007)	(0.004)			
ΔLnECON*ΔLnHCON*ΔLnTOP				0.001	-0.005***	0.000
				(0.003)	(0.001)	(0.001)
Constant	-1.029***	0.125	-0.173*	-0.800***	0.288***	-0.204***
	(0.388)	(0.172)	(0.100)	(0.334)	(0.149)	(0.086)
R^2	0.305	0.980	0.877	0.300	0.979	0.876
No. of obs.		174			174	
No. of coeff.		21			18	

Notes: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$; Robust standard errors in parenthesis. The estimates represent Model 13 and 14, respectively.

Models 13-14 follows the methodology of the most basic form of a VAR model with 2- and 3-way interaction variables

5.4 Panel VAR Diagnostic Tests

Diagnostic tests are conducted after VAR estimation to ensure that the model assumptions are met and to evaluate its performance, thereby verifying the validity of the panel VAR models. The diagnostics considered here include tests for stability, normality, ARCH, and serial correlation. Therefore, not all diagnostic tests for VAR are displayed in this subsection. Furthermore, not all the tests for VAR model validity are shown here, as some have been covered in previous or subsequent sections of this chapter. The tests not covered in this section comprise Granger causality (Subsection 5.4.1), cointegration, model adequacy, lag order selection criteria (Subsection 5.2.6), forecast evaluation (not considered), impulse responses (Subsection 5.4.2), and forecast error variance decomposition (Subsection 5.4.3). The summarized results of all four diagnostic tests for panel VAR(1) mostly based on SC, and VAR(2 and 7), mostly based on AIC, are presented in Table 5.19 and Figures in Appendix A.

5.4.1 Summary Diagnostics

Table 5.20 reports model diagnostics for the panel models created in Section 5.3. Although every diagnostic test has a role, stability and lag length selection criteria are most important and recurring in empirical studies. All the models are stable, but the model with the lowest selection criteria, void of serial correlation, homoscedasticity, and normal data, is favored compared to the others. The serial correlation and heteroskedasticity results are shown in Table A5.8 in Appendix B.

Table 5.20 Panel VAR Models and their Diagnostic Status

Model	VAR model (CEMAC sample)	Model stability	AIC/SC	Normality (Skewness)
1	Core VAR model	stable	-0.854/-0.636	405.0 (0.172) - yes
2	VAR/5 exogenous variables	stable	-0.938/-0.448	2010.3 (0.021) - yes
3	VAR/2 exogenous variables	stable	-0.886/-0.559	412.6 (0.000) - yes
4	Panel VAR with currency devaluation (CDEV)	stable	-0.989/-0.716	1.5 (0.222) - yes
5	Panel VAR with GFC	stable	-0.863/-0.590	28.5 (0.000) - no
6	Panel VAR with both CDEV and GFC	stable	-0.998/-0.671	6.1 (0.0.014) - no
7	Panel VAR with income groups dummy	stable	-0.918/-0.672	4.7 (0.030) - no
8	Panel VAR with HIPC dummy	stable	-0.932/-0.673	62.8 (0.000) - no
9	Panel VAR with LDC dummy	stable	-0.847/-0.674	4.2 (0.014) - no
10	Panel VAR with regime change	stable	-0.913/-0.675	91.3 (0.000) - no
11	Panel VAR with instability dummy	stable	-0.981/-0.676	12.1 (0.002) - no
12	Panel VAR with regime change and instability	stable	-0.910/-0.638	3.033 (0.082) - yes
13	2WI-VAR	stable	-0.883/-0.502	0.095 (0.758) - yes
14	3WI-VAR	stable	-0.891/-0.565	1.092 (0.296) - yes

Notes: Only diagnostics for the initial Models (1-14) are shown and those for Models 15-23 are not shown anywhere in this thesis.

5.4.2 Model Stability

The stability of a VAR model is a crucial aspect to consider when using VAR models for time series analysis and forecasting. Paci and Consonni (2018) argue that VAR models can lead to unstable inference and inaccurate forecasts, particularly with many variables. Thus, stable models provide reliable and meaningful forecasts. Figure 5.1 shows the roots and graph of model stability with eigenvalues of the companion matrix for Model 1. Recall that in a VAR model, the parameters are estimated using a companion matrix, which is derived from the lag polynomials. The stability of the VAR model is closely related to the eigenvalues of this companion matrix.

By assessing the roots of the VAR system, the stability of the VAR system is visually assessed. The dots indicate the roots of a certain polynomial. If there are no roots outside the unit circle, the VAR system meets the stability criteria, showing model stability (Bose, Hravnak, & Sereika, 2017; Suliman & Mollick, 2009). For the panel VAR Model 1 to be stable, all the eigenvalues should lie inside the unit circle in the complex plane. If any eigenvalues are outside the unit circle, the model is unstable, and its forecasts may diverge over time. Based on both the values and the graph in Figure 5.1, the roots are all less than 1 and within the unit circle.

Roots of Characteristic Polynomial

Root	Modulus
-0.670	0.670
-0.431	0.431
0.208	0.208

Endogenous variables: *ΔLnFDI, ΔLnGDPPC, and ΔGOV*

No root lies outside the unit circle.
VAR satisfies the stability condition.
Lag specification: 1 1

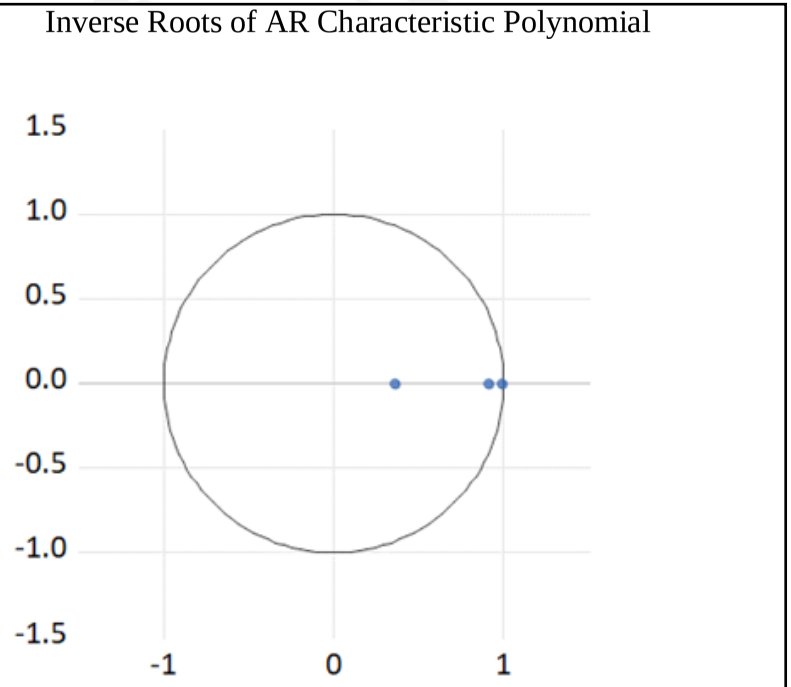

Figure 5.2 Stability of Model 1

Notes: VAR satisfies the stability condition; No root lies outside the unit circle; Endogenous variables: ΔLnFDI, ΔLnGDPPC, and ΔGOV, and Lag specification: 1 1.

5.4.3 PVAR Residuals for Model 1 (PVAR(1))

Figure 5.3 shows the ACF or correlograms of the residuals for FDI inflow for the panel VAR(1), with the diagonals representing individual ACFs for the model's residuals. It also shows the cross-correlation plots for each of the residuals. The objective is to investigate the presence of autocorrelation in the residuals. The absence of major spikes in the ACF of the residuals indicates that Model 1 has many autocorrelations that are significantly zero, and hence the data is said to be random. In other words, the low degree of autocorrelation between adjacent lag (1) and near-adjacent observations or around zero captures all the autocorrelation in the data.

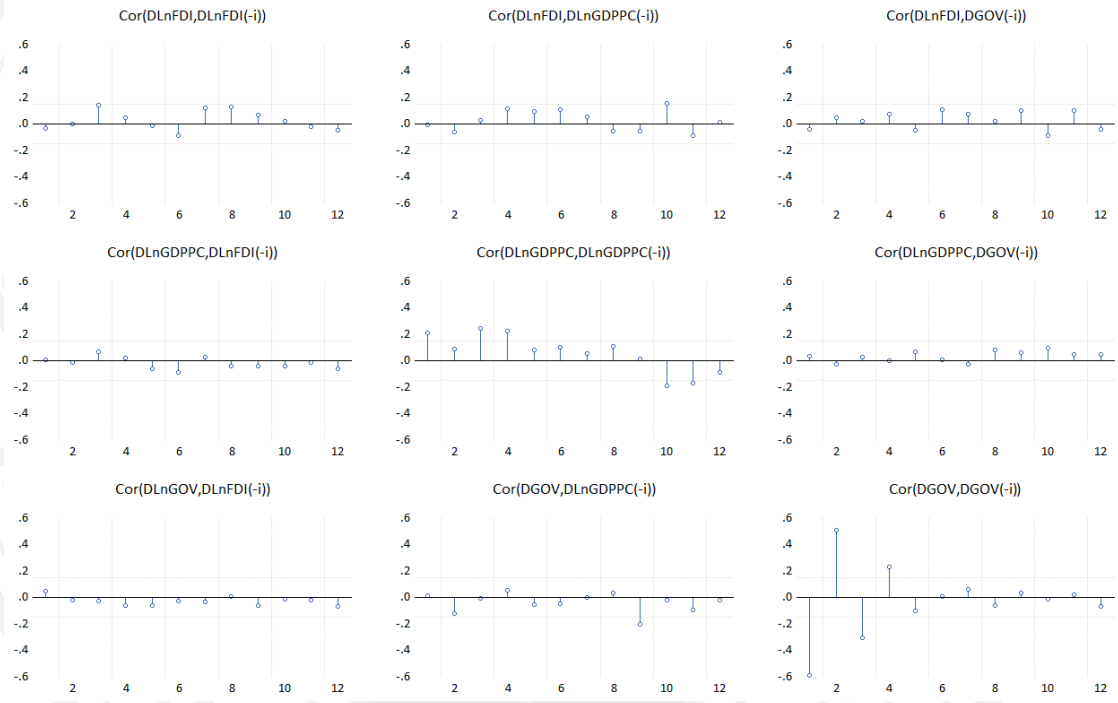

Figure 5.3 PVAR Residuals (Cross-Correlations Matrix)

Note: Autocorrelations with approximate 2 Std. Err. bounds

5.5 Granger Causality and Structural Analysis

In this section, Granger causality, impulse responses, and error decompositions are used to analyze causal relationships, dynamic interactions, and sources of uncertainty between FDI inflows, GDP per capita, and governance. All

three concepts are linked. For instance, Lütkepohl (2005) shows that impulse responses are zero if one of the variables does not Granger cause the other variables taken as a group. In other words, if the former variable does not Granger cause the set of the other variables, an innovation in, say, governance has no effect on the other variables. They are all linked in the sense that Dumitrescu and Hurlin (2012) tests homogenous non-causality/causality, which is related to the response of shocks in the system. That is, no response to a shock in the system is an indication of the absence of causality. Due to the intricate interactions within the VAR model, Stock and Watson (2001) argue that causality, IRFs, and FEVD metrics offer greater insights compared to the estimated coefficients or R-squared statistics, which are often omitted from reporting. However, this thesis reports both statistics as this section is used to confirm and support the results produced by the CEMAC data.

5.5.1 Panel Granger Causality Tests

Two causality tests (Granger and Dumitrescu-Hurlin) for panel data are presented with comments in this subsection. While both examine causal relationships between variables in a panel data setting, there are opposite differences. First, Granger (1969) posits that the Granger causality test is a statistical hypothesis test for detecting whether one time series is helpful in forecasting another. It treats panel data as one wholesome set of data without the interference of cross-sectional lagged data. Thus, Granger considers the presence of cross-sectional dependence and individual heterogeneity in the panel data. On the other hand, Dumitrescu-Hurlin is more robust and allows all coefficients to be different across cross-sections. It is normally applied in cases when there is a concern about cross-sectional dependence and individual heterogeneity. In fact, it is a non-parametric test that allows for both homogeneous and heterogeneous Granger-causal relationships across countries with the aim of analyzing whether the lagged values of GDP per capita and governance improve the forecasting accuracy of FDI inflows.

Table 5.21 VAR Granger Causality Matrix for CEMAC Sample

Lags and Direction of Causality	Chi-sq	df	p-Value	H1 Decision
Lag 1				
ΔLnGDPPC→ΔLnFDI	11.358	1	0.001	Yes
ΔGOV→ΔLnFDI	1.430	1	0.232	-
All→ΔLnFDI	12.160	2	0.002	Yes
ΔLnFDI→ΔLnGDPPC	2.682	1	0.095	Yes
ΔGOV→ΔLnGDPPC	0.437	1	0.509	-
All→ΔLnGDPPC	2.842	2	0.241	-
ΔLnFDI→ΔGOV	1.608	1	0.205	-
ΔLnGDPPC→ΔGOV	2.723	1	0.099	Yes
All→ΔGOV	3.110	2	0.211	-
Lag 2				
ΔLnGDPPC→ΔLnFDI	7.242	2	0.027	Yes
ΔGOV→ΔLnFDI	1.329	2	0.515	-
All→ΔLnFDI	9.253	4	0.055	Yes
ΔLnFDI→ΔLnGDPPC	2.161	2	0.339	-
ΔGOV→ΔLnGDPPC	1.011	2	0.603	-
All→ΔLnGDPPC	2.999	4	0.558	-
ΔLnFDI→ΔGOV	2.066	2	0.356	-
ΔLnGDPPC→ΔGOV	0.613	2	0.736	-
All→ΔGOV	2.375	4	0.667	-
Lag 7				
ΔLnGDPPC→ΔLnFDI	10.442	7	0.165	-
ΔGOV→ΔLnFDI	5.974	7	0.543	-
All→ΔLnFDI	15.295	14	0.358	-
ΔLnFDI→ΔLnGDPPC	8.602	7	0.283	-
ΔGOV→ΔLnGDPPC	3.810	7	0.801	-
All→ΔLnGDPPC	14.183	14	0.436	-
ΔLnFDI→ΔGOV	5.114	7	0.646	-
ΔLnGDPPC→ΔGOV	6.483	7	0.485	-

Lags and Direction of Causality	Chi-sq	df	p-Value	H1 Decision
All→ΔGOV	10.483	14	0.726	-

Notes: *** p < 0.01, ** p < 0.05, * p < 0.1; 174, 168, and 138 included observations for lags 1, 2, and 7, respectively; values represent p-values for significance of the Chi-square statistics; Model 1 comprises of three endogenous variables: FDI inflow, GDP per capita, and governance. H0: the causal variable does not Granger cause the dependent variable vs. H1: the causal variables Granger causes the dependent variable.

Different models have been run, but this section considers only the panel Granger causality tests to understand the direction of causality between economic growth, governance, and FDI (Model 1). Table 5.21 presents the p-values extracted from the Granger causality matrix, linked to the Chi-square test that evaluates the significance of coefficients within the panel VAR(1), VAR(2), and VAR(7) models encompassing the three principal variables. The Granger causality findings for the overall CEMAC sample show that economic growth Granger causes FDI inflows at lag 1 at the 1% level of significance (χ^2=11.358, p = 0.001) and a df = 1, suggesting that growing GDP per capita expands an economy, thereby attracting investors seeking opportunities in a growing market. FDI inflow Granger causes economic growth at lag 1 at the 10% level of significance (χ^2 = 2.682, p = 0.095) and a df = 1. Hence, Granger causality between economic growth and FDI is bidirectional from economic growth to FDI inflows and vice versa, also known as having a feedback effect or bilateral causality. The same result from economic growth to FDI inflow is obtained for lag 2 at the 5% level of significance (χ^2=7.242, p = 0.027) and not the reverse. Hence, a unidirectional Granger causality from growth to FDI. For lag 7, no Granger causality is found between FDI, economic growth, and governance. This shows that there is not enough evidence to suggest causality for higher lags.

In addition, economic growth Granger causes governance for lag 1 at the 10% level of significance meaning a growing economy may be the driving force for improved governance practices such as less corruption, accountability, as well as the rule of law. Like economic growth and FDI, Granger causality from GDP per capita

to governance is unidirectional from economic growth to governance and not the reverse, and not a feedback or bilateral causality. For the joint effects (all-to-dependent variable) of the lag of GDP per capita ($GDPPC_{(t-1)}$) and the lag of governance ($GOV_{(t-1)}$) on FDI inflow reveal that GDP per capita offers just a temporal relationship and more so predictive value for FDI inflow at a significance level of 1% (χ^2=12.160, p = 0.002) and a df = 2. And, for the joint effects (all-to-dependent variable) of the lag of GDP per capita ($GDPPC_{(t-1)}$) and the lag of governance ($GOV_{(t-1)}$) on FDI inflow for lag 2 reveal that GDP per capita offers just a temporal relationship and more so predictive value for FDI inflow at a significance level of 10% (χ^2 = 9.253, p = 0.055) and a df = 2.

A study asserts that GDPPC Granger causes FDI if a series of t-tests and F-tests (Wei, 2000) are conducted, along with lagged values of GDPPC and FDI. The study finds that GDPPC values provide statistically significant information about future values of FDI. There are four expected outcomes: unidirectional causality from GDPPC to FDI, unidirectional causality from FDI to GDPPC, bidirectional causality between LnFDI and GDPPC, and lack of any causal relationship between FDI and GDPPC.

This subsection evaluates whether GDP per capita Granger causes FDI inflows. Table 5.21 summarizes Granger causality test for a VAR model including FDI inflow, GDP per capita and governance with three different lags: 1, 2, and 7. Lags 1 and 2 for GDPPC caused FDI, showing a unidirectional causality running from GDPPC to FDI. Although all three models are found to be stable, no causal structure was identified for the VAR(7) model.

Tables 5.22 and 5.23 present an alternative test (Dumitrescu-Hurlin for homogeneous causality) to confirm previous results in Table 5.21. It is important to note that this test is not considered a superior option to the Granger causality test but an extension of it. Therefore, it should be interpreted side-by-side with the previous one, especially for data with small sample sizes. This argument is supported by the study conducted Gourène and Mendy (2017), which suggests that the *Z-tilde* ($\tilde{Z}$) test statistic is better suited for the analysis of small data samples compared to the *Z-bar* ($\bar{Z}$).

The assumption that FDI inflows (ΔLnFDI) Granger cause economic growth (ΔLnGDPPC) cannot be rejected at any level of significance when one lag is applied. Additionally, the results show a unidirectional causality from ΔLnGDPPC to ΔLnFDI at the 5% level of significance when two lags are applied. At one lag, the hypothesis that GDPPC Granger causes governance (ΔGOV) cannot be rejected at the 10%. Specifically, there is a unidirectional causality from ΔLnGDPPC to ΔGOV. Although Granger causality tests are generally sensitive to lag length (Ong et al., 2015), the results in Table 5.21 do not differ for ΔGOV and ΔLnGDPPC at lag 1, indicating a weak signal of Granger causality from ΔLnFDI to ΔLnGDPPC, ΔGOV to ΔLnFDI, ΔLnFDI to ΔGOV, as well as from ΔGOV to ΔLnGDPPC. This provides further support for the reasoning behind this study, which suggests that economic growth is a driving force for FDI inflows, and a more productive and better economy leads to a better quality of governance in CEMAC countries.

The influence of governance quality is not statistically significant, and economic growth is statistically significant in attracting FDI. In simple terms, past values of GDP per capita carry information that aids in forecasting FDI inflow, whereas historical governance quality data does not hold similar predictive power. It is important to note that neither FDI inflow nor governance Granger cause variations in economic growth, signifying that both FDI inflow and governance quality do not enhance the prediction of economic growth. Lastly, the past values of GDP per capita exhibit Granger causality for governance at a 10% significance level, while the historical values of FDI inflow do not exhibit this influence.

In addition to Granger causality, the Granger cause causality (GCC) is also interpreted here. The interpretations for each pair of variables are as follows. First, the effect of $\Delta LnGDPPC_{(t-1)}$ on ΔLnFDI is significant, based on the Chi-squared statistic of 11.358 with df = 1 and a *p*-value = 0.001, but the effect of $\Delta LnFDI_{(t-1)}$ on ΔLnGDPPC is insignificant, based on the Chi-squared statistic of 2.682 with df = 1 and a *p*-value = 0.102. Thus, the GCC of ΔLnFDI and ΔLnGDPPC runs in one way, that is, from ΔLnGDPPC to ΔLnFDI.

Second, the effect of $\Delta GOV_{(t-1)}$ on ΔLnGDPPC is insignificant, based on the Chi-squared statistic of 0.437 with df = 1 and a *p*-value = 0.509, but the effect of $\Delta LnGDPPC_{(t-1)}$ on ΔGOV is significant, based on the Chi-squared statistic of 2.723

with df = 1 and a *p*-value = 0.099 (at the 10% significance level). Again, the GCC of ΔGOV and ΔLnGDPPC runs in one way, that is, from ΔLnGDPPC to ΔGOV.

Finally, the effect of $\Delta LnGOV_{(t-1)}$ on ΔLnFDI is insignificant, based on the Chi-squared statistic of 1.430 with df = 1 and a *p*-value = 0.232, and the effect of $\Delta LnFDI_{(t-1)}$ on ΔGOV is insignificant, based on the Chi-squared statistic of 1.608 with df = 1 and a *p*-value = 0.205. Again, there is no GCC between ΔGOV and ΔLnFDI. Consequently, considering the past values of GDP per capita improves the accuracy of FDI inflow forecasts beyond what can be achieved using only the past values of FDI inflow. The predictive capacity of FDI inflow seems to extend beyond the information contained in the past values of GDP per capita or governance. This predictive influence of both FDI and governance quality might rely predominantly on the past behavior of GDP per capita and FDI itself, and past values of economic growth and governance itself. This pattern can be observed in the impulse responses (Subsection 5.5.2) or the variance decompositions (Subsection 5.5.3).

Table 5.22 Panel Granger and DH Causality Tests (1)

Causality Tests	**Direction of Causality**	**CEMAC-6 sample**	
Granger-causality: Homogeneous causality hypotheses	Causality from ΔLnGDPPC to ΔLnFDI	4.789***	
	Causality from ΔGOV to ΔLnFDI	5.553***	
	Causality from ΔLnFDI to ΔLnGDPPC	0.519	
	Causality from ΔGOV to ΔLnGDPPC	0.424	
	Causality from ΔLnFDI to ΔGOV	0.838	
	Causality from ΔLnGDPPC to ΔGOV	0.141	
		$\boldsymbol{W}_{N,T}$	$\widetilde{\boldsymbol{Z}}_{N,T}$
Dumitrescu-Hurlin: Homogeneous causality hypotheses	Causality from ΔLnGDPPC to ΔLnFDI	2.747***	2.495***
	Causality from ΔGOV to ΔLnFDI	4.583**	5.248**
	Causality from ΔLnFDI to ΔLnGDPPC	1.343	0.389
	Causality from ΔGOV to ΔLnGDPPC	2.049	1.449
	Causality from ΔLnFDI to ΔGOV	1.130	0.070
	Causality from ΔLnGDPPC to ΔGOV	3.063**	2.970**

Notes: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$; no. of lags = 1; no. of obs. = 174. $\boldsymbol{W}_{N,T}$ and $\widetilde{\boldsymbol{Z}}_{N,T}$ stand for the global panel statistic and standardized statistic, respectively.

Table 5.23 Panel Granger and DH Causality Tests (2)

Panel A: Null: does not Granger cause	**Direction of causality**	**CEMAC sample**	
Granger-causality: Homogeneous causality hypotheses	Causality from ΔLnGDPPC to ΔLnFDI	3.797**	
	Causality from ΔLnFDI to ΔLnGDPPC	0.984	
	Causality from ΔGOV to ΔLnFDI	0.912	
	Causality from ΔLnFDI to ΔGOV	0.830	
	Causality from ΔGOV to ΔLnGDPPC	0.384	
	Causality from ΔLnGDPPC to ΔGOV	0.160	
Panel B: Null: does not homogenously cause		$\boldsymbol{W_{N,T}}$	$\boldsymbol{\widetilde{Z}_{N,T}}$
Dumitrescu-Hurlin: Homogeneous causality hypotheses	Causality from ΔLnGDPPC to ΔLnFDI	2.733	0.537
	Causality from ΔLnFDI to ΔLnGDPPC	3.151	0.958
	Causality from ΔGOV to ΔLnFDI	1.269	-0.938
	Causality from ΔLnFDI to ΔGOV	1.569	-0.635
	Causality from ΔGOV to ΔLnGDPPC	1.708	-0.496
	Causality from ΔLnGDPPC to ΔGOV	3.201	1.008

Notes: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$; no. of lags = 2; and, no. of observations = 174. $\boldsymbol{W_{N,T}}$ and $\boldsymbol{\widetilde{Z}_{N,T}}$ stand for the global panel statistic and standardized statistic, respectively.

5.5.2 Impulse response functions of the panel VAR core model

Apart from Granger causality, impulse response analysis is another very important test that adds more meaning to the interpretation of VAR models. However, recall that Lütkepohl (2005) argues that Granger causality may not tell us the whole picture about how variables interact in a system, and so it is frequently useful to know the reaction of one variable to an impulse in another variable in a system that also includes a number of other variables. Although IRFs could be done for higher-dimensional systems, this thesis investigates the impulse response relationship between the three core variables (see Model 1 in subsection 5.3.1) as well as those for the subsamples. Recall, Dumitrescu and Hurlin (2012) argue that the key of IRFs is to determine the direction of transmission between these macroeconomic variables. This helps to better comprehend the shocks or unlikely issues in some CEMAC countries as well as the behavioral asymmetries between income level differentials, LDC stage, and HIPC status. The results for Model 1 are provided in Table 5.13 for the entire CEMAC sample. Other results for the subsamples (INC, HIPC, LDC) for IRFs are shown in this subsection.

IRFs measure the effect of a one-time shock to a variable on all other variables in the system over time. In other words, it tells us how much a change in one variable will affect other variables in the system. IRFs are important because they allow us to predict the impact of policy changes or economic shocks on the overall system. While the horizontal axis represents time (years), the vertical axis represents the change in the dependent variable due to a one-time shock to the independent variable. Output views in EViews show table, multiple graphs, as well as combined graphs to compare the responses of different variables. Figures 5.1–5.4 show the response of FDI, GDP, and governance to a one-unit positive shock to GDP or governance. There are nine (9) multiple graphs with horizon lengths of 10 periods after the shock and three variables both showing the magnitude of the effect of the shock on the FDI, for instance, at that point in time. The slope of the line shows how quickly the effect fades away over time.

Vinod and Rao (2020) reiterate the difficulty involved in interpreting multivariate models, especially models with more than one lag. Despite presenting the VAR estimates in section 5.5, this section clarifies the interpretation using IRFs. For

easy understanding of the results, Figure 5.1 is interpreted with respect to the time horizon, significance, economic interpretation, as well as the cumulative effects. Although there are many models, this section attempts the interpretation of the first and main model, Model 1. Recall that this model contains three equations representing the three endogenous variables: FDI, GDP per capita, and governance. Each equation has one lag of these three variables. This part of the results presents the effects of governance, GDP per capita, and FDI shocks, each in turn, on the VAR system in Equations (4.9)-(4.11). The shocks are introduced in the three equations through the error terms ε_{1it}, ε_{2it}, and ε_{3it} for FDI, GDP per capita, and governance, respectively. Nine impulse response functions are computed for Model 1.

Based on Lütkepohl (2005), the reaction of a variable to a unit shock (forecast error) in another variable is commonly graphically displayed to provide a visual representation of the system's dynamic interrelationships. Figure 5.1 illustrates the sequence of impulse responses in the VAR model for the CEMAC sample for FDI inflow, GDP per capita, and governance, and Figures 5.2-5.4 present the dynamic responses of the FDI and GDP per capita, and governance system for the three subsamples. In the nine graphs, the first column represents the impact of an unexpected 1%-point rise in FDI inflow on these variables; the second column shows the effect of the same magnitude increase in GDP per capita; and the third column demonstrates the consequences of a corresponding increase in governance. In addition, the figure includes Cholesky response visuals for a standard deviation, adjusted with degrees of freedom, along with 95% confidence intervals reflecting innovations or shocks using analytical asymptotic standard errors.

Observing the response pattern to FDI shocks in the first column, an unexpected increase initially and gradually fades over a decade, and it is associated with a persistent increase in GDP per capita, while governance is persistently unaffected and unaltered. Figure 5.1 shows the impulse response functions with standard errors of one standard deviation of Cholesky ordering. Only the first 10 impulse responses from VAR(1) model for the core variables are computed. The output view in EViews presents both the tables (with standard errors) and the graphs for the responses. The graphs produce nine panel Cholesky ordering, each of the impulse responses. Thus, there are nine graphs arranged in three rows and three

columns. The first row shows the responses of ΔLnFDI to the structural shocks to ΔLnGDPPC and ΔGOV, while the second and third rows show the responses of ΔLnGDPPC to structural shocks to ΔLnFDI and ΔGOV, and ΔGOV to structural shocks to ΔLnFDI and ΔLnGDPPC, respectively. The responses of a variable to structural shock in the same variable are represented diagonally. In Figure 5.4, the response of FDI to shocks in GDP per capita and governance is zero. Zero response is not uncommon in VAR systems. Note that zero impulse responses mean no Granger-causality. Thus, a shock in governance has no effect on FDI and GDP per capita. FDI or GDP per capita will not react to such an impulse.

There are three structural shocks in both the VAR(1) and VAR(2) systems: ε'_{1it}, ε'_{2it}, and ε'_{3it}. In response to the first shock in the VAR(1) system, ε'_{1it}, ΔLnFDI initially increases but drops quickly to zero after 2 years and increases again in 3 years before leveling off to zero after a decade, ΔLnGDPPC initially increases slightly in year 2 and drops back to zero after 3 years, and ΔGOV initially increases slightly too and then levels off after 1 year. In response to the second structural shock in the VAR(1) system, ε'_{2it}, ΔLnFDI remains at zero over a decade. By assumption, there is no initial response of ΔLnFDI to shocks in ΔLnGDPPC. ΔLnGDPPC initially increases but drops off to zero after 3 years, and ΔGOV shows no response over a decade. In response to the third structural shock in the VAR(1) system, ε'_{3it}, ΔLnFDI remains at zero over a decade. Again, by assumption, there is no initial response of ΔLnFDI to shocks in ΔLnGOV. ΔLnGDP initially increases slightly in 2 years and drops back to zero after 3 years, and ΔGOV initially increases in 1 year, regained at 3 years and then fluctuates between 4 to 10 years.

Note that these impulse responses in Figures 5.4 – 5.7 are based on the recursive causal ordering ($\Delta GOV_{it} \rightarrow \Delta LnGDPPC_{it} \rightarrow \Delta LnFDI_{it}$). This means that the variables to the left of the arrow affect the variables to the right of the arrow but not vice versa. Thus, this ordering imposes the following restrictions: ΔGOV_{it} affects $\Delta LnGDPPC_{it}$ and $\Delta LnFDI_{it}$ but $\Delta LnGDPPC_{it}$ and $\Delta LnFDI_{it}$ do not affect ΔGOV_{it}, and $\Delta LnGDPPC_{it}$ affects $\Delta LnFDI_{it}$ but $\Delta LnFDI_{it}$ does not affect $\Delta LnGDPPC_{it}$. This can be proved by the $n!$ recursive causal orderings. A reverse ordering would mean identifying a different shock, hence producing different IRFs.

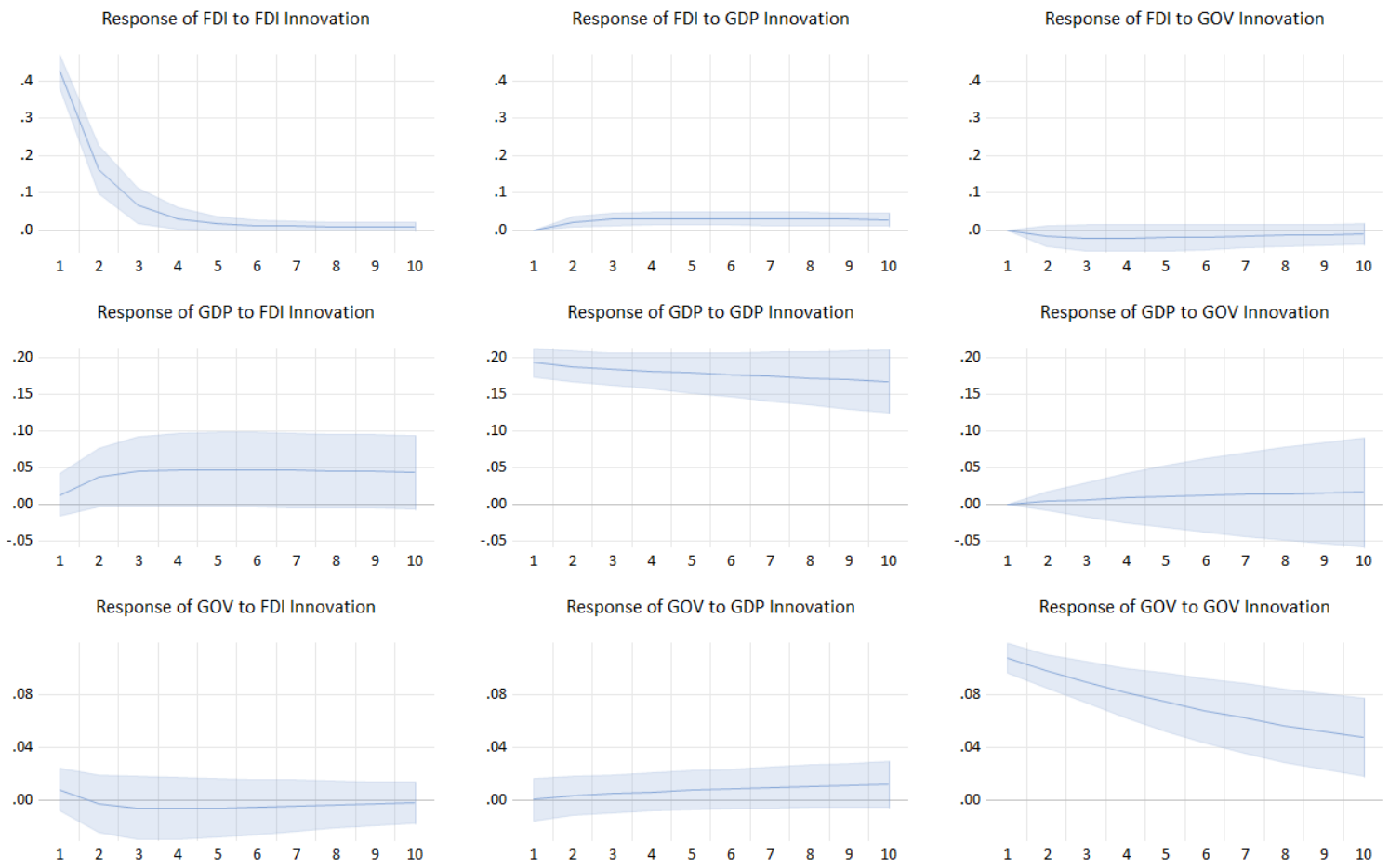

Figure 5.4 IRFs of the FDI-GDP-Governance System (CEMAC Sample)

Notes: Response to Cholesky One S.D. (d.f. adjusted) Innovations; 95% CI using analytic asymptotic S.E.s; IRF based on Panel VAR(1)

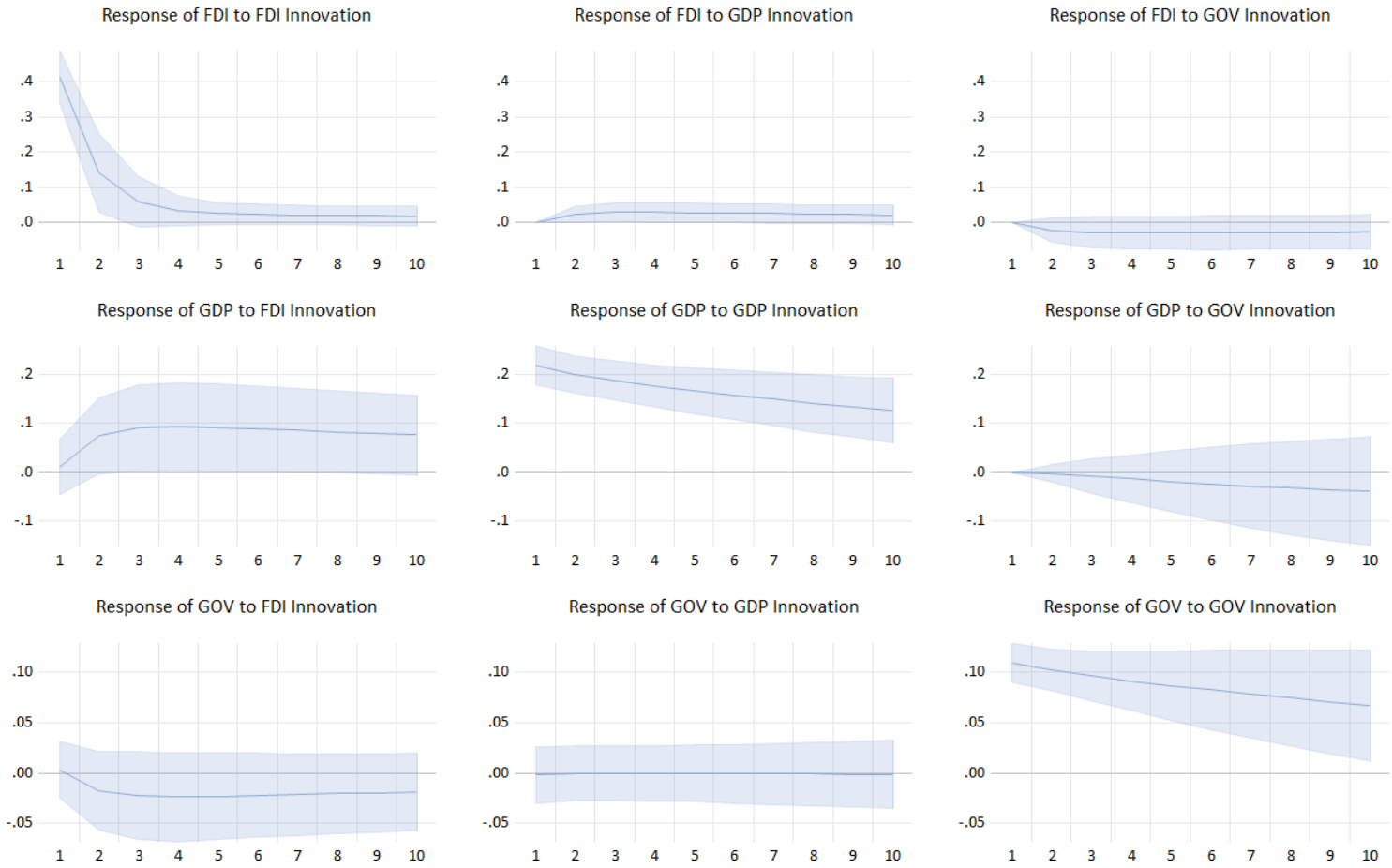

Figure 5.5 IRFs of FDI, Growth and Governance System (INC Sample)

Notes: Response to Cholesky One S.D. (d.f. adjusted) Innovations; 95% CI using analytic asymptotic S.E.s; IRF based on Panel VAR(1)

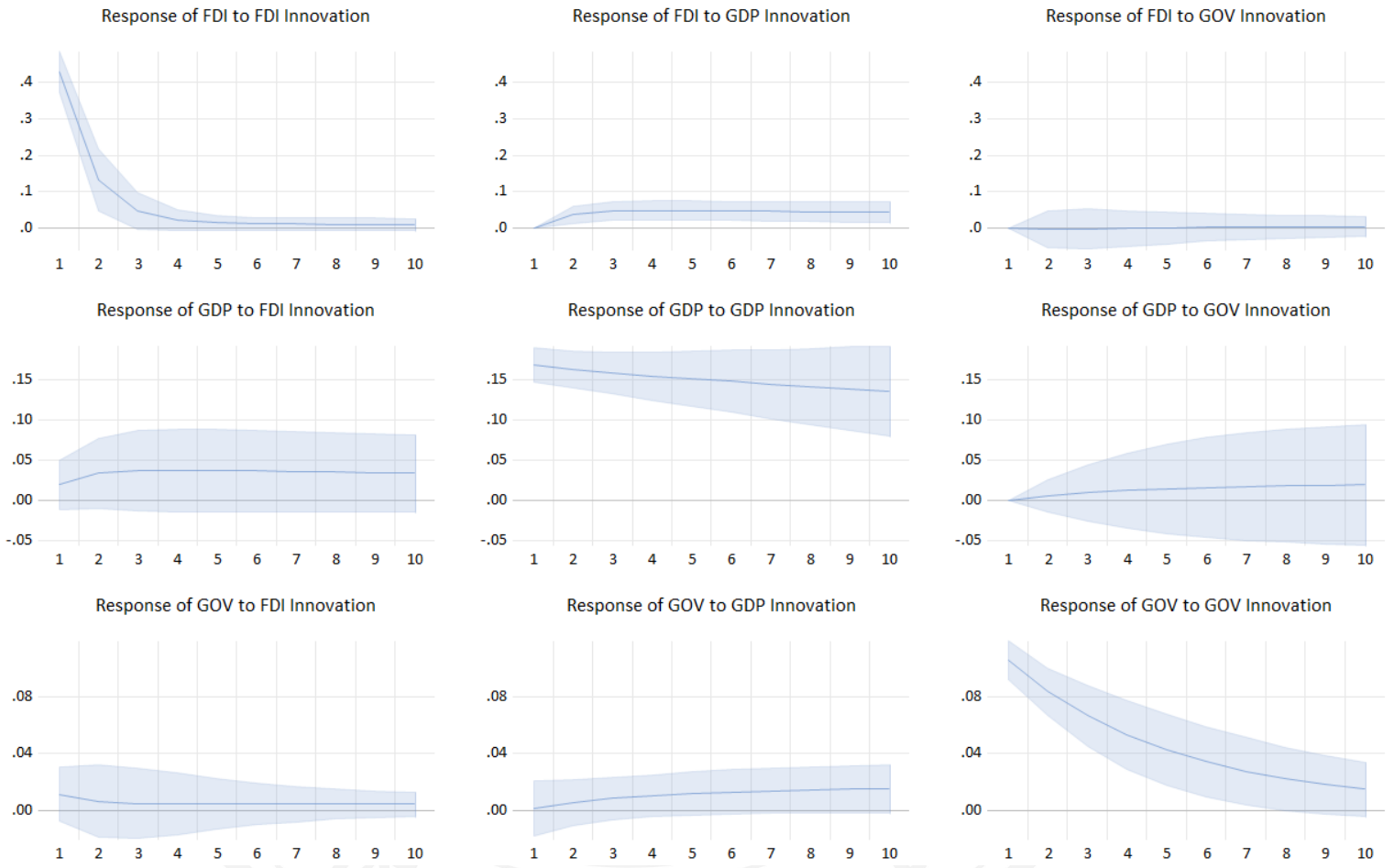

Figure 5.6 IRFs of FDI, Growth and Governance System (HIPC Sample)

Notes: Response to Cholesky One S.D. (d.f. adjusted) Innovations; 95% CI using analytic asymptotic S.E.s; IRF based on Panel VAR(1)

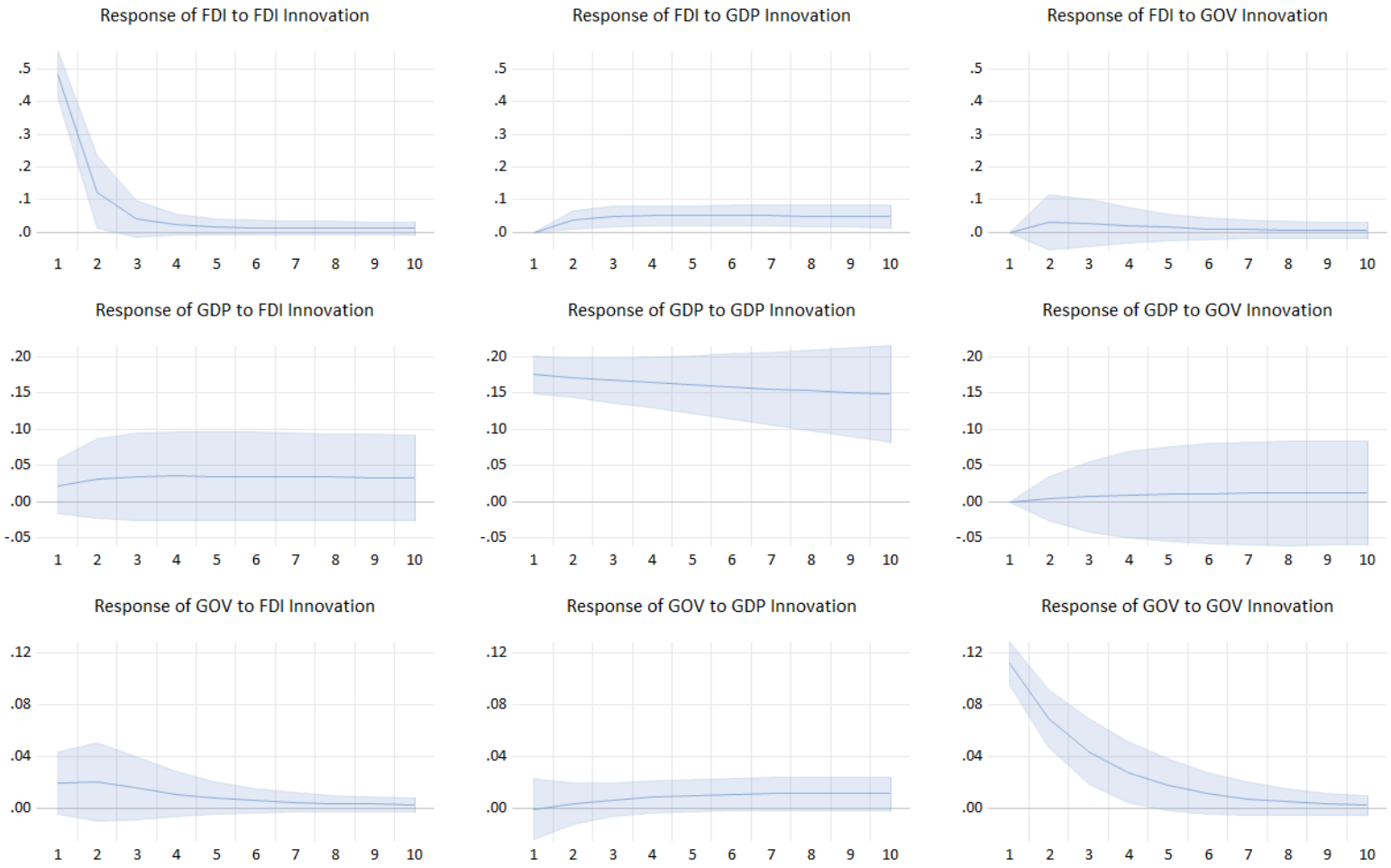

Figure 5.7 IRFs of FDI, GDP per capita, and Governance (LDC Sample)

Notes: Response to Cholesky One S.D. (d.f. adjusted) Innovations; 95% CI using analytic asymptotic S.E.s; IRF based on Panel VAR(1)

IRFs Figures in Appendix A show the responses of FDI and GDPPC to the 1994 CFA currency devaluation and the 2008 GFC, as well as the orthogonal impulse responses used for a different ordering: $\Delta LnGDPPC_{it} \rightarrow \Delta GOV_{it} \rightarrow \Delta LnFDI_{it}$. The impulse responses are identical to those of the previous ordering. Zivot and Wang (2006) suggest that these unchanged impulse responses may be due to almost uncorrelated reduced form VAR residuals, $\hat{\varepsilon}_{1it}, \hat{\varepsilon}_{2it}$ and $\hat{\varepsilon}_{3it}$. Despite this sensitivity in ordering, theory does not support the assertion that ΔGOV_{it} and/or $\Delta LnGDPPC_{it}$ does not affect $\Delta LnFDI_{it}$. Fortunately, all the different orderings present the same results. Although this part of the analysis ends here, Figure 5.5A in the appendix presents the impulse response functions for the VAR(2) model with core variables as specified by the AIC criterion.

5.5.3 FEVD Results

Stock and Watson (2001) define the forecast error variance decomposition (FEVD) as the percentage of variance error made in the forecasting variable due to shock at a given time horizon. In other words, it quantifies the proportion of the prediction error variance attributed to a particular shock at a specific time frame, such as four years. The error of the predicted variance could be FDI inflow while the specific shock could represent the error term in the GDP per capita equation. Thus, Stock and Watson hold that this resembles a partial R^2 for the forecast error but applied across different forecast horizons. Interpretation of FEVD is important because it provides insights into the relationships and interdependencies between the variables in the VAR model, aiding the understanding of how shocks in one variable transmits to the others over time.

Table 5.24 depict a FEVD estimates for a VAR model with FDI inflow, GDP per capita, and governance, for a VAR(1) forecast horizon of 10 years. The results for Panel VAR(1) show just minor interaction between FDI inflow, GDP per capita, and governance. At the 10-year horizon, only 4.7% of the error in forecast of FDI inflow is attributed to the GDP per capita and governance shocks in the VAR system. This is not even better for the 5-year horizon (2.2%). Again, at the 1, 5, and 10-year horizons, only 0.5%, 4.6%, and 5.9% of the error in forecast of GDP per capita is attributed to the shocks to FDI inflow and governance in the recursive VAR system. Finally, at the

1, 5, and 10-year horizons, only 0.5%, 0.8%, and 1.5% of the error in forecast of GDP per capita is attributed to the shocks to FDI inflow and GDP per capita in the recursive VAR system.

The obvious fact is the high percentage points on these variables is a result of its own-variable shocks. First, FDI inflow contributes about 95.4% to its own forecast error variances for FDI inflow, shocks in GDP per capita account for 94.1% of variability in the forecast of GDP per capita over the 10-year horizon, and shocks in governance account for 98.5% of variability in the forecast of GDP per capita over the 10-year horizon. Zivot and Wang (2006) propose that forecasting is a common application for VAR models. Hence, the structure of a VAR model gives information about a variable(s) capacity to forecast other variables. Granger (1969) developed the following intuitive concept of a variable's predicting capacity. Note that Granger causality, clearly, does not entail real causality. It just implies the ability to forecast. Recall that the VAR model is used to estimate the IRFs (see subsections 4.4.2 and 5.4.2) before computing FEVD. Computing FEVD involves simulating the responses of each variable in the VAR model to different types of shocks, one at a time. The variance of the forecast error of the variable of interest is then decomposed into contributions from each individual shock.

Figure 5.8 shows the orthogonal FEVD of the forecast errors from the VAR(1) model fit for the three core variables using the Cholesky factors ordering for 95% CI Monte Carlo SEs with 100 replications−recursive causal ordering $\Delta LnFDI_{it} \rightarrow \Delta LnGDPPC_{it} \rightarrow \Delta GOV_{it}$. The FEVD results show the percentage of the forecast error variance of the variable that can be attributed to each specific shock. It helps to answer questions like: what proportion of the forecast error variance of $\Delta LnFDI_{it}$ is due to shocks in $\Delta LnGDPPC_{it}$ and/or ΔGOV_{it}, and vice versa. Like IRFs, the nine-panel graphics plot for FEVDs are presented rather than the tables. The interpretation of FEVD involves understanding the impact of each shock on the variability of the core variables. For instance, to interpret FEVD results more clearly, a higher percentage of the forecast error variance of a variable, say $\Delta LnFDI_{it}$, due to shocks in another variable, say $\Delta LnGDPPC_{it}$, means the latter shock variable has a substantial influence on the forecast accuracy of the variable in the former variable.

Table 5.24 FEVD Matrix for with FDI, Growth and Governance

Panel VAR(1)		Horizons and Forecast SE		Variance Decomposition (percentage points)		
		Forecast Horizon	Forecast Standard Error	ΔLnFDI	ΔLnGDPPC	ΔGOV
Variance decomposition of:	ΔLnFDI	1	0.426	100.0	0.0	0.0
		5	0.468	97.8	1.5	0.7
		10	0.474	95.4	3.5	1.2
	ΔLnGDPPC	1	0.194	0.5	99.5	0.0
		5	0.426	4.5	95.4	0.1
		10	0.585	5.5	94.1	0.4
	ΔGOV	1	0.108	0.5	0.0	99.5
		5	0.204	0.5	0.3	99.2
		10	0.243	0.4	1.1	98.5

Notes: Cholesky ordering: ΔLnFDI ΔLnGDPPC ΔGOV; Standard errors: Monte Carlo (100 repetitions) standard deviations in parentheses.

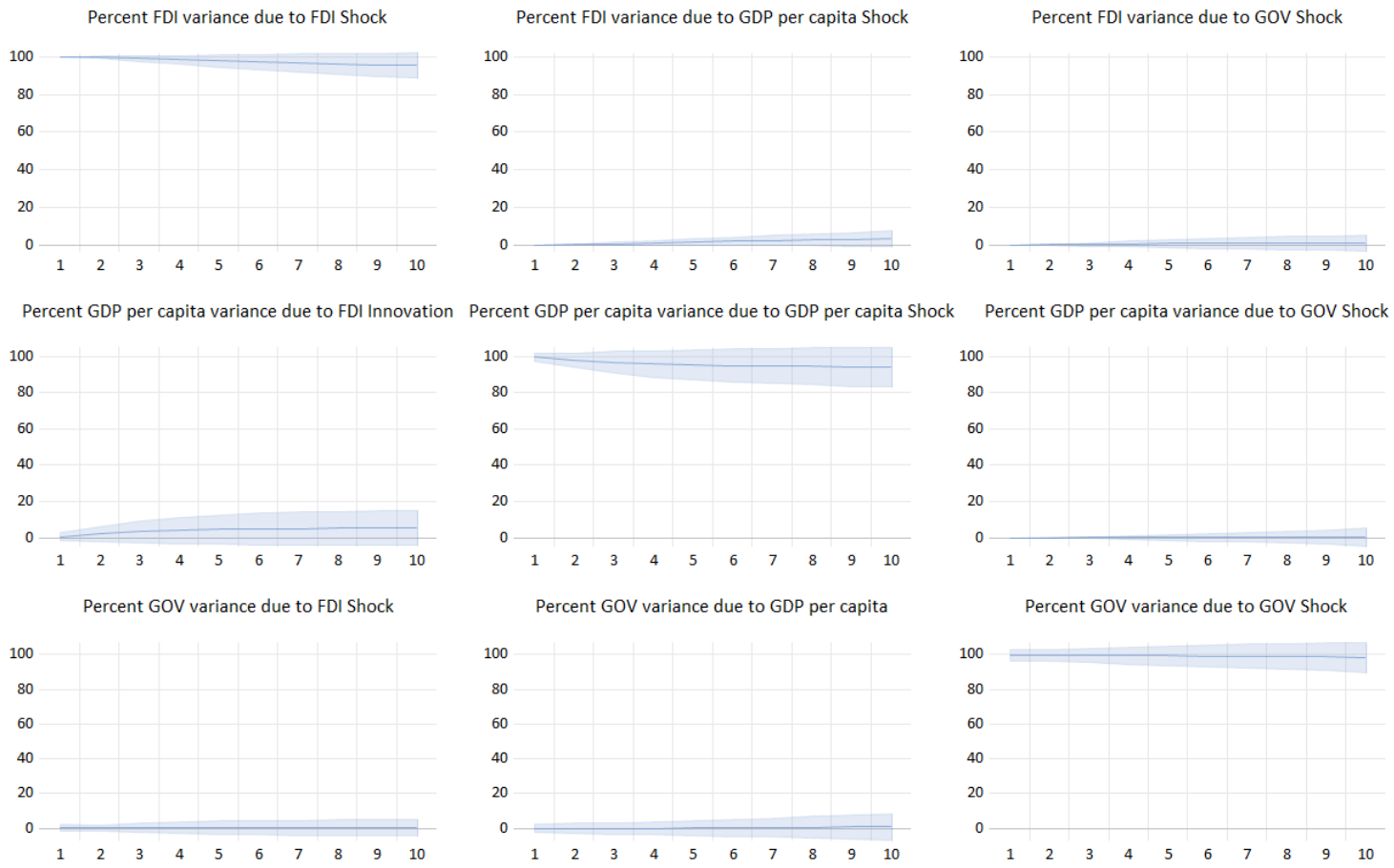

Figure 5.8 Orthogonal FEVDs

Notes: Variance Decomposition using Cholesky (d.f. adjusted) Factors 95% CI using Monte Carlo S.E.s with 100 replications.

All the off diagonal FEVD values in Figure 5.3 are low (just about 0%). This means that the $\Delta LnGDPPC_{it}$ and ΔGOV_{it} in the system have a relatively minor impact on the forecast error variance on $\Delta LnFDI_{it}$. In other words, the low values represent low contribution of the shock to the FEVD. Thus, the variability in the forecast errors of the variable is not significantly affected by that shock. The core variables are less sensitive to their shocks.

On the other hand, all the diagonal FEVD values indicate that 100% of the forecast error variance of $\Delta LnFDI_{it}$ is due to shocks in $\Delta LnGDPPC_{it}$ and/or ΔGOV_{it} . This means that $\Delta LnGDPC_{it}$ or ΔGOV_{it} has substantial influence on the forecast accuracy of $\Delta LnFDI_{it}$. This latter result indicates that, firstly, most of the variance of the forecast errors for $\Delta LnFDI_{it+h}$ at all horizons, h, is due to the orthogonal $\Delta LnFDI_{it}$ innovations/shocks. Secondly, most of the variance of the forecast errors for $\Delta LnGDPPC_{it+h}$ at all horizons, h, is due to the orthogonal $\Delta LnGDPPC_{it}$ innovations/shocks. Finally, most of the variance of the forecast errors for ΔGOV_{it+h} at all horizons, h, is due to the orthogonal ΔGOV_{it} innovations/shocks. These high values represent high contribution of the shock to the FEVD. Thus, the variability in the forecast errors of the variable is significantly affected by the shock of itself. The core variables are more sensitive to their shocks.

Note again that almost identical results for FEVDs using alternative Cholesky ordering. he FEVD is a valuable tool for understanding the dynamic relationships between variables in a VAR model and can offer insights into the transmission and interactions of shocks in a multivariate time series system. Although IRFs and FEVDs are valuable tools for understanding the underlying dynamics and drivers of a particular variable's forecast errors and variables correlation, their interpretations should be done with caution. In relation to Gospodinov, María Herrera and Pesavento (2013), SVARs have proven to be a valuable tool for policy analysis and the evaluation of dynamic economic models.

The most dependable technique for applied work is to use VAR models in levels and discover structural impulse responses using short-run constraints. FDI inflows, economic growth and governance are all part of the macroeconomic class and application of the FEVD approach should not be strange. Unlike the impulse response functions, variance decomposition uses all the endogenous variables in the

system to expend on the relationships in the variables based on the coefficient matrices. In fact, FEVD advances our understanding of the proportion of the forecast error variance for each variable that may be accounted for by external shocks to other variables.

The FEVD method, according to Shan (2005), displays the precise amount of feedback in a variable caused by innovative shocks in another variable over a range of time horizons (Kyophilavong et al., 2015). This method's usefulness to the variable orderings is one of its benefits. Although FEVD and IRF are often taken as alternatives, they are complements and using both is not a mistake. Another confusion is using both techniques with Granger causality. Both methods are different from Granger causality in that the fundamental issue with basic Granger causality is that it only illustrates the relative degree of causality and offers no details regarding the time period or the precise causal relationship between one variable and another.

Table 5.18 shows the FEVD for FDI inflows, GDP per capita and governance. Going by the Table 5.15a, 100% of 1-step (short horizon) forecast error variance for FDI inflows is accounted for by own innovations, 0% is accounted for by GDP per capita, and 0% is accounted for by governance; about 97.8% of 5-step (middle horizon) forecast error variance for FDI inflows is accounted for by own innovations, 1.5% is accounted for by GDP per capita, and 0.7% is accounted for by governance; about 95.4% of 10-step (long horizon) forecast error variance for FDI inflows is accounted for by own innovations, 3.5% is accounted for by GDP per capita, and 1.2% is accounted for by governance.

In Table 5.18, about 99.5% of 1-step (short horizon) forecast error variance for GDP per capita is accounted for by own innovations, 0.5% is accounted for by FDI inflows, and 0% is accounted for by governance; about 95.4% of 5-step (middle horizon) forecasts for GDP per capita is accounted for by own innovations, 4.5% is accounted for by FDI inflows, and 0.2% is accounted for by governance; about 94% of 10-step (long horizon) forecasts for GDP per capita is accounted for by own innovations, 5.5% is accounted for by FDI inflows, and 0.4% is accounted for by governance. Still in Table 5.18, about 99.5% of 1-step (short horizon) forecast error variance for governance is accounted for by own innovations, 0.5% is accounted for by FDI inflows, and 0% is accounted for by governance; about 99.2% of 5-step

(middle horizon) forecasts for governance is accounted for by own innovations, 0.5% is accounted for by FDI inflows, and 0.3% is accounted for by GDP per capita; about 98.5% of 10-step (long horizon) forecasts for governance is accounted for by own innovations, 0.4% is accounted for by FDI inflows, and 1.1% is accounted for by GDP per capita.

5.6 Robustness Tests for PVAR Models

There are many tests for robustness of estimates for a panel VAR model ranging from specification (lags or inclusion of different variables), model stability, cross-sectional dependence, sensitivity analysis bootstrap methods, Monte Carlo simulations, reweighted multivariate least trimmed squares (Croux & Joossens, 2008), and multivariate MM estimation (Kudraszow & Maronna, 2011). Chang and Shi (2022) argue that these latter two are susceptible, and note that these are normally implemented to handle outliers and robustly estimate parameters. Despite the myriad of tests available, this thesis performs tests are similar to those in Section 5.2 with the major goal being robustness checks to ensure that the conclusions drawn from the panel VAR analysis are reliable and not driven solely by specific modeling choices or data subsets. Thus, by systematically testing the sensitivity of your results, it enhances the credibility of the findings and the generalizability of the conclusions. Note that some robust estimates such as inclusion of variables, two-way and three-way interaction terms have been performed in Section 5.3. This section on reinforces the analysis while trying to obtain the optimal model.

5.6.1 PVAR with Linear Restrictions

Canova and Ciccarelli (2013) underscored the distinctive capability of panel VARs to capture dynamic interactions and variations among different groups. Nevertheless, to estimate these models effectively, it is necessary to introduce various types of constraints. Therefore, this section imposes linear restrictions on a model parameters or coefficients of the VAR system in order to test whether GDP per capita has a contemporaneous effect on FDI inflow but not on governance. The main reason for imposing restrictions is to provide more parsimonious model. It is worthy to note

that there are different ways of imposing restrictions two of which are the reduced form VARs with linear restrictions and the structural VARs with Cholesky decomposition. The former is implemented in the section and the setup follows an unrestricted panel VAR model with restrictions based on the objective. For instance, based on H6, GDP per capita is assumed to have a contemporaneous impact on FDI inflow but not governance. In this case, the coefficients for FDI and GDP per capita are zero (0) in the governance equation.

Table 5.25 presents the panel VAR(1) model with linear restrictions for the FDI and GDP per capita coefficients in the governance equation. The results are confirmed by the non-validity or statistical significance of the Wald test meaning GDP per capita has a contemporaneous effect on FDI inflow beyond the influence of governance (Hypotheses 11-12 on Section 4.1.3). Likewise, placing constraints on coefficients of governance and FDI in the GDP per capita equation leads to a statistically significant Wald test indicating the contemporaneous impact of governance on FDI inflow even without the influence of GDP per capita.

5.6.2 Panel Bayesian VAR Analysis

Like VAR models in Section 5.5, Bayesian models are used to analyze the dynamic relationships between variables, but they are introduced here as a robustness measure to adjust the issue of over-parametrization, small sample, as well as shaping posterior distribution of the model parameters. The essence is to compare the estimates and forecasts for panel VAR and Bayesian VAR to check for improvements in the models. Besides forecasting of VAR models, Ouliaris, Pagan and Restrepo (2016) argue that BVARs effect forecasting since the priors corresponding to the VAR coefficients have fewer parameters and impose certain constraints that erase certain parts of the parameter space.

Table 5.26 shows the forecasting performance of Bayesian estimation methods for the core variables using three (3) priors: Litterman/Minnesota, Sims-Zha (Normal-Wishart), and Sims-Zha (Normal-Flat). These priors are informative and they convey strong prior beliefs about parameter values. The sample size is small (30 years across just six countries) and hence, the influence of priors on the posterior distribution can be substantial. However, the question raised sometimes is the criteria used in selecting

these priors. The criteria may be knowledge of the researcher, nature of the data or the goal of the analysis. This thesis selects these three criteria simply based on empirical studies. Ouliaris, Pagan and Restrepo (2016) Ouliaris et al. (2016) uses the Sims-Zha prior which are the latter two listed above (see Hypothesis 13 in Section 4.1.3).

Apart from regular VAR models, forecasting for both standard and Bayesian VAR models is possible. Two models for standard VAR and BVAR for the core variables are presented in Table 5.27 to perform out-of-sample forecasting for mainly FDI inflow and GDP per capita with governance and they are just shown without much interpretation. In addition to the estimates in Table 5.26, three different priors of Bayesian estimates are compared with those of Table 5.25. The model with the best VAR estimates is normally used to create impulse responses to a shock in FDI inflow. The graph of the responses is in Figure 5.6.

Table 5.25 PVAR(1) Core Model with Restrictions

	Model 15			Model 16			Model 17		
	FDI	**GDPPC**	**GOV**	**FDI**	**GDPPC**	**GOV**	**FDI**	**GDPPC**	**GOV**
$FDI_{(t-1)}$	0.386***	0.056**	0.000	0.371***	0.000	-0.024	0.494***	0.060**	-0.022
	(0.074)	(0.034)	---	(0.074)	---	(0.019)	(0.069)	(0.034)	(0.019)
$GDPPC_{(t-1)}$	0.109***	0.975***	0.000	0.115***	0.989***	0.014**	0.000	0.971***	0.012
	(0.033)	(0.015)	---	(0.033)	(0.011)	(0.008)	---	(0.015)	(0.008)
$GOV_{(t-1)}$	-0.148	0.040	0.935***	-0.162	0.000	0.905***	0.000	0.044	0.908***
	(0.129)	(0.059)	(0.027)	(0.129)	---	(0.033)	---	(0.059)	(0.033)
Constant	-0.748***	0.240*	-0.075***	-0.803***	0.114	-0.201***	0.163***	0.268**	-0.183***
	(0.331)	(0.151)	(0.030)	(0.331)	(0.083)	(0.084)	(0.039)	(0.151)	(0.084)
R^2	0.279	0.978	0.874	0.279	0.977	0.876	0.228	0.978	0.876
No. of obs.		174			174			174	
No. of coeff.		10			10			10	
Restrictions		2			2			2	

Notes: *** $p < 0.01$, ** $p < 0.05$, *** $p < 0.1$; Robust standard errors in parenthesis. The estimates represent Model 15 and 17, respectively. The variables are in first difference log except GOV which is in first difference.

Table 5.26 Standard PVAR and Bayesian PVAR Estimates

	Panel standard VAR			**Panel Bayesian VAR**		
	ΔLnFDI	**ΔLnGDPPC**	**ΔGOV**	**ΔLnFDI**	**ΔLnGDPPC**	**ΔGOV**
$\Delta LnFDI_{(t-1)}$	0.379***	0.056*	-0.024	0.240***	0.048*	-0.020
	(0.075)	(0.034)	(0.019)	(0.061)	(0.027)	(0.015)
$\Delta LnGDPPC_{(t-1)}$	0.113***	0.975***	0.014	0.135***	0.959***	0.025
	(0.034)	(0.015)	(0.009)	(0.033)	(0.014)	(0.008)
$\Delta GOV_{(t-1)}$	-0.156	0.039	0.905***	-0.170	0.073	0.819***
	(0.130)	(0.059)	(0.033)	(0.127)	(0.056)	(0.031)
Constant	-0.784	0.238	-0.201	-0.912***	0.392***	-0.371***
	(0.335)	(0.153)	(0.085)	(0.326)	(0.145)	(0.081)
R2	0.279	0.978	0.876	0.265	0.978	0.871
F-statistics	22.0	2496.7	400.6	20.4	2471.6	381.8
No. of obs.		174			174	
No. of coeff.		10				

Notes: *** $p < 0.01$, ** $p < 0.05$, *** $p < 0.1$; Robust standard errors in parenthesis. The estimates represent Models 1 and 18, respectively. Model 1 is shown here for emphasis and comparison with a more robust Model 18.

Table 5.27 Bayesian Estimation with Different Priors (1992-2019)

Prior Type	**Litterman / Minnesota**			**Sims-Zha (normal-Wishart)**			**Sims-Zha (normal-flat)**		
	ΔLnFDI	**ΔLnGDPPC**	**ΔGOV**	**ΔLnFDI**	**ΔLnGDPPC**	**ΔGOV**	**ΔLnFDI**	**ΔLnGDPPC**	**ΔGOV**
$\Delta LnFDI_{(t-1)}$	0.246***	0.049*	-0.020	0.240***	0.048	-0.020	0.240***	0.048*	-0.020
	(0.060)	(0.027)	(0.015)	(0.060)	(0.033)	(0.018)	(0.060)	(0.033)	(0.018)
$\Delta LnGDPPC_{(t-1)}$	0.134***	0.959***	0.025	0.135***	0.959	0.025	0.135***	0.959***	0.025
	(0.032)	(0.014)	(0.008)	(0.032)	(0.018)	(0.010)	(0.032)	(0.018)	(0.010)
$\Delta GOV_{(t-1)}$	-0.169**	0.073	0.820***	-0.171	0.074	0.819	-0.171**	0.074*	0.819***
	(0.123)	(0.056)	(0.031)	(0.125)	(0.069)	(0.037)	(0.125)	(0.069)	(0.037)
Constant	-0.905	0.391	-0.369	-0.913	0.393	-0.371	-0.913	0.393	-0.371
	(0.315)	(0.144)	(0.080)	(0.322)	(0.178)	(0.096)	(0.321)	(0.178)	(0.095)
R^2	0.266	0.978	0.871	0.265	0.978	0.871	0.265	0.978	0.871
Adj. R^2	0.253	0.977	0.869	0.252	0.977	0.868	0.252	0.977	0.868
F-statistic	20.5	2472.6	382.4	20.4	2471.7	381.8	20.4	2471.7	381.8
No. of Obs.	174			174			174		

Notes: *** $p < 0.01$, ** $p < 0.05$, *** $p < 0.1$; Robust standard errors in parenthesis. The estimates represent Models 19 (same as in Model 18 with the imposition of zero in the AR coefficient: AR(0)) and 21, respectively.

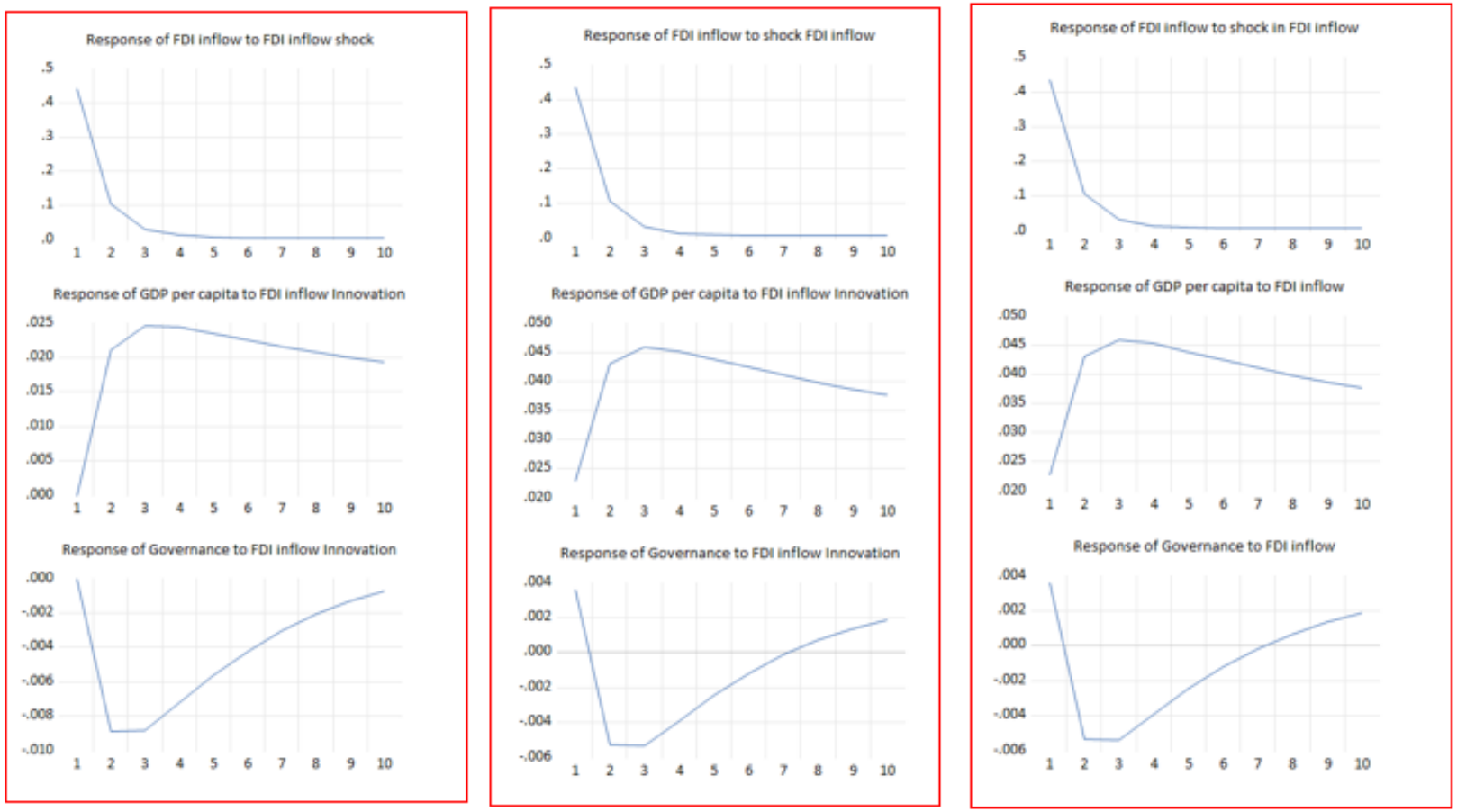

Figure 5.9 Impulse Responses of Bayesian VAR

Notes: IRFs of a shock in FDI inflow for Litterman/Minnesota, normal/Wishart, and Normal-flow, respectively.

5.6.3 Panel Structural VAR Analysis

This subsection extends the panel VAR model in Section 5.5 to include the three core variables and two exogenous variables: the 1994 currency devaluation (CFA zone variable) and the 2008 financial crisis (world variable). Structural VAR is used to assess how the 2008 global financial crisis and the CFA currency devaluation affected the three core variables. Hence, SVAR model determines the effect of both shocks on FDI, GDP per capita, and governance with short-and long-run constraints or restrictions (Cholesky and Blanchard-Quah, respectively). This extension is a step further from Section 5.5 and note that certain constraints in SVAR models allow for causal links other than those identified by recursive or reduced-form models (in Section 5.5). The assumption here is that these two shocks aforementioned caused FDI inflow to slow. In Section 5.5, the shocks identified were those of growth and governance in CEMAC countries. Shocks from currency devaluations and GFCs generally decrease FDI inflow, GDP per capita, and governance quality.

SVAR model determines the effect of both shocks on the contemporaneous relationships between FDI, GDP per capita, and governance, especially after identification, with short-and long-run constraints or restrictions (Cholesky and Blanchard-Quah, respectively). Cholesky's short-term restriction and Blanchard-Quah's long-term restriction are both used to identify and estimate the underlying economic shocks (structural dynamics) that drive the observed data. While, in this thesis, the Cholesky restriction focuses on contemporaneous causal relationships between FDI, GDP per capita, and governance, Blanchard-Quah is concerned with identifying permanent and transitory shocks that have long-run effects on FDI, GDP per capita, and governance. The Blanchard-Quah's long-term restriction shown in Table 5.28 is a different approach to identifying structural shocks in SVAR models. Instead of focusing on contemporaneous causal relationships, it looks at the long-run relationships between the core variables. Thus, it assumes that some shocks have only temporary effects on variables (transitory shocks), while others have permanent effects (structural or permanent shocks). Further details of this shows that long-term restriction is often used to identify supply and demand shocks in our core model. This is, however, not shown or covered in this thesis. This proves that identifying shocks could be complex with the Blanchard-Quah method aiding researchers separate

permanent and transitory shocks by imposing restrictions on the SVAR system, often through the use of cointegration techniques (see Section 5.3).

Figure 5.10 confirms the results presented in Table 5.27 with both showing that the 2008 GFC had a positive and significant impact on FDI, while it had a negative and significant effect on GDP per capita. The 1994 currency devaluation, on the other hand, had a significantly positive impact on GDP per capita and an insignificant effect on GDP per capita. Both were insignificant in predicting governance. Although the inclusion of both shocks did not add much to explain the dynamic relationship between the three core variables, Figure 5.3 shows the response of FDI to both shocks. Table 5.28 shows a matrix of long-run effects and further provides interpretation of the structural shocks affecting the core variables. Cholesky decomposition transforms this matrix into a lower triangular form. Cholesky's short-term restriction (not shown in the table) identifies the contemporaneous causal relationships the core variables. Note that this assumes that shocks to the core variables are ordered in a particular way, and the effects of shocks on each variable occur immediately in the same period. Despite the main two shocks identified, shocks to governance, for instance, could still be of importance. For instance, in Table 5.27, Cholesky's short-term restriction might assume that the shock to governance affects governance and FDI inflow in the current period, but the shock to FDI affects only FDI in the current period. This implies that governance has a contemporaneous causal effect on both governance and FDI, while FDI has a contemporaneous causal effect only on FDI. The key takeaway from this is that this restriction helps in identifying the structural shocks and causal relationships among variables by simplifying the SVAR system.

Going by Table 5.28, the upper panel shows the structure of the F matrix and the lower panel shows the estimates. The upper-off diagonal of zero indicates no impact. The lower off-diagonal elements of the F matrix represent the impact of a one-unit structural shock to FDI, GDP per capita, and governance on FDI, GDP per capita, and governance. The values show the contemporaneous spillover effects of shocks from one variable to another, with a positive value (like in the response of FDI to shocks in the other variables) indicating a shock to the variables has a positive impact on variable FDI, and a negative value indicating a negative impact. The

hypothesis hereunder is guided by the structural VAR analysis. Like VAR models, in SVAR analysis structural parameters are estimated, but SVAR goes further to establish causal relationships among the variables, in this case just the core variables. In this hypothesis lies many other sub-causal relationships such as the positive impact of economic growth (GDP per capita) on FDI inflow, the positive impact of FDI inflow on economic growth, feedback between FDI and governance, and economic growth and governance.

In addition to this SVAR model, different sets relevant control variables could be included, namely; the 1994 currency devaluation and the 2008 financial crisis, as well as the sets of exogenous variables introduced in Section 5.3. These variables are normally added to account for potential confounding factors (see Hypothesis 14 in Section 4.1.3). Figure 5.8 explores the 3 by 3 row by column graphs on how FDI inflow, GDP per capita, and governance respond to a sudden, one-time change in FDI inflow, GDP per capita, and governance (similar to Subsection 5.5.2). Recall that in the case of the response of FDI, the two latter two variables represent the impulses commonly known as shocks. Again, the IRFs are run using the long-term (Blanchard-Quah, 1988) restrictions in Figure 5.7.

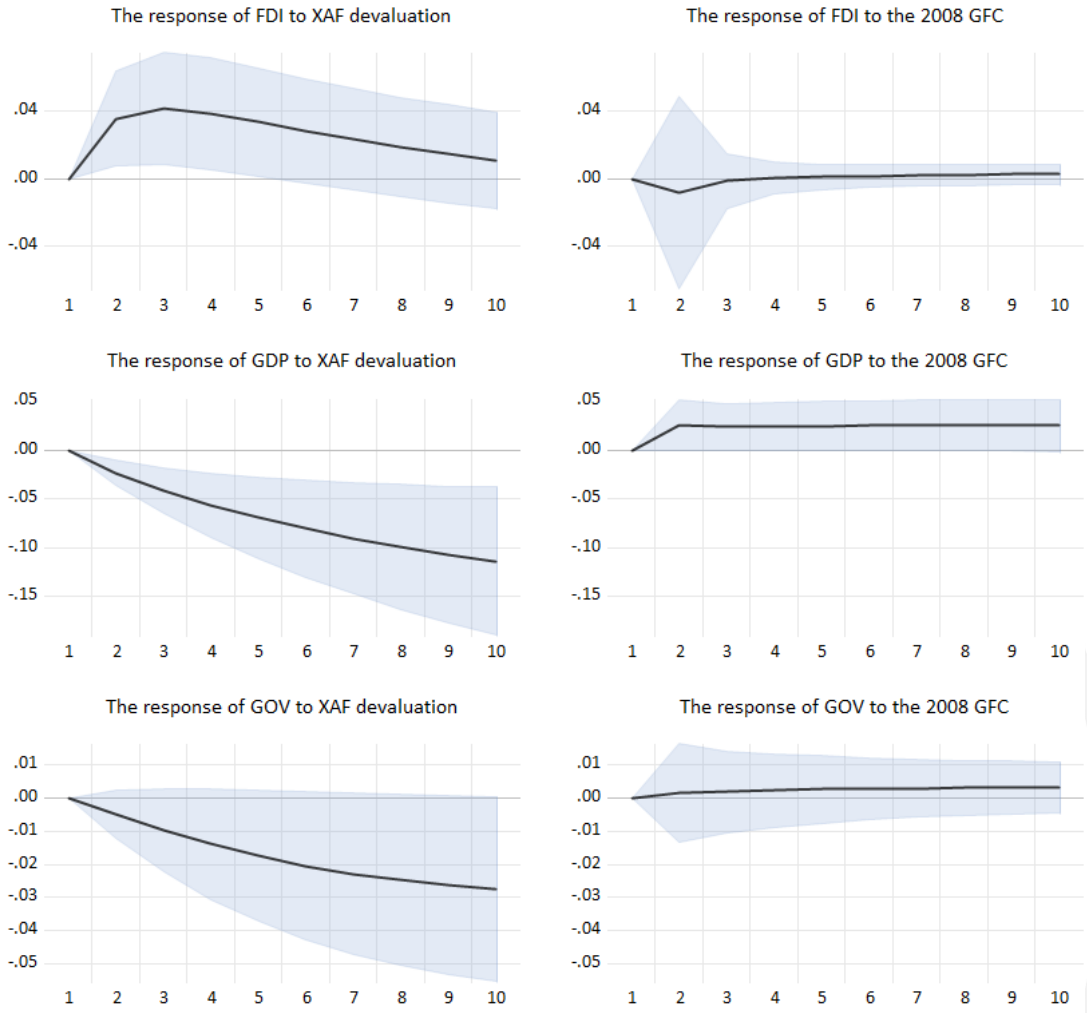

Figure 5.10 IRFs Structural VAR of FDI with Policy Shocks

Notes: Response of FDI inflow to (structural VAR) shocks in core variables 95% CI (±2S.E.) using analytic asymptotic S.E.; for long-run Blanchard-Quah

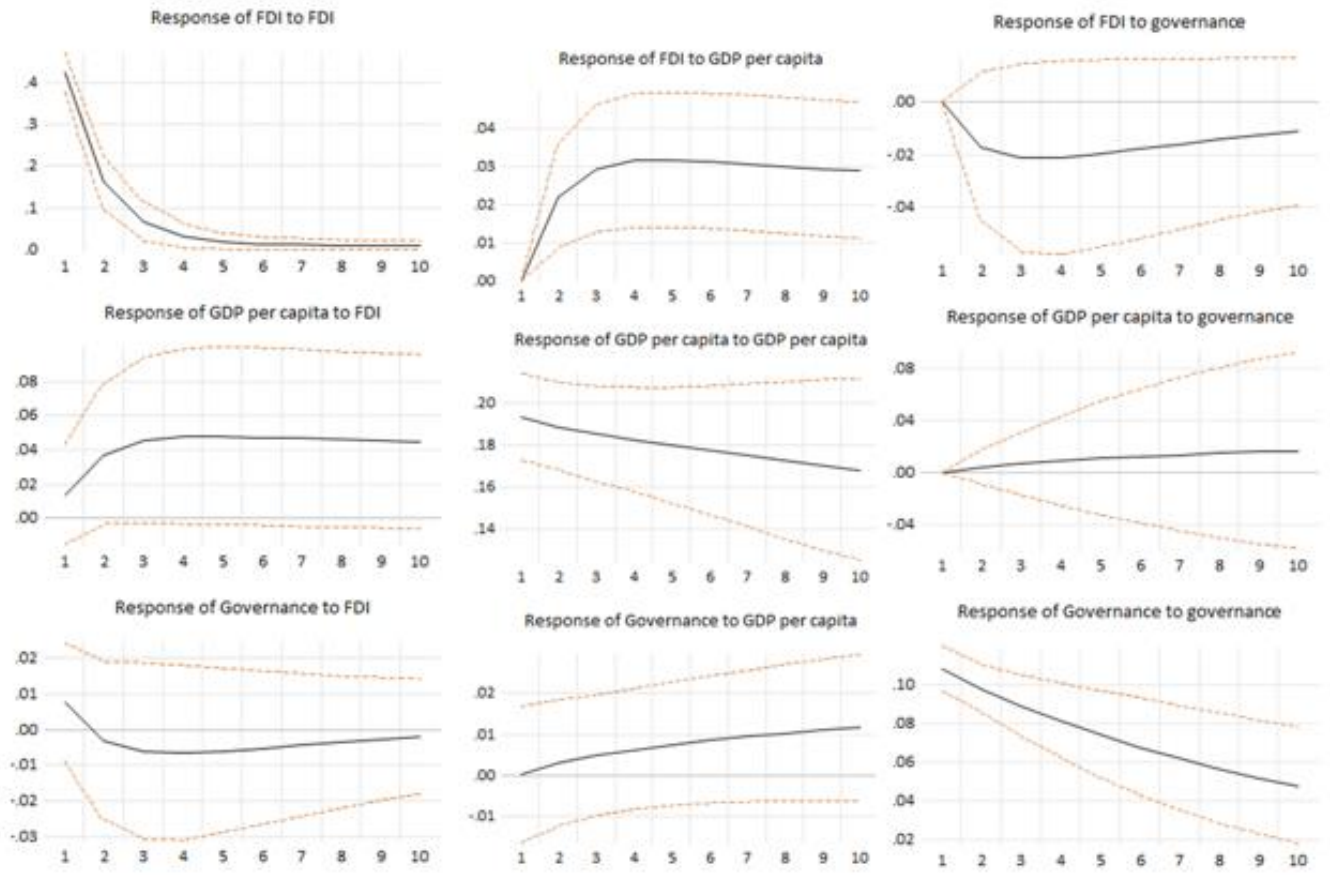

Figure 5.11 IRFs of the Structural VAR Model for Core Variables

Notes: Response of FDI inflow to (structural VAR) shocks in core variables 95% CI (±2S.E.) using analytic asymptotic S.E.

Going by Figure 5.12 which contains the description of the forecast error variance decomposition (see Subsection 5.5.3 for the regular panel VAR model) for FDI inflow. Here, the FEVD helps to decompose the variance of forecast errors for FDI inflow (sometimes for each variable in the system as shown in Subsection 5.5.3) into contributions from FDI inflow shocks and the shocks of GDP per capita and governance. So, the aim here is to show how the relative importance of the core variables shocks in explaining the sources of forecast errors in FDI inflow.

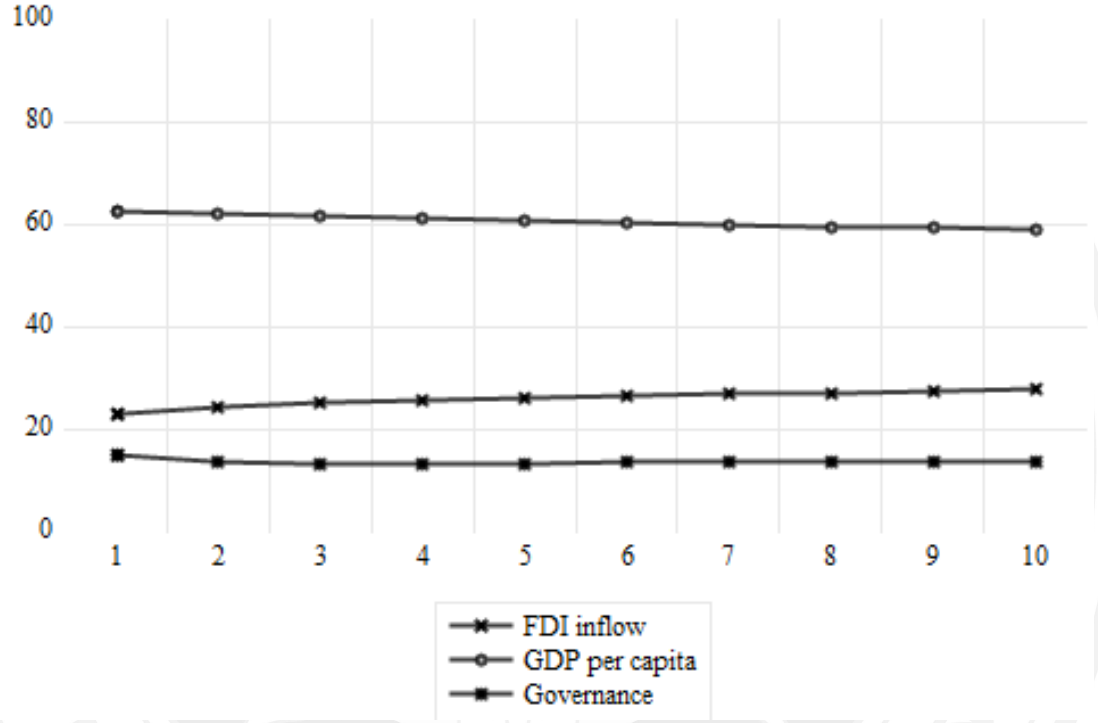

Figure 5.12 Variance Decomposition Using Structural VAR Factors

Notes: The lines in the graph represent percent of FDI inflow variance due to FDI inflow, GDP per capita, and governance, respectively.

The variance of the change in FDI inflow has been affected, in varying magnitude, by the core variables for several years although with low volatility. For example, about 62% of the forecast error or variance for FDI inflow in the first four years is due to shocks in GDP per capita, and somewhat between 15% and 25 % is due to shocks from FDI inflow itself and governance. This suffices that FDI fluctuations are more driven or significantly influenced by GDP per capita dynamics, with those of FDI and governance being non-negligible on the forecast of FDI inflow.

The volatility is quite low and the decline for all three variations across the 10 years is gradual and not too much. While the variation of GDP per capita remained between 60-62%, those for FDI inflow and governance remained between 15-25% throughout the first 10 years.

Table 5.28 F-Matrix with Long-run Effects

	Panel SVAR model 22					Panel SVAR model 23			
	Shock					Shock			
Variable	**ΔLnFDI**	**ΔLnGDPPC**	**ΔGOV**	**CDEV_1994**		**ΔLnFDI**	**ΔLnGDPPC**	**ΔGOV**	**GFC_2008**
	Structure of F-matrix					**Structure of F-matrix**			
ΔLnFDI	f11	0	0	0	ΔLnFDI	f11	0	0	0
ΔLnGDPPC	f21	f22	0	0	ΔLnGDPPC	f21	f22	0	0
ΔGOV	f31	f32	f33	0	ΔGOV	f31	f32	f33	0
CDEV_1994	f41	f42	f43	f44	GFC_2008	f41	f42	f43	f44
	Estimated F matrix					Estimated F matrix			
ΔLnFDI	1.92	0	0	0	ΔLnFDI	1.1	1.2	0.3	-0.9
ΔLnGDPPC	9.18	-6.02	0	0	ΔLnGDPPC	1.7	5.3	4.5	-8.3
ΔGOV	0.99	-1.66	0.99	0	ΔGOV	0.0	0.2	1.8	-1.2
ΔCDEV_1994	1.94	0.83	-0.69	0.86	ΔCDEV_1994	0.9	2.1	-0.4	-0.2

Notes: *** $p < 0.01$, ** $p < 0.05$, *** $p < 0.1$; Robust standard errors in parenthesis. The estimates represent Model 22 and 23, respectively.

5.6.4 Specification and Robustness

The choice of lower lags (especially using the SC criterion) is not unusual but other lags for AIC are also estimated in Subsection 5.6.4 as part of the robustness checks. In addition, due to the small sample size, Ouliaris, Pagan and Restrepo (2016) recommends using a lower lag too. The essence of lag order is to reflect the level of complexity needed to capture the dynamics in the data adequately and not some unnecessarily high lag that could lead to overfitting. This section introduces VAR models with alternative lags or testing the inclusion or exclusion of different variables to see if either of these choices affects the estimates (Hafer & Sheehan, 1989). The model of interest here is the baseline model based on two most recurring AIC lag order values (2 and 7). Table 5.29 presents alternative lag (7) of the baseline model with the objective to determining whether the number of lags considered in the model have a meaningful effect on the estimates obtained from panel VAR models. The results for other lag models are presented in the Appendix B.

Table 5.29 Panel VAR Model for an Alternative Lag Length Specification

	ΔLnFDI	**ΔLnGDPPC**	**ΔGOV**	**ΔLnFDI**	**ΔLnGDPPC**	**ΔGOV**	**ΔLnFDI**	**ΔLnGDPPC**	**ΔGOV**
$\Delta LnFDI_{(t-1)}$	0.241***	0.060*	0.014	0.027	1.199***	0.002	-0.424	0.070	0.347***
	(0.097)	(0.036)	(0.018)	(0.239)	(0.089)	(0.044)	(0.444)	(0.166)	(0.082)
$\Delta LnFDI_{(t-2)}$	0.017	-0.027	-0.005	-0.239	-0.258**	-0.033	0.410	-0.208	0.736***
	(0.105)	(0.039)	(0.020)	(0.370)	(0.138)	(0.069)	(0.474)	(0.177)	(0.088)
$\Delta LnFDI_{(t-3)}$	0.177*	0.033	-0.008	0.155	0.205*	0.046	0.829	0.020	-0.127
	(0.111)	(0.042)	(0.021)	(0.331)	(0.124)	(0.061)	(0.584)	(0.218)	(0.108)
$\Delta LnFDI_{(t-4)}$	0.071	0.019	-0.027	0.330	-0.034	0.053	-0.137	0.180	-0.094
	(0.121)	(0.045)	(0.022)	(0.306)	(0.115)	(0.057)	(0.585)	(0.219)	(0.108)
$\Delta LnFDI_{(t-5)}$	-0.076	-0.067	-0.019	0.125	-0.135	-0.029	-0.760	0.095	-0.056
	(0.132)	(0.049)	(0.024)	(0.311)	(0.116)	(0.058)	(0.582)	(0.218)	(0.108)
$\Delta LnFDI_{(t-6)}$	-0.200	-0.077	0.006	-0.022	0.108	-0.064	0.332	-0.079	-0.023
	(0.146)	(0.055)	(0.027)	(0.320)	(0.120)	(0.059)	(0.484)	(0.181)	(0.090)
$\Delta LnFDI_{(t-7)}$	0.463***	0.042	-0.009	-0.393**	-0.126	0.036	0.038	0.009	0.181***
	(0.140)	(0.052)	(0.026)	(0.231)	(0.086)	(0.043)	(0.464)	(0.173)	(0.086)
Constant	0.572	0.408***	-0.113						
	(0.548)	(0.205)	(0.102)						
R^2							0.397	0.986	0.939

	ΔLnFDI	ΔLnGDPPC	ΔGOV	ΔLnFDI	ΔLnGDPPC	ΔGOV	ΔLnFDI	ΔLnGDPPC	ΔGOV
F-statistic							3.6	381.9	85.0
AIC								-1.225	
SC								0.175	
No. of obs.								138	
No. of coeff.								66	

Notes: *** $p < 0.01$, ** $p < 0.05$, *** $p < 0.1$; Robust standard errors in parenthesis. The estimates represent Model 22 and 23, respectively.

CHAPTER 6

CONCLUSION AND POLICY IMPLICATIONS

On a broad scale, the flow of FDI globally and for CEMAC countries has grown during the last three decades, growing by 622% from 204,888 to 1,480,626 million in 1990-2019 and from 4 to 7,259 million, respectively. Comparatively, the numbers for most African countries seem to be lagging behind, with the CEMAC countries combined boasting just 0.5% of the world FDI share in 2019. This slow growth has been attributed to a myriad of factors with varying and conflicting sentiments, from economic growth or development (Nunnenkamp & Spatz, 2003a) to governance institutions (Globerman & Shapiro, 2002, 2003), as well as the joint role of governance and development (Dixit, 2012).

Even with this growing concern for FDI in most African countries, a serious concern for researchers is the tools used in estimating the dynamic interaction of these macroeconomic variables. Whether directly or indirectly, FDI and growth seem to have an endogenous relationship (Li & Liu, 2005). This thesis partially works through the lens of Li and Liu's study in examining the endogenous links between FDI, growth and governance using a set of VAR-linked methodologies. To achieve this, estimates the impact of GDP per capita on FDI flows, the impact of GDP per capita on governance, and the impact of governance on FDI inflows were presented in Chapter 5. Although Canova and Ciccarelli (2013) emphasize that panel VARs are unique in their ability to model dynamic interdependencies, cross sectional heterogeneities and, at the same time, account for the evolving pattern of transmission, panel Bayesian as well as structural VARs provide a robust statistical foundation with the capacity to incorporate various economic restrictions (Wieladek, 2016).

Researchers have sought explanations for these conflicting sentiments, and this dissertation delves into investigating the dynamic interactions of FDI inflows, growth (GDP per capita), and governance, and even other macroeconomic variables over the span of 1990-2019 using panel VAR models. The analysis ranges from assessing how GDP per capita and governance impact the transmission of macroeconomic shocks to FDI inflows in CEMAC countries. Although this is achieved by impulse response functions, the introduction of panel structural VARs adds a robust background by imposing identification restrictions and the Bayesian VAR for over-parametrization.

GDP per capita is an important factor in determining the flow of capital across borders (Encinas-Ferrer & Villegas-Zermeño, 2015). Quite uniquely among with most African countries, the problem of bad governance, and as such it plays a role in the relationship between FDI and GDP growth. By investigating the function of governance, this thesis highlights the indirect effect of governance on the impact of GDP growth on FDI inflows. The outcomes, both good and significant, demonstrate that a well-governed country has the potential for more inflows. Despite this overall conclusion, this study also examines the heterogeneity in these interactions concerning country-specific factors among CEMAC countries. These interactions are analyzed using panel VAR and Bayesian VAR frameworks for six CEMAC countries from 1990 to 2019. The analysis shows that upper middle-income economies attract more FDI inflows than others, controlling for various factors including labor force, electricity consumption, and household consumption. A higher GNP per capita income allows upper middle-income CEMAC economies to increase economic growth and thus attract more FDI.

6.1 Summary of Findings

In this dissertation, a stable multivariate panel VAR model is estimated using FDI inflow, economic growth, and governance in CEMAC countries to understand both the linkages and the Granger causal dynamics among the variables, impulse responses and external shocks, and variance decomposition dynamics. In this section, the analysis of the dynamic interactions and dependencies between FDI inflow,

economic growth, and governance in CEMAC countries is presented with key findings. More specifically, this dissertation assesses the effects of economic growth and governance quality on FDI inflow through panel VAR analysis and a host of robust measures. First, the findings show that FDI and economic growth are determinants of each other with an endogenous relationship between them (Türkcan, Duman, & Yetkiner, 2008). In addition, economic growth is a significant determinant of governance but not the reverse. The same result for growth and FDI holds for upper-middle-income countries but not for HIPCs and LDCs in which economic growth is a significant predictor of FDI but not the reverse. To compare these findings to prior research, particularly Gnimassoun and Mignon (2013), we begin with a homogeneous panel VAR setup. Later, using a more suitable configuration with heterogeneous coefficients and a Bayesian panel VAR structure to adjust for cross-sectional dependency and small sample bias, we loosen this assumption (Comunale, 2022).

As this subsection discusses a summary of the empirical analysis in the interaction between FDI, governance, and growth in CEMAC countries using a panel VAR model for yearly data from 1990 through 2019, the insignificance of governance and the significance of GDP per capita were analyzed by first looking at them as the main variables influencing FDI inflows in CEMAC countries and later looked at different sets of other macroeconomic factors as weak exogenous variables, structural breaks, and exogenous dummy variables. The impact of economic growth and governance on FDI inflow is both positive but only GDP per capita is significant and varies across income groups, HIPC status, and LDC stages. The results presented for PVAR, SVAR, and panel BVAR show that considering how other macroeconomic variables and economic indicators fit into the system. Weak endogenous variables were grouped and considered in the analysis. For instance, economic structure and development include the labor force, household consumption, electricity consumption, agricultural value added, and economic freedom measure the country's ability to attract FDI, while economic structure and market include trade openness and market size, showing how open and interconnected a country is to the rest of the world.

Since growth significantly and favorably influence FDI inflows, whereas governance does not, this thesis further investigates heterogeneity across CEMAC countries by distinguishing between HIPC and non-HIPC, LDC and non-LDC, and income levels, and looks at how the impact of GDP per capita and governance differ across them. Second, upper-middle countries in CEMAC attract more FDI inflows than otherwise, controlling for many factors including labor force, electricity consumption, and household consumption. Therefore, being classified as an upper-middle country allows CEMAC countries to attract more FDI. In addition, analyzing structural analyses (Granger causality, impulse response functions, and variance decomposition) across countries and among the three main variables were found to be important. Other CEMAC countries are impacted when one country experiences a shock to a particular variable, and shocks have diverse effects among LDCs, income levels, as well as HIPC status.

Third, throughout this dissertation, the goal was to identify factors that allow some countries to attract more FDI inflows. This thesis thus argues that growth and governance (although not significant) matter, and this study provides evidence that this is unquestionably the case for GDP per capita. However complex and inconclusive the relationships might be, it goes beyond that; other models in the analyses also show how growth and governance matter. Contributions made are outlined to understand the nuanced interaction between FDI, growth, and governance in this final chapter. One of such political aspect hindering FDI flows is democracy. First, CEMAC is home to the longest-serving presidents and dictators in the world, the slow flow could be tied to this. Jensen (2012) explains that many political economy specialists contend that the parallel expansion of FDI and political change is not only a coincidence and that democracy genuinely encourages more FDI in developing countries. Moreover, Jensen et al. argue that beyond the fundamental principles of what constitutes a democracy, there is also the claim that strong legal systems and respect for the rule of law foster an environment that is favorable to both local and international investment.

Based on the estimates for the panel VAR (Section 5.3) and the four robustness VAR models (Section 5.6), there is still not much difference in which has more accurate estimates. Therefore, no conclusion can be drawn that the robust panel

VAR models provide more reliable or accurate results. This does not signify that the robust tests are unwarranted, it just seeks to show that our data does not show significant differences. Since Ocampo and Rodríguez (2012) argue that the presence of exogenous variables (augmented in the other models) does not change the identification of the structural shocks, and because the center of VAR models lies in the interpretation of its impulse responses, the choice of the model with core variables was made. Hence, going by the main analysis, the baseline model is preferred and the results show that:

1) FDI inflow and GDP per capita in the last period (or year) have a stronger positive effect on FDI inflow and GDP per capita, while GDP per capita and governance in the last period (or year) have a stronger positive effect on governance in the CEMAC region. For the upper middle-income countries, FDI inflow and GDP per capita in the last period (or year) have a very strong and positive effect on FDI inflow and GDP per capita, but no effect on FDI, GDP per capita, and governance in the last period (or year) on governance in the upper-middle income countries. Also, FDI inflow and GDP per capita in the last period (or year) have a very strong and positive effect on FDI inflow, GDP per capita in the last period (or year) have a very strong and positive effect on GDP per capita, and governance in the last period (or year) has a strong positive impact on governance in the HIPC countries. And, FDI inflow and GDP per capita in the last period (or year) have a very strong and positive effect on FDI inflow, GDP per capita in the last period (or year) have a very strong and positive effect on GDP per capita, and governance in the last period (or year) has a strong positive impact on governance in the LDC countries.

2) The Granger causality findings for the overall CEMAC sample show that economic growth Granger causes FDI inflows, suggesting that growing GDP per capita expands an economy, thereby attracting investors seeking opportunities in a growing market. Hence, Granger causality between economic growth and FDI is bidirectional, from economic growth to FDI inflows and vice versa, also known as having a feedback effect or bilateral causality. The same result is obtained. In addition, economic growth Granger causes governance meaning a growing economy may be the driver for improved governance practices such as less corruption, accountability, as well as the rule of law. Like economic growth and FDI, Granger

causality from GDP per capita to governance is unidirectional, from economic growth to governance and not the reverse, and not a feedback or bilateral causality. For the joint effects (all-to-dependent variable) of the lag of economic growth and lag of governance on FDI inflow, it is revealed that GDP per capita offers just a temporal relationship and, furthermore, predictive value for FDI inflow. And, for the joint effects (all-to-dependent variable) of the lag of GDP per capita and lag of governance on FDI inflow for lag 2, it is revealed that GDP per capita offers just a temporal relationship and, furthermore, predictive value for FDI inflow.

3) For the overall CEMAC sample, the impulse responses, or the dynamic responses, of the FDI-growth-governance system show that an initial first-period FDI shock induces a positive response in FDI and tapers off to zero. This means that this shock, an increase in FDI, has an immediate positive impact on FDI but dies down to zero over time, signifying that the impact is not permanent. The FDI shock pushes a slight response or increase in economic growth in the first year and stays positive and significant but constant over the course of the 10-year period. Again, this FDI shock has a negative response in governance for the entire 10 years. A governance shock induces a positive but declining response only on itself (governance) with no response to FDI and economic growth. This suggests that an increase in governance may lead to no effect on FDI and economic growth, but only an increase in governance.

The FDI shock suggests that FDI has a positive short-term impact on FDI and economic growth in CEMAC countries. However, the effect on FDI diminishes over time, indicating that economic growth and governance may come into play in the long run but remain constant on economic growth. Likewise, economic growth has a positive but low short-term impact on FDI and governance and a high positive short-term impact on economic growth. The effect on FDI diminishes over time, indicating that economic growth and governance may impact FDI in the long run but remain constant on economic growth. The effect on governance indicates a delayed effect of FDI on governance and might take time for an increase in FDI to lead to improvements in governance quality. Similar observations with an even more negative response in governance for the entire 10 years are observed for upper middle-income countries. The unique change in the HIPC and LDC samples is that of

a shock in governance inducing an initial increase in FDI and governance and then tapering off to zero. These results can be linked to the ones obtained previously in that Lütkepohl (2005) posits that the impulse responses are zero if one of the variables does not Granger-cause the other variables taken as a group. For instance, a shock in the variable FDI inflow has no effect on the governance if FDI does not Granger-cause the governance. Likewise, governance has no effect on the FDI inflow if governance does not Granger-cause the FDI inflow.

4) In addition to shocks in the FDI-growth-governance system, this thesis also investigated how each variable contributes to the forecast error variable for each during the 10-year horizon. The results prove that for FDI, past shocks to FDI, economic growth, and governance all have an effect in explaining the forecast error variance in FDI. This implies that while FDI is influenced by its own past values, it reacts to changes in economic growth and governance conditions. Also, economic growth proves to be influenced by both its own past values and external factors like FDI and governance. This underscores the importance of considering these variables when analyzing economic growth trends. And, governance quality is influenced by its own historical performance but not entirely isolated from the effects of FDI and economic growth. This implies that good or bad governance can be influenced by changes in growth and FDI inflows.

5) Furthermore, four robust tests are run, beginning with the first two being the imposition of linear restrictions and the testing of alternative lags for the FDI and GDP per capita coefficients on governance. The results are confirmed by the non-validity or statistical significance of the Wald test, meaning GDP per capita has a contemporaneous effect on FDI inflow beyond the influence of governance. Likewise, placing constraints on coefficients of governance and FDI in the GDP per capita equation leads to a statistically significant Wald test indicating the contemporaneous impact of governance on FDI inflow, even without the influence of economic growth.

6) The other two robust tests include a powerful framework for capturing the dynamic interaction of these variables, including the Bayesian and structural panel VAR analyses. The estimates of the BVAR and standard panel VAR models, as well as the structural forms of VAR models (IRF and FEVD) and panel structural VAR, reveal that there is no major difference, at least in the CEMAC

sample. However, the Bayesian VAR is an extension meant to fix shortcomings of the standard VAR method and normally does not yield similar results. Likewise, the structural form VAR models, including IRF and FEVD, as well as the panel structural VAR, produce comparable results.

Although not considered in the main analysis, the vagueness of governance should not be ignored. For instance, in line with democracy, partisan politics, clans, and the role of autocrats in attracting FDI inflows must not be ignored. Although all these democratic ills differ across economic and political settings, they are not new in CEMAC countries. This expands on Jensen (2012), which emphasizes this dynamic interaction. The sequence of impulse responses in the panel VAR model (Model 1) for the CEMAC sample, focusing on FDI inflow, GDP per capita, and governance, shows that the first column represents the impact of an unforeseen 1%-point rise in FDI inflow on these variables; the second column showcases the effect of the same magnitude increase in GDP per capita; and the third column demonstrates the consequences of a corresponding increase in governance. Additionally, the figure includes Cholesky response visuals for a standard deviation, adjusted with degrees of freedom, along with 95% confidence intervals reflecting innovations using analytical asymptotic standard errors. Observing the response pattern to FDI shocks in the first column, an unexpected increase initially diminishes within two years, experiences a recovery in the third year, followed by a gradual fade over a decade, while notably leaving GDP per capita and governance persistently unaffected and unaltered.

6.2 Overview of Policy Recommendations

Having acknowledged the positive impact of FDI inflows on economic growth for developing, emerging and developed countries alike, the role of economics in attracting FDI flows into CEMAC countries has been imminent throughout the previous sections of this dissertation. However, the effect of growth on FDI inflow is aided by the presence of the governance factor in the VAR system. Thus, attracting more FDI inflow is mainly based on economic growth but more so on the interaction between FDI, economic growth and governance. Hereunder are recommendations for

improving governance to attract FDI and promote economic growth in CEMAC countries.

First, if FDI is a precursor in the growth process (Cleeve, 2008), CEMAC countries ought to seek ways of attracting investments that promote development. This is a big challenge for most developing countries especially in Africa, as Cleeve (2008) recommends that in order to draw FDI, CEMAC countries require both political and macroeconomic stability on both national and regional levels, safeguarding property rights, and implementing other regulations that facilitate investment, as well as enhancing infrastructure and support services. In line with the regulations that attract investment, Shiells (2003) highlights burdensome tax systems, rampant corruption, excessive state intervention combined with poor legal and regulatory frameworks, and unfinished structural reforms as hurdles restricting FDI inflow. Thus, strengthening legal and regulatory frameworks as well as, according to the ESCAP (2018) report, reducing restrictions on the value, sectors, level of foreign ownership, controls of profit repatriation, compulsory joint ventures with local firms, performance requirements, and import restrictions are important clues for CEMAC countries.

Second, enhancing transparency, accountability, and anti-corruption measures. Transparency, accountability, and corruption are typical problems faced by most central African nations. In most CEMAC countries, Amoako (2003) narrates that governments are only free to act in a few main policy areas, with the rest being chosen by the Head of State (as in Equatorial Guinea, Gabon, and Cameroon), where major political and economic choices are taken by the Heads of State. However bad corruption might sound to many, it seems to be the remedy, in the form of incentives, in both developed and developing countries. Egger and Winner (2005) argue that corruption and FDI are positively related, and hence, corruption remains a stimulus for FDI.

Third, recall that CEMAC is home to the longest-serving presidents and home to arguably the most corrupt countries in the world. Such a region may be a mixed blessing in the form of stability in “dictatorship” and unrests, coups, and bad governance. Such can either be home to the most unscrupulous entrepreneurs and corrupt business practices from multinationals. Hence, an impediment to growth and

deterrent of inflow into the region. Goutte, Porcher and Péran (2021) propose levers to be used in the fight against corruption by analyzing national public policies and attempting to create a regional political program at the Central African level. Regionalization of political responses to national problems, according to Goutte et al., caused by corruption is critical since it is the only way for states to properly collaborate with international institutions such as the AfDB or the AU−the UN and World Bank whose main goal is to reduce such ills in society. Furthermore, Goutte, Porcher and Péran advise the quartet "prevent, detect, deter, sanction," recommended by international organizations working in the field, must become a norm of conduct to combat political corruption.

Fourth, the importance of fostering political stability and policy consistency for sustainable economic growth and fostering FDI inflow cannot be overemphasized. Amoako (2003) cites political governance (political representation and multipart system, institutional efficacy and accountability, respect for human rights, civil society groups, and gender organizations), economic governance, and corporate management as examples of governance. The UN report indicates that other issues to build good governance in the CEMAC subregion include the participation of women, capacity and independence of the media, traditional governance, the impact of HIV/AIDS on governance, governance and the regional process of economic integration, youth participation, as well as peace, stability, and security. All these would go a long way to foster economic growth and stimulate the inflow of FDI into the CEMAC subregion. It is worth noting that in CEMAC countries, like other African countries, only a few countries truly have a democracy that is capable of safeguarding human rights, general freedom, and judicial independence. However, there seems to be progress and if this is the case, one would expect more FDI to flow into Africa. Indeed, Herre, Ortiz-Ospina and Roser (2013) state that "the world is more democratic than ever before." However, Amoako (2003) still asserts that only 80 of the 140 countries that have multiparty elections – representing 55% of the world's population – are completely democratic by one standard. And, 106 countries continue to restrict important civil and political liberties. Almost all African countries fall into this group. According to the same research, UNDP, wars between countries have significantly decreased. Civil war and internal conflicts, on the other hand, have

increased. These disputes are caused by a lack of democracy as well as civil and political liberties.

Finally, CEMAC countries must embark on structural reforms (Campos & Kinoshita, 2010) aimed at creating an enabling environment for FDI inflows through increased growth and good governance. Structural reforms range from investment liberalization, investment promotion and facilitation (Amiti & Wakelin, 2003), infrastructure development, legal and regulatory reforms, financial sector reforms (Campos & Kinoshita, 2010), human capital development, and sector-specific reforms.

6.3 Limitations and Future Research

Policy implications and recommendations are only as important as the vectors of these policies. As such, potential challenges and limitations in implementing governance reforms, fostering economic growth, and attracting FDI are vital for CEMAC countries. These challenges and limitations range from policy to specific ones based on this research with respect to data and methodology. Although as of now, this is the best-suited model chosen for this work and only deeply rooted issues are highlighted hereunder. Suggestions for future research on the relationship between FDI inflows, economic growth, and governance are also outlined.

To begin with, due to a lack of data for some variables, somewhat inaccurate representations or measurements are made for variables. Temple (1999) terms this the use of “dubious proxies”. Aggregate human capital, for instance, Temple posits, the literature employs questionable approximations in which the emphasis is nearly entirely on education rather than training. As earlier mentioned, Temple argues that this is mostly due to data constraints, but it is also related to the excessive focus on school enrollment rates. According to him, these rates were once thought to be one of the more reliable and satisfying variables in the growth literature, but it is important to remember that they are almost always positively linked with starting efficiency, and hence, the results can be misleading. Studies dealing with developing countries are always faced with data inadequacy.

Although finding an effect of human capital in panel data studies has been considerably more difficult, too few researchers pay attention to the specification. Temple settles this by arguing that most researchers tend to be too optimistic, expecting a change in school enrollments to boost growth nearly immediately. Also, for years, growth has been used as a proxy for economic growth or development and wellbeing. A sentiment shared by many is the setup of the concept of GDP, thus, through the lens of business or economics researcher, GDP is the most powerful measure in history. Landefeld (2000) is a proponent of this, and he argues that "GDP is one of the great innovations of the twentieth century." Living standards have risen all around the world as a result of economic expansion, and this is often read as growth in GDP. However, like human capital, GDP's value and durability are based on political realities rather than economic ones and hence called into question by many researchers and academics alike (Assa, 2018; Kapoor & Debroy, 2019).

Although a rising GDP is frequently used as a barometer of well-being and economic success, Prasad and Castro argue that it ignores the multi-faceted nature of growth as well as the inherent flaws of capitalism, which tend to concentrate money and, therefore, power. This same sentiment is shared by Kapoor and Debroy (2019); Living standards have risen all around the world as a result of economic expansion. Modern economies, on the other hand, have lost sight of the reality that the traditional metric of economic growth, GDP, only measures the size of a country's economy and does not represent the well-being of that country. However, politicians and economists frequently use GDP or GDP per capita in some circumstances as an all-encompassing metric to measure a country's progress, combining economic success with societal well-being. As a result, measures that promote economic growth are regarded as positive for society. Dynan and Sheiner (2018) offer deep and revealing arguments on this subject regarding GDP as a measure of economic well-being.

The use of statistics and advanced techniques in modeling and making predictions about human well-being and other macroeconomic variables may be problematic and misleading. Dynan and Sheiner (2018) argue that the perception that recent technological advancements have resulted in significant benefits for everyday life, as well as disappointment with measured productivity and output growth in recent years, has sparked widespread concerns about whether our statistical systems

are accurately capturing these gains. Despite the fact that economic well-being is continuously measured, there is still a lack of knowledge of how flawed the current official figures are (Feldstein, 2017). Nevertheless, Dynan and Sheiner argue that while worries about measurement are not new to the statistical community, more people are now participating in the debate, and more economists are seeking to do research that will aid the statistical agencies. Additionally, there are more sophisticated ways of handling outliers instead of treating outliers as dummy variables. To handle potential outliers, Chang and Shi (2022) implement two measures, namely the reweighted multivariate least trimmed squares and the multivariate MM estimate. Although both methods are superior to OLS or MLE in dealing with outliers and provide robust estimates of parameters (mean vectors and covariance matrices), the reason for not pursuing this path is that they are computationally intensive.

Finally, with the criticism of enabling variables in their original form or log form to be differenced for a VAR analysis, a brief form of VECM analysis could be introduced here to analyze the variables in their non-stationary or mixed stationarity and unit root form. In its basic form, the VECM takes a step further from VAR to analyze the long-run and short-run relationships between FDI inflow, economic growth, and governance. The following hypothesis could guide further analysis, estimates, and conclusion of the VECM model of these core variables for CEMAC countries.

6.4 Contribution and the Politics of FDI in CEMAC Countries

Based on Tsai (1994), there are geographical differences in the relationships between FDI and economic growth. It is evident that the inflows of FDI stimulate the host economy in most parts, but it is not solely understood from a clear quantitative perspective even after controlling for potential endogeneity. Considering domestic policy preferences and country-specific political factors that affect FDI flows is paramount, although politics is part of the governance equation. Coan and Kugler (2008) and Büthe and Milner (2008) argue that political factors are not well understood. One such extension of governance in politics is political risk. Jensen

(2012) posits that for FDI investors, political risk is a major concern, particularly when they invest in developing countries. Jensen further delineates that many academics in the fields of international business, economics, and political science have used a composite indicator of political risk or instability to evaluate how political risk affects global flows. While doing so, Jensen et al. hold that many other researchers working to understand the factors that influence FDI have discovered that political institutions have an impact on the investment and entry-mode choices made by MNCs by influencing how they perceive the political risk in the host country.

With FDI being a long-term investment involving the acquisition of tangible assets or a sizable stake in a company's stock in another nation in order to increase its managerial control, the main agents of this long-term investment are MNCs. Jensen (2012) opines that the volume and breadth of international production through MNCs and FDI have been growing so much that many people consider it to be one of the most important characteristics of globalization. Caution at this juncture is that all this political risk does not delve into the analysis of political risk by Büthe and Milner (2008). Instead, it tilts towards the view on the politics of FDI by Coan and Kugler (2008). Hence, this section explains the idiosyncrasies of politics in lobbying or deterring FDI flows.

This thesis ends by outlining suggestions for future research on the interrelationship between FDI inflows, economic growth, and governance (in developing countries). This study undertakes a comprehensive exploration of the intricate interactions between governance quality, GDP per capita, and FDI inflows across the member states of CEMAC. Harnessing this rich panel dataset encompassing CEMAC countries, this study employs a panel VAR framework to uncover the dynamic interactions among the variables. Governance metrics encapsulate institutional strength, regulatory efficacy, and the rule of law, while GDP per capita signifies the economic prosperity of individual nations. The inclusion of FDI inflows offers insights into the role of international capital mobility in fostering economic development. One distinctive feature of this research lies in the integration of categorical dummies, encompassing HIPC and non-HIPC statuses, LDC and non-LDC classifications, and variations in income levels. These dummies illuminate the nuanced impact of these differential characteristics on the dynamics between

governance, GDP per capita, and FDI inflows. To ensure the robustness of our findings, we employ both Panel Structural VAR (PSVAR) and Panel Bayesian VAR (PBVAR) models. PSVAR provides insights into the causal relationships among variables, while PBVAR offers a Bayesian perspective that incorporates prior information and uncertainties.

The thesis contributes to theoretical and policy domains alike. By disentangling the interplay between governance, GDP per capita, and FDI inflows, we enrich the understanding of CEMAC countries' investment attractiveness and economic growth potential. Furthermore, our inclusive approach, considering various economic classifications and dummies, yields insights into the contextual drivers of FDI across diverse strata. The research yields policy insights, furnishing tailored recommendations for improving investment environments and promoting sustainable development in CEMAC countries. Our findings also underscore the significance of categorical differentials in shaping FDI patterns, aiding policymakers in designing targeted interventions.

Overall, this panel VAR analysis demonstrates a comprehensive multivariate model to aid the understanding of the FDI-Growth-governance nexus in CEMAC by integrating weak exogenous variables, categorical dummies and employing robust PSVAR and P-BVAR models. It offers a comprehensive framework for analyzing FDI determinants, thereby enriching academic discourse and informing evidence-based policy formulation for inclusive economic growth.

The role of growth in attracting FDI or the impact of FDI on economic growth is, according to Narula and Driffield (2011), ambiguous, especially for developing countries. Despite this ambiguity, the link between these variables is still thought to be multifaceted, with both positive and negative externalities. Alfaro et al. (2004) attribute this to the contingent role of a third factor: financial markets. This thesis points to the effect of the host country's governance structure. Thus, effective governance, characterized by the six worldwide governance indicators, see Kaufmann, Kraay and Mastruzzi (2011), plays a crucial role in determining the extent to which FDI contributes to sustainable economic growth.

This thesis delves into an additional dimension of the nexus between FDI, economic growth, and governance while narrowing the research gap as highlighted by

Giwa et al. (2020) through the lens of the sustainable development goals (SDGs). Note that SDGs provide a comprehensive framework for addressing global challenges while ensuring sustainability (Griggs et al., 2014; Leal Filho, Shiel, et al., 2019). The interplay between these variables is explored in the context of achieving SDGs, as Giwa et al. (2020) explains how FDI can serve as a catalyst for inclusive and sustainable industrial growth and how this is achieved when coupled with sound governance practices. Conversely, poor governance may lead to less investment flow and slow growth, undermining the achievement of SDGs. Note that this does not extend to the inclusion of SDG scores into the analysis (Aust, Morais, & Pinto, 2020). Instead, economic growth is seen as progress toward the path of sustainable growth in CEMAC countries.

Based on empirical evidence and theoretical frameworks, this thesis underscores the need for a holistic approach that considers the synergies and trade-offs between FDI, economic growth, governance, and the pursuit of SDGs. To this end, Suehrer (2019) remarks that while FDI plays a crucial role in fostering sustainable economic growth, there is a notable absence of policies and a comprehensive framework that effectively connect the 2030 Agenda with tangible investment opportunities. Hence, emphasis on the importance of policy interventions that promote FDI, improve governance, and align economic growth with sustainability goals is imperative. As CEMAC countries strive to navigate the complexities of the global economy, understanding the dynamic relationships among FDI, economic growth, and governance through SDGs becomes imperative for crafting policies that promote enduring and equitable development.

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APPENDICES

Appendix A

Supplementary Graphs for Trends and Structural Analysis

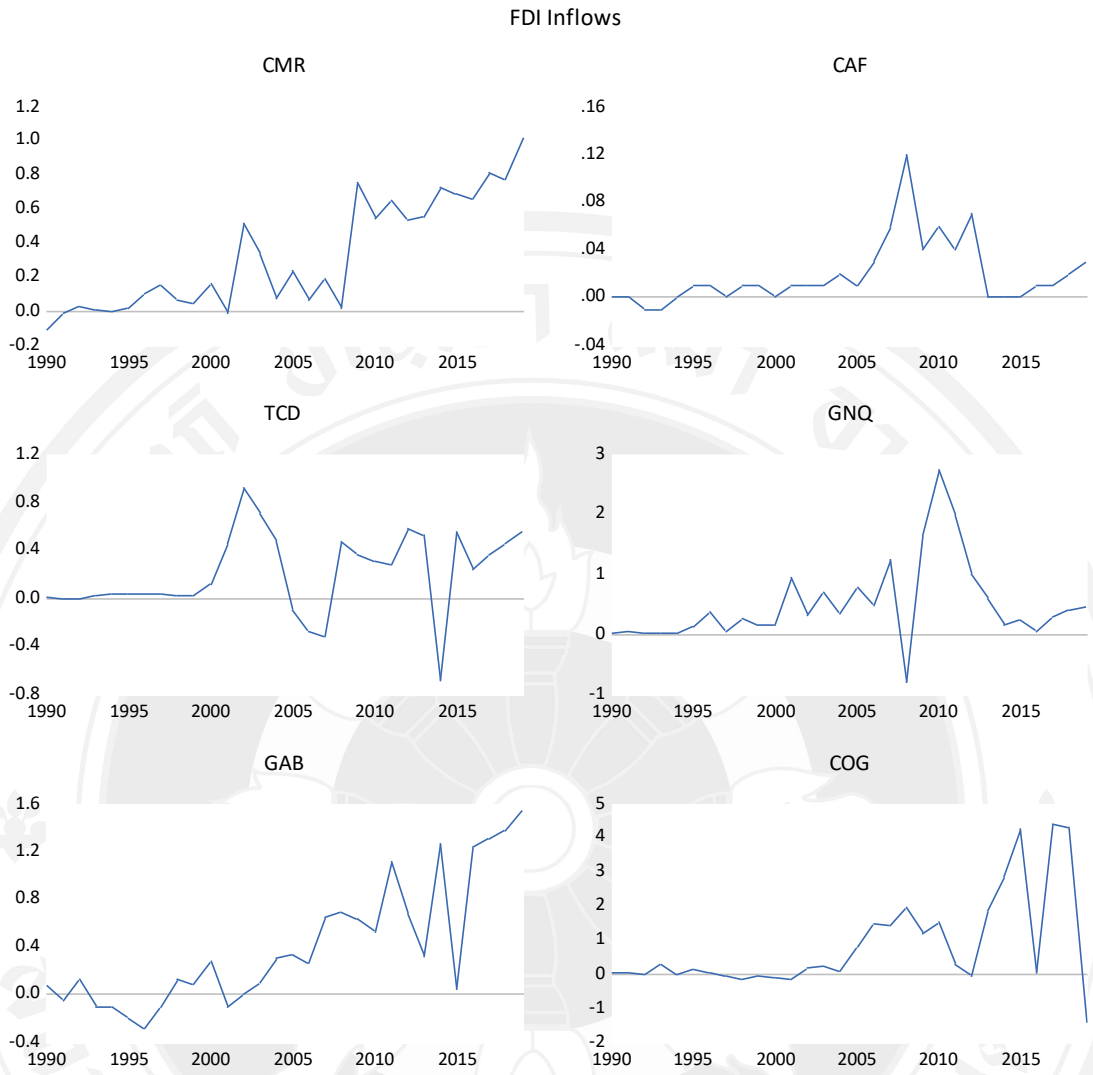


Figure A2.1 Seasonality for FDI inflows at level

Notes: Core variables include FDI inflows, GDP per capita, and governance

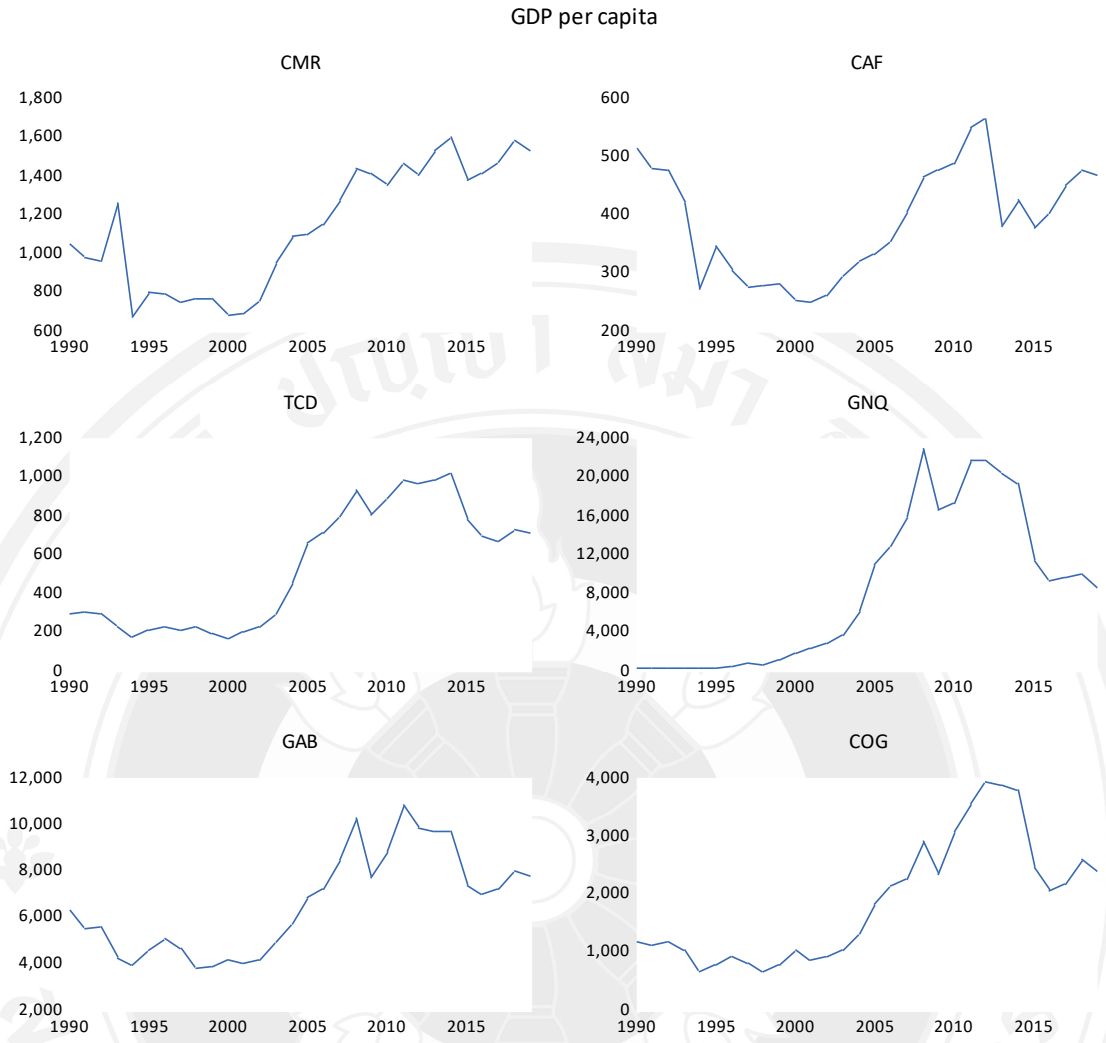


Figure A2.2 Seasonality for GDP per capita at level

Notes: Core variables include FDI inflows, GDP per capita, and governance

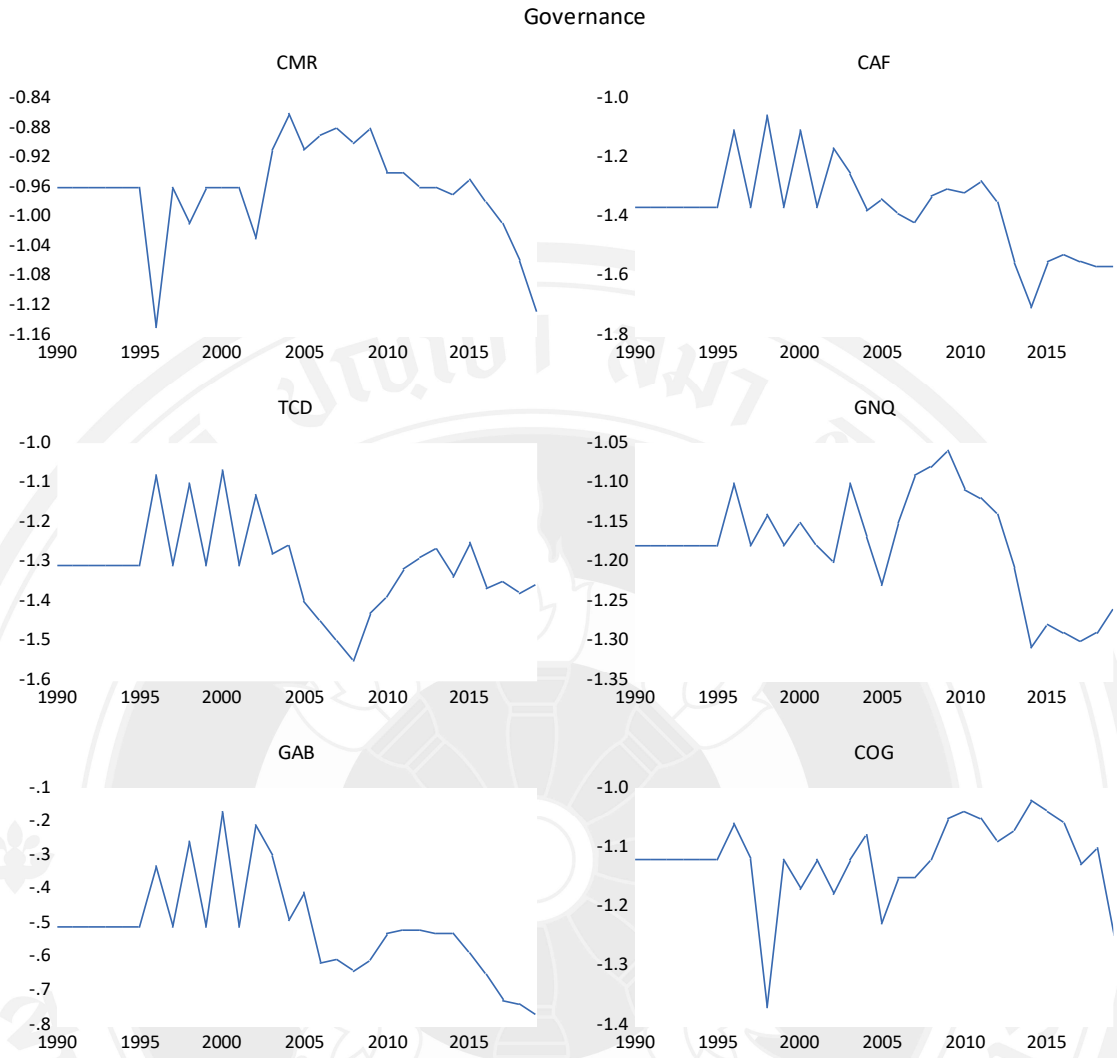


Figure A2.3 Seasonality for Governance at level

Notes: Core variables include FDI inflows, GDP per capita, and governance

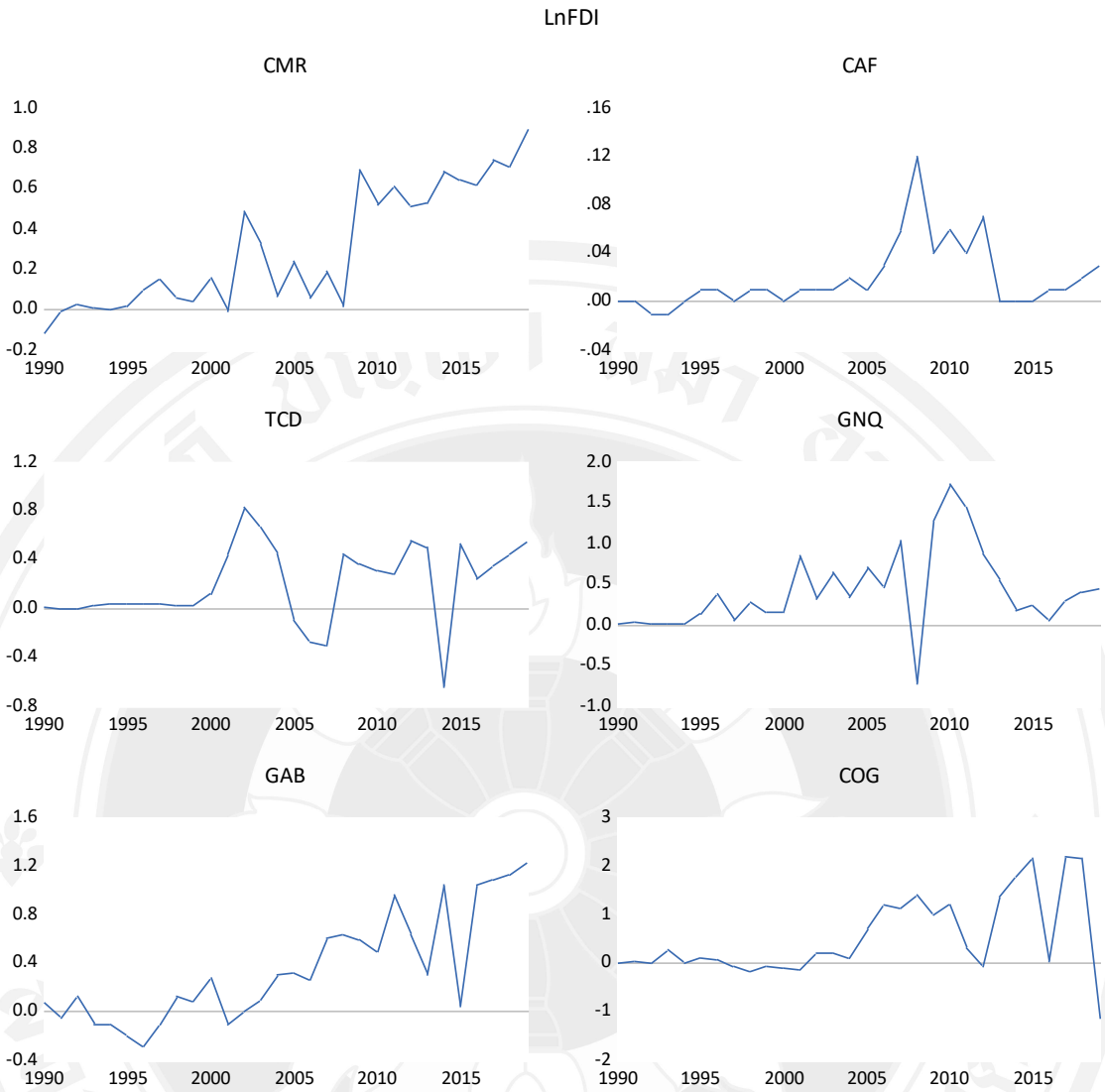


Figure A2.4 Seasonality for log of FDI inflows

Notes: Core variables include FDI inflows, GDP per capita, and governance

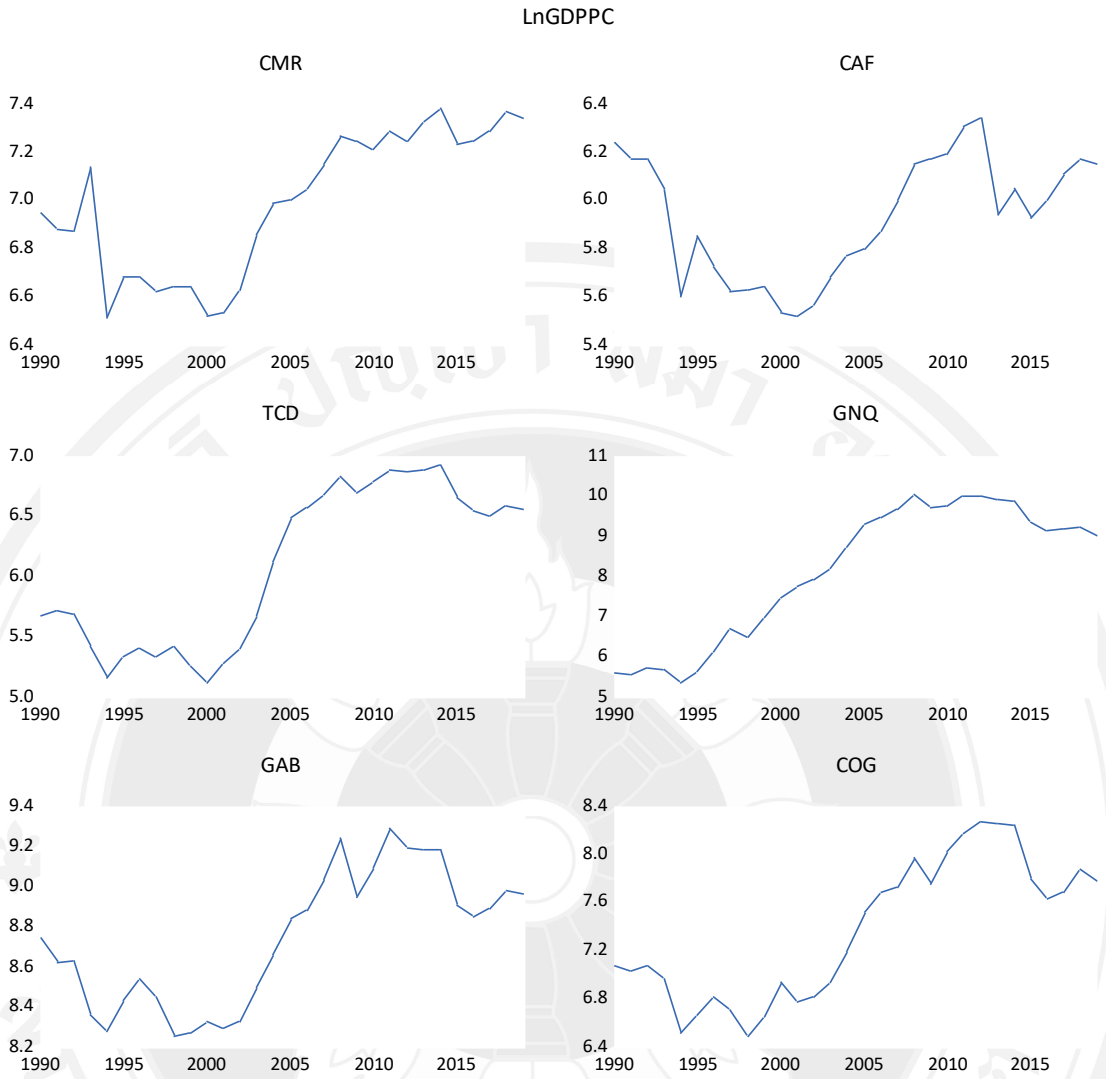


Figure A2.5 Seasonality for log of GDP per capita

Notes: Core variables include FDI inflows, GDP per capita, and governance

Figure A2.6 Seasonality for first difference log of FDI inflows

Notes: Core variables include FDI inflows, GDP per capita, and governance

Figure A2.7 Seasonality for first difference log of GDP per capita

Notes: Core variables include FDI inflows, GDP per capita, and governance

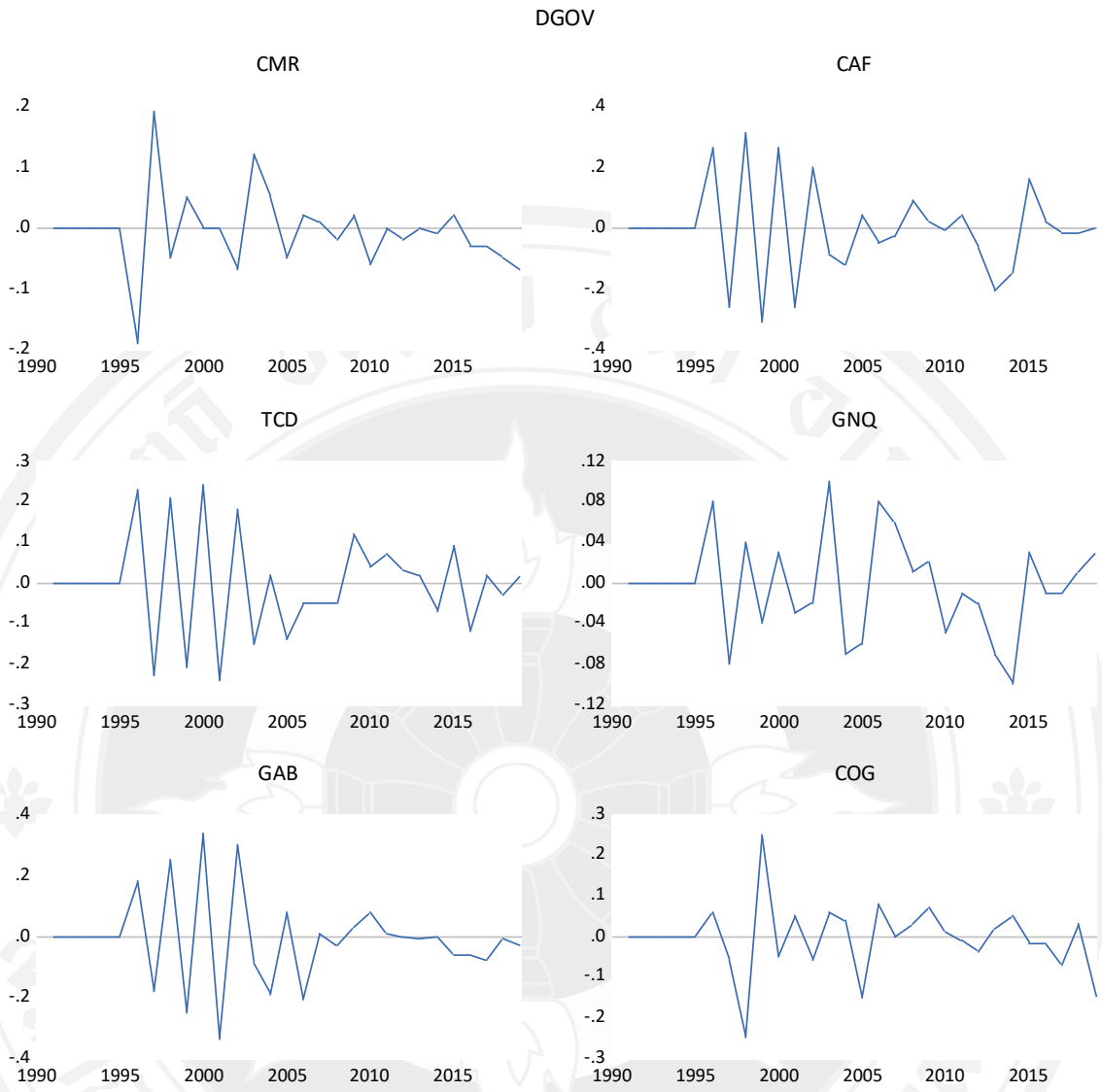
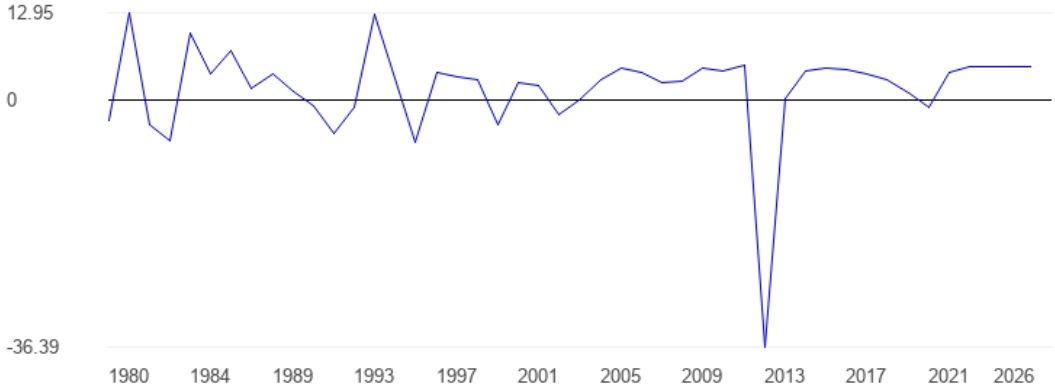


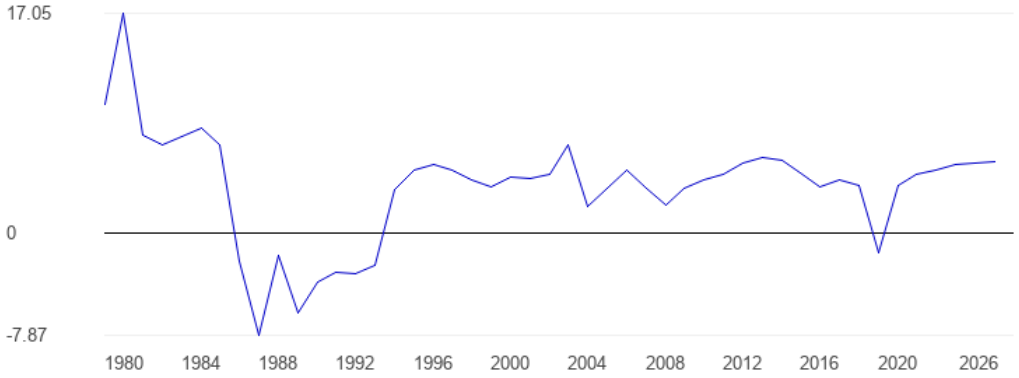
Figure A2.8 Seasonality for first difference of Governance

Notes: Core variables include FDI inflows, GDP per capita, and governance

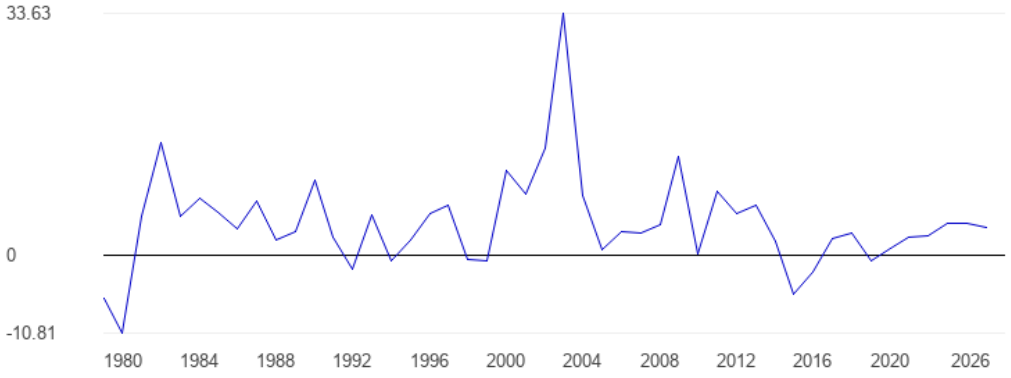
A. Central African Republic



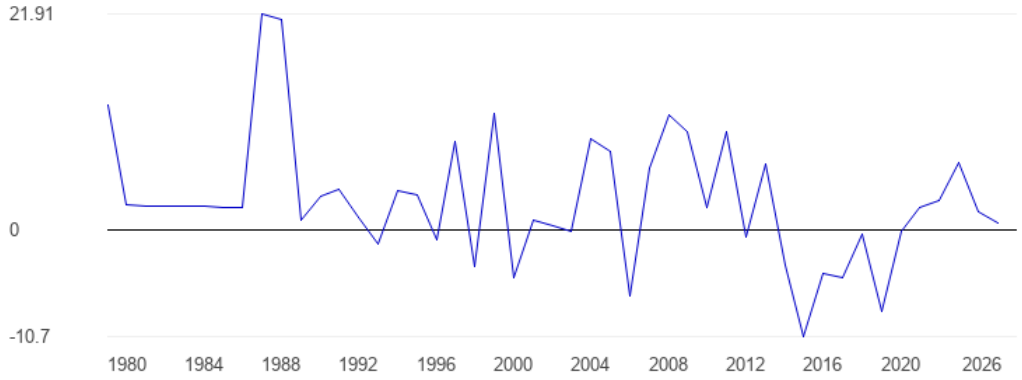
B. Cameroon



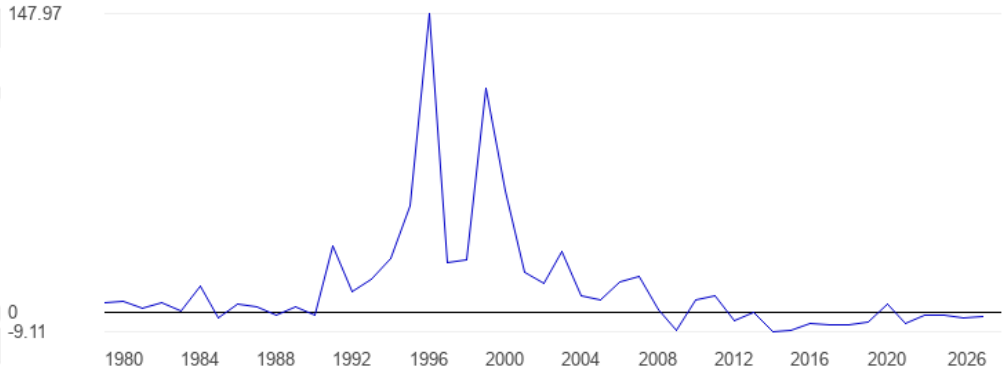
C. Chad



D. Republic of Congo



E. Equatorial Guinea



F. Gabon

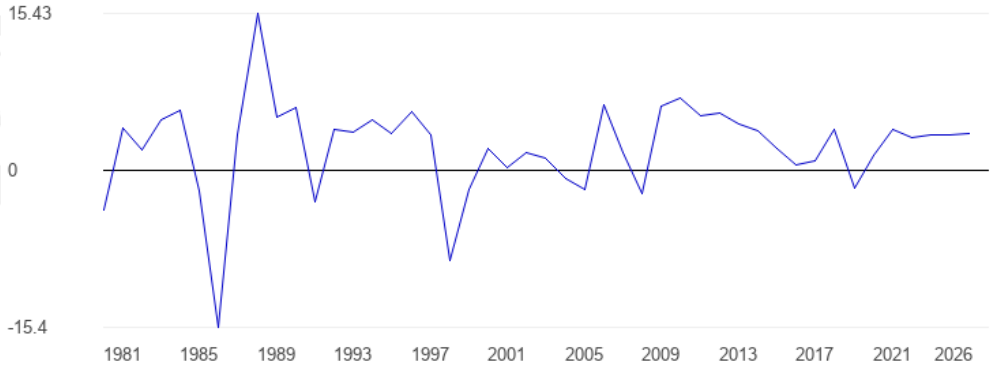


Figure A2.9 Graphs of Economic Growth Forecast for CEMAC Countries

Source: The World Bank

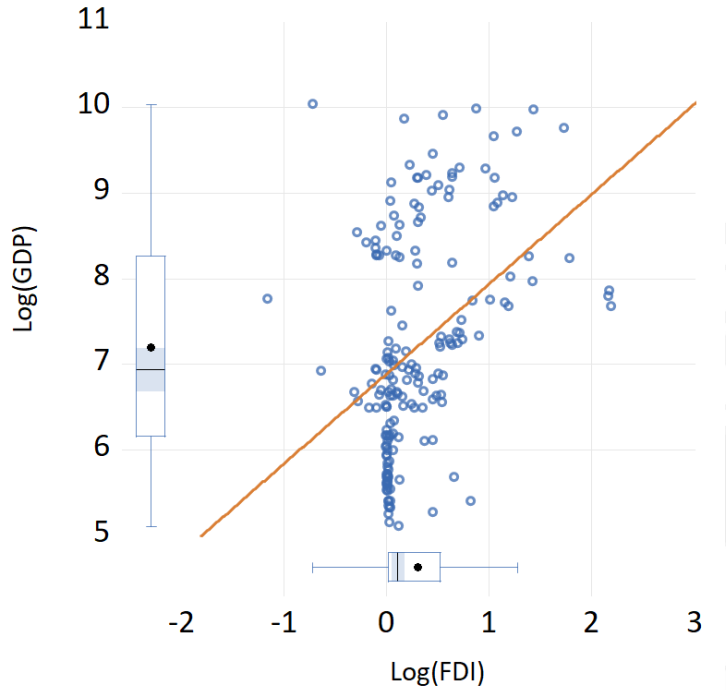


Figure A2.10: FDI-GDP: Panel Data Scatter Plots

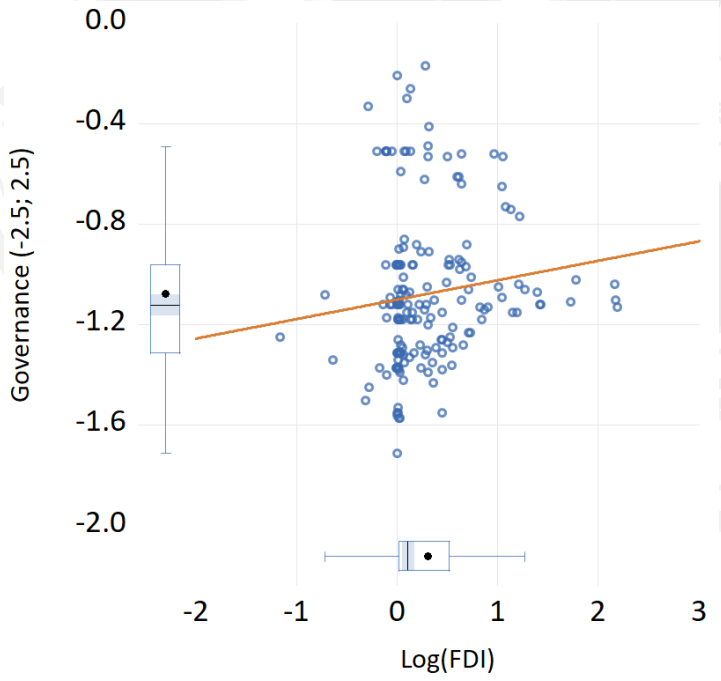


Figure A2.11 Governance-GDP: Panel Data Scatter Plots

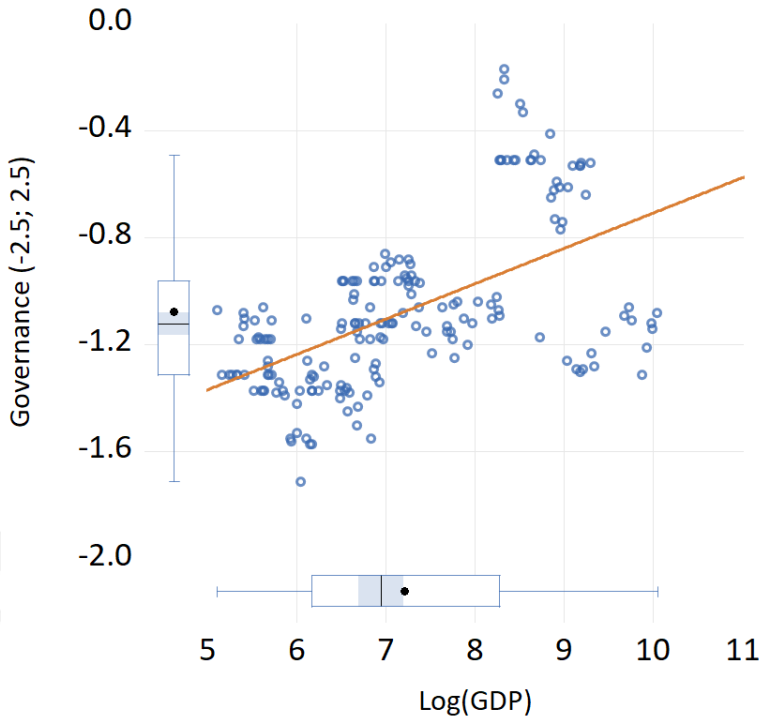


Figure A2.12 Governance-GDP: Panel Data Scatter Plots

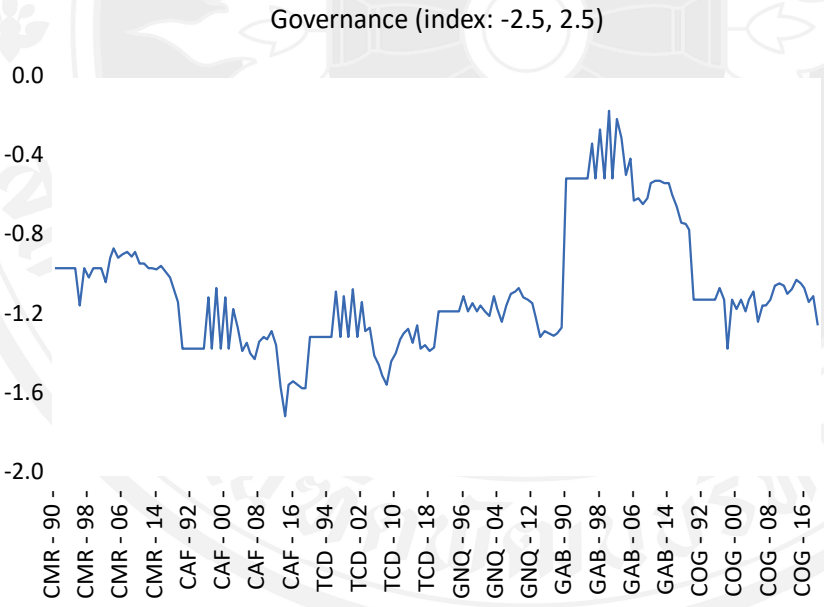


Figure A2.13 CEMAC governance for the panel data series

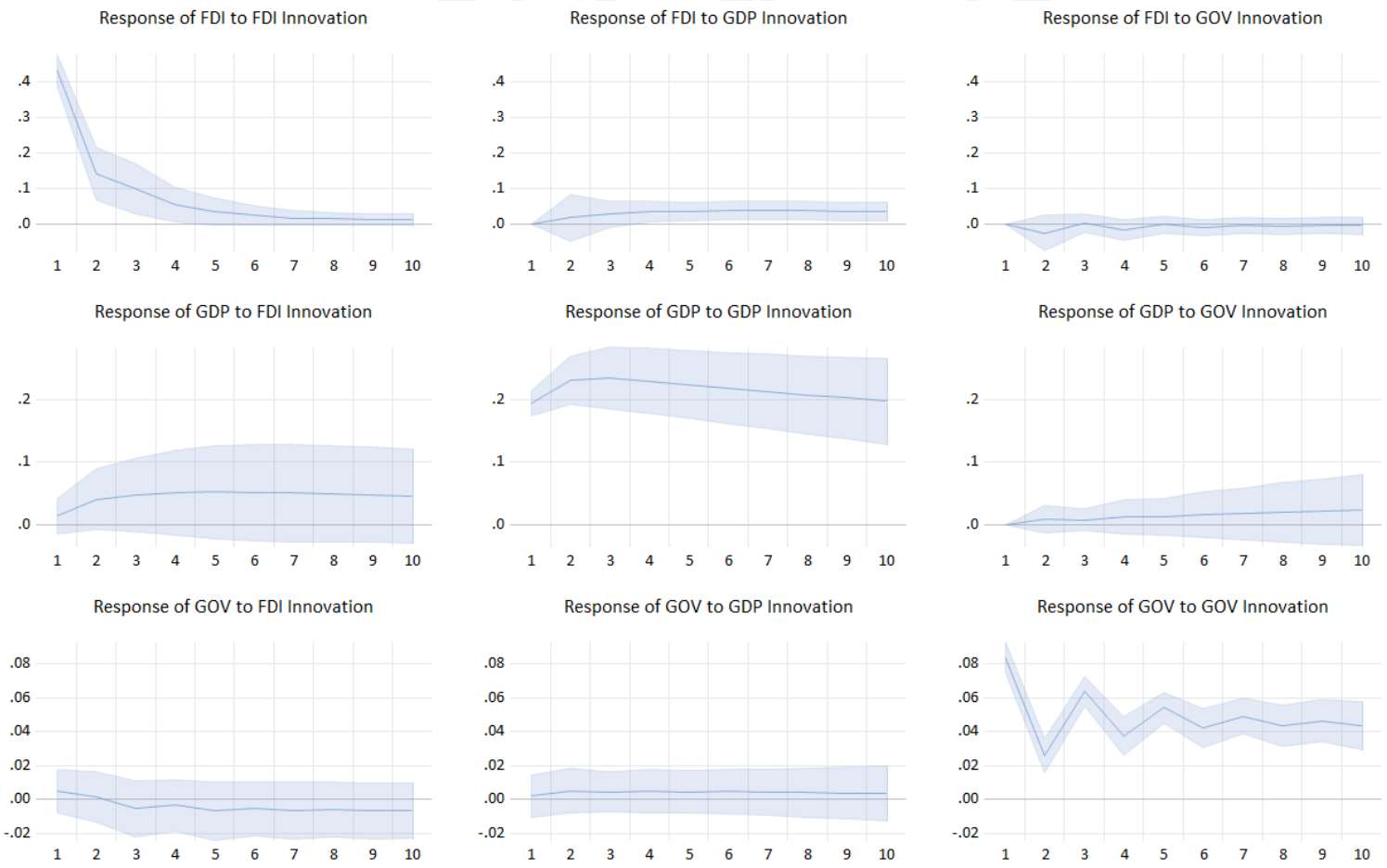


Figure A5.1 Impulse responses of the FDI-GDP-Governance system (CEMAC sample)

Notes: Response to Cholesky One S.D. (d.f. adjusted) Innovations; 95% CI using analytic asymptotic S.E.s; IRF based on Panel VAR(2)

Figure A5.2a Impulse responses of the FDI-GDP-Governance system (CEMAC sample)

Notes: Response to Cholesky One S.D. (d.f. adjusted) Innovations; 95% CI using analytic asymptotic S.E.s; IRF based on Panel VAR(7)

Figure A5.2b Impulse responses of the FDI-GDP-Governance system (INC sample)

Notes: Response to Cholesky One S.D. (d.f. adjusted) Innovations; 95% CI using analytic asymptotic S.E.s; IRF based on Panel VAR(7)

Figure A5.2c Impulse responses of the FDI-GDP-Governance system (HIPC sample)

Notes: Response to Cholesky One S.D. (d.f. adjusted) Innovations; 95% CI using analytic asymptotic S.E.s; IRF based on Panel VAR(7)

Figure A5.2d Impulse responses of the FDI-GDP-Governance system (LDC sample)

Notes: Response to Cholesky One S.D. (d.f. adjusted) Innovations; 95% CI using analytic asymptotic S.E.s; IRF based on Panel VAR(7)

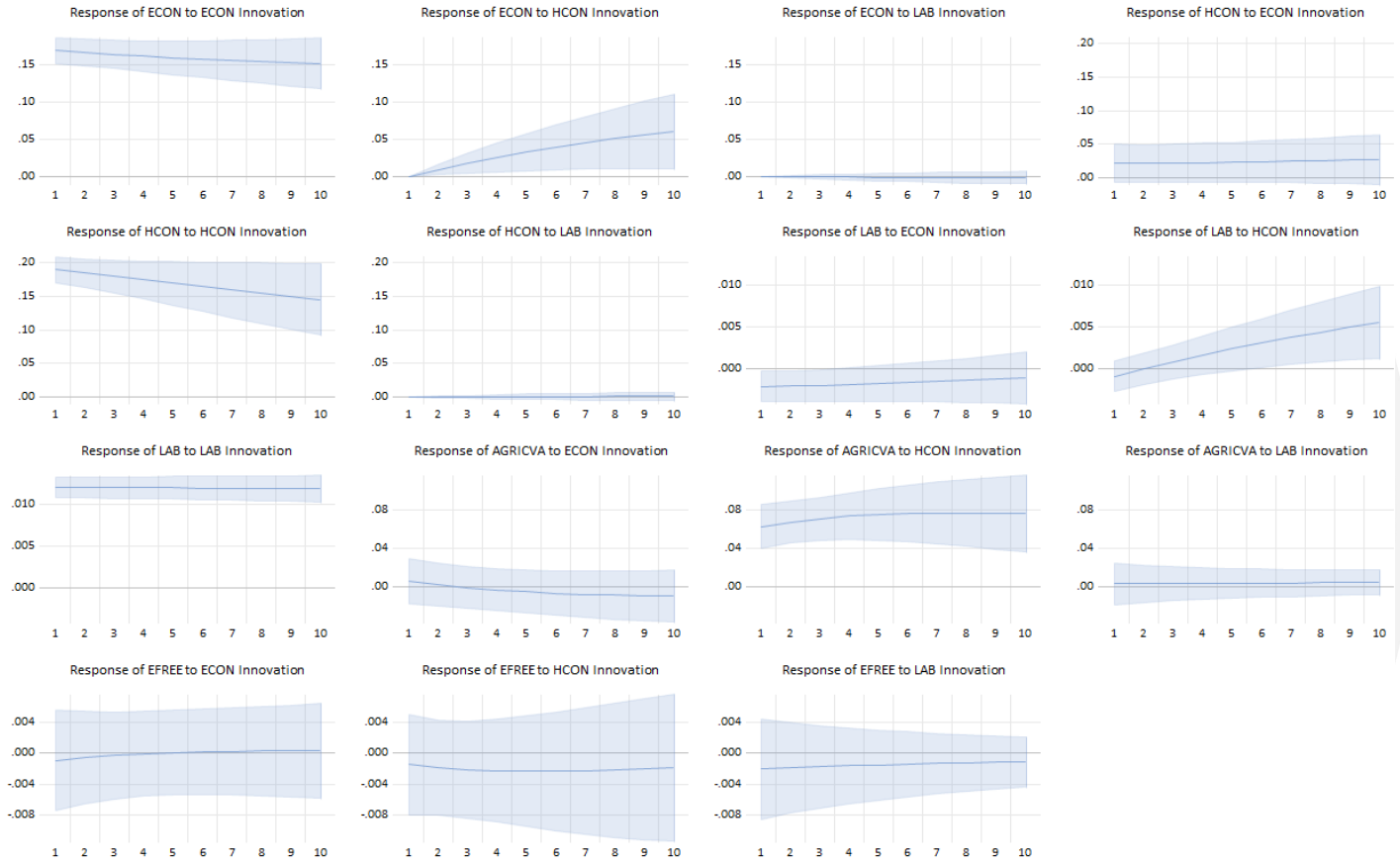


Figure A5.3a Impulse responses of economic activity and development variables

Notes: Response to Cholesky One S.D. (d.f. adjusted) Innovations; 95% CI using analytic asymptotic S.E.s; IRF based on Panel VAR(1) based on SIC

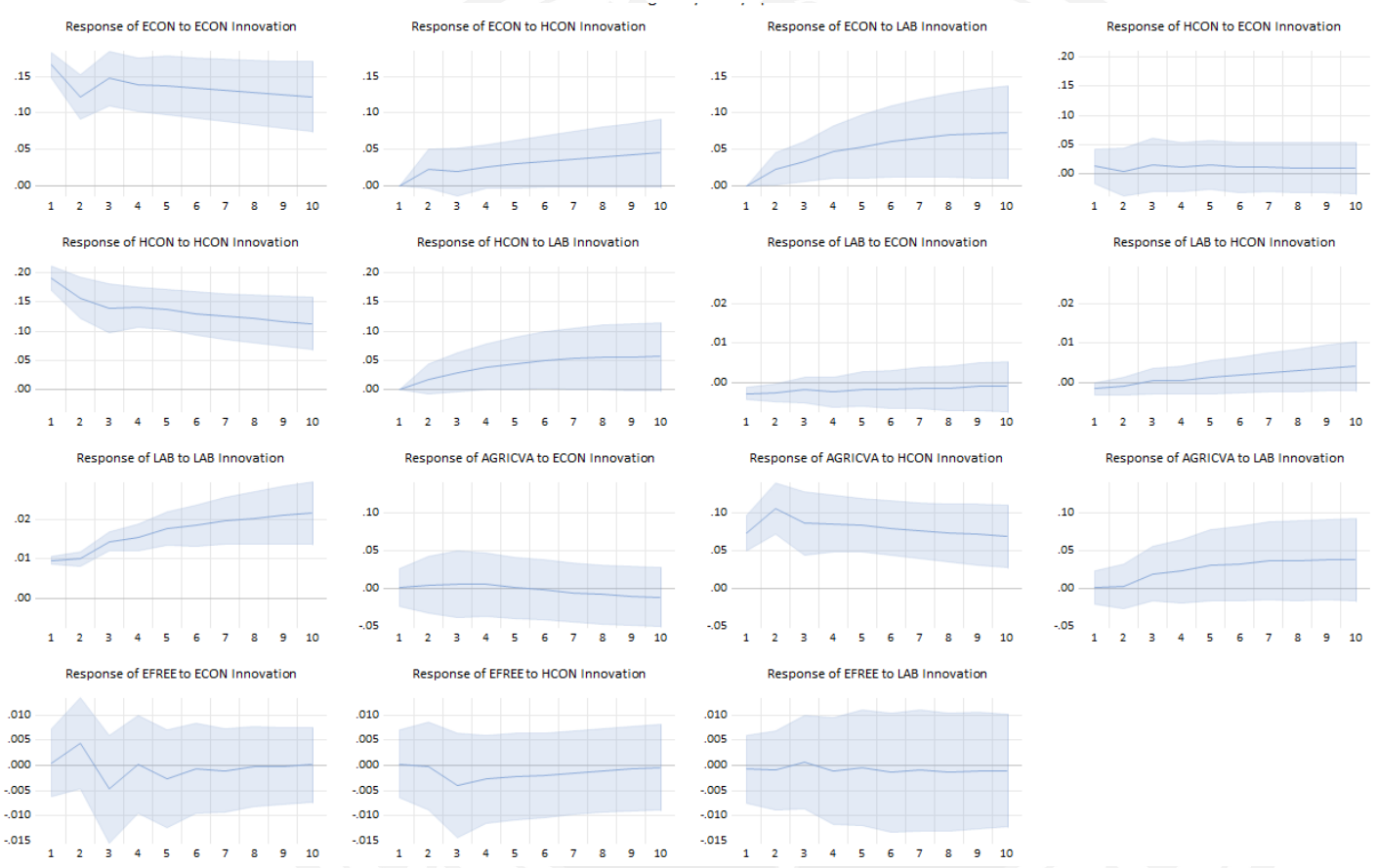


Figure 5.3b Impulse responses of economic activity and development variables

Notes: Response to Cholesky One S.D. (d.f. adjusted) Innovations; 95% CI using analytic asymptotic S.E.s; IRF based on Panel VAR(3) based on AIC

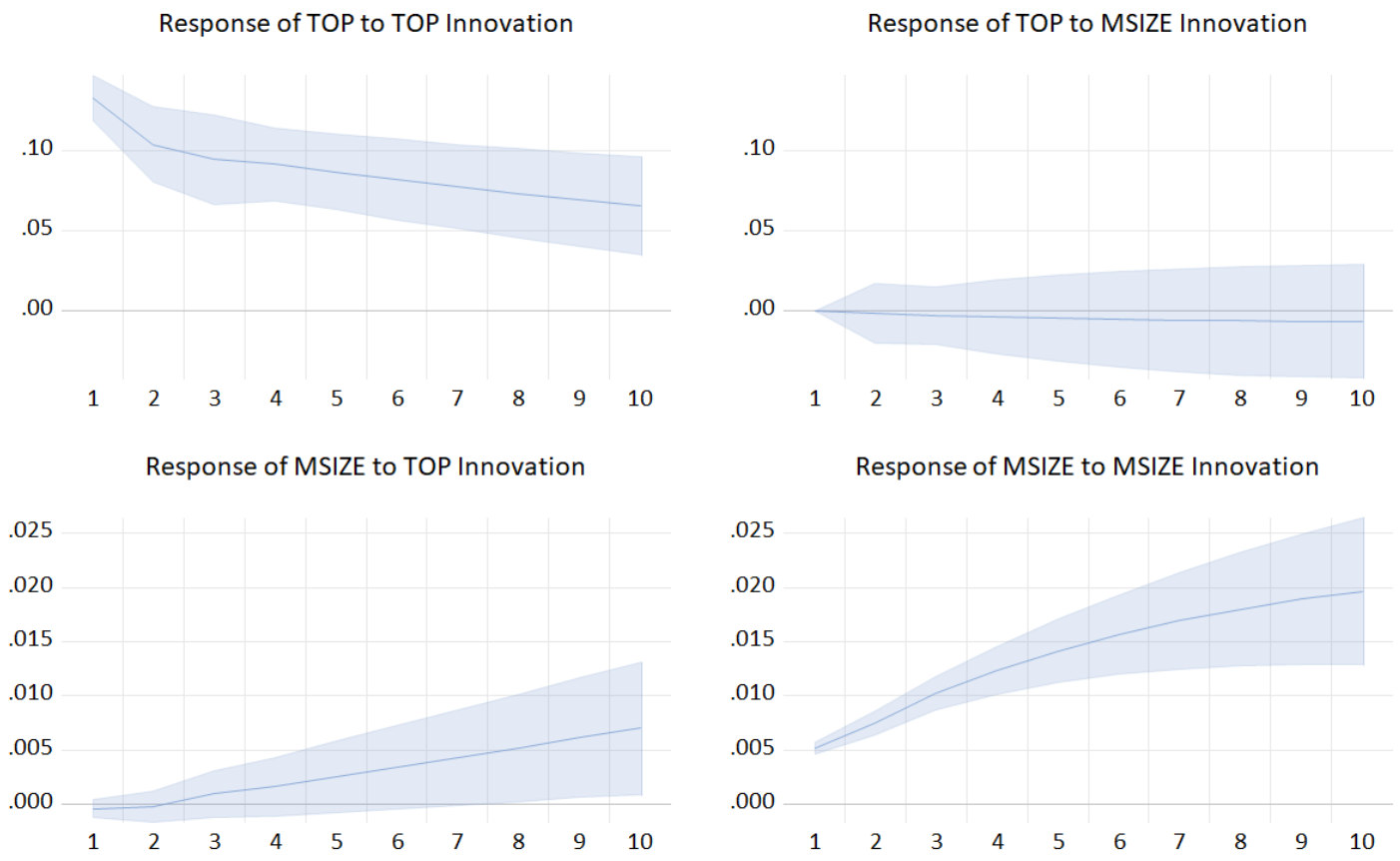


Figure A5.4 Impulse responses of economic structure and market variables

Notes: Response to Cholesky One S.D. (d.f. adjusted) Innovations; 95% CI using analytic asymptotic S.E.s; IRF based on Panel VAR(3) based on SIC

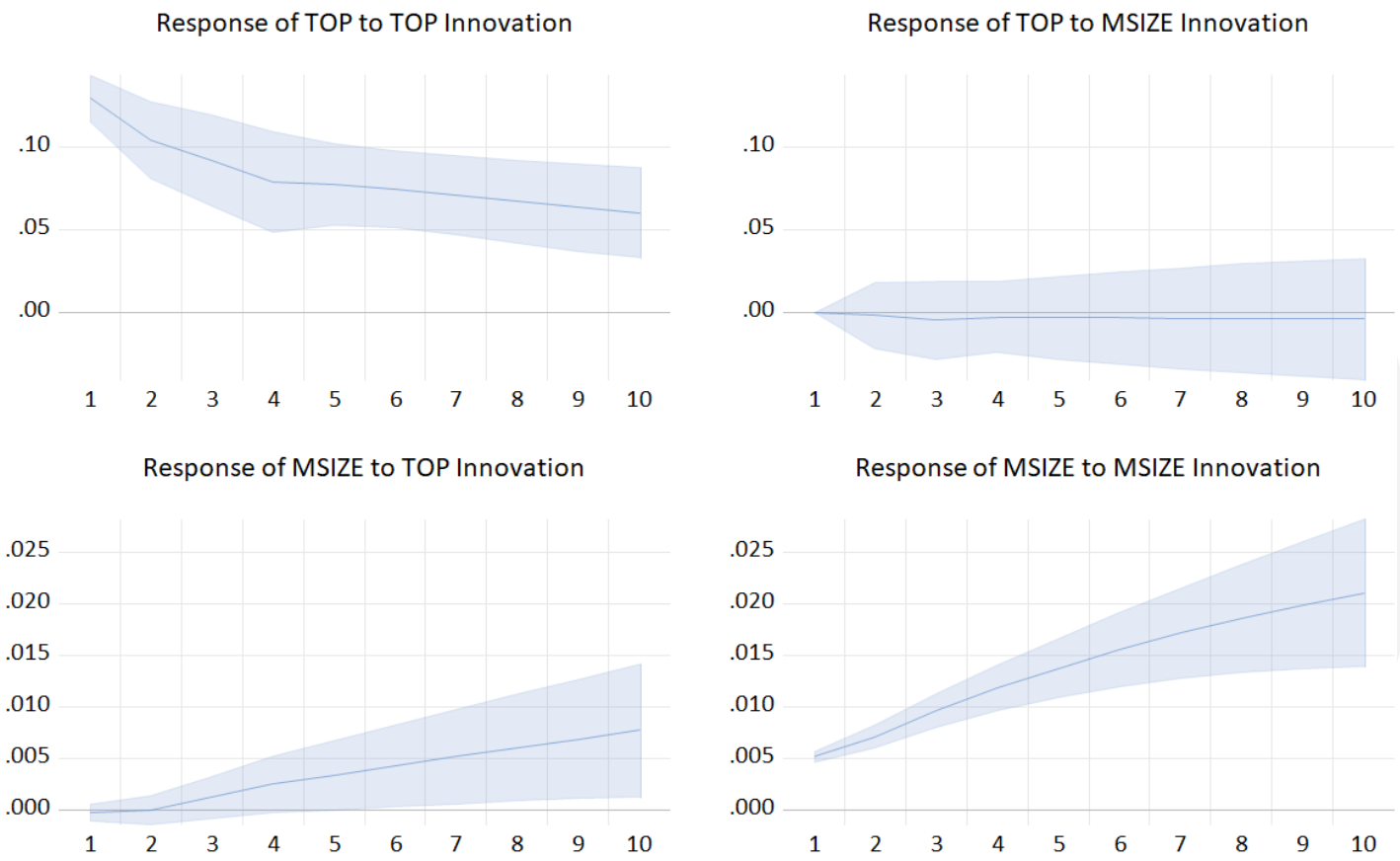


Figure A5.5 Impulse responses of economic structure and market variables

Notes: Response to Cholesky One S.D. (d.f. adjusted) Innovations; 95% CI using analytic asymptotic S.E.s; IRF based on Panel VAR(4) based on AIC

Roots of Characteristic Polynomial

Root	Modulus
0.988292	0.988292
0.909811	0.909811
0.361445	0.361445

Endogenous variables: ΔLnFDI ΔLnGDPPC ΔGOV
Lag specification: 1 1
No root lies outside the unit circle.
VAR satisfies the stability condition.

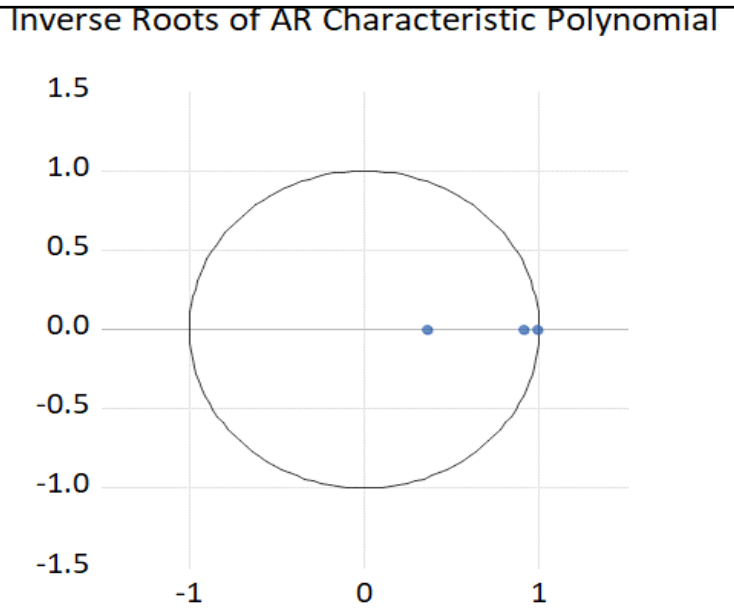


Figure A5.6 Stability of the panel VAR model

Roots of Characteristic Polynomial

Root	Modulus
0.976072	0.976072
0.816722	0.816722
0.224267	0.224267

Endogenous variables: ΔLnFDI ΔLnGDPPC ΔG

Lag specification: 1 1

No root lies outside the unit circle.

VAR satisfies the stability condition.

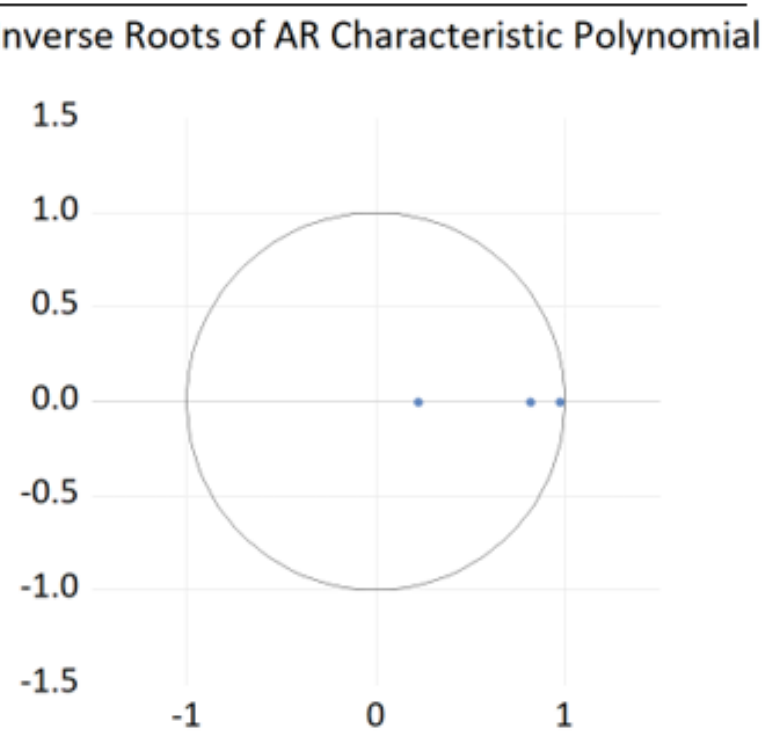


Figure A5.7 Stability of Bayesian VAR Model

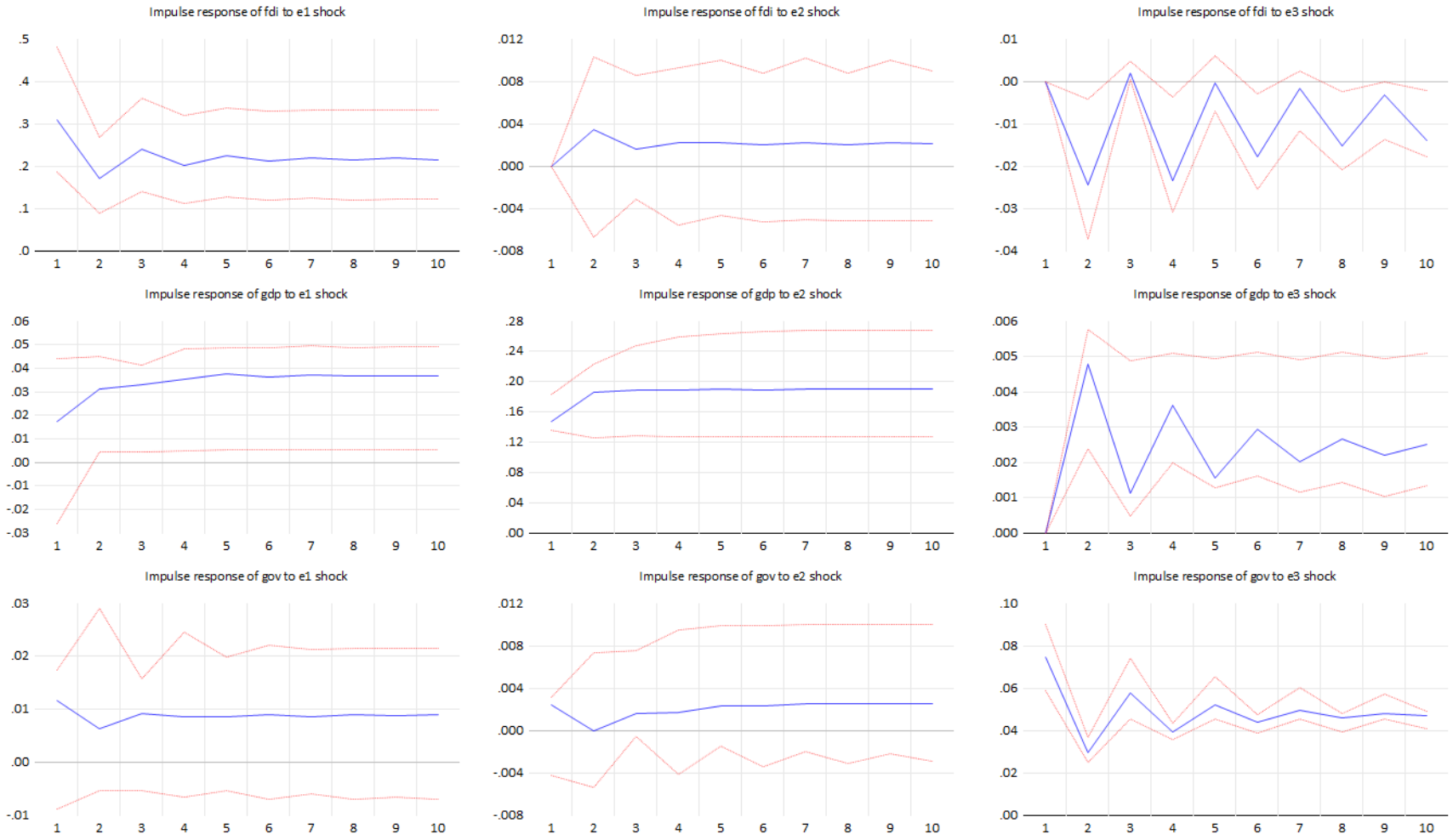


Figure A5.8 Long run response estimates to composite shocks

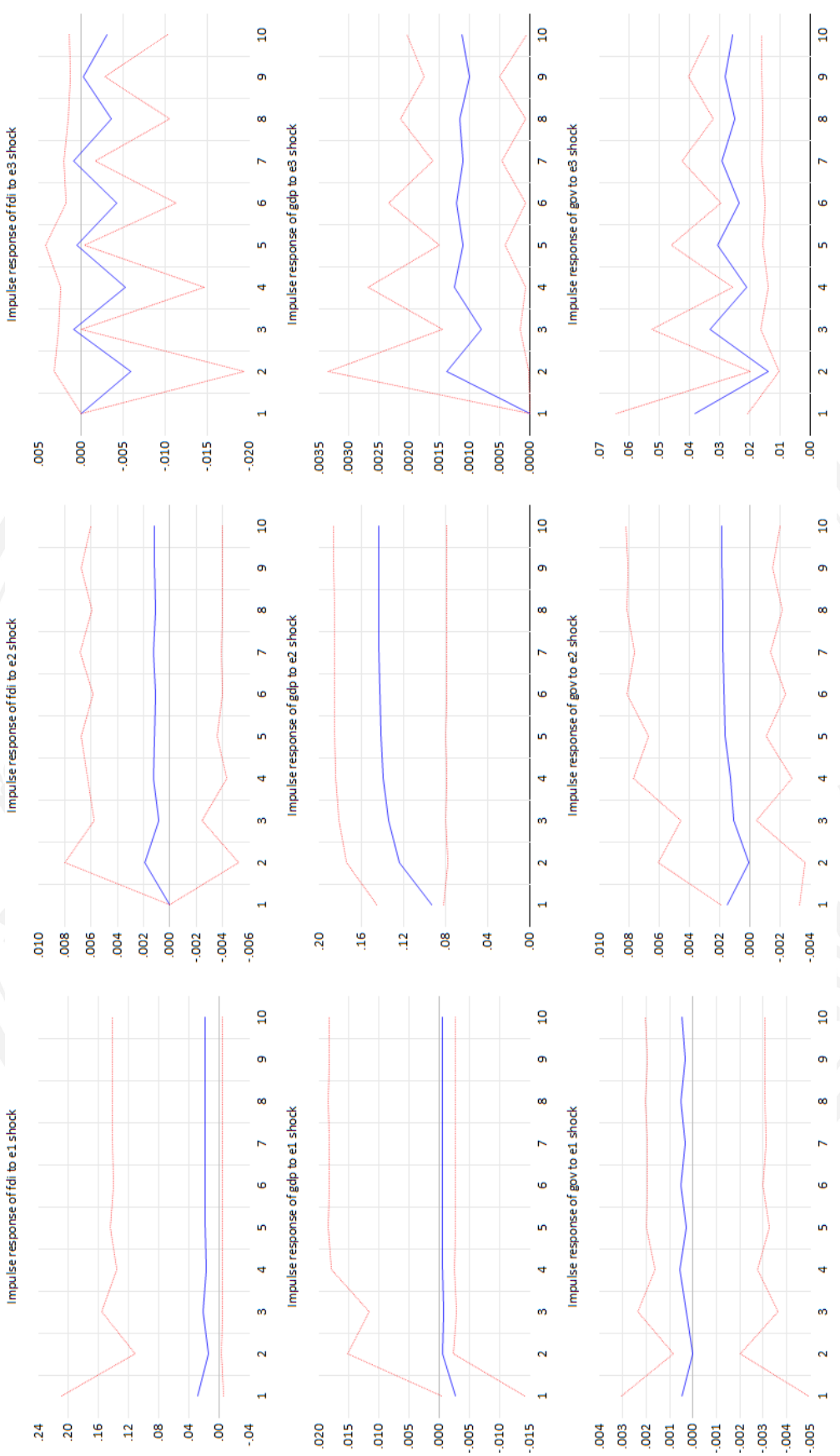


Figure A5.9 Short run response estimates to common shocks

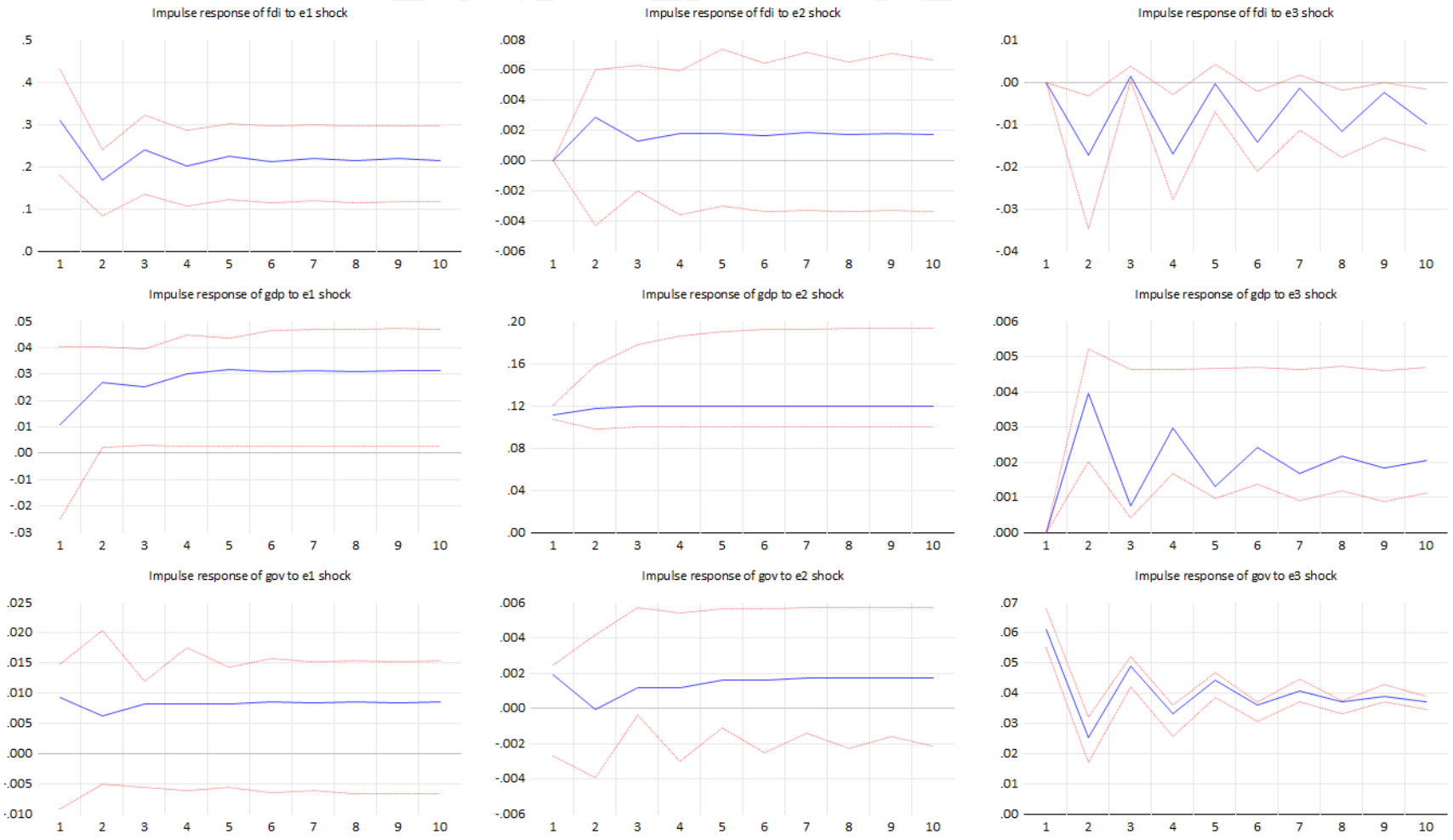


Figure A5.10 Short run response estimates to idiosyncratic shocks

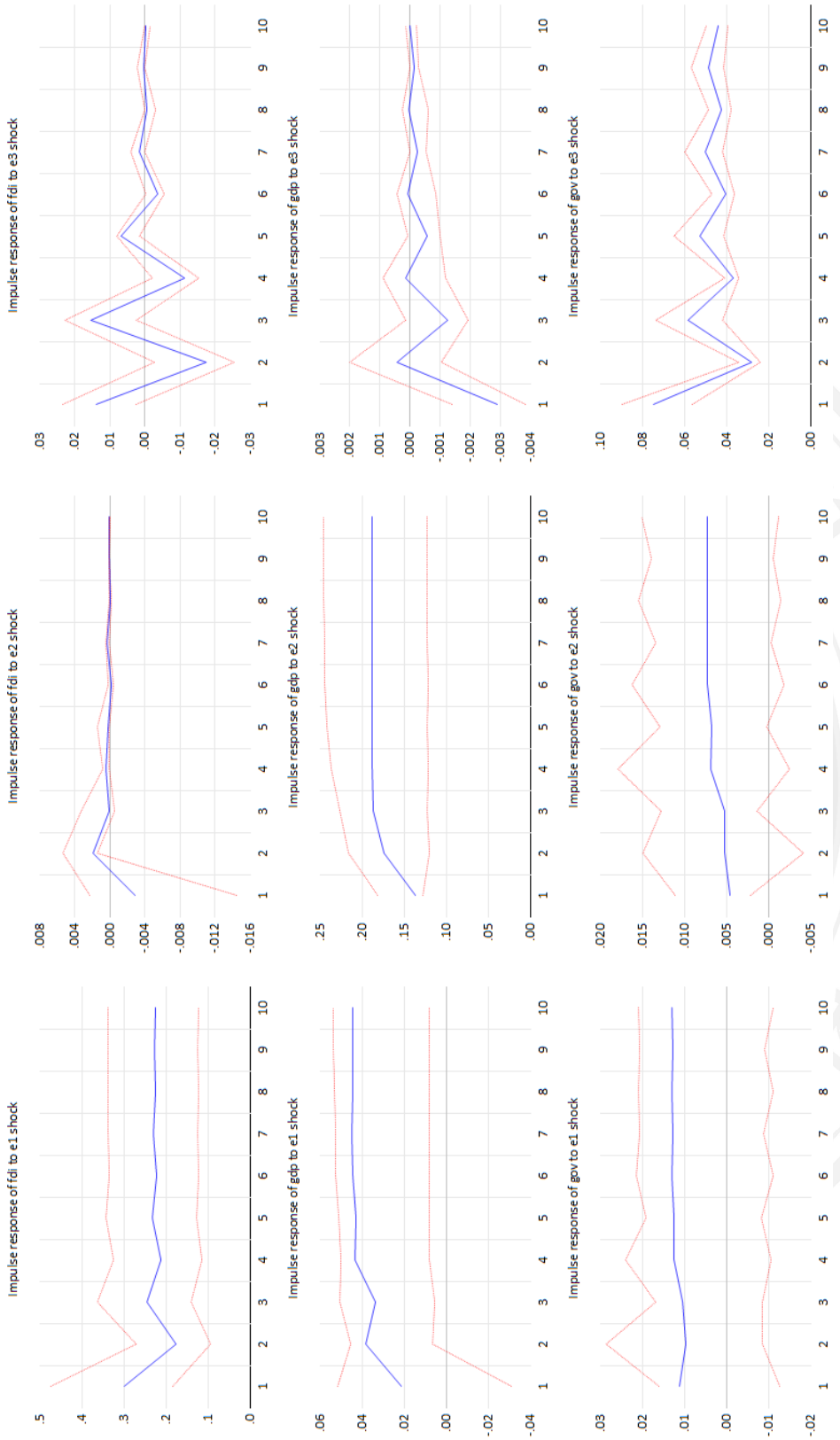


Figure A5.11 Long run response estimates to composite shocks

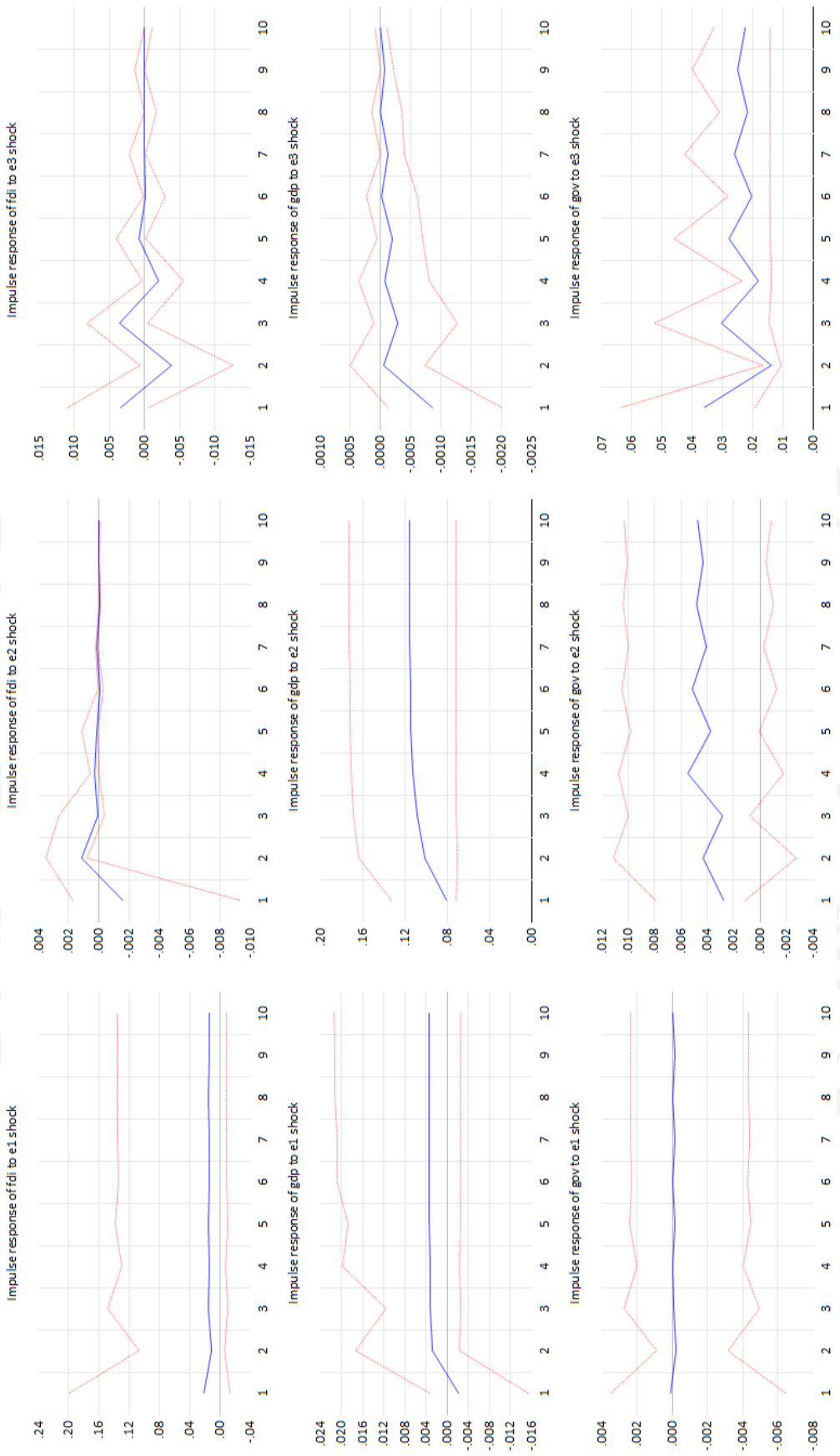


Figure A5.12 Long run response estimates to common shocks

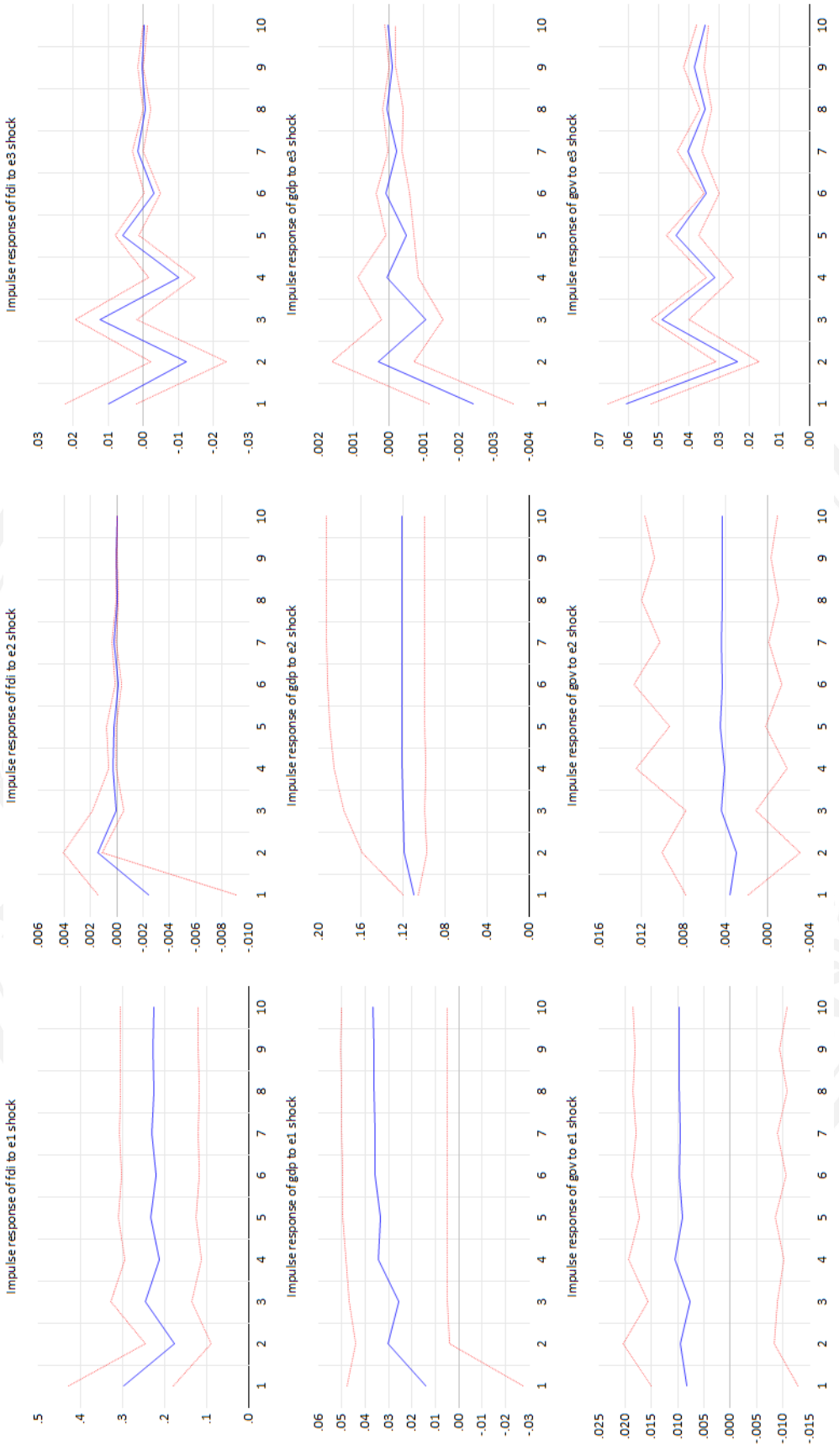


Figure A5.13 Long run response estimates to idiosyncratic shocks

Appendix B

Supplementary Tables for Data and PVAR Estimates

Table A1.1: Sample Characteristics

Sample	Countries (ISO3 codes)	Period	*N*	*T*	Obs.
a. CEMAC sample	Cameroon (CMR), Central African Republic (CAF), Chad (TCD), Republic of Congo (COG), Equatorial Guinea (GNQ), Gabon (GAB)	1990-2019	6	30	180
b. Income group: High (0)	GNQ, GAB	1990-2019	2	30	60
Middle (1)	CMR, COG		2	30	60
Low (2)	CAF, TCD		2	30	60
c. HIPC countries (0)	CMR, CAF, TCD, COG	1990-2019	4	30	120
non-HIPC countries (1)	GNQ, GAB	1990-2019	2	30	60
d. LDCs countries (0)	CAF, TCD, COG	1990-2019	3	30	90
non-LDCs (1)	CMR, GNQ, GAB		3	30	90

Notes: Parentheses contain the dummy variable codes

Table A1.2a: Definition and Description of Variables

Variable	Definition
FDI	Foreign direct investment (real, in billion US dollars)
GDPPC	Proxy for economic growth (GDP per capita)
GOV	Governance (index, PCA to reduce six WGI indices or aggregate
LAB	Labor force participation
HCON	Household consumption
ECON	Electric power consumption (real value, kWh)
MSIZE	Proxy for market size (real value, GDP per capita constant 2010 USD)
TOP	Trade openness (in trade % of GDP)
AGRICVA	Agricultural value added
EFREE	Economic Freedom
HIPC	Dummy for heavily indebted poor country; 1 if HIPC, 0 otherwise
INC	Dummy variable for income level (1= if country is LINC; 0 otherwise)
LDC	Dummy for least developing countries (1= if country is LDC; 0 otherwise)
Code	Dummy for countries (1 = C.A.R., 2 = CMR, 3 = CHD, 4 = CGO, 5 = EQG, 6 = GAB)

Table A1.2b: Variable, abbreviation and characteristics

	Variables	Description	Source
Endogenous variables	FDI	Foreign direct investment (billion USD)	The World Bank
	GDPPC	GDP per capita (US dollars)	The World Bank
	GOV	Governance (-2.5 weak - 2.5 strong pointsa)	The World Bank
Exogenous (weakly I(1)) variables	AGRICVA	Agricultural value added (billion USD)	The World Bank
	ECON	Electricity consumption (billion kwhoursb)	The U.S. EIAc
	EFREE	Economic freedom (0-100 index points)	The Heritage Foundation
	HCON	Household consumption (billion USD)	The World Bank
	LAB	Labor force (million people)	The World Bank
	MSIZE	Market size (million, population)	UN Population Divisiond
	TOP	Trade openness (% of GDP)	The World Bank
Exogenous (dummy) variables	Income group	Upper-middle income = 1 (4,096-12,695)	See the notes to Table 5.1
	HIPC status	HIPC = 1	"
	LDC level	LDC = 1	"

Notes: Governance is an aggregation of six dimensions (Kaufmann et al., 2011); kwhours and EIA stand for kilowatts-hours and Energy Information Administration, respectively; United Nations Population Division; and July 1, 2021 for FY22.

Table A2.3 Coup events in CEMAC countries (1990-2019)

Country	Regine change	Instability (year)
Cameroon	none; Paul Biya (since 1982)	Anglophone crisis: NOSO (2016, 2017, 2018,2019)
C. A. Republic	Ange-Félix Patassé (1993)	President Ange-Félix Patassé came to power (1996)
	François Bozizé (2013)	A failed coup attempt against President Ange-Félix Patassé (2001)
	Faustin-Archange Touadéra (2016)	UFDR against President Patassé's government (2003)
		François Bozizé took control of the government (2003)
		Séléka coalition against President François Bozizé's government (2013)
		Michel Djotodia stepped down as president (2014)
		Catherine Samba-Panza was elected as interim president (2014)
Chad	none; Idriss Déby (1990 - 2021)	President Hissène Habré was ousted (1990)
		Idriss Déby's government claimed to have thwarted a coup attempt (2006)
		Rebels from various groups launched an offensive (2008)
Congo (Rep.)	Denis Sassou Nguesso (1979 - 1992; 1997-date)	Pascal Lissouba elected president (1992) -end of single-party rule

Country	Regine change	Instability (year)
		Civil war (1997)
		Transitional government (2002)
		Denis Sassou Nguesso was re-elected as president (2009)
Equatorial Guinea	none; Teodoro Obiang Nguema Mbasogo (since 1979)	Mercenary Plot (2004)
		Coup Attempt (2009)
		Mercenary Plot (2017)
		Coup Attempt (2009)
		Mercenary Plot (2017)
Gabon	Omar Bongo (1967 - 2009)	Attempted Coup (1990)
	Ali Bongo Ondimba (2009 -)	Attempted Coup (2019)

Notes: NOSO stands for North West and South West (Anglophone) Regions of Cameroon; UFDR for the Union of Democratic Forces for Unity. Source: Author

Table A1.4: Descriptive Statistics (with log and first difference transformed variables), 6 countries 1990-2019

	Mean	**Max**	**Min**	**Std. Dev.**	**Skewness**	**Kurtosis**	**J-Bera**	**Sum**	**Obs.**
FDI	0.38	4.42	-1.43	0.75	2.95	14.89	1321.17	68.74	180
GDPPC	3134.75	22942.60	166.18	4594.81	2.38	8.74	417.70	564254.65	180
GOV	-1.08	-0.17	-1.71	0.30	0.89	3.40	24.94	-193.84	180
ECON	1.10	6.51	0.02	1.47	1.94	6.33	196.27	197.43	180
HCON	5.27	28.82	0.63	5.81	2.34	8.34	377.53	948.52	180
LAB	2.53	11.33	0.14	2.79	1.50	4.28	79.97	455.89	180
MSIZE	6.35	25.78	0.47	6.29	1.30	3.72	54.61	1143.68	180
TOP	79.05	156.86	26.16	33.86	0.28	1.81	12.95	14229.58	180
AGRICVA	1.44	7.06	0.15	1.84	1.67	4.40	98.36	259.02	180
EFREE	49.68	61.00	34.00	5.20	0.00	2.50	1.88	8943.00	180
LnFDI	0.30	2.19	-1.16	0.49	1.40	6.12	131.87	54.31	180
LnGDPPC	7.20	10.04	5.11	1.29	0.42	2.15	10.68	1296.78	180
LnECON	-0.86	1.87	-3.91	1.51	-0.09	2.09	6.43	-154.52	180
LnHCON	1.21	3.36	-0.46	0.94	0.24	2.40	4.45	218.25	180
LnLAB	0.30	2.43	-1.97	1.20	-0.07	2.00	7.59	54.14	180
LnMSIZE	1.34	3.25	-0.76	1.06	-0.04	2.01	7.36	240.72	180
LnTOP	4.27	5.06	3.26	0.46	-0.17	1.70	13.57	768.81	180

	Mean	Max	Min	Std. Dev.	Skewness	Kurtosis	J-Bera	Sum	Obs.
LnAGRICVA	-0.28	1.95	-1.90	1.08	0.67	2.34	16.81	-50.87	180
LnEFREE	3.90	4.11	3.53	0.11	-0.25	2.84	2.15	702.03	180
Δ*LnFDI*	0.01	2.14	-3.33	0.50	-1.45	18.83	1877.87	1.97	174
Δ*LnGDPPC*	0.03	0.60	-0.63	0.19	-0.15	4.37	14.27	5.53	174
Δ*GOV*	-0.01	0.34	-0.34	0.11	0.15	4.77	23.34	-0.89	174
Δ*LnECON*	0.05	1.50	-0.41	0.17	3.66	31.73	6372.96	9.14	174
Δ*LnHCON*	0.04	0.63	-1.34	0.19	-2.17	18.92	1974.68	6.42	174
Δ*LnLAB*	0.03	0.08	0.00	0.01	0.41	5.18	39.33	5.05	174
Δ*LnMSIZE*	0.03	0.06	0.00	0.01	0.08	4.59	18.39	5.31	174
Δ*LnTOP*	0.01	0.68	-0.42	0.13	0.94	8.54	248.56	1.24	174
Δ*LnAGRICVA*	0.03	1.27	-0.52	0.16	1.74	22.00	2705.64	4.96	174
Δ*LnEFREE*	0.00	0.21	-0.21	0.04	0.57	9.88	352.29	-0.23	174

Notes: FDI = Foreign Direct Investment, GDPPC = GDP per capita, GOV = Governance, ECON = Electricity Consumption, HCON = Household Consumption, LAB = Labor Force, MSIZE = Market Size, TOP = Trade Openness, AGRICVA = Agricultural value added, and EFREE = Economic freedom.

Table A1.5 Mean and standard deviation of CEMAC countries (country-by-country)

	FDI			GDPPC			GOV		
	Mean	**SD.**	**Obs.**	**Mean**	**SD.**	**Obs.**	**Mean**	**SD.**	**Obs.**
Central African Republic	0.019	0.028	30	388.208	95.506	30	-1.373	0.147	23
Cameroon	0.319	0.327	30	1135.899	317.706	30	-0.964	0.065	23
Congo (Rep.)	0.850	1.457	30	1856.840	1052.763	30	-1.120	0.071	23
Gabon	0.405	0.532	30	6576.980	2174.568	30	-0.512	0.144	23
Equatorial Guinea	0.491	0.683	30	8317.646	7974.606	30	-1.180	0.068	23
Chad	0.208	0.339	30	532.916	310.829	30	-1.312	0.110	23
Log transformed	0.019	0.028	30	5.931	0.254	30	(Governance is same as above)		
	0.299	0.300	30	6.993	0.297	30			
	0.534	0.835	30	7.367	0.581	30			
	0.352	0.447	30	8.738	0.335	30			
	0.408	0.496	30	8.115	1.691	30			
	0.198	0.320	30	6.081	0.663	30			
First difference log transformed	0.001	0.026	29	-0.003	0.147	29	-0.007	0.151	22
	0.035	0.194	29	0.013	0.155	29	-0.006	0.064	22
	-0.041	0.940	29	0.024	0.202	29	-0.004	0.087	22
	0.040	0.356	29	0.008	0.143	29	-0.009	0.150	22

	FDI			GDPPC			GOV		
	Mean	**SD.**	**Obs.**	**Mean**	**SD.**	**Obs.**	**Mean**	**SD.**	**Obs.**
	0.015	0.591	29	0.119	0.295	29	-0.003	0.049	22
	0.018	0.383	29	0.030	0.174	29	-0.002	0.126	22

Table A1.6 Descriptive statistics by country (excluding core variables)

	LnECON		***LnHCON***		***LnLAB***		***LnMSIZE***		***LnTOP***	
	Mean	**Std. Dev.**	**Mean**	**Std. Dev.**	**Mean**	**Std. Dev.**	**Mean**	**Std. Dev.**	**Mean**	**Std. Dev.**
Log transformed variables										
CAF	-2.118	0.240	3.743	0.179	0.437	0.155	1.392	0.185	3.743	0.179
CMR	1.264	0.389	3.770	0.159	2.056	0.226	2.840	0.245	3.770	0.159
COG	-0.573	0.565	4.755	0.245	0.339	0.267	1.296	0.270	4.755	0.245
GAB	0.269	0.340	4.446	0.103	-0.865	0.276	0.384	0.256	4.446	0.103
GNQ	-1.871	1.704	4.734	0.094	-1.376	0.392	-0.164	0.380	4.734	0.094
TCD	-2.122	0.435	4.179	0.314	1.214	0.246	2.276	0.313	4.179	0.314
CAF	0.015	0.095	0.021	0.170	0.018	0.010	0.021	0.008	0.005	0.112
CMR	0.036	0.076	0.043	0.151	0.027	0.009	0.028	0.001	0.005	0.153
COG	0.056	0.176	0.062	0.180	0.030	0.005	0.029	0.006	0.020	0.160
GAB	0.044	0.071	0.026	0.132	0.030	0.011	0.029	0.005	-0.002	0.074
GNQ	0.135	0.335	0.013	0.289	0.042	0.022	0.041	0.008	-0.006	0.077
TCD	0.030	0.105	0.056	0.193	0.028	0.002	0.035	0.005	0.020	0.184

	LnAGRICVA		*LnEFREE*	
	Mean	Std. Dev.	Mean	Std. Dev.
CAF	-0.361	0.113	3.932	0.068
CMR	1.239	0.432	3.947	0.045

	LnECON		*LnHCON*		*LnLAB*		*LnMSIZE*		*LnTOP*	
	Mean	**Std. Dev.**	**Mean**	**Std. Dev.**	**Mean**	**Std. Dev.**	**Mean**	**Std. Dev.**	**Mean**	**Std. Dev.**
COG					-0.968	0.577	3.758		0.063	
GAB					-0.711	0.323	4.045		0.028	
GNQ					-1.482	0.161	3.849		0.079	
TCD					0.588	1.101	3.87		0.045	
CAF					-0.004	0.119	-0.001		0.049	
CMR					0.028	0.135	0		0.032	
COG					0.034	0.167	-0.002		0.066	
GAB					0.026	0.109	-0.001		0.028	
GNQ					0.007	0.114	-0.005		0.049	
TCD					0.08	0.278	0.001		0.032	

Notes. ECON = Electricity Consumption, HCON = Household Consumption, LAB = Labor Force, MSIZE = Market Size, and TOP = Trade Openness, AGRICVA = Agricultural value added, and EFREE = Economic freedom.

Table A3.1: Panel Unit Root Tests (with constant)

Sample	Variable	IPS	Fisher-ADF		Fisher-PP		Decision
	LnFDI	0.872	18.475	-0.934	33.904	-3.142	nonstationary
CEMAC sample	LnGDPPC	0.943	5.292	1.075	5.495	1.020	nonstationary
	GOV	0.711	7.795	0.797	36.715	-3.815	nonstationary
	LnFDI	0.109	4.693	0.079	11.645	-1.845	nonstationary
Income Level sample	LnGDPPC	0.156	2.453	0.207	1.898	0.472	nonstationary
	GOV	0.984	1.417	1.032	8.116	-1.402	nonstationary
	LnFDI	-1.145	13.781	-1.199	22.259	-2.543	nonstationary
HIPC sample	LnGDPPC	1.045	2.839	1.170	3.597	0.915	nonstationary
	GOV	0.175	6.378	0.246	28.600	-3.681	nonstationary
	LnFDI	-1.965	13.522	-2.058	21.593	-3.267	nonstationary
LDC sample	LnGDPPC	0.633	2.524	0.742	3.037	0.658	nonstationary
	GOV	-0.083	5.709	-0.045	25.026	-3.694	nonstationary

Table A3.2: Panel Unit Root Tests (with constant and trend)

Sample	Variable	IPS		Fisher-ADF	Fisher-PP		Decision
	LnFDI	-2.184	23.060	-2.285	51.817	-5.233	stationary
CEMAC sample	LnGDPPC	1.049	6.905	1.004	7.562	1.028	nonstationary
	GOV	1.288	5.416	1.368	33.180	-3.289	nonstationary
	LnFDI	-1.092	6.561	-1.208	22.752	-3.757	nonstationary
Income Level sample	LnGDPPC	1.733	1.250	1.741	1.549	1.744	nonstationary
	GOV	0.857	1.236	0.935	9.405	-1.459	nonstationary
	LnFDI	-1.903	16.498	-1.944	29.065	-3.753	nonstationary
HIPC sample	LnGDPPC	0.059	5.655	-0.002	6.013	0.025	nonstationary
	GOV	0.971	4.180	1.013	23.775	-2.996	nonstationary
	LnFDI	-1.824	13.580	-1.823	18.987	-2.899	nonstationary
LDC sample	LnGDPPC	0.055	4.250	0.005	3.447	0.371	nonstationary
	GOV	0.255	4.068	0.247	22.208	-3.397	nonstationary

Table A3.3: Panel Unit Root Tests (with constant)

Sample	Variable	IPS	Fisher-ADF		Fisher-PP		Decision
CEMAC sample	ΔLnFDI	-9.703***	98.534***	-4.367***	158.618***	-11.188***	stationary
	ΔLnGDPPC	-5.393***	51.741***	-5.270***	89.653***	-7.652***	stationary
	ΔGOV	-7.174***	70.516***	-6.687***	188.890***	-12.511***	stationary
Income Level sample	ΔLnFDI	-6.013***	35.527***	-5.106***	53.875***	-6.512***	stationary
	ΔLnGDPPC	-2.805***	15.475***	-2.778***	22.736***	-3.777***	stationary
	ΔGOV	-4.229***	23.919***	-3.964***	55.708***	-6.692***	stationary
HIPC sample	ΔLnFDI	-7.632***	63.008***	-6.637***	104.743***	-9.097***	stationary
	ΔLnGDPPC	-4.621***	36.266***	-4.490***	66.917***	-6.701***	stationary
	ΔGOV	-5.796***	46.597***	-5.387***	133.182***	-10.591***	stationary
LDC sample	ΔLnFDI	-6.630***	47.405***	-5.731***	82.256***	-8.077***	stationary
	ΔLnGDPPC	-3.445***	23.010***	-3.449***	39.549***	-5.008***	stationary
	ΔGOV	-4.864***	33.836***	-4.529***	101.927***	-9.280***	stationary

Table A3.4 Correlation Matrices

	LnFDI	LnGDPPC	GOV	LnECON	LnHCON	LnLAB	LnMSIZE	LnTOP	LnAGRICVA	LnEFREE
LnFDI	1									
LnGDPPC	0.402	1								
GOV	0.125	0.559	1							
LnECON	0.274	0.570	0.562	1						
LnHCON	0.310	0.307	0.191	0.581	1					
LnLAB	-0.002	-0.428	-0.272	0.355	0.389	1				
LnMSIZE	0.011	-0.403	-0.258	0.357	0.416	0.996	1			
LnTOP	0.284	0.498	0.174	-0.096	-0.074	-0.595	-0.578	1		
LnAGRICVA	0.036	-0.228	-0.095	0.384	0.656	0.837	0.863	-0.544	1	
LnEFREE	-0.073	0.169	0.557	0.233	0.125	-0.053	-0.034	-0.344	0.192	1

Table A3.5 Correlation Matrices for First difference log transformed variables

	ΔLnFDI	ΔLnGDPPC	ΔGOV	ΔLnECON	ΔLnHCON	ΔLnLAB	ΔLnMSIZE	ΔLnTOP	ΔLnAGRICVA	ΔLnEFREE
ΔLnFDI	1									
ΔLnGDPPC	-0.008	1								
ΔGOV	0.108	-0.009	1							
ΔLnECON	-0.107	0.208	-0.001	1						
ΔLnHCON	-0.019	0.334	0.086	0.083	1					
ΔLnLAB	-0.044	0.135	0.027	-0.056	-0.124	1				
ΔLnMSIZE	0.013	0.277	0.045	0.092	0.140	0.562	1			
ΔLnTOP	-0.042	-0.227	-0.012	-0.067	-0.117	0.024	-0.128	1		
ΔLnAGRICVA	0.004	0.496	-0.102	0.059	0.396	-0.013	0.109	-0.242	1	
ΔLnEFREE	-0.019	0.054	0.228	-0.034	-0.041	-0.034	0.048	-0.025	0.001	1

Table A3.6 Kao Cointegration Test for FDI, Growth, and Governance

Panel A: CT for log variables		
	t-Statistic	Prob.
ADF	0.2399	0.4052
Residual variance	0.0746	
HAC variance	0.0606	
Panel B: CT for first difference variables		
	t-Statistic	Prob.
ADF	-4.4187	0.0000
Residual variance	0.0487	
HAC variance	0.0057	

Notes: For Panel A in Table A3.5, Kao residual test for cointegration shows that there is no cointegration between FDI, Growth and Governance. In other words, there is no long run relationship between these variables in log terms. Meanwhile, Panel B shows that there is cointegration between FDI, Growth and Governance. Indeed, there is a long run relationship between these variables in first difference. Like the Kao test, a robust Pedroni works differently with same conclusions for log (not cointegrated) and first difference (panels are cointegrated) variables (see Table A3.7).

Table A3.7 Pedroni Cointegration Test for FDI, Growth, and Governance

Cointegration Test for FDI, Growth, and Governance				
Panel A: CT for log variables				
Alternative hypothesis: common AR coefs. (within-dimension)				
	Statistic	Prob.	Weighted Statistic	Prob.
Panel v-Statistic	-1.5598	0.9406	-1.5598	0.9406
Panel rho-Statistic	0.5883	0.7218	0.5883	0.7218
Panel PP-Statistic	-0.1973	0.4218	-0.1973	0.4218
Panel ADF-Statistic	1.4565	0.9274	1.4565	0.9274
Alternative hypothesis: individual AR coefs. (between-dimension)				
	Statistic	Prob.		
Group rho-Statistic	1.7976	0.9639		
Group PP-Statistic	0.6136	0.7303		
Group ADF-Statistic	2.6791	0.9963		
Panel B: CT for first difference log variables				
Alternative hypothesis: common AR coefs. (within-dimension)				
	Statistic	Prob.	Weighted Statistic	Prob.
Panel v-Statistic	4.0358	0.0000	4.0358	0.0000
Panel rho-Statistic	-24.8953	0.0000	-24.8953	0.0000

Cointegration Test for FDI, Growth, and Governance				
Panel PP-Statistic	-15.5624	0.0000	-15.5624	0.0000
Panel ADF-Statistic	-15.5424	0.0000	-15.5424	0.0000
Alternative hypothesis: individual AR coefs. (between-dimension)				
	Statistic	Prob.		
Group rho-Statistic	-25.1580	0.0000		
Group PP-Statistic	-18.5766	0.0000		
Group ADF-Statistic	-18.5517	0.0000		

Table A3.8 PDOLS and PFMOLS Model Results: *LFDI*

PDOLS and PFMOLS results				
Panel A: Panel Dynamic OLS (PDOLS) Model				
	Coefficient	Std. Error	t-Statistic	Prob.
LGROWTH	-1.4279	0.0701	-20.3636	0.0000
LGOV	-0.7748	0.1950	-3.9736	0.0001
R-squared	0.2265	Mean dependent var		-1.9109
Adjusted R-squared	0.1834	S.D. dependent var		1.1840
S.E. of regression	1.0699	Sum squared resid		760.1326
Long-run variance	5.2740			
Panel B: Panel Fully Modified OLS (PFMOLS) Model				
	Coefficient	Std. Error	t-Statistic	Prob.
LGROWTH	-1.4424	0.0641	-22.4916	0.0000
LGOV	-0.8409	0.1679	-5.0086	0.0000
R-squared	0.1018	Mean dependent var		-1.9159
Adjusted R-squared	0.1005	S.D. dependent var		1.1960
S.E. of regression	1.1343	Sum squared resid		916.0306
Long-run variance	4.9829			

Table A5.1 Panel VAR(2) model estimates for CEMAC Sample

Model A1									
Dep. Variable:	**ΔLnFDI**			**ΔLnGDPPC**			**ΔGOV**		
Variable	**Coeff.**	**SE**	**t-stat**	**Coeff.**	**SE**	**t-stat**	**Coeff.**	**SE**	**t-stat**
Constant	-0.622*	-0.370	-1.681	0.263	-0.165	1.590	-0.053	-0.072	-0.743
$\Delta LnFDI_{(t-1)}$	0.324***	-0.089	3.637	0.055	-0.040	1.390	0.000	-0.017	-0.014
$\Delta LnGDPPC_{(t-1)}$	0.086	-0.177	0.489	1.193***	-0.079	15.134	0.024	-0.034	0.700
$\Delta GOV_{(t-1)}$	-0.313	-0.314	-0.996	0.103	-0.140	0.734	0.309***	-0.061	5.086
$\Delta LnFDI_{(t-1)}$	0.107	-0.095	1.132	-0.012	-0.042	-0.283	-0.022	-0.018	-1.226
$\Delta LnGDPPC_{(t-1)}$	0.012	-0.176	0.068	-0.221***	-0.079	-2.811	-0.021	-0.034	-0.613
$\Delta GOV_{(t-1)}$	0.212	-0.317	0.668	-0.055	-0.142	-0.391	0.664***	-0.061	10.828
R^2	0.275			0.978			0.925		
F-statistic:	9.801			1141.623			320.158		
No. of obs.:	162			162			162		

Notes: Significance: * p < 0.10, ** p < 0.05, *** p < 0.01, Standard errors are not shown.

Table A5.3 Panel VAR(2) Model Estimates for CEMAC Sample

	Model A2						
	ΔLnFDI	**ΔLn GDPPC**	**ΔGOV**	**ΔLnECON**	**ΔLnHCON**	**ΔLnLAB**	**ΔLnMSIZE**
$\Delta LnFDI_{(t-1)}$	0.2835***	0.0656*	0.0031	0.0207	0.0529	0.0017	0.0012
	(-0.0910)	(-0.0402)	(-0.0178)	(-0.0313	(-0.0401	(-0.0022)	(-0.0011)
$\Delta LnFDI_{(t-2)}$	0.0556	-0.0062	-0.0261*	0.0533*	0.0024	-0.0006	-0.0011
	(-0.0980)	(-0.0433)	(-0.0191)	(-0.0337	(-0.0431	(-0.0024)	(-0.0012)
$\Delta LnGDPPC_{(t-1)}$	0.0498	1.1005***	0.0015	0.1858***	0.0600	0.0048	0.0035*
	(-0.2060)	(-0.0909)	(-0.0402)	(-0.0708	(-0.0907	(-0.0050)	(-0.0024)
$\Delta LnGDPPC_{(t-2)}$	0.2250	-0.1752***	-0.0148	-0.0343	-0.0796	-0.0070	-0.0035
	(-0.2123)	(-0.0937)	(-0.0414)	(-0.0730	(-0.0934	(-0.0051)	(-0.0025)
$\Delta GOV_{(t-1)}$	-0.1724	0.0913	0.2918***	0.0852	-0.0827	-0.0035	0.0067**
	(-0.3291)	(-0.1453)	(-0.0642)	(-0.1131	(-0.1448	(-0.0080)	(-0.0039)
$\Delta GOV_{(t-2)}$	0.4369	-0.0454	0.6650***	0.1894*	0.0452	-0.0072	-0.0067**
	(-0.3400)	(-0.1501)	(-0.0664)	(-0.1169	(-0.1496	(-0.0082)	(-0.0040)
$\Delta LnECON_{(t-1)}$	-0.0606	0.0842	0.0711	0.5274***	0.0344	0.0075	0.0122***
	(-0.2493)	(-0.1100)	(-0.0487)	(-0.0857	(-0.1097	(-0.0060)	(-0.0029)
$\Delta LnECON_{(t-2)}$	-0.1383	-0.0713	-0.0538	0.2976***	0.0037	-0.0024	-0.0127***
	(-0.2203)	(-0.0973)	(-0.0430)	(-0.0757	(-0.0970	(-0.0053)	(-0.0026)

Model A2							
	ΔLnFDI	**ΔLn GDPPC**	**ΔGOV**	**ΔLnECON**	**ΔLnHCON**	**ΔLnLAB**	**ΔLnMSIZE**
$\Delta LnHCON_{(t-1)}$	0.1980	-0.0303	-0.0012	0.0844	0.8186***	-0.0075*	-0.0041**
	(-0.2106)	(-0.0930)	(-0.0411)	(-0.0724)	(-0.0927)	(-0.0051)	(-0.0025)
$\Delta LnHCON_{(t-2)}$	-0.1126	0.0520	-0.0099	-0.0335	0.1137	0.0070*	0.0045**
	(-0.2016)	(-0.0890)	(-0.0394)	(-0.0693)	(-0.0887)	(-0.0049)	(-0.0024)
$\Delta LnLAB_{(t-1)}$	-0.6025	0.0430	0.4977	1.0359	1.6235	0.8277***	0.1356***
	(-3.5760)	(-1.5783)	(-0.6979)	(-1.2291)	(-1.5736)	(-0.0866)	(-0.0419)
$\Delta LnLAB_{(t-2)}$	1.5978	-0.1297	-0.5147	-0.1787	-1.8620	0.1579**	-0.1401***
	(-3.6167)	(-1.5963)	(-0.7059)	(-1.2431)	(-1.5915)	(-0.0876)	(-0.0424)
$\Delta LnMSIZE_{(t-1)}$	-2.0629	2.9793	1.2560	-1.9640	1.2928	0.8737***	1.5715***
	(-6.2991)	(-2.7802)	(-1.2294)	(-2.1651)	(-2.7719)	(-0.1525)	(-0.0738)
$\Delta LnMSIZE_{(t-2)}$	1.1592	-2.9441	-1.2469	1.1395	-1.0015	-0.8645***	-0.5663***
	(-6.1442)	(-2.7118)	(-1.1992)	(-2.1118)	(-2.7037)	(-0.1487)	(-0.0720)
Constant	-0.7621	0.4660**	0.0125	-0.0885	-0.1645	0.0087	0.0012***
	(-0.5702)	(-0.2517)	(-0.1113	(-0.1960)	(-0.2509)	(-0.0138)	(-0.0067)
F-statistic	4.7195	499.4952	134.5431	1085.7540	261.6153	140505.5000	476383.9000
No. of coeff.		105					

Table A5.4 Panel VAR model estimates for CEMAC Sample

	Model A3									
	FDI	**GDPPC**	**GOV**	**ECN**	**HCON**	**LAB**	**MSIZE**	**TOP**	**AGRICVA**	**EFREE**
$FDI_{(t-1)}$	0.277***	0.0333	-0.0138	0.0417	0.0343	-0.0002	-0.0012	0.04**	0.0174	-0.006
	(-0.0820)	(-0.0334)	(-0.0210)	(-0.0305)	(-0.0360)	(-0.0022)	(-0.0013)	(-0.025)	(-0.0291)	(-0.009)
$GDPPC_{(t-1)}$	0.17***	0.9233***	-0.0367**	0.1332***	-0.0315	0.0025	0.006***	(-0.0030	-0.0484**	-0.0052
	(-0.08)	(-0.0331)	(-0.0208)	(-0.0302)	(-0.0356)	(-0.0022)	(-0.0012)	(-0.025)	(-0.0287)	(-0.008)
$GOV_{(t-1)}$	-0.07	-0.1184	0.7562***	0.2077***	-0.1654	0.0002	0.009***	0.063	-0.0939	0.0397*
	(-0.24)	(-0.0972)	(-0.0612)	(-0.0888)	(-0.1046)	(-0.0065)	(-0.0036)	(-0.073)	(-0.085)	(-0.025)
$ECON_{(t-1)}$	-0.09	-0.0051	0.0606***	0.8497***	0.0402	-0.0026	-0.008***	-0.004	0.0169	0.0012
	(-0.08)	(-0.0329)	(-0.0207)	(-0.0301)	(-0.0354)	(-0.0022)	(-0.0012)	(-0.025)	(-0.029)	(-0.008)
$HCON_{(t-1)}$	0.15***	0.0809***	-0.0215	0.0479**	0.9583	0.0056***	0.0057***	0.0040	0.0501***	-0.0013
	(-0.07)	(-0.028)	(-0.018)	(-0.026)	(-0.030)	(-0.002)	(-0.001)	(-0.021)	(-0.025)	(-0.007)
$LAB_{(t-1)}$	0.33***	0.1143	-0.1050	0.7223***	-0.0734	1.0068***	0.0213***	-0.2501*	-0.2704*	-0.0436
	(-0.5)	(-0.209)	(-0.131)	(-0.190)	(-0.224)	(-0.014)	(-0.008)	(-0.155)	(-0.181)	(-0.053)
$MSIZE_{(t-1)}$	-0.08	-0.0762	0.0444	-0.67***	0.13	-0.007	0.98***	0.289**	0.43***	0.040
	(-0.6)	(-0.228)	(-0.144)	(-0.209)	(-0.25)	(-0.015)	(-0.009)	(-0.17)	(-0.198)	(-0.058)
$TOP_{(t-1)}$	0.1689*	0.261***	0.058**	0.007	0.185***	0.006*	0.006***	0.842***	0.178***	-0.016
	(-0.133)	(-0.0540)	(-0.034)	(-0.049)	(-0.058)	(-0.004)	(-0.002)	(-0.04)	(-0.047)	(-0.014)

	Model A3									
	FDI	**GDPPC**	**GOV**	**ECN**	**HCON**	**LAB**	**MSIZE**	**TOP**	**AGRICVA**	**EFREE**
$\Delta GVA_{(t-1)}$	-0.19**	-0.09***	0.032	-0.017	-0.023	-0.004*	-0.004***	-0.049*	0.864***	0.06
	(-0.109)	(-0.04)	(-0.028)	(-0.04)	(-0.048)	(-0.003)	(-0.002)	(-0.033)	(-0.039)	(-0.011)
$\Delta EFREE_{(t-1)}$	0.7012	1.051***	0.173	0.1358	0.65***	0.004	0.006	-0.32***	0.747***	0.817***
	(-0.52)	(-0.21)	(-0.134)	(-0.195)	(-0.23)	(-0.014)	(-0.0080)	(-0.1588)	(-0.185)	(-0.054)
Constant	-4.8***	-4.826***	-0.86	-0.766	-3.34***	-0.03	-0.0522*	1.66***	-3.9795***	0.83***
	(-2.45)	(-0.999)	(-0.629)	(-0.913)	(-1.075)	(-0.067)	(-0.0374)	(-0.745)	(-0.869)	(-0.25)
No. of coef.						110				
No. of obs.						168				

Notes: Significance: *** p < 0.01, ** p < 0.05, * p < 0.1, Standard errors in parentheses.

Table A5.5 Panel VAR Model Estimates for CEMAC Sample

Model A4									
Dep. Variable:	**FDI**			**GDPPC**			**GOV**		
Variable	**Coefficient**	**SE**	**t-stat**	**Coefficient**	**SE**	**t-stat**	**Coefficient**	**SE**	**t-stat**
Constant	-0.6906	-0.3836	-1.8005	0.2881	-0.1752	1.6442	-0.0280	-0.0756	-0.3703
FDI	0.3306	-0.0938	3.5238	0.0653	-0.0429	1.5234	0.0073	-0.0185	0.3925
GDPPC	0.0833	-0.1805	0.4614	1.1798	-0.0824	14.3122	0.0129	-0.0356	0.3629
GOV	-0.3062	-0.3099	-0.9879	0.1006	-0.1416	0.7105	0.3075	-0.0611	5.0328
FDI	0.1493	-0.0986	1.5151	-0.0029	-0.0450	-0.0643	-0.0179	-0.0194	-0.9233
GDPPC	0.0833	-0.1805	0.4614	-0.2107	-0.0808	-2.6098	-0.0130	-0.0349	-0.3736
GOV	0.1686	-0.3146	0.5359	-0.0483	-0.1437	-0.3358	0.6704	-0.0620	10.8090
DUMCOG_19	-0.2214	-0.2625	-0.8434	-0.0818	-0.1199	-0.6822	-0.0439	-0.0518	-0.8483
DUMGNQ_08	-0.3499	-0.3322	-1.0531	0.0273	-0.1518	0.1798	0.0521	-0.0655	0.7951
DUMTCD_14	-1.0765	-0.4385	-2.4548	-0.0048	-0.2003	-0.0242	-0.0498	-0.0865	-0.5764
R-squared:	0.310			0.978			0.926		
F-statistic:	7.586			748.804			211.681		
No. of coeff.:	30			30			30		
Number of obs.:	162			162			162		

Table A5.7 Forecast error variance decomposition (FEVD) for FDI inflows, GDP per capita, and governance

Response variables	**ΔLnFDI**			**ΔLnGDPPC**			**ΔGOV**		
	Impulse variables								
Forecast horizon	**ΔLnFDI**	**ΔLnGDPPC**	**ΔGOV**	**ΔLnFDI**	**ΔLnGDPPC**	**ΔGOV**	**ΔLnFDI**	**ΔLnGDPPC**	**ΔGOV**
1	100.000	0.000	0.000	0.070	99.930	0.000	1.201	0.074	98.725
	0.000	0.000	0.000	1.123	1.123	0.000	1.785	0.833	1.782
2	99.833	0.008	0.159	0.669	99.307	0.024	0.877	0.220	98.902
	0.884	0.724	0.554	1.868	1.904	0.757	1.746	1.351	2.257
3	99.415	0.217	0.368	0.862	98.969	0.170	0.758	1.269	97.973
	2.022	1.738	1.054	2.097	2.028	0.878	1.811	2.418	3.138
4	99.336	0.247	0.417	0.862	98.921	0.217	0.740	1.401	97.858
	2.222	1.851	1.238	2.267	2.216	0.962	2.111	2.748	3.498
5	99.336	0.243	0.421	0.904	98.845	0.251	0.799	1.532	97.669
	2.262	1.874	1.281	2.377	2.329	1.038	2.287	3.004	3.786
6	99.327	0.251	0.422	0.915	98.820	0.266	0.827	1.590	97.583
	2.308	1.912	1.302	2.424	2.380	1.076	2.312	3.133	3.921
7	99.328	0.250	0.422	0.916	98.810	0.274	0.824	1.628	97.548
	2.312	1.903	1.314	2.443	2.403	1.104	2.316	3.218	3.994
8	99.323	0.251	0.426	0.921	98.800	0.278	0.819	1.648	97.533
	2.327	1.912	1.329	2.460	2.422	1.121	2.323	3.264	4.037
9	99.318	0.253	0.430	0.922	98.796	0.281	0.817	1.658	97.525
	2.340	1.919	1.345	2.466	2.431	1.134	2.337	3.290	4.065
10	99.316	0.253	0.431	0.922	98.795	0.283	0.817	1.663	97.520

Response variables	ΔLnFDI			ΔLnGDPPC			ΔGOV		
	Impulse variables								
Forecast horizon	ΔLnFDI	ΔLnGDPPC	ΔGOV	ΔLnFDI	ΔLnGDPPC	ΔGOV	ΔLnFDI	ΔLnGDPPC	ΔGOV
	2.346	1.920	1.357	2.470	2.436	1.142	2.348	3.304	4.083

Notes. Cholesky One S.D. (d.f. adjusted) Innovations; Cholesky ordering: ΔLNFDI ΔLNGDPPC ΔGOV; Standard errors: Monte Carlo (100 repetitions) standard deviations in parentheses.

Table A5.8 Serial Correlation Heteroskedasticity

Model	Lags: (AIC, SIC)	Serial correlation		Heteroskedasticity
		Q-stat	Adj. Q-stat	
1	(7, 1)	17.7 (0.139)	18.0 (0.135)	173.5 (0.972)
2	(7, 1)	20.1 (0.017)	20.3 (0.016)	210.6 (0.004)
3	(8, 1)	115.6 (0.011)	116.6 (0.001)	152.5 (0.517)
4	(5, 1)	68.1 (0.001)	68.5 (0.003)	128.3 (0.808)
5	(5, 1)	62.6 (0.034)	63.0 (0.002)	129.6 (0.010)
6	(7, 1)	112.7 (0.0023)	113.6 (0.030)	173.6 (0.032)
7	(8, 1)	114.6 (0.030)	115.5 (0.041)	155.0 (0.000)
8	(7, 1)	17.7 (0.032)	18.0 (0.036)	80.1 (0.000)
10	(5, 1)	51.2 (0.027)	23.2 (0.016)	41.0 (0.559)
11	(7, 1)	86.6 (0.010)	75.1 (0.020)	33.9 (0.867)
12	(7, 1)	33.4 (0.008)	31.3 (0.018)	66.0 (0.002)
13	(5, 1)	29.5 (0.031)	3.2 (0.023)	60.6 (0.011)
14	(5, 1)	28.4 (0.023)	3.37 (0.011)	26.3 (0.001)

Table A5.9 Panel VAR estimates for economic activity and development variables

	ECON	**HCON**	**LAB**	**AGRICVA**	**EFREE**	**ECON**	**HCON**	**LAB**	**AGRICVA**	**EFREE**
$ECON_{(t-1)}$	0.98***	0.006	0.000	-0.02***	0.002	0.8***	-0.007	0.001	0.011	0.023
	(0.012)	(0.013)	(0.001)	(0.01)	(0.003)	(0.09)	(0.098)	(0.005)	(0.084)	(0.023)
$ECON_{(t-2)}$						0.4***	0.10	0.010*	0.033	-0.06***
						(0.104)	(0.12)	(0.006)	(0.102)	(0.028)
$ECON_{(t-3)}$						-0.2***	-0.09	-0.01***	-0.07	0.04***
						(0.08)	(0.09)	(0.01)	(0.08)	(0.02)
$HCON_{(t-1)}$	0.07***	0.99***	0.01***	0.07***	-0.006	0.2***	0.8***	0.005	0.21***	0.008
	(0.03)	(0.03)	(0.002)	(0.02)	(0.01)	(0.08)	(0.09)	(0.005)	(0.078)	(0.021)
$HCON_{(t-2)}$						-0.05	0.09	0.008*	-0.22***	-0.03
						(0.09)	(0.12)	(0.01)	(0.09)	(0.025)
$HCON_{(t-3)}$						-0.029	0.135*	-0.01***	0.063	0.016
						(0.08)	(0.09)	(0.01)	(0.08)	(0.02)
$LAB_{(t-1)}$	0.014	0.04*	0.9***	0.09***	-0.007	2.3***	1.858	1.04***	0.22	-0.039
	(0.03)	(0.03)	(0.002)	(0.025)	(0.01)	(1.17)	(1.34)	(0.07)	(1.14)	(0.31)
$LAB_{(t-2)}$						-1.09	-0.282	0.4***	1.09	0.15
						(1.65)	(1.9)	(0.10)	(1.61)	(0.44)
$LAB_{(t-3)}$						-1.22	-1.49	-0.46***	-1.21	-0.12

	ECON	HCON	LAB	AGRICVA	EFREE	ECON	HCON	LAB	AGRICVA	EFREE
						(1.103)	(1.27)	(0.07)	(1.08)	(0.29)
AGRICVA$_{(t-1)}$	-0.056*	-0.035	-0.005**	0.9***	0.011	-0.024	0.22***	-0.002	0.9***	-0.028
	(0.035)	(0.04)	(0.003)	(0.03)	(0.009)	(0.095)	(0.12)	(0.006)	(0.09)	(0.025)
AGRICVA$_{(t-2)}$						-0.119	-0.24***	-0.004	0.025	0.04*
						(0.117)	(0.134)	(0.007)	(0.114)	(0.03)
AGRICVA$_{(t-3)}$						0.08	-0.04	0.006	-0.032	-0.003
						(0.09)	(0.103)	(0.005)	(0.09)	(0.024)
EFREE$_{(t-1)}$	0.123	0.127	-0.009	0.378***	0.9***	-0.463*	-0.076	0.026*	0.052	0.78***
	(0.15)	(0.17)	(0.01)	(0.14)	(0.04)	(0.31)	(0.35)	(0.02)	(0.3)	(0.08)
EFREE$_{(t-2)}$						0.575*	-0.110	-0.011	0.406	0.26***
						(0.375	(0.43)	(0.023)	(0.37)	(0.1)
EFREE$_{(t-3)}$						0.188	0.508*	-0.032*	-0.045	-0.128*
						(0.33)	(0.37)	(0.02)	(0.32)	(0.09)
Constant	-0.551	-0.460	0.058	-1.614***	0.4***	-1.4***	-1.33*	0.08*	-1.78***	0.4*
	(0.615)	(0.694)	(0.04)	(0.58)	(0.16)	(0.71)	(0.82)	(0.04)	(0.69)	(0.19)
R^2	0.988	0.960	1.000	0.979	0.836	0.989	0.963	1.000	0.980	0.848
Adj. R^2	0.987	0.959	1.000	0.979	0.831	0.988	0.960	1.000	0.978	0.833
F-statistic	2709.5	810.0	331388.	1584.3	170.8	852.1	256.3	146098.	489.0	54.5

	ECON	HCON	LAB	AGRICVA	EFREE	ECON	HCON	LAB	AGRICVA	EFREE
			8					4		
AIC		-11.48					-11.67			
SC		-10.94					-10.146			
No. of obs.		162					162			
No. of coeff.		30					80			

Table A5.10 Panel VAR model of Economic structure and market variables

	ΔLnTOP	**ΔLnMSIZE**	**ΔLnTOP**	**ΔLnMSIZE**
$\Delta LnTOP_{(t-1)}$	0.781***	0.003	0.804***	0.003
	(0.080)	(0.003)	(0.079)	(0.003)
$\Delta LnTOP_{(t-2)}$	0.102	0.007*	0.063	0.007**
	(0.101)	(0.004)	(0.100)	(0.004)
$\Delta LnTOP_{(t-3)}$	0.057	-0.007***	-0.006	-0.001
	(0.081)	(0.003)	(0.101)	(0.004)
$\Delta LnTOP_{(t-4)}$			0.076	-0.006***
			(0.081)	(0.003)
$\Delta LnMSIZE_{(t-1)}$	-0.290	1.438	-0.386	1.380***
	(1.838)	(0.072)	(2.004)	(0.080)
$\Delta LnMSIZE_{(t-2)}$	0.099	-0.088	-0.087	-0.036
	(3.309)	(0.130)	(3.397)	(0.135)
$\Delta LnMSIZE_{(t-3)}$	0.177	-0.350***	1.071	-0.222**
	(1.802)	(0.071)	(3.237)	(0.129)
$\Delta LnMSIZE_{(t-4)}$			-0.609	-0.122*
			(1.898)	(0.076)
Constant	0.302***	-0.007	0.308***	-0.005

	ΔLnTOP	ΔLnMSIZE	ΔLnTOP	ΔLnMSIZE
	(0.134)	(0.005)	(0.136)	(0.005)
R^2	0.918	1.000	0.921	1.000
Adj. R^2	0.915	1.000	0.917	1.000
F-statistic	288.2	1095941.0	214.6	807794.7
AIC		-8.795		-8.840
SC		-8.528		-8.488
No. of obs.		162		162
No. of coeff.		14		18

Table A5.11 VAR matrix residual cross-correlations

	ΔLnFDI	**ΔLnGDPPC**	**ΔGOV**
Δ*LnFDI*	1.000	0.069	0.072
Δ$LnFDI_{(t-1)}$	-0.034	0.006	0.047
Δ$LnFDI_{(t-2)}$	0.001	-0.016	-0.019
Δ$LnFDI_{(t-3)}$	0.142	0.068	-0.029
Δ$LnFDI_{(t-4)}$	0.048	0.020	-0.064
Δ$LnFDI_{(t-5)}$	-0.012	-0.058	-0.059
Δ$LnFDI_{(t-6)}$	-0.087	-0.089	-0.025
Δ$LnFDI_{(t-7)}$	0.125	0.029	-0.035
Δ$LnFDI_{(t-8)}$	0.131	-0.043	0.008
Δ*LnGDPPC*	0.069	1.000	0.007
Δ$LnGDPPC_{(t-1)}$	-0.007	0.212	0.017
Δ$LnGDPPC_{(t-2)}$	-0.060	0.087	-0.119
Δ$LnGDPPC_{(t-3)}$	0.028	0.243	-0.010
Δ$LnGDPPC_{(t-4)}$	0.115	0.226	0.056
Δ$LnGDPPC_{(t-5)}$	0.098	0.082	-0.053
Δ$LnGDPPC_{(t-6)}$	0.105	0.099	-0.050
Δ$LnGDPPC_{(t-7)}$	0.055	0.055	0.003
Δ$LnGDPPC_{(t-8)}$	-0.052	0.107	0.031
Δ*GOV*	0.072	0.007	1.000
Δ$GOV_{(t-1)}$	-0.040	0.035	-0.589
Δ$GOV_{(t-2)}$	0.048	-0.028	0.507
Δ$GOV_{(t-3)}$	0.019	0.025	-0.305
Δ$GOV_{(t-4)}$	0.072	-0.003	0.228
Δ$GOV_{(t-5)}$	-0.048	0.068	-0.099
Δ$GOV_{(t-6)}$	0.108	0.010	0.008
Δ$GOV_{(t-7)}$	0.074	-0.026	0.064
Δ$GOV_{(t-8)}$	0.018	0.081	-0.062

Notes: Asymptotic standard error (unadjusted) for lag > 0: 0.075810; ordered by variables

Table A5 12 Panel VAR for all 10 variables

	FDI	**GDPPC**	**GOV**	**ECON**	**HCON**	**LAB**	**MSIZE**	**TOP**	**AGRICVA**	**EFREE**
FDI*(t-1)*	0.28***	0.033	-0.014	0.042	0.035	0.000	-0.001	0.045**	0.016	-0.006
	0.08	0.033	0.021	0.03	0.035	0.002	0.001	0.025	0.029	0.008
GDPPC*(t-1)*	0.17***	0.93***	-0.04**	0.13***	-0.035	0.004*	0.007***	-0.008	-0.042*	-0.005
	0.078	0.03	0.02	0.029	0.034	0.002	0.001	0.024	0.028	0.008
GOV*(t-1)*	-0.089	-0.113	0.8***	0.21***	-0.17***	0.00	0.010***	0.051	-0.079	0.039*
	0.23	0.096	0.06	0.087	0.102	0.007	0.004	0.071	0.083	0.024
ECON*(t-1)*	-0.088	-0.008	0.1***	0.85***	0.042	-0.003	-0.01***	0.002	0.008	0.001
	0.078	0.032	0.020	0.029	0.034	0.002	0.001	0.024	0.028	0.008
HCON*(t-1)*	0.15***	0.07***	-0.02	0.04**	0.96***	0.01***	0.005***	0.001	0.054***	-0.001
	0.066	0.027	0.017	0.025	0.03	0.002	0.001	0.020	0.024	0.007
LnLAB*(t-1)*	0.311	0.109	-0.108	0.71***	-0.082	1.01***	0.023***	-0.3***	-0.249	-0.043
	0.493	0.203	0.126	0.184	0.217	0.014	0.008	0.151	0.176	0.051
MSIZE*(t-1)*	-0.071	-0.057	0.051	-0.66***	0.141	-0.005	0.983***	0.29***	0.414***	0.040
	0.536	0.220	0.137	0.200	0.236	0.015	0.008	0.164	0.192	0.055
LnTOP*(t-1)*	0.180	0.254***	0.06**	0.010	0.19***	0.005	0.005***	0.85***	0.164***	-0.016
	0.13	0.05	0.03	0.05	0.06	0.004	0.002	0.039	0.046	0.013
AGRICVA*(t-1)*	-0.19***	-0.10***	0.03	-0.014	-0.024	-0.01*	-0.01***	-0.04	0.856***	0.01

	FDI	GDPPC	GOV	ECON	HCON	LAB	MSIZE	TOP	AGRICVA	EFREE
	0.103	0.042	0.026	0.038	0.045	0.003	0.002	0.032	0.037	0.011
$EFREE_{(t-1)}$	0.712	1.032***	0.171	0.116	0.63***	0.005	0.006	-0.3***	0.74***	0.82***
	0.508	0.209	0.130	0.19	0.224	0.015	0.008	0.156	0.182	0.053
Constant	-4.9***	-4.8***	-0.86	-0.700	-3.24***	-0.045	-0.051	1.57***	-3.9***	0.81***
	2.372	0.975	0.607	0.886	1.044	0.068	0.037	0.727	0.849	0.245
R^2	0.332	0.983	0.884	0.990	0.964	1.000	1.000	0.926	0.982	0.844
Adj. R^2	0.291	0.982	0.876	0.989	0.962	1.000	1.000	0.921	0.981	0.834
F-statistic	8	955.5	124	1585	434	170144	457856	202	894	88
AIC		-22.055								
SC		-20.058								
No. of obs.		174								
No. of coeff.		110								

Notes: *** p < 0.01, ** p < 0.05, * p < 0.1; All variables are in first difference log except GOV which is only first difference.

Table A5.13 Statistics from the Correlation Matrix in Table 5.6

Panel B: Correlation among countries for FDI, GDPPC and GOV				
Test	Statistic	p-value	Statistic	p-value
LM	31.520	0.0075	55.630	0.0000
LM adj¡	7.667	0.0000	19.580	0.0000
LM CD¡	-1.955	0.0506	-2.828	0.0047
Panel C: Correlation among countries for all 10 variables				
LM	35.020	0.0024	49.14	0.0000
LM adj¡	6.390	0.0000	12.540	0.0000
LM CD¡	-2.027	0.0426	-2.312	0.0208

Notes: *, **, *** denote 10%, 5%, 1% significance levels, respectively; ¡ stands for two-sided test; Bias-adjusted LM test of error cross-section independence where ¡ stands for two-sided test.

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