PhD DISSERTATION

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EXTERNAL DEBT IN HEAVILY INDEBTED POOR COUNTRIES: DETERMINANTS, SUSTAINABILITY, CHANNELS, AND IMPACTS

PhD Dissertation

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CHAPTER ONE

INTRODUCTION

1.1. Background of the study

Economists argue that the accumulation of foreign debt is a common phenomenon of developing countries at the early stage of their economic development. Due to limited availabilities of domestic resources compared to required, most developing countries, such as Heavily Indebted Poor Countries (HIPCs[1]) borrow from abroad to finance and fill the resource gaps which are vital for growth and development (Umaru et al. 2013; Siddique et al. 2016). For the past four decades, why HIPCs have accumulated excess and unsustainable external debt, leading to qualified repeated debt cancellations and relief and its solution has been the forefront of international discussion. Commonly, the causes of foreign debt are classified into domestic (Sachs 1989; Osei 1995; Uzun et al. 2012; Berensmann 2019) and external (Cline 1985; Iyoha 2000; Easterly 2002; Berensmann 2019) factors and both are interrelated with each other.

Since the early 1970s, the external debt accumulation of developing countries in general and HIPCs in particular has increased. Sub-Saharan African (SSA) countries which constitute most HIPCs, the total external debt stock was US$ 60.02 billion in 1980, jumped to US$110.64 billion in 1988 and US$ 172.98 billion in 1990. In addition, their entire foreign debt stock amounted to US$ 218.298 billion in 1995 (International Monetary Fund (IMF) 2017). Between 1980 and 1995, the debt stock increased by US$ 158.278 billion or on an average annual rate of 10.55. Furthermore, the average debt stock from 1995 to 2005 was US$ 215.5 billion. Besides, from 2006 to 2013, the average external debt of SSA was US$ 285.6 billion and reached US$ 385.5 billion in 2013 (IMF 2017). Similarly, the external debt of Latin America and Caribbean developing countries has increased continuously since 1970. It was only US$ 22.8 billion and reached more than seven times in 1980, while the magnitude increased until

[1]Post-completion-point countries: Afghanistan, Benin, Bolivia, Burkina Faso, Burundi, Cameroon, Central African Republic, Chad, Comoros, Congo Democratic Republic, Congo Republic, Côte d'Ivoire, Ethiopia, Gambia, Ghana, Guinea, Guinea-Bissau, Guyana, Haiti, Honduras, Liberia, Madagascar, Malawi, Mali, Mauritania, Mozambique, Nicaragua, Niger, Rwanda, São Tomé & Príncipe, Senegal, Sierra Leone, Tanzania, Togo, Uganda, and Zambia (IMF 2019).

1988/89. It is when, starting from 1990 to 1999, the external debt raised and reached US$ 543.25 billion. However, it was reduced from 2000 to 2002. Except for 2005, the external debt increased for ten years between 2003 and 2014, and during 2014 it was US$ 1.3 trillion.

Beyond the issue of accumulation of external debt, its unsustainability is a headache for most HIPCs. The IMF (1997, 17) defined external debt sustainability by saying that "A country can be said to achieve external debt sustainability if it can meet its current and future external debt service obligations in full, without recourse to debt rescheduling or the accumulation of arrears and without compromising growth."

Although debt has been substantially reduced after enhanced HIPC debt relief, debt sustainability has not been achieved for an extended period of time. According to IMF estimates, for 27 countries that reached their decision points, the NPV[2] of the external debt-to-exports ratio was 274% before enhanced HIPC relief. Even though the IMF and World Bank (WB) argued that this ratio should not have exceeded 128% at the completion point in 2005, after enhanced HIPC relief, some individual countries[3] are still faced with ratios of debt to export earnings of over 150%, which exceeds the limit for debt sustainability set by the IMF and WB under the HIPC initiative. Furthermore, due to structural deficiencies (widespread unemployment, massive and frequent budgeted deficit, and fiscal cliff) in developing countries, several scholars contend that new external debt may be unsustainable in HIPCs (Yang – Nyberg 2008; Beddies et al. 2009; Ellmers – Hulova 2013; Vaggi – Prizzon 2014).

Due to the unsustainability of external debt, the HIPCs initiative was launched in the mid-1990s, aiming to reduce the debt burden of developing countries. Long-term debt sustainability was brought to the point of being a leading economic decision in the 1980s. The issue of external debt sustainability was addressed through several schemes. The Paris Club debt treatment of Toronto (1988), London (1991) and Naples (1995) were the leading schemes, and the other structures included the IMF and the WB HIPCs Initiatives (HIPC I and II), as well as the Multilateral Debt Reduction Initiatives (MDRI) (Isar 2012).

[2] The rate was estimated as 6.0 percent for 2000 and 2001. In the costing exercise for the end of 2002, this factor was adjusted from 6.0 percent to 5.45 percent for 2000 and 2001 and a 5.45 percent rate was applied to increase costs from the end of 2001 to the end of 2002. The 5.45 percent rate corresponds to the implicit long-term interest rate of currencies that comprise the Special Drawing Rights for the 36 monthly periods from end-1999 to end-2002. It was calculated as a weighted average of the average Commercial Interest Reference Rate for the period 2000–02 (IMF – IDA 2003).

[3] Ethiopia, Bolivia, Burkina Faso, Mozambique, Nicaragua, and Uganda.

Such type of external debt accumulation and unsustainability condition leads to a low level of foreign direct investment (private investment) and other macroeconomic distortions in the domestic economy, appreciation of the domestic currency, and underdevelopment of the financial sector (Ajayi 1991). Similarly, this day's researchers and policymakers also worry about and predict a continuous growth of external debt, the unsustainability and unmanageability of which will adversely affect the macroeconomic variables that are the bases for growth and development directly and indirectly and lead the HIPCs to the second round debt crisis.

1.2. Statement of the problem

As explained in the previous section, at the initial stages of a country's development, domestic resources may not be adequate to finance basic growth factors (investment, savings, human capital development (HCD), and total factor productivity (TFP)) which are necessary to ensure the fast and sustained economic growth of developing countries, especially HIPCs. Hence, it becomes essential to look for overseas borrowing to supplement growth factors and then economic growth. However, the issue of external debt as a mechanism to promote economic growth creates a relevant debate among economists (Ayadi 2008). The main concern is whether external borrowing makes economic growth faster in debtor countries directly or indirectly. There are two leading opposing schools of thought on the economic theory of external debt and growth, namely the Keynesian[4] and the Classical[5] (disincentive effect) economists. To the Keynesians, indebtedness does not bring about charges either for future generations or present generations due to the investments that it generates. According to this theory, indebtedness stimulates demand, results in a more proportionate increase in investment through the accelerator effect; this, in turn, leads to a rise in production (Diallo 2009). Their justification is that external debt is one of the sources for financing capital formation and this financing in capital formation contributes to investment; therefore, it promotes economic growth (Oleksandr 2003).

In contrast, classical economists argue a massive amount of external debt can reduce the growth of a country since the future debt will be larger than the repayment capacity of a country, which discourages capital accumulation. In this regard, the "debt overhang theory" is the most common theory which explains the effect of substantial external debt on investment

[4] Early post Keynesian, Neoclassical, and Endogenous growth models
[5] The debt overhang theory of Krugman (1988) and Sachs (1989) and the crowding out effect theories

and economic growth. The debt overhang is defined as a situation in which the creditors do not expect to be fully repaid because of the presence of a large stock of debt (Arnone et al. 2005). This theory was first introduced by Krugman (1988) and then Sachs (1989), implying that when external debt grows large, investors fear high and progressively more taxes to repay their debt and they expect lower returns from their investment, which therefore adversely affects growth. Furthermore, the new investment will be discouraged due to the uncertainties regarding what portion of the debt will be repaid with the country's resources, and this, in turn, slows capital accumulation and growth (Agénor – Montiel 1996; Serven 1997; Serieux 2001; Pattillo et al. 2002; Oleksandr 2003; Arnone et al. 2005; Ossemane 2007; Hwang et al. 2010; Sheikh et al. 2014). Similarly, the crowding out effect theory is the one that describes a large number of external obligations can affect investment (both private and public) and then growth. It mainly occurs due to high real interest rates, worse terms of trade (TOT) of borrowed countries and lack of (shut-off) foreign credit markets. Hence, investments are expected to have declined because of a shortage of available resources for financing investment.

In addition to the impact of external debt on growth through investment, there are also other channels (savings, HCD, TFP, interest rate) in which external debt is transmitted to the economy and affect economic growth. Regarding the saving channel, the above-mentioned contradicting schools of thought provided their point of view. The Classicals believe that massive accumulation of external debt adversely affects growth via savings, while the Keynesians argue the reverse. The other channel through which external debt depresses economic growth is by lowering TFP growth. The efficiency of investment and productivity can be affected by a lousy policy environment. Also, a large amount of external debt (the debt overhang) can hinder the incentive for technological advancement or use limited resources efficiently, which leads to slower productivity growth (Pattillo et al. 2002, 2004; Clements et al. 2005; Schclarek 2005; Kumar – Woo 2010; Checherita-Westphal – Rother 2012; Riffat – Munir 2015). Similarly, external debt accumulation can affect economic growth by decreasing human capital accumulation (Pattillo et al. 2004; Haaparanta – Virta 2007; Tabengwa 2014).

Besides the above-described contradicting theories, based on the type of functional model, empirical findings concerning the impact of external debt on economic growth can be broadly categorized into two groups. The first group considers a linear relationship between external debt and growth, while the second group uses a non-linear model to examine the relationship between external debt and economic growth. Even though there are many

empirical findings about the linear or non-linear impact of external debt on growth, only Clements et al. (2003), Pattillo et al. (2004), Schclarek (2005), Kumar – Woo (2010), Afonso – Jalles (2011), Checherita-Westphal – Rother (2012), Riffat – Munir (2015), and Silva (2020) examined the channels and impacts of external debt on growth using non-linear models. This implies that, to the best of the writer's knowledge, no study shows the non-linear effect of external debt on growth factors and growth in the case of HIPCs. Also, the channels through which external debt affects growth are not investigated in HIPCs, leading to a literature gap. In addition to differences in the applied models and channels explorations, the previous studies' findings are mixed and inconclusive.

Even though HIPCs need external borrowing for growth and development, once the debt grows more prominent and unmanageable, it becomes a major macroeconomic destabilizing factor and a severe bottleneck to promoting the economy. To keep countries away from the macroeconomic instability caused by excessive external debt, identifying the determinants of external indebtedness in HIPCs needs a precise empirical analysis. Similarly, external debt sustainability has become a necessary condition for sustainable economic growth in open economies. Hence, since HIPCs are suffering from external debt accumulation, examining their debt sustainability condition is crucial for their economic growth and development. Furthermore, this huge amount of external debt of HIPCs can affect both growth factors and growth directly or indirectly. Therefore, exploring the channels and impacts of external debt on growth is vital to understand and develop effective policies for HIPCs.

Therefore, based on all contradictory theories and empirical findings discussed above along with the essentiality of the study, this paper examines the determinants, sustainability, channels and impacts of external debt in HIPCs.

Even though there are some findings which are related to this topic, most of the studies suffer from either one or several of the following issues;

a. Although there are some studies about the determinants of external indebtedness, there is a lack of empirical findings in HIPCs, which leads to a literature (knowledge) gap in the area.
b. Most studies in the case of developing or SSA countries or HIPCs did not pay attention to external debt sustainability, which leads to a literature gap.

c. Non-linear relationship – most empirical findings focus on the linear impact of external debt on growth factors (channels) and economic growth. Currently, however, an essential feature of the research in this area indicates that the impact of external debt on growth factors and growth could be non-linear rather than linear. Although some (few) empirical studies considered the non-linear relationship/impact of external debt on growth factors (channels) and economic growth, there are no empirical findings in the case of HIPCs, which leads to a literature gap.
d. Channels explorations – most empirical findings did not analyze the channels through which external debt affects economic growth. Presently, however, an emerging concern among policymakers is for channels through which a country's external debt is transmitted into the economy and affects economic growth. Regarding this, there is no empirical exploration on the channels and impacts of external debt on economic growth, specifically in HIPCs, which results in a literature gap.
e. Conventional estimation techniques and the problem of the cross-sectional dependence (CD) – most empirical studies (the determinants, sustainability, channels, impacts of external debt) employed either the static models (Pooled OLS, FE, or RE) or failed to capture the cross-sectional nature of the series and second-generation panel data analysis. However, this study considered the above drawbacks of other studies along with the dynamic panel estimations techniques.
f. Most of the previous works' time scope was outdated compared to the fast and dynamic changes in global microeconomic situations. For example, the latest panel data study on the determinant of external debt is Chiminya – Nicolaidou (2018) and they used the dataset until 2012. Similarly, Llorca's (2017) is the latest study on external debt sustainability and employed the dataset until 2014. However, this study used the dataset until 2017. Likewise, concerning external debt – investment relationship, Turan – Yanıkkaya (2020) is the latest, but they employed the data set until 2014. For external debt and growth relationship, the latest studies are Zaghdoudi (2018) (used non-linear model) and Turan – Yanıkkaya (2020) (used linear model); however, their time scope was until 2016 and 2014, respectively. Moreover, the latest studies focusing on the impact of external debt on saving or human capital or TFP also employed the data set until 2014, 2015, and 2019, respectively.
g. Specific studies on HIPCs that consider all regions (SSA, Latin America, and Asia) are rare. Thus, this research can widen the scope in this area.

h. Simultaneous equations method – most studies independently estimated their models to examine the impact of external debt on growth factors or growth. However, except for chapter 6.2, this study evaluated the equations simultaneously, enhancing the accuracy of the estimated results.

Relative to previous studies, this dissertation is unique in terms of: first, the study focuses on the most concerned countries (HIPCs) in which there are no (limited) studies. Secondly, the study uses a more robust estimation technique that safeguards the regression against cross-sectional dependency, serial correlation, and endogeneity present in a panel dataset. Thirdly, this study employs an indicator, Country Policy and Institutional Assessment (CPIA) policy rating, and an intertemporal approach to the current account in examining external debt sustainability. Fourth, the study follows the non-linear feature relationship between external debt and growth factors (economic growth), recommended by many scholars. Fifth, the study also considers the channels (indirect) through which external debt affects growth rather than the direct impact. Sixth, it employs simultaneous equations estimation technique to analyze the channels and impacts of external debt. Finally, compared to other empirical studies, the time frame for the dataset used in this study is the most recent (until 2017) and fills the time gap. This study's general time scope is broad and holistic. It considers international programs and events (Millennium Development Goals, Sustainable Development Goals, global financial crisis) and regional events (HIPCs initiatives and the economic boom of SSA countries).

1.3. Objectives of the study

This study's primary objective is to investigate the main determinants of external indebtedness, its sustainability, and whether external debt affects growth mostly through an effect on investment, national saving, HCD, and TFP using panel time-series data for HIPCs.

This study attempts to address the following research questions:

I. What are the trends and components of external debt in HIPCs and how does it look like based on the region?
II. Why are the HIPCs indebted, what are the main determinants and the extent to which the determinants influence their external debt?
III. Is external debt sustainable in HIPCs after the initiatives? Do they need another initiative?

IV. What is the impact of external debt on growth factors and growth in HIPCs? What are the channels through which external debt affects economic growth, what is their impact (linear or non-linear), and how does external debt affect economic growth through its channels?

The study's general objective is to examine the determinants, sustainability, channels, and impacts of external debt in HIPCs. Besides, specifically, the study seeks to:

I. Show the magnitude and components of foreign debt in HIPCs and the regional level (East Africa, West Africa, Central & South Africa, Asia & Latin America).
II. Examine the primary determinants of external indebtedness of HIPCs and select the significant factors that require urgent actions to overcome indebtedness.
III. Investigate the debt sustainability condition of HIPCs after the initiatives.
IV. Explore the channels and impacts of external debt in HIPCs.
   - ✓ The impact of external debt on investment and economic growth
   - ✓ The impact of external debt on national saving and economic growth
   - ✓ The impact of external debt on HCD and economic growth
   - ✓ The impact of external debt on TFP and economic growth
V. Provides policy recommendations

1.4. Hypotheses of the study

This study, in addition to the above research questions and based on different studies conducted in a different part of the world, is fundamentally guided by the following testable hypotheses (H):

- ✓ On the determinant model

  H1: Both internal and external factors determine the level of external debt of HIPCs.
- ✓ On the sustainability model

  H2: External debt is sustainable for HIPCs after their initiatives.
- ✓ On channels and impacts of external debt models

  H3: External debt has a direct or indirect impact on investment and economic growth of HIPCs.

H3a: External debt has a significant and non-linear impact on both investment and growth in HIPCs.

H3b: External debt has a significant impact on the growth of HIPCs through the investment channel.

H4: External debt has a direct or indirect impact on the national saving and economic growth of HIPCs.

H4a: External debt has a significant and non-linear impact on both national saving and growth in HIPCs.

H4b: External debt has a significant impact on the growth of HIPCs through the saving channel.

H5: External debt has a direct or indirect impact on human capital development and the economic growth of HIPCs.

H5a: External debt has a significant and non-linear impact on human capital development and growth in HIPC.

H5b: External debt has a significant impact on the growth of HIPCs through the HCD channel.

H6: External debt has a direct or indirect impact on total factor productivity and economic growth of HIPCs.

H6a: External debt has a significant and non-linear impact on both total factor productivity and growth in HIPCs.

H6b: External debt has a significant effect on the growth of HIPCs through the TFP channel.

1.5. Significance of the study

Developing countries in general and HIPCs in particular experienced external borrowing for an extended period to fill their resource gaps and achieve economic growth. However, excessive external debt beyond the limit can affect (directly or indirectly) growth factors and economic growth adversely. Therefore, detailed knowledge and understanding of the determinants, sustainability, channels, and impact of external debt accumulation of HIPCs is important for government leaders and policymakers to adopt appropriate policies that minimize macroeconomic imbalances and eliminate economic distortions caused by heavy debt stock and obligation.

Also, this thesis's output will contribute more to the existing literature, time, and methodology gaps of previous studies in this area. Furthermore, this thesis provides direction and guidance for further research related to external debt and other related issues of any country both in the HIPCs and other non-HIPCs suffering from excessive debt accumulations and unsustainability.

1.6. Scope of the dissertation

Except for the sustainability model (2000 to 2017), this dissertation's time scope is from 1990 to 2017. The sustainability time frame is relevant for the study because it examines whether the debt is sustainable or not after the second HIPCs initiative, which was applied in 1999. Also, it captures the dawn of most HIPCs, such as SSA countries economic boom since 2000, the Millennium Development Goals in 2000, the global financial crisis in 2007/8, and Sustainable Development Goals since 2015. The time frame (1990 to 2017) for other models is also appropriate since it captures both before and after the decline of most HIPC economies, the two main HIPCs initiatives in 1996 and 1999, and others listed above.

Similarly, depending on the study's availability of data and objective, except for the sustainability (included 32 HIPCs) model, this study's empirical analysis is limited to 15 HIPCs. Furthermore, to represent the dynamic nature, this study used dynamic panel estimation techniques along with simultaneous equations model, recent cross-sectional dependence tests, both first and second-generations panel unit root tests, and accurate panel cointegration tests.

1.7. Organization of the study

This dissertation generally contains six basic and four sub-chapters, and their structure has the following form:

Chapter One: Introduction

The dissertation begins with the introduction chapter. It contains the study's background, statements of the problem, objectives of the study, research questions, hypotheses, significance, scope, and organization of the study.

Chapter Two: Definitions, description of the study area, the debt crisis, and conditions after the debt crisis

This chapter discusses the definitions of external debt by well-known international institutions. Besides, it addresses the study areas' description and their socio-economic and demographic conditions along with an overview of foreign debt of HIPCs. This chapter also tries to achieve the first specific objective of the study.

Chapter Three: Methodology of the study

This chapter deals with the methodology of the study and aims to briefly explain data type, sources, and data analysis, basic panel data econometrics procedures, and model specification, justifications, and estimation techniques.

Chapter Four: Determinants of external indebtedness of HIPCs

The empirical studies of this dissertation begin from this chapter. It examines the determinants of external debt accumulation in 15 HIPCs employing Panel - Corrected Standard Error (PCSE) between 1990 and 2017. This chapter aims to achieve the first and second hypotheses and specific objectives of the study, respectively.

Chapter Five: Is external debt sustainable in HIPCS after the initiatives?

This chapter investigates whether an external debt is sustainable in HIPCs after the 1990s initiatives. It employs an indicator based CPIA policy rating and an intertemporal approach to the current account between 2000 and 2017/18. It also intends to achieve the third specific objective and the second hypothesis of the study.

Chapter Six: The impact of external debt on growth factors and economic growth in HIPCs: the channels through which external debt affects growth

This chapter has four different sub-chapters, and it focuses on the impact of external debt on growth factors and growth to investigate the channels through which external debt affects the growth of HIPCs. All chapters use a sample of 15 HIPCs for the period from 1990 to 2017. It also intends to achieve the fourth specific objective and hypotheses (third to sixth) of this study.

- 6.1: The impact of external debt on investment and economic growth

This chapter deals with the impact of external debt on investment and growth in HIPCs using a non-linear model and investment channel in which external debt affects growth. It employs the Seemingly Unrelated Regression (SUR) model and second-generation dynamic

panel data analysis between 1990 and 2017 to investigate the third hypothesis (H3) and sub-hypotheses.

- 6.2: The impact of external debt on national saving and economic growth

To examine the fourth hypothesis and sub-hypotheses of the study, this chapter investigates the impact of external debt on national saving and economic growth in HIPCs. Like the previous chapter, this chapter employs a non-linear model and considers the national saving channel through which external debt affects growth for the period from 1990 to 2017. However, it uses two – Pooled Mean Group (PMG) and PCSE – estimation techniques.

- 6.3: The impact of external debt on HCD and economic growth

This chapter focuses on exploring the impact of external debt on HCD and growth in HIPCs. Except for examining the HCD channel, all the methodology, and the scopes, this chapter's model type is similar to chapter 6.1 and aims to evaluate the fifth hypothesis (H5) and sub-hypotheses.

- 6.4: The impact of external debt on TFP and economic growth

The final sub-chapter of chapter five focuses on examining the last hypothesis (H6) and sub-hypotheses of the study and it focuses on analyzing the impact of external debt on TFP and growth in HIPCs. It employs the SUR with a non-linear model for 15 HIPCs between 1990 and 2017.

Chapter Seven: Summary, Conclusions, and Recommendations

The final chapter of this dissertation summarizes the study's major findings and concludes the study by comparing the results with the stated objectives and hypothesis. Based on the empirical results, this chapter also provides policy recommendations and future studies for concerned bodies.

CHAPTER TWO

DEFINITIONS, DESCRIPTION OF THE STUDY AREA, THE DEBT CRISIS, AND CONDITIONS AFTER DEBT CRISIS

Introduction

For a long period, institutions and researchers defined external debt differently depending on different international statistical guidelines over time. This chapter focuses on reviewing the definitions of foreign debt by well-known international institutions. Besides, the problem of a large stock of external debt in the HIPCs has a long history, and such accumulation of external debt may be linked with the countries' economy. To better understand the nature of the external debt, this chapter also discusses the description of the study areas and their socio-economic and demographic conditions along with an overview of the foreign debt of HIPCs. Therefore, the chapter is organized as follows: the first section provides definitions of external debt and then describes the study area in the second section. The third section provides a brief history of the debt crisis in HIPCs, while the final section presents the descriptive statistics of an overview of external debt.

2.1. Definitions of external debt

Since the definition of external debt varies from time to time, this section chronologically (from the late 1980s) provides some of the definitions available in the theoretical literature.

The 1988 Grey book[6] provided an agreed (common) definition of what constituted external debt, intending to encourage a greater consistency of approach in its measurement. Hence, the book defined gross external debt as: "It is the amount, at any given time, of disbursed and outstanding contractual liabilities of residents of a country to non-residents to repay principal, with or without interest, or to pay interest, with or without principal." (IMF 1988).

[6] Published jointly by the Bank for International Settlements (BIS), IMF, the Organisation for Economic Co-operation and Development (OECD), and the World Bank.

However, depending on the stage of economic development, borrowing by the public sector from banks and government sources may remain the focus of external debt analysis for several countries. Nevertheless, for many countries, the growth during the 1990s of cross-border private sector capital flows, the exposure of the private sector to foreign borrowing, the widespread issuance of debt securities, and the use of financial derivatives and similar instruments necessitated a broader scope of external debt analysis. In responding to these developments, other new definitions were developed in 1993 by the United Nations (UN) and IMF – the System of National Accounts 1993 (1993 SNA) and the fifth edition of the IMF's Balance of Payment Manual (BPM5).

The UN (1993) SNA[7] could be a comprehensive, consistent, and versatile set of macroeconomics accounts supposed to fulfil the needs of state and private sector analysts, policymakers, and decision-takers. It is also the point of reference in establishing standards for related statistics, such as government finance and monetary and financial statistics. According to the 1993 SNA document, the economy net financial claim on the rest of the globe, i.e., external financial assets minus financial liabilities characterizing the economy as net debtor or creditor. Such a label is not accurate as a depiction of the net external position of the economy. Instead, it is more relevant to view only the non-equity components of the external balance sheet as debt, i.e., all recorded liabilities other than shares and other equity. This view is in general concordance with the "core" definition of IMF (1988) of external debt.

The BPM5 approach facilitates consistency and comparability among external debt and other macroeconomic statistics, such as the national accounts, the balance of payment, and the international investment position. In this framework, external debt comprises all liabilities defined in the 1990 SNA (without including equity liabilities and financial derivatives) that are due to non-residents and the gross amount of these liabilities considered as gross external debt position.

The IMF (2003) updated the previous definitions of external debt, and its definition is based on the concept that if a resident has a current liability to a non-resident that needs payments of principal along with interest in the future, this liability represents a future claim on the resources of the economy of the resident, and so is an external debt of that economy. This approach offers a broad measure of foreign debt consistent across the range of debt

[7] Published jointly by the Commission of the European Communities (Eurostat), IMF, OECD, United Nations, and World Bank.

instruments irrespective of its structure. The emphasis of the definition rests on gross liabilities— i.e., exclusive of any assets and defined as: "Gross external debt, at any given time, is the outstanding amount of those actual current, and not contingent, liabilities that require payment(s) of principal and/or interest by the debtor at some point(s) in the future and that are owed to non-residents by residents of an economy."

IMF (2014) recently updated the previous guides on external debt statistics and provided a new definition of external debt. Under this guide, external debt contains all obligations defined in the 2008 SNA (exclusive of equity liabilities and investment fund shares, financial derivatives, and employee stock options) that are billed to non-residents, and the total sum of such liabilities is presented as the total external debt position. Hence, the focus of the definition is on gross liabilities, i.e., excluding any assets and defined as: "Gross external debt, at any given time, is the outstanding amount of those actual current, and not contingent, liabilities that require payment(s) of principal and/or interest by the debtor at some point(s) in the future and that are owed to non-residents by residents of an economy."

Similarly, the WB (2009) describes total external debt as a debt owed to non-residents by a particular country, which must be paid in foreign currency, goods, or services. The compositions of external debt are long term[8] and short-term[9] credits that are owed to a non-resident of a particular economy.

This chapter, therefore, summarize all the above definitions of external debt and defines (uses) it as: external debt is money borrowed with interest by residents of a country from foreign lenders (either government of foreign countries, commercial banks, or international financial institutions) which will be paid in the future in the currency of the lender. This definition was also used by different scholars, such as Zaki (1995) and Ampah (2020), even though their definitions were not phrased with the same words.

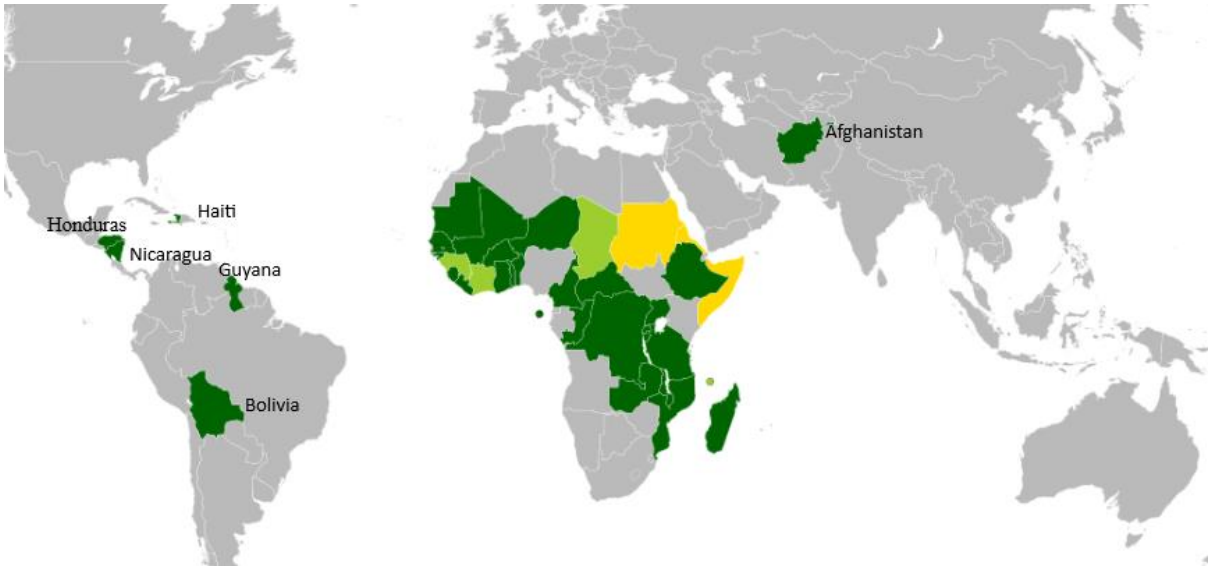
2.2. Description of the study area

According to IMF (2019), HIPCs are classified into 36 post-completion-point countries 3 pre-decision-point countries[10]. Of the 39 countries eligible or potentially eligible for HIPC Initiative assistance, 36 are receiving full debt relief from the IMF and other creditors are after

[8] Public, publicly guaranteed, private nonguaranteed and IMF credit
[9] Debt with a maturity of one year or less
[10] Eritrea, Somalia, and Sudan.

reaching their completion points. Three countries, which have been identified as potentially eligible for HIPC Initiative assistance, have not yet reached their decision points. Out of 39 HIPCs, 33 are in SSA countries, which represent 84%. HIPCs has 17,378,791 a size of square kilometers, which is 13 % of the world and more than 800 million of the population (10 % of the world) along with total labor force of over 300 million (8% of the world) (WB online data 2020).

Figure 2.1 Map of HIPCs



Note: The green color represents countries qualifying for full HIPC relief
The olive color refers to countries qualifying for partial HIPC relief.
The yellow color is for countries eligible for HIPC relief but not yet meeting the necessary conditions

2.3. Socio-economic and demographic conditions of HIPCs since the debt crisis

Even though this dissertation focuses on the post-completion-point countries of HIPCs, due to data availability from the WB, which combines both post-completion-point and pre-decision-point countries, in an exceptional case, this section provides the socio-economic and demographic conditions of all 39 HIPCs.

The annual GDP growth of HIPCs was 2.9% in the 1970s. However, it reduced to 1.8% in the 1980s, which might be an adverse effect of the debt crisis. In the 1990s, when the two significant HIPCs initiatives took place, the GDP growth of HIPCs recovered and became 2.5%. Besides, the GDP growth of the countries increased after the new millennium and

reached 5.23%. Hence, we can say that the economy of HIPCs was worse during the crisis, and good progress was recorded after the initiatives. In the early 1990s, most countries implemented structural reforms, such as privatization, financial sector reform, and trade liberalization. As a result of these efforts, the GDP of HIPCs improved.

Except in the 1990s, similar behavior was observed for GDP per capita growth of HIPCs (i.e. during the debt crisis of the 1970s and 80s, the growth of GDP per capita was 0.2 and -0.9 %, respectively). Similarly, GDP growth per capita was negative during the initiatives, but it was better than in the previous decade. Even though there were initiatives in the 1990s, the growth of GDP per capita was negative; it might be the highest population growth (around 3%).

The other critical macroeconomic variable affected by the debt crisis is inflation, and it continuously increased during the crisis and initiatives periods. In the 1990s, most HIPCs implemented comprehensive macroeconomic adjustment policies; however, inflation did not reduce. This might be explained by the adopted policies in which countries that have reached the completion point have benefited from resources that were used to finance social projects. For this reason, growth in money supply in some countries, such as Ethiopia and Uganda and the rise in oil price in Tanzania caused inflation through investment and salaries. However, inflation was reduced in HIPCs in the 2000s and 2010s.

Trade openness in HIPCs was the lowest in the 1980s, which is observed by the lowest values of both exports (19%) and imports of goods and services (26%). However, countries have become more open since the initiatives period. This might be due to the trade liberalization policies adopted by HIPCs. For example, in the 1990s, exports and imports were 21% and 29.6%, respectively. This trend also continued in the 2000s and 2010s; however, exports decreased in the 2010s compared to the previous decade. Nevertheless, from exports and imports performance, we can derive and observe that HIPCs had worse and increasing trade balance from 1970 and even worse recorded during initiatives and in the 2010s.

The Gross capital formation of HIPCs was 10.7% in the 1980s and significantly jumped to 17.2% in the initiatives period. Furthermore, it was around 20 and 26% in the 2000s and 2010s, respectively. A similar trend was also observed in the growth of gross capital formation from the 1990s; however, it reduced in the 2010s compared to 2000s performance. Likewise, in the 1980s, the gross domestic savings of HIPCs was 4.6%, but it jumped more than double

in the 1990s. The countries' domestic saving also increases after the initiatives even though it is not too significant, especially in the 2000s.

The main social factor of HIPCs is schooling, which is proxied as compulsory education, duration (years). The data for this is available from the 1990s (7 years), and it increased to 8.1 and 8.5 years in the 2000s and 2010s, respectively. This might be the contributions of the two major plans – Millenium Development Plan (MDP), which had a goal in achieving universal primary education and the 4th goal of Sustainable Development Goals (SDG) to "ensure inclusive and equitable quality education and promote lifelong learning opportunities for all".

The population growth of HIPCs was increasing from the 1970s and reached the highest in the 1990s (3%). However, it became the lowest in the 2000s (2.1%), even though it again increased to 2.8% in the 2010s. The three main components of population growth rate are birth rate, death rate, and net migration. From the 1970s, both birth and death rates of HIPCs reduced. Likewise, the life expectancy of HIPCs improved from time to time and reached 61 years in the 2010s.

Table 2.1 Socio-economic and demographic conditions of HIPCs

Variables	**During the debt crisis**		**During HIPCs initiatives**	**After initiatives**	
	1970-80	1981-90	1991-2000	2001-10	2011-17
GDP growth (annual %)	2.89	1.75	2.47	5.23	5.23
GDP per capita growth (annual %)	0.21	-0.93	-0.42	2.32	2.33
Inflation, GDP deflator (annual %)	9.22	10.37	11.03	6.79	4.67
Inflation, consumer prices (annual %)	NA	8.04	10.87	6.14	5.09
Exports of goods and services (% of GDP)	21.16	19.22	21.24	27.22	25.61
Imports of goods and services (% of GDP)	26.50	25.91	29.66	34.85	35.53
Gross capital formation (% of GDP)	NA	10.78	17.27	19.96	25.70

Gross capital formation (annual % growth)	NA	NA	6.09	7.46	6.33
Gross domestic savings (% of GDP)	NA	4.69	10.25	11.95	16.95
Secondary education, duration (years)	6.36	6	6	6	6
Compulsory education, duration (years)	NA	NA	7	8.1	8.5
Population growth (%)	2.68	2.72	2.91	2.16	2.83
Birth rate, crude (per 1,000 people)	47.58	46.38	44.09	40.92	37.14
Death rate, crude (per 1,000 people)	19.55	16.94	15.28	11.76	8.62
Net migration[11](in millions)	-1.97	-4.09	-0.44	-3.30	-2.17
Life expectancy at birth (years)	45.79	49.14	50.91	55.68	61.24

Note: NA refers to the data that is not available and all values in the table are averages.

Source: Author's own computation from the WB online database

2.4. Causes of HIPCs debt crisis: A brief history

The large stock of external debt in the HIPCs has a long history. Different factors aggravated the debt crisis in HIPCs, and this section presents them in chronological order in the 1970s. In the early 1970s, countries' positive growth and optimistic assumptions were the leading causes for the debt crisis in HIPCs. Governments of HIPCs played the main role in the build-up of external debt. Following a decade of good growth in the 1960s (and after gaining independence), several African and sub-Saharan governments started externally financed public projects in the 1970s, intending to build up their economies. Much of foreign borrowing went towards improving domestic industry and infrastructure (Greene 1989) and the expansion of current expenditure (Krumm 1985). They assumed that national economies would grow over time and that commensurate increases in export production and continuing favorable export

[11] The data for net migration is available every 5 years from 1972. Except for 1992, it was negative for all years.

performance would allow the debt service obligations arising from these projects to be met (Mustapha 2014). Similarly, during the early 1970s, there was a rise in the price of commodities and the growth of imports of capital and intermediate goods to develop infrastructure, which was complemented by foreign borrowing. At this particular moment, most countries were hit by the first oil price shock (1972-1973). This shock was tackled, partly by resorting to external financing (which eventually turned into debt) requirements of African countries as a policy response to the external shocks they were facing (Balassa 1983; Sellewe 1993; Alemayehu 2003). Both the African governments and creditors believed that these shocks were temporary and expected an increment in commodity prices and a low real-world interest rate. However, their expectation turned out to be the opposite, which led to an enormous burden on Africa rather than the creditors (Alemayehu 2003).

Besides, these optimistic expectations were shaped by the prevailing macroeconomic conditions of the 1970s. After the first oil shock, the current account surpluses in oil-exporting countries resulted in a large excess of liquidity in financial markets, which led to the evolution of the international banking system (Dommen 1989). In particular, the Euromarkets became an essential source of financing for many governments that had never borrowed in it before (Krumm 1985). In addition to Africa, in the mid-1970s, the Latin American countries' debt crisis began due to the Organization of Petroleum Exporting Countries' (OPEC) accumulated wealth. Banks were willing to lend the collected money and many developing countries borrowed at small and floating interest rates. However, the borrower countries did not use the new dollars for productive investment; instead, they spent on direct consumption, and hence they could not repay their external obligations.

Besides borrowers, lenders' optimistic expectation was the leading cause of the debt crisis in the 1970s. The relatively high growth in the world economy, stable commodity prices and the low-interest rates in 1974–1979 encouraged positive risk assessment analysis for HIPCs debt (Dommen 1989; Prizzon 2009). Therefore, creditors perceived HIPCs as creditworthy, which simultaneously matched with developed countries' commercial interest of Export Credit Agencies (ECA). These agencies played a significant role in the debt evolution of HIPCs, especially SSA countries (Mustapha 2014). The rapid debt accumulation of HIPCs was thus the result of a process jointly determined by borrowers and lenders, a process that was shaped by an optimistic set of assumptions that became unrealistic due to a change in the favorable condition at the end of the 1970s (Mustapha 2014).

Furthermore, in the 1980s and 90s, disappointing growth, exogenous shocks and inadequate policy response also represented the main causes of indebtedness in HIPCs. The developing countries' debt crisis began to unfold in the 1980s, when the shocks of the second oil crisis (1979-1980), rising interest rates, and a fall in global prices for primary commodities began to take a toll (Mustapha 2014). During adjustment programs undertaken by several African nations, especially between 1985 and 1990, due to deteriorations in TOT, the average export commodities were declined by 40% compared to 1977-1979 even though the export volume increased by 75% (Husain 1994), which led African countries became more vulnerable to further indebtedness. Moreover, African countries external debt stock also increased due to the Paris and London clubs rescheduling of capitalization of amortization and interest payment (Van der Hoeven 1994; Alemayehu 2003). Besides the long-term trend in external debt from 1985 to the early 1990s, African economies were hugely indebted by the end of the 1990s. Moreover, in Africa, external finance was needed not only for investment in infrastructure but also imported intermediate inputs were dependent on external funding to ensure the smooth functioning of their economy (Ndulu 1986; Ngwenya – Bugembe 1987; Fantu 1992; Rattso 1992; Mbelle – Sterner 1991; Alemayehu 2002b, 2003).

The second shock of oil price and the recession in OECD countries had a devastating effect upon the price of non-oil commodities and HIPCs terms of trade, especially for countries characterized by a limited diversification of their export base. Indeed, total debt levels rose steadily from 1978 in SSA countries, including the majority of HIPCs, while their export earnings were limited. With diminished export earnings and rising import prices, these countries found it increasingly difficult to meet their debt service burdens (Mustapha 2014). For example, in August 1982, Mexico proclaimed it to the international financial community that it did not have sufficient external liquidity to fulfil its external debt and demanded a 90-day rollover of the principal's payments to prepare toward a definite restructuring financial package. Just a few weeks later, the problem spread throughout Latin America. Furthermore, due to the second oil price shock, the revenue of oil exporters increased, which was more than their demand. Hence, like the first oil price shock, they deposited these “petrodollars” in the Eurodollar markets, and consequently, other developing countries, including HIPCs, borrowed large sums of money (Menbere 2004; Ali – Mustafa 2012). For more details concerning the evolution of the debt build-up in developing countries in the 1980s, see Menbere (2004, p. 84).

Restrictive monetary policies of industrialized countries were also the causes of the 1980s debt crisis. In the 1980s, the tight monetary policy led to an increasing international real interest

rate, as well as exchange rate appreciation of their currencies (Krumm 1985). For example, in Africa, due to the USA's negligent fiscal and tight monetary policy, by 1981, the real foreign interest rate was 17.4% compared to -17.9% in 1973 (Khan – Knight 1983). The tight monetary policy aggravated the interest rate cost of non-concessional and private debts that became increasingly important during this period (Alemayehu 2003). This development encouraged many African governments to continue borrowing (and get credit) on the assumption of a cyclical turnaround in commodity prices. These new loans were used to finance enlarged oil bills and avoid sharp politically/socially disruptive cutbacks in public expenditure (Mistry 1988; Alemayehu 2003). Furthermore, this interest rate shock exacerbated some key high-debt countries' situation, especially those that made significant use of commercial borrowing at a variable interest rate (Prizzon 2009). The US dollar's appreciation further contributed to the debt burden's worsening as loans were denominated in that currency. Moreover, when the commodity prices fell sharply and the TOT declined, several HIPC governments did not cut back their expenditure programs and borrowed more instead. Many countries continued living beyond their means, with high trade and budget deficits before and during the crisis. This delay in macroeconomic adjustment was, in turn, facilitated by the policy responses of authorities such as the IMF (Mustapha 2014). However, these responses were mostly inadequate, and to a large extent, worsened the crisis (Brooks et al. 1998). While private creditors typically reduced their exposure and cut their losses when a commodity price shock adversely affected a country’s debt-servicing capacity, the IMF and the rest of the international community provided support in the form of new finance and rescheduling. However, a large part of this support in the 1980s was in non-concessional loans, particularly from the IMF, IBRD, and multilateral development banks. This contributed to excessive borrowing, which was inconsistent with the country’s debt-servicing capacity. Moreover, several HIPCs were unable to service their rescheduled obligations, and the regular rescheduling of debt service payments also helped to increase the outstanding debt stocks (Brooks et al. 1998; Daseking – Powell 1999; Mustapha 2014).

In addition, poor debt management along with poor project selection were the other factors for HIPCs debt crisis. Before and during the crisis, the new borrowing generally did not translate into productive investments that would generate returns to service this debt (Krumm 1985; Varma 2006). Even in the productive sectors, many projects also proved to be economically unviable, such as luxury hotels, oil and sugar refineries, and steel mills. Therefore, the loan funds which were designed to increase productivity and generate exports

failed to produce the expected yields and brought very little long-term benefit in terms of capacity to earn foreign exchange (Mustapha 2014). Concerning this, a lack of systematic and comprehensive assessment on debt management and capacity was also the cause of HIPCs debt crisis. Until 2001, there was no systematic assessment made across the HIPCs. In 2001, a self-assessment of 33 HIPCs was conducted. The assessment found that countries at or close to the decision point needed significant improvements in a basic debt management capacity, including data management and debt renegotiation, and that they lacked a clear legal and institutional framework for debt management (Mustapha 2014).

Also, several HIPCs struggled with the sustained implementation of sound macroeconomic policies during the debt crisis — loans from the multilateral provided balance of payments and development financing to support adjustment programs. However, loans for adjustment programs did not fully succeed in many HIPCs and led the countries unsustainable in their debt. Furthermore, civil conflict was another major factor exacerbating the debt burden in some HIPCs (Brooks et al. 1998). In some cases, it eroded the export base by destroying the country's infrastructure. In contrast, in others, it led to a rise in the debt-financed military and non-military imports and may have given rise to what is known as 'odious debt'. This is generally understood as debt taken on by a country that serves the ruler's interests or the ruling regime (typically a non-democratic one) rather than the entire country and its people (Mustapha 2014).

Due to HIPCs poor macroeconomic policies and other factors discussed above, the external debt of HIPCs became unsustainable; hence, HIPCs initiatives were launched in 1996 and 1999. The program was designed to ensure that the poorest countries in the world were not overwhelmed by unmanageable or unsustainable debt burdens. It reduced the debt of countries meeting strict criteria.

According to Johnson (1998), the World Bank and the IMF made a preliminary determination that 20 of the 40 countries might eventually receive relief based on the initiative's specific criteria concerning income, indebtedness, and reform efforts underway. The total cost of HIPC Initiative debt relief to creditors is estimated at US$76 billion in end-2010 present value (PV) terms (International Development Association (IDA) – IMF 2011)

About two-thirds of the cost (US$54.6 billion) represents irrevocable debt relief to the 32 post-completion point countries. The estimated cost for the four interim countries amounts to US$4.4 billion. The estimated cost of HIPC Initiative debt relief to the creditors of the

remaining four pre-decision point HIPCs is estimated at US$17 billion, most of which is accounted for by two countries, Sudan and Somalia. Topping-up assistance, which has been provided so far to seven HIPCs, represents less than 3% of the total HIPC Initiative cost (IDA – IMF 2011). These costs are about equally divided between multilateral and bilateral creditors. The World Bank, IMF, the African Development Fund (AfDF) and Inter-American Development Bank (IDB) account for about 44%, while Paris Club creditors account for about 36% of the total costs.

The debt sustainability criteria under HIPCs I was the following: the ratio of NPV of a country's debt-to-exports would need to exceed 200-250%, the ratio of debt service-to-exports needed to be over the range of 20-25% (Boote – Thugge 1997) while the NPV of debt to-fiscal revenue needed to be over 280%. The minimum ratios of export-to-GDP and fiscal revenue-to-GDP would need to reach 40% and 20%, respectively (Gautam 2003). The debt sustainability criteria were also altered following the introduction of the HIPC II. The Net Present Value of debt-to-export was lowered from 200-250% to 150%, while the debt-to-revenue was reduced from 280% to 250%. In addition, the minimum ratio of export-to-GDP and fiscal revenue-to-GDP were reduced from 40% and 20% to 30% and 15%, respectively (Gautam 2003).

Following the 1990s HIPCs initiatives, a new debt relief initiative called Multilateral Debt Reduction Initiative (MDRI) was proposed by G8's in 2005. The three multilateral institutions, the World Bank, IDA of the World Bank and the AfDF, forgave 100% of debts of countries who owed them only on their reaching to the completion point. Countries with a per-capita income of $380 a year or less (whether HIPCs or not) would receive debt relief (Isar 2012)

Due to the initiatives, HIPCs increased their social spending, reduced debt services, and improved public debt management. However, it also had limitations, e.g., it was a very slow process, ignored exogenous economic shocks that unavoidably affected many debt-burdened countries, it helped more for larger economies to influence global governance and maintain smaller countries dependence on biased decisions. Therefore, the initiative was not entirely successful for HIPCs (Isar 2012).

2.5. Overview of external debt in HIPCs during the debt crisis, initiatives, and after initiatives

The previous section provided a detailed discussion about the historical origin of the HIPCs debt crisis from the 1970s. To strengthen the above historical evidence, this section presents a descriptive study about an overview of HIPCs external debt from 1970 to 2017. Due to the availability of data, the descriptive study in section 2.5.1. discusses all HIPCs, while section 2.5.2 and 2.5.3 discuss post-completion-point HIPCs.

2.5.1. External debt, international comparison, and capital inflows in HIPCs

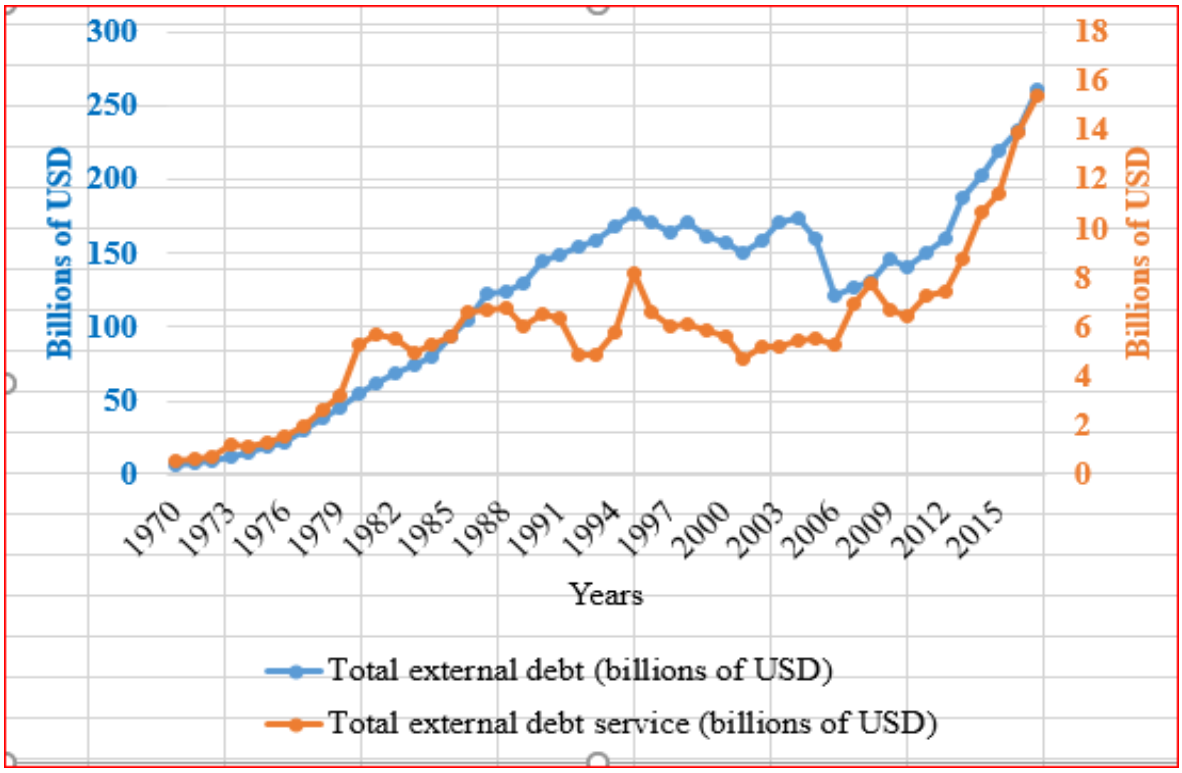
This section presents the magnitude of external debt and its service, the flow of HIPCs external debt compared to other capital inflows, and the amount of external debt of HIPCs compared to other regions in the world from 1970 to 2017.

2.5.1.1. External debt and its service in HIPCs

The external debt of HIPCs was increasing from 1970 to mid of 1995 and started to decline afterwards until the beginning of the 2000s. Except for a few years, the external debt of HIPCs was increasing from the early 2000s and reached around 261 billion in 2017. Unlike the external debt stock of HIPCs, the external debt service shows some fluctuation in trend. It had an increasing trend in the 1970s and 80s, but it showed a little reduction in 1982 and 1983. In the 1990s, the debt service shows a frequent fluctuation, but it is still high compared to 1970 and early 1980s. From 1970 to mid-1990s, global oil price shocks and both borrowers and creditors wrong predictions about these shocks and global macroeconomic, excess Petro-dollar accumulations in the financial institutions, disappointing growth, exogenous shocks, and inadequate policy response are the reasons for the continuous rise of foreign debt in HIPCs. Nevertheless, due to insolvency, HIPCs external debt showed some reduction (stability) between 1995 and 2006. However, from 2007 up to now, it is increasing, and it might be connected to previous decades' governments having better reputation and development projects; hence, borrowing more money. Similarly, HIPCs had a continuous increment of external debt service from 1970 to the end of the 1980s. This might be related to high debt accumulation and tight monetary policy of industrialized countries, which aggravated the interest rate cost of non-concessional and private debts. However, from 1990 to the mid-2000s, the external debt service of HIPCs was relatively stable. This might be due to the two HIPCs initiatives in the 1990s and the Multilateral Debt Reduction Initiative (MDRI) in 2005.

However, except for a few years, HIPCs debt service increased from 2006 and reached 15.4 billion USD in 2017 (see Figure 2.2).

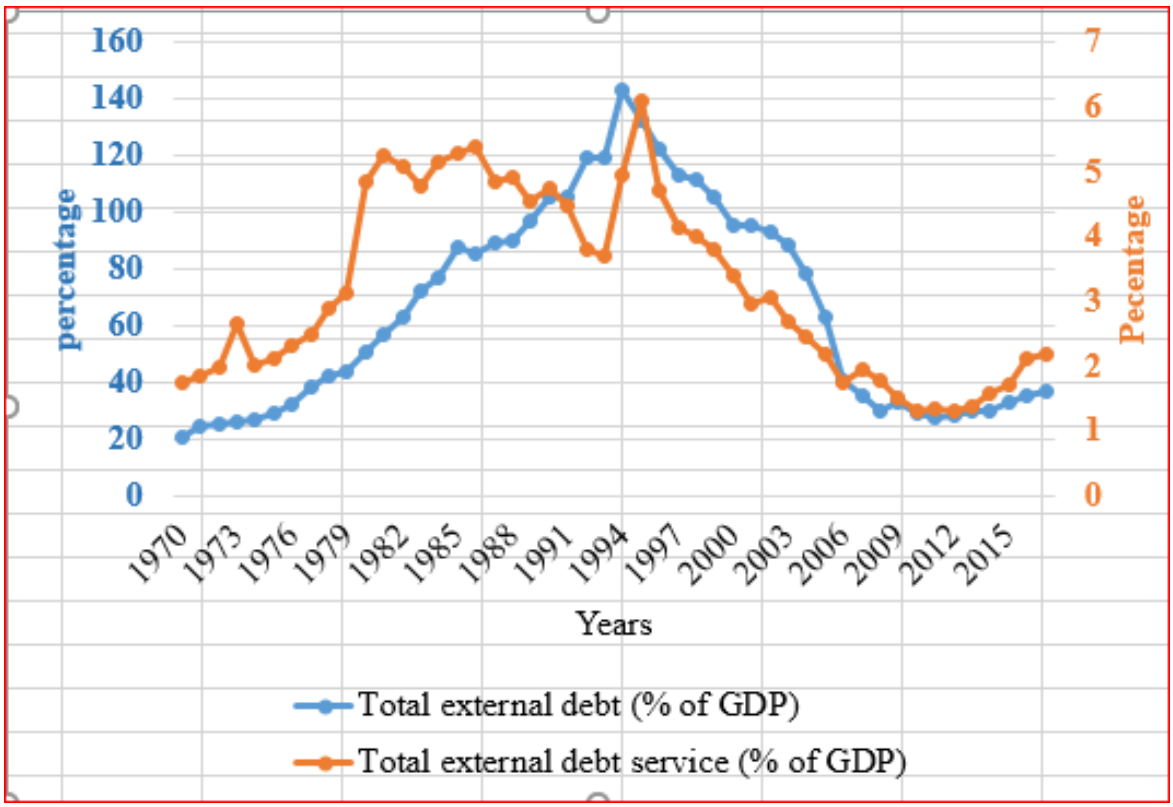
Figure 2.2 External debt and its service in HIPCs, 1970-2017 (current USD)



Source: Constructed by the author using WB data

The story is quite similar when we see the trend of external debt and its service as a percentage of GDP. The HIPCs external debt (% GDP) increased continuously from 1970 to 1998, but it started to decline afterwards until the beginning of the 2010s. However, it started rising from 2012. When we see HIPCs debt service % of GDP increasing from 1970 to early 1980s, it fluctuated afterwards and reached a maximum (6.1 % of GDP) in 1995. A continued reduction of HIPCs external debt service was observed between 1996 and 2006 and again started rising (see Figure 2.3).

Figure 2.3 External debt and its service in HIPCs, 1970-2017 (% of GDP)

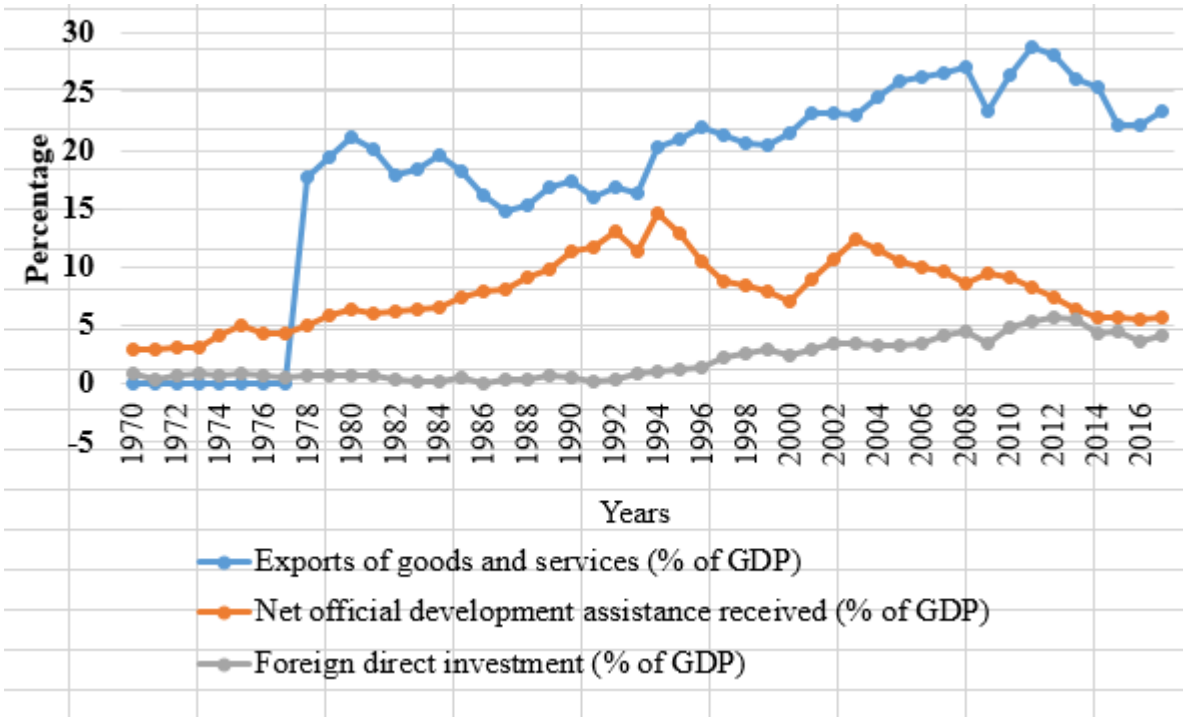


Source: Constructed by the author using WB data

2.5.1.2. HIPCs foreign capital inflows

Besides foreign borrowing, HIPCs have different capital inflows, such as income from exports, foreign aids, and foreign direct investment. Among these, the magnitude of exports as % GDP is substantial from 1978. Next to income from the export of goods and services, official development assistance is also a part of capital inflows from the 1970s. Even though foreign direct investment (FDI) does not contribute a lot compared to the others, it is one source of HIPCs foreign capital inflows. Generally, HIPCs are highly dependent on foreign capital to finance their economy (see Figure 2.4).

Figure 2.4 HIPCs exports, official development assistance, FDI, 1970-2017



Source: Constructed by the author using WB data

2.5.1.3. External debt of HIPCs compared with other regions

Even though the WB classified the regions into different categories, including developing countries, low-income countries, most HIPCs are from SSA, developing and low-income countries, and this section focuses on other areas. Therefore, compared to the other regions, the external debt stock of HIPCs is the highest and followed by Latin America & Caribbean and upper-middle-income countries. However, the story is different when we compare the debt service of HIPCs with other regions. It means that except for a few years (1991-1995), HIPCs debt service's magnitude is lower than that of Latin America & Caribbean countries. The debt service of HIPCs was higher than that of upper-middle-income countries between 1970 and 1995, but it became lower afterwards. A similar trend is observed when comparing HIPCs debt service with the Middle East & North Africa and Europe & Central Asia countries. However, except for the period from 2001 to 2005, the debt service of HIPCs was higher than in East Asia & Pacific countries (see Table 2.2).

Table 2.2 Comparison of external debt stocks and service of HIPCs with other regions

Years	HIPCs	East Asia & Pacific (excluding high income)	Europe & Central Asia (excluding high income)	Middle East & North Africa (excluding high income)	Upper middle income	Latin America & Caribbean (excluding high income)
1970-75	29.58 (2.40)	7.01 (0.72)	NA (NA)	NA (NA)	9.61 (1.39)	20.82 (3.05)
1976-80	48.05 (3.64)	13.27 (1.70)	NA (NA)	NA (NA)	15.68 (2.46)	30.75 (4.80)
1981-85	78.11 (5.61)	20.22 (2.85)	NA (NA)	NA (NA)	23.95 (3.76)	49.17 (7.06)
1986-90	98.11 (5.14)	31.67 (3.84)	8.64 (1.60)	NA (NA)	29.41 (3.92)	50.73 (5.54)
1991-95	131.52 (4.88)	36.60 (3.96)	26.35 (2.24)	36.13 (3.77)	30.47 (3.28)	35.43 (3.76)
1996-00	112.25 (4.12)	32.89 (3.89)	46.33 (4.85)	42.53 (4.50)	34.03 (5.19)	35.73 (6.69)
2001-05	86.84 (2.77)	23.02 (3.32)	45.53 (6.97)	34.02 (3.52)	30.74 (4.99)	37.62 (6.78)
2006-10	34.78 (1.72)	14.83 (1.68)	40.08 (7.06)	18.24 (2.31)	21.69 (3.27)	22.92 (3.92)
2011-17	32.35 (1.70)	17.22 (1.59)	43.34 (6.62)	18.67 (1.87)	23.64 (2.87)	30.01 (4.14)

Note: NA refers to not available data. Figures outside the brackets are average values of external debt stocks (% of GNI), and inside the brackets are average values of external debt service (% of GNI).

Source: Computed by author using WB data

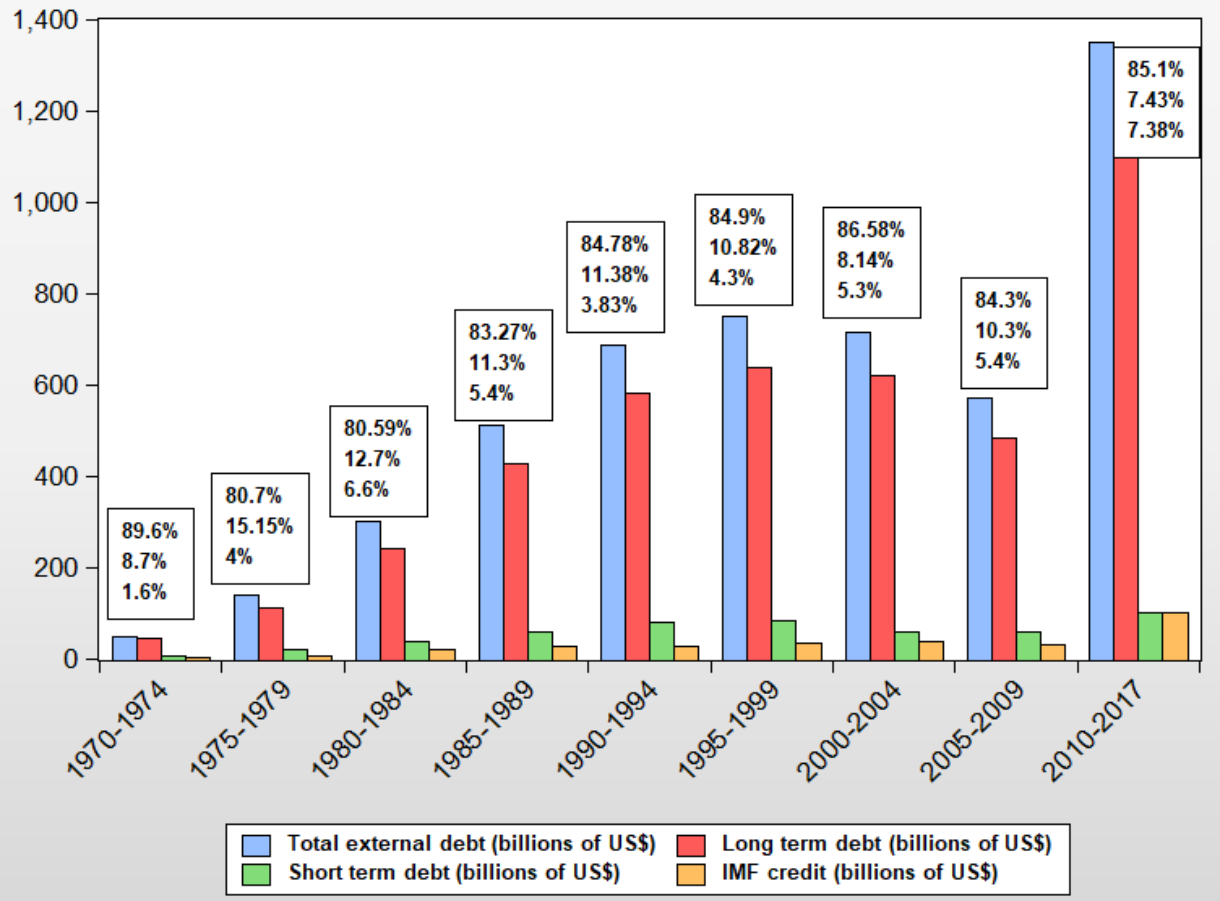
2.5.2. External debt components of HIPCs

This section presents components of the external debt of HIPCs during the period from 1970 to 2017. According to Global Development Finance (GDF) (2012, p. 317), foreign debt components can broadly be classified as long-term, short-term, and use of IMF. Furthermore, long-term debt is classified into private non-guaranteed and public & publicly guaranteed debt on the debtor's side. Besides, public & publicly guaranteed debt can be further classified into official and private creditors on the creditor's side. Official creditors are multilateral and bilateral. However, private creditors are commercial banks, bonds, and others. Hence, this section discusses the components of HIPCs external debt.

2.5.2.1. External debt classification by type and debtor

Similarly to GDF (2012), the total external debt of HIPCs is divided into long-term, short-term and IMF credit. Long-term debt can be further divided into public & publicly guaranteed and private non-guaranteed external debt. Figure 2.5 presents the three types (long-term, short-term, and IMF credit) of external debt of HIPCs.

Figure 2.5 The Types and the amount of HIPCs External Debt, 1970-2017 (current US$)



Note: the percentage values in the figure are the share of long-term, short-term, and IMF credits to the total external debt, respectively.

Source: Computed by the author using WB data

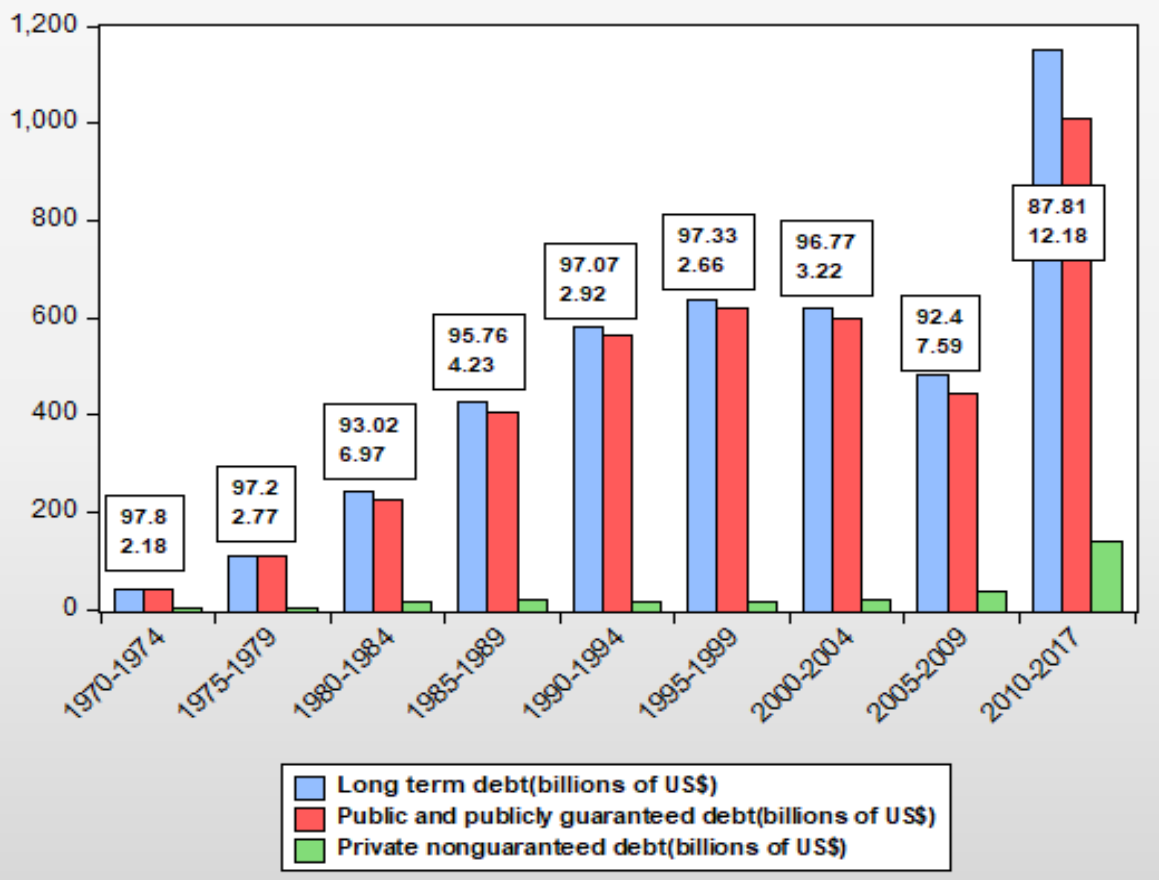
The total external debt of HIPCs increased for the past four decades. It was 47.6 billion US$ in the first half of the 1970s, and it became triple in the second half. Furthermore, it was 298.8 and 510 billion US$ in the first and second half of the1980s respectively, and the trend continued and reached 749 billion US$ at the end of the 1990s. However, in the early 2000s, the external debt reduced, and it was 714 and 570.6 billion US$ in the first and second half of

the 2000s. Recently, over the years of 2010-2017, the total external debt stock of HIPCs reached 1.3 trillion US$.

Furthermore, a major part of the total external debt of HIPCs is long-term debt. On average, the long-term debt has a share of around 84.4% of the total external debt over the studied period. However, the short-term and the IMF credits cover only 10.6 and 4.8% of the total external debt stock of HIPCs, respectively. Considering the external debt movements, all types of external debts are not stable for the last 40 years. The long-term debt fluctuates between 80-89% of the total debt and its maximum & the minimum level was during 1970-74 (89.6%) & 1980-84 (80.5%), respectively. Besides, the maximum amount of short-term debt was 15.1% between the years of 1975-79. However, its minimum share was 7.4 % over the period of 2011-17. Also, IMF credit reached a maximum during the 2010s (7.38%) and reached a minimum during the early 1970s (1.8%) (see Figure 2.5).

The long-term debt of HIPCs is further divided into public & publicly guaranteed and private non-guaranteed debt, even though the share of the latter one is too small. Figure 2.6 shows that the public & publicly guaranteed debt has a lion share (averagely 95%) of long-term debt over the last four decades. The maximum amount of public & publicly guaranteed debt occurs in the early 1970s (87.9%) of the total long-term debt. However, currently, it has reduced to 74.8%. Thirty years ago, the HIPCs privately non-guaranteed debt was too low; it was 2% of the long-term debt in the first half of the 1970s. However, it increased from time to time and reached 10.3% of the long-term debt during the 2010s.

Figure 2.6 Long-term debt, private non-guaranteed debt, and public & publicly guaranteed debt of HIPCs, from 1970-2017 (current US$)



Note: The figure's percentage values are the share of public & publicly guaranteed debt and private non-guaranteed to the long-term external debt in HIPCs, respectively.

Source: Computed by the author using WB data

2.5.2.2. Creditors classification of external debt

The sources of public & publicly guaranteed debt are official and private creditors. The official creditors include loans from multilateral[12] (international organizations) and bilateral[13] (from governments) sources. Furthermore, the loan from private creditors is commercial bank loans from private banks, publicly or privately issued bonds, and other private loans (from manufacturers, exporters, suppliers of goods, and bank credit in the form of guarantee of export credit agencies) (GDF 2012).

[12] Loans and credits from the World Bank, regional development banks, and other multilateral and intergovernmental agencies

[13] Loans from single government donor and their agencies (including central banks), loans from autonomous bodies, and direct loans from official export credit agencies

Except for a few countries, most HIPCs have public & publicly guaranteed debts. Similarly to the GDF (2012) structure of debt, the multilateral and bilateral creditors are the two types of official debt creditors of HIPCs. However, commercial banks, bonds, and others belong to private creditors. Table 2.3 and 2.4 show that the primary providers of credit to HIPCs are from official and private sources, respectively. The total official debt of HIPCs is around 28 billion US$ in the early 1970s; it became more than double at the end of the 1970s. Also, in the 1980s and 90s, it becomes 237 and 456 billion US$, respectively. Currently, it is around 27 times higher than in the early 1970s. Likewise, the private debt of HIPCs has also increased for the past 40 years. In the early 1970s, it was 11 billion US$. However, it became above triple in the second half 1970s and reached a maximum during the 1980s (73 billion US$).

Table 2.3 Official external debt and its sources in billions, 1970-2017 (current US$)

Years	Multilateral credit	Bilateral credit	Total	official debt (% of public and publicly guaranteed debt)
1970-74	5.9	22.2	28.1	67.22
1975-79	19.4	39.9	59.3	54.74
1980-84	48.7	69.6	118.3	52.79
1985-89	113.3	123.9	237.2	58.31
1990-94	188.7	172.1	360.8	64.05
1995-99	248.3	183.4	431.7	69.75
2000-04	300	156.1	456.1	76.22
2005-09	233	128.1	361.1	81.24
2010-17	483	284.1	767.1	75.97

Source: Computed by the author using WB data

Table 2.4 Private external debt and its sources in billions, 1970-2017 (current US$)

Years	Commercial credit	Bonds	Others	Total	Total private debt (% of public and publicly guaranteed debt)
1970-74	2.6	0.89	7.5	10.99	26.28
1975-79	12.8	0.68	21.8	35.3	32.58
1980-84	29.7	0.38	34.1	64.1	28.6
1985-89	35.2	0.25	37.6	73	17.9

1990-94	31.4	2.66	27.2	61.26	10.87
1995-99	15.6	8.36	14.4	38.36	6.19
2000-04	9.7	12	9.4	31.1	5.19
2005-09	12.7	15.7	6.5	34.9	7.85
2010-17	58.1	84.9	31.4	174.4	17.27

Source: Computed by the author using WB data

In the 1970s and 1980s, the official debts of HIPCs are mainly from bilateral sources. This is, maybe, due to the bilateral loan's direct contract by the other governments or their export credit agencies and private loans were insured for payment by export credit agencies. However, after the 1990s, multilateral debt consists of a significant proportion of total official debt.

In HIPCs, commercial credit, bonds, and other types of debt come from private creditors. All the loans from private creditors are small in the early 1970s. However, commercial and other types of debts increased more than triple in the second half of the 1970s. The trend continued until the end of the second half of the 1980s. At that time, the commercial credit and other types of private external debt reached 35.2 and 37.6 billion US$, respectively. However, their amount reduced over the period from the 1990s up to 2000s. To the reverse, the bond increased during these periods and reached 84.9 billion US$ in the 2010s (see Table 2.4).

The share of the official credit to the total external debt and public & publicly guaranteed debt is high relative to a private loan. Out of this large share of official sources, multilateral and bilateral accounts for a massive amount of total external debt of HIPCs. On average, multilateral creditors' external debt shares 49.2, 27, and 33.5 % of the official, total, and public & publicly guaranteed debt during the studied period. Besides, bilateral debt also has a share of 50.6 % of the official debt, 26.6 % of the total external debt, and 32.8 % public & publicly guaranteed debt (see Table 2.5).

Table 2.5 Official external debt, its sources and shares in percentage, 1970-2017 (current US$)

Years	Official debt					
	Multilateral			Bilateral		
	% share to total official debt	% share to total external debt	% share to total long-term debt	% share to total official debt	% share to total external debt	% share to total long-term debt

1970-74	20.5	12.13	13.8	79.4	47	53.6
1975-79	31.9	14	17.9	68	30.6	38.7
1980-84	41	16.1	20.9	58.9	23.2	30
1985-89	47.3	21.9	27.3	52.6	24.2	30.3
1990-94	52.2	27.5	34.3	47.7	25.1	31.3
1995-99	57.5	33.2	42.1	42.4	24.4	31
2000-04	65.5	41.8	52	34.4	21.8	27.2
2005-09	63.7	40.3	49.2	36.2	22.7	27.8
2010-17	63.4	36.3	44.5	36.5	20.8	25.5
Average	49.2	27.0	33.5	50.6	26.6	32.8

Source: Computed by the author using WB data

Similarly, on average, the commercial banks' share is 38.3, 5.03, and 6.29 % of the private, total, and public & publicly guaranteed external debt, respectively. Likewise, the loan from other sources has a share of 44.4%, 6.97%, and 8.63% of private, total, and public and publicly external debt, respectively. However, the bonds have a small share of the total, private and long-term debt (see Table 2.6).

Table 2.6 Private external debt, its sources and shares in percentage, 1970-2017 (current US$)

	Private debt								
	Commercial			Bonds			Others		
	% share to total private debt	% share to total external debt	% share to total long-term debt	% share to total private debt	% share to total external debt	% share to total long-term debt	% share to total private debt	% share to total external debt	% share to total long-term debt
1970-74	21.1	4.9	5.6	8.9	2	2.3	69.9	16.1	18.4
1975-79	36	9.2	11.7	2.1	0.55	0.69	61.7	15.7	20.1
1980-84	46.2	9.98	12.9	0.6	0.13	0.17	53.1	11.6	15.1
1985-89	48.2	7	8.8	0.35	0.05	0.06	51.4	7.47	9.34
1990-94	51.4	4.6	5.75	4.46	0.38	0.47	44.1	4	5
1995-99	38.9	2	2.6	23.8	1.13	1.43	37.2	1.9	2.4
2000-04	30.7	1.35	1.68	38.8	1.68	2.1	30.5	1.32	1.65

2005-09	36.3	2.25	2.75	45.2	2.8	3.46	18.5	1.14	1.39
2010-17	36.2	4	4.9	42.9	5.59	6.72	33.3	3.5	4.3
Average	38.3	5.03	6.29	18.5	1.59	1.93	44.4	6.97	8.63

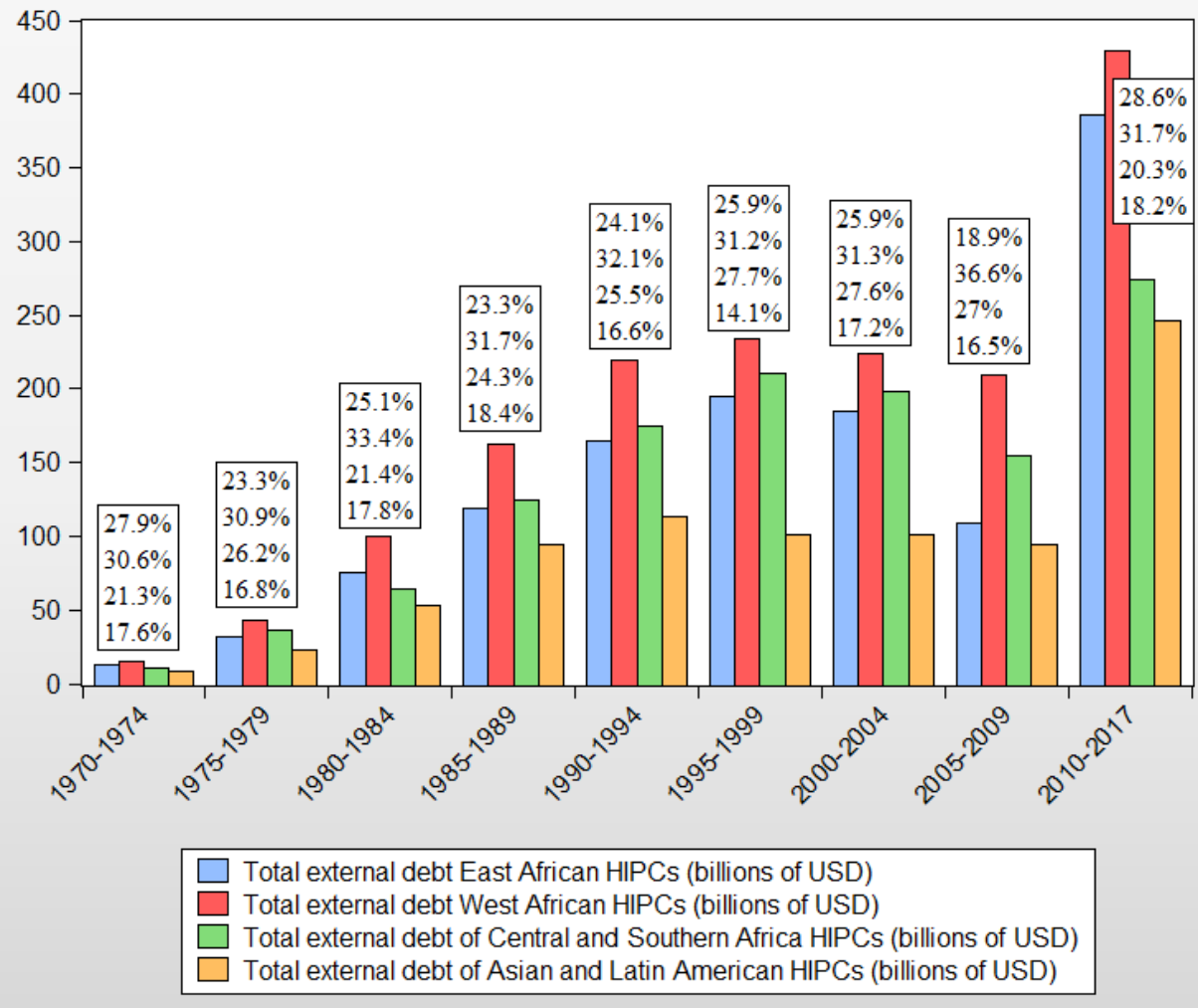
Source: Computed by the author using WB data

2.5.3. External debt by region

To show the external debt conditions of HIPCs by different geographical region, this section clustered the HIPCs into four regions (three from Africa and one from Asia & Latin America). The three African regions are East[14] (8 countries), West[15] (14 countries), and Central & Southern African[16] (8 countries). Besides, we categorized six countries in one group to represent the Asian and Latin American[17] countries. Hence, we have four regions (three from Africa and one from Asia & Latin America). East African countries share around 33.6 % of the total external debt of HIPCs, on average. Except in the 2000s, all regions' external debt had an increasing trend for the past 40 years. However, the West African external debt is substantial relative to the other areas. Following the West African countries, the East and the central & southern part of African countries share 24.8 and 24.6 % of the total external debt of HIPCs, respectively. Furthermore, Asian, and Latin American countries share only 16.6 % of the total external debt of HIPCs. Even though the share of the total external debt of Asia and Latin American countries is little, their per capita external debt is higher than the per capita debt of other regions of HIPCs (see Figure 2.7)

Figure 2.7 The External Debt of HIPCs by Region (current US$)

[14] Burundi, Comoros, Ethiopia, Madagascar, Malawi, Rwanda, Tanzania, Uganda.
[15] Benin, Burkina Faso, Cotedvoire, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Mauritania, Niger, Senegal, Sierra Leone, Togo.
[16] Cameroon, Central African Republic, Chad, Congo Dem. Rep., Congo Rep., Mozambique, São Tomé & Príncipe, Zambia.
[17] Afghanistan, Bolivia, Guyana, Haiti, Honduras, and Nicaragua.



Note: the percentage values in the figure are the share of total external debt of East, West, Central, Southern African, and Asian & Latin American HIPCs to total external debt of HIPCs, respectively.

Source: Computed by the author using WB data

For the past 40 years, the percentage share of East African external debt fluctuates in between 19 % (in 2005-09) and 28.6 % (in 2010-17). Similarly, in West Africa, the percentage share varies between 30.6 % during the early 1970s and 36.6 % in the second half of the 2000s. Furthermore, in the central and southern parts of Africa, the minimum share (20.2%) was during the 2010s, and the maximum share was in the second half of the 1990s. Unlike the years of other regions, the Asian & Latin American countries have a maximum share (18.4 %) and minimum share (13.5 %) in the late 1980s and 90s, respectively.

2.6. Chapter summary

When we compare and contrast the socio-economic and demographic performance of HIPCs during the debt crisis on one hand and during and after initiatives on the other, except for a few, most indicators performed better during and after the initiatives. This implies HIPCs initiatives contribute to a better socio-economic and demographic improvement in the 1990s and the initiatives were also used as a base for the 2000s and 2010s. Besides, the total external debt of HIPCs increased for the past four decades, and a major part of it was long-run debt. Besides, the public & publicly guaranteed debt has the lion's share of long-term debt. Compared to private creditors, official creditors were the primary providers of credit to HIPCs. The multilateral and bilateral creditors are the two types of official debt creditors of HIPCs. However, commercial banks, bonds, and others belong to private creditors. In the 1970s and 1980s, the official debts of HIPCs are mainly from bilateral sources. However, after the 1990s, multilateral debt consists of a significant proportion of total official debt. When we see the accumulation of external debt by regions, following the West African countries, the East and the central & southern part of African countries accumulated a considerable amount of external debt. Even though the share of the total external debt of Asia and Latin American countries is little, their per capita external debt is higher than that of the other regions of HIPCs.

CHAPTER THREE

METHODOLOGY OF THE STUDY

Introduction

This chapter deals with the data, the model specification, and the methodology (estimation techniques) of the study. Specifically, data type, source, and data analysis, model specification along with the expected signs of explanatory variables. Moreover, it provides estimation techniques and procedures. This chapter is organized as follows: Section 3.1 informs about data type, sources, and data analysis, while section 3.2 provides basic panel data econometrics procedures. Section 3.3 covers model specification, justifications, and estimation techniques.

3.1. Data type, source, and data analysis

This study used secondary time-series panel data collected from well-known international institutions, such as World Development Indicator (WDI), International Monetary Fund (IMF), Polity IV, United Nations Development Program (UNDP), and Penn World Table databases (for more details, see Table 3.1). It also used descriptive statistics (averages, percentages, ratios, and tabulations) and an econometrics approach to examine its objectives.

Table 3.1 Definitions, measurement, and sources

Variables	Definition	Source
ED	External debt as a percentage of GDP	WDI database
DSRN	Debt service as a % of Gross national income.	WDI database
IMP	Import of goods and services % of GDP	WDI database
EXP	Export of goods and services % of GDP	WDI database
FDI	Foreign direct investment as a % GDP	WDI database
POP	Population growth rate (%)	WDI database
GDPGR	GDP growth rate (annual %)	WDI database
INF	Inflation, GDP deflator (annual %)	WDI database

POLITY2	Political Stability is measured as the country's elections competitiveness and openness, the nature of political involvement in general, and the degree of checks on administrative authority. The estimate gives the country's score on the aggregate indicator, in units of a standard normal distribution, ranging from -10 to +10.	Polity 2 data series from the Polity IV database
GRMAC	Growth rate of major advanced countries (%)	WDI database
INV	Investment as a percentage of GDP	IMF database
ED	External debt as a percentage of GDP	WDI database
ED^2	Square of external debt as a percentage of GDP	WDI database
DSR	Debt service as a Percentage of GDP	WDI database
OPPN	Trade as a proxy variable for Oppness and measured the sum of exports and imports of goods and services measured as a percentage of GDP	WDI database
EXCH	Official exchange rate (LCU per US$, period average)	WDI database
DMCR	Domestic credit to the private sector as a percentage of GDP	WDI database
LAB	Labour force as a percentage of the total population	WDI database
SAV	Gross national savings % GDP	IMF database
DEPEN	Age dependency ratio (% of working-age population)	WDI database
HDI	Proxy of human capital, it is a summary measure of average achievement in key dimensions of human development: a long and healthy life, being knowledgeable and have a decent standard of living.	UNDP database
INSQ	Institutional quality proxied as Polity 2, which is measured as the country's elections competitiveness and openness, the nature of political involvement in general, and the degree of checks on administrative authority. The estimate gives the country's score on the aggregate indicator, in units of a standard normal distribution, ranging from -10 to +10.	Polity 2 data series from Polity IV database
NBTOT	Net barter terms of trade index (2000 = 100)	WDI database
TFP	It is the portion of output not explained by the amount of inputs used in production measures at constant purchasing	Penn World Table 9.1 database

	power parity (PPP) rates relative to the United States in terms of the prices in that period (i.e. current prices).	
UNEMP	Unemployment, total (% of the total labor force) (modeled ILO estimate)	WDI database
HC	Human capital, proxies as human development index (HDI) which is a summary measure of average achievement in key dimensions of human development: a long and healthy life, being knowledgeable and have a decent standard of living.	UNDP database
GCF	Gross capital formation (% of GDP)	WDI database

Source: Constructed by the author

3.2. Basic panel data econometrics procedures

A growing body of the panel data literature concludes that panel-data models are likely to exhibit substantial cross-sectional dependence (CD) in the errors resulting from frequent shocks, unobserved components, spatial dependence and idiosyncratic pairwise dependence. Even though the impact of CD in estimation depends on several factors, such as magnitude of the correlations across cross-sections and the nature of CD itself, relative to the static model, the effect of CD in dynamic panel estimators is more severe (De Hoyos – Sarafidis 2006). Moreover, Pesaran (2006) noted that occurrences such as recessions, economic or financial crises potentially affect all countries, even though it might start from one or two countries. These occurrences inevitably introduce some cross-sectional interdependencies across the cross-sectional unit, their regressors, and the error terms. Hence, overlooking the CD in panel data leads to biased estimates and spurious results (De Hoyos – Sarafidis 2006; Pesaran 2007). Therefore, examining the cross-sectional dependence is vital and the first step in panel data econometrics.

In literature, there are several tests for CD, such as the Breusch – Pagan (1980) LM test, Pesaran (2004) scaled LM test, Pesaran (2004) CD test, and Baltagi et al. (2012) bias-corrected scaled LM test (for more details, see Tugcu – Tiwari 2016), Besides, the Friedman's (1937) nonparametric test based on Spearman's rank correlation coefficient and Frees (1995, 2004) of the sum of the squared rank correlation coefficients also existing CD tests (for more details, see Hoyos – Sarafidis 2006). However, in addition to Pesaran (2004) CD test, he also developed Friedman (1937) and Frees (1995) CD tests (Hoyos – Sarafidis 2006).

The panel unit root and panel cointegration tests are also common steps following the CD test. However, the CD test determines the type of the panel unit root and cointegration tests that we should apply. Generally, there are two types of panel unit root test: (1) the first-generation panel unit root tests, such as Im et al. (2003), Maddala – Wu (1999), Choi (2001), Levin et al. (2002), Breitung (2000), and Hadri (2000) and (2) the second-generation panel unit root test, e.g. Bai – Ng (2004); Chang (2002, 2004); Choi (2002); Phillips – Sul (2003); Harris – Sollis (2003); Smith et al. (2004); Moon – Perron (2004); Cerrato – Sarantis (2007); Pesaran (2007); and Palm et al. (2011).

The first-generation panel unit root tests have been criticized because they assume cross-sectional independence and this assumption is appropriate (O'Connell 1998; Hurlin – Mignon 2005; Baltagi 2008; Chudik – Pesaran 2015). This hypothesis is somewhat restrictive and unrealistic because macroeconomic time series exhibit significant cross-sectional correlation among countries in a panel (Baltagi 2008), and co-movements of economies are often observed in the majority of macroeconomic applications of unit root tests (Hurlin – Mignon 2005). The presence of cross-sectional correlation of errors in panel data applications in economics is likely to be the rule rather than the exception (Chudik – Pesaran 2015). Moreover, the correlation across units in panels may have significant consequences on the first-generation of tests assuming cross-sectional independence. When applied to cross-sectional dependent panels, such panel unit root tests can generate substantial size distortions (O'Connell 1998). Using the first-generation panel unit root test in the case of CD in errors resulting in the null hypothesis of nonstationary being quickly rejected (Pesaran 2007; Eberhardt – Presbitero 2015). As a result, second-generation panel unit root tests have been proposed to take cross-sectional dependence into account.

The cointegration test is the third basic panel data econometric test but the type of the test is determined by the results of the CD. The three, widely used and easily available in EViews and Stata, Engle-Granger based cointegration tests when there is no CD are Pedroni (1999, 2004), Kao (1999), and Fisher-type (Choi 2001). The main advantage of the Pedroni residual-based test relative to the others (Kao and Fisher) is that it accounts for heterogeneity by using specific parameters, and it assumes CD (for more details, see Beyene – Kotosz 2020). However, it sometimes cannot provide results when there is a large number of explanatory variables in the model. In this case, the Kao and Fisher types of cointegrations are recommended. Unlike the Pedroni test, the Kao cointegration test has two values (t-statistics and probability) to decide the long-run relationship. The third type of panel cointegration test

is the Fisher type of combined Johansen. Nevertheless, the Kao cointegration test is relatively more comprehensive than the Fisher type.

However, the most common cointegration tests when there is CD are Westerlund (2007), Westerlund – Edgerton (2007), and McCoskey – Kao (1998). Both the Westerlund (2007) error-correction panel cointegration test and Westerlund – Edgerton (2007) test can be used both in the existence and non-existence of CD. These tests allow autocorrelation to differ from one cross-section to another cross-section. In these tests, the bootstrap method is used in the existence of cross-sectional independence, while McCoskey – Kao (1998) are used in its the non-existence. However, the Westerlund (2007) and Westerlund – Edgerton (2007) cointegration tests may not accept when the model's regressors are more than seven and six, respectively; in this case, the McCoskey – Kao (1998) test is recommended. Examining and knowing the results of these basic panel econometrics tests can help us to choose relatively appropriate estimation techniques, prevent spurious results, and develop appropriate policy recommendations; therefore, this study followed these procedures to get valid results.

3.3. Model specification, justifications, and estimation techniques

This study employed ten macroeconomic models to examine the objectives empirically. Except for four models (examined independently), all others are estimated using a simultaneous model called the SUR. However, the study used PCSE estimation technique for the external indebtedness and external debt-growth models, applied unit root and cointegration approaches for external debt sustainability model, and employed PMG estimation technique for external debt-national saving model.

3.3.1. External indebtedness model

The external debt model is used to identify the causes of indebtedness for two country groups empirically. Due to a lack of relevant data, the model used a sample of 15 HIPC[18]s and 12 HIPCs in SSA[19] for the period between 1990 and 2017. This implies the study has n*T=420 (for HIPCs) and 336 (for HIPCs in SSA) observation which is fulfilled above the minimum rule – 5*parameters < observations in econometrics. Hence, the estimated results and policy

[18] Benin, Burundi, Cameroon, Central African Republic, Mauritania, Mozambique, Niger, Rwanda, Senegal, Sierra Leone, Tanzania, Togo, Honduras, Bolivia, Nicaragua.

[19] Benin, Burundi, Cameroon, Central African Republic, Mauritania, Mozambique, Niger, Rwanda, Senegal, Sierra Leone, Tanzania, and Togo.

recommendations can represent and work for the other HIPCs and HIPCs in SSA. Furthermore, the time scope of this study is also appropriate since it captures both before and after the decline of most HIPCs economies in 2000, the two main HIPCs initiatives in 1996 and 1999, the Millennium Development Goals in 2000, the global financial crisis in 2007/8, and Sustainable Development Goals from 2015. Therefore, the findings of this study considered various global development programs and events related to the title.

Similarly to other empirical studies, this study's analytical framework includes both domestic and external causes of the foreign debt variables. Therefore, based on the theoretical framework described so far, the study uses the following model:

$$ED_{it} = \alpha + \beta X_{it} + \eta_t \quad (1)$$

where ED is external debt stock to GDP ratio at period *t*; X_{it} is a vector of explanatory variables included in the model at period *t*; η_t is the stochastic error term at period *t*.

Besides, variables in the vector X were identified based on theoretical and empirical evidence in the literature. It captures both internal and external factors that cause indebtedness directly or indirectly. Hence, *X* can be specified as:

$$X_{it} = f(DSRN, IMP, EXP, FDI, POP, GDPGR, INF, POLITY2, GRMAC) \quad (2)$$

Finally, the model we used is:

$$\begin{aligned} ED_{it} = {} & \beta_0 + \beta_1 DSRN_{it} + \beta_2 IMP_{it} + \beta_3 EXP_{it} + \beta_4 FDI_{it} + \beta_5 POP_{it} + \beta_6 GDPGR_{it} + \\ & \beta_7 INF_{it} + \beta_8 POLITY2_{it} + \beta_9 GRMAC_{it} + \eta_{it} \end{aligned} \quad (3)$$

where β_0 is an intercept term, and (+) β_1, (+) β_2, (-) β_3, (-) β_4, (+) β_5, (-) β_6, (-/+) β_7, (-) β_8 and (-/+) β_9 are the estimated long-run coefficients. The signs in the parenthesis are the expected hypothesized signs of the variables.

The GRMAC is external factors; in addition, Tiruneh (2004) used debt service as an external factor in his study. Other variables, such as imports, exports, FDI, POP, GDPGR, INF and POLITY 2 are considered as internal factors. Although this study is more focused on internal factors, it does not mean that external factors are not important. Rather, we believe that HIPCs should cure their internal problems, which leads to borrowing from abroad rather than blaming external creditors.

In the theoretical section, this study mentioned oil prices and TOT, and changes in international borrowing rates as external factors. However, this paper did not include all the

variables in the model. It is because changes in oil prices were an external factor, especially for oil-dependent economies or countries that imported a lot of oil. However, this situation was in the 1970s and early 1980s due to petrodollars accumulation in the banks. Nevertheless, currently, there is no (limited) petrodollar in international financial institutions. Hence, we believe oil price is not a significant variable today. Besides, the study included exports and imports instead of TOT to follow the theoretical framework of Equations 25 and 26 and if we add TOT, it leads to a multicollinearity problem with exports and imports. Of course, we can use TOT instead of exports and imports; however, as it has an insignificant effect on indebtedness, it is better to use exports and imports rather than TOT. Furthermore, the international borrowing rates can be external factors, but it is already included in external debt service.

Due to basic panel econometric results, such as CD, unit root and cointegration, this study adopts the two-stage modified OLS estimator, commonly known as the PCSE estimator. According to Hoechle (2007), this estimation technique is more robust in correcting the cross-sectional dependence, serial correlation, and heteroskedasticity in the datasets when the number of the cross-sectional units is smaller than the time series. In the estimation, the PCSE estimator implicitly assumes that the error terms are autocorrelated within the panel and heteroskedastic across the panel with the autocorrelation parameter assuming to be fixed across panels or vary for each panel (Ampah – Kiss 2019).

3.3.2. External debt sustainability model

Depending on the availability of data, the number of countries (32 HIPCs[21+22], 27 HIPCs in SSA[20] and five HIPCs in non-SSA[21]) included in econometrics estimation is different from the indicator and CPIA policy rating approaches. Due to the objective of the study, the time frame for the empirical model of this study is from 2000 to 2017. This implies the model has n*T=576 (for HIPCs), 486 (for HIPCs in SSA), and 90 (for HIPCs in non-SSA) observations which fulfil the minimum rule (5*parameters < observations) in econometrics. Therefore, the estimated results and policy recommendations of this study can be valid even though its time scope is after the millennium.

[20] Benin, Burkina Faso, Cameroon, Central African Republic, Chad, Comoros, Congo Democratic Republic, Congo Republic, Côte d'Ivoire, The Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Madagascar, Malawi, Mali, Mauritania, Mozambique, Niger, Rwanda, Senegal, Sierra Leone, Tanzania, Togo, Uganda, and Zambia.
[21] Bolivia, Guyana, Haiti, Honduras, and Nicaragua.

Most empirical studies on the sustainability of external debt focus on testing whether variables which are related to the external debt satisfy the solvency condition in Equation (29). To do so, there are two steps: firstly, the stationary properties of the current account, exports, imports, and external debt should be tested. External debt sustainability requires that these variables be integrated of order zero. If imports and exports are integrated of order one (non-stationary at level), it is essential to investigate in a second step whether there is a cointegration relationship between them. Cointegration between these variables is a necessary condition for external sustainability.

3.4. External debt – Growth factors – GDP growth models

Due to a lack of relevant data and for consistency, all models used a sample of 15 HIPCs[22] from 1990 to 2017 and this scope (time and sampled countries) is sufficient to represent HIPCs in general. Each chapter has n*T=420 observation which is fulfilled above the minimum rule – 5*parameters < observations in econometrics. Therefore, the estimated results and policy recommendations of all studies can represent and work for the other HIPCs. Furthermore, similarly to external indebtedness model, the time scope of all studies is also appropriate. Therefore, the findings of all studies considering various global development programs and events are related to the title.

To examine the impacts of external debt on growth factors and GDP growth in HIPCs, and the channels through which external debt affect growth, this thesis examined four different studies, and each study has two models. To make the studies consistent, except for the channel variables, all explanatory variables of growth models are the same. Besides, except for the external debt-national saving-growth model, all other models were estimated using the SUR approach developed by Zellner (1962) and later adopted by Kmenta (1971), Felmlee – Hargens (1988), Kim – Cho (2019), and Abdelaziz et al. (2019).

Unlike standard panel data approaches (pooled OLS, Least Square Dummy Variable (LSDV) or fixed effect (FE) and random effect (RE)), the SUR model is a dynamic panel approach, which is able to capture the dynamic nature of the data. However, according to Samargandi et al. (2014), random or fixed effects estimators can only deal with the structural heterogeneity but impose homogeneity in the model's slope coefficients across countries even

[22] Post-completion-point countries: Benin, Burundi, Cameron, Central Africa Republic, Mauritania, Mozambique, Niger, Rwanda, Senegal, Sierra Leone, Tanzania, Togo, Honduras, Bolivia, and Nicaragua.

when substantial variations between them. Besides, the pooled OLS estimation, FE, and RE do not consider the correlation across equations. However, the seemingly unrelated regressions - generalized least squares (SUR-GLS) estimator takes the cross-equation correlation into account (Baltagi – Pirotte 2011). Also, the SUR method estimates all equations' parameters simultaneously so that the parameters of every single equation also take the information provided by the other equations into account. This results in greater efficiency of the parameter estimates because additional information is used to describe the system (Cadavez – Henningsen, 2012). Moreover, the SUR approach is feasible for T (the number of time series) > N (the number of cross-sectional units) (Coakley et al. 2006). Therefore, since this study considers the dynamic behavior of the data, has a large number of T compared to N, and has two equations that will be estimated simultaneously, the SUR estimator is better to overcome spurious results than standard panel data approaches.

In addition, Breitung – Pesaran (2008) noted that SUR-GLS estimation technique is more robust in correcting the CD in the datasets when N < T. Moreover, the SUR method was motivated by the efficiency gained in estimation since it results in a combination of information from different equations. Furthermore, this method can test restrictions that involve parameters in different equations. Compared with OLS estimators, the two-stage general least square and Maximum Likelihood (ML) estimators, the SUR model is considered more efficient (Abdelaziz et al. 2019).

The SUR model is a system of several equations (S) with a single dependent (endogenous) variable for each equation and (D) independent or exogenous variables. Greene (2012) also noted that SUR is a linear regression model that contains several regression equations, each having its dependent variable, and potentially different sets of explanatory variables.

Therefore, based on previous studies that adopted the SUR method, the general specification of the SUR simultaneous equation systems model of this study is:

$$Y_1 = \beta_{11} + \beta_{12}S_{12} + \beta_{13}S_{13} + \beta_{14}S_{14} + \cdots + \beta_{1D}S_{1D1} + \varepsilon_1 \quad (4)$$

$$Y_2 = \beta_{21} + \beta_{22}S_{22} + \beta_{23}S_{23} + \beta_{24}S_{24} + \cdots + \beta_{2D}S_{2D2} + \varepsilon_2 \quad (5)$$

…

…

…

$$Y_S = \beta_{S1} + \beta_{S2}S_{S2} + \beta_{S3}S_{S3} + \beta_{S4}S_{S4} + \cdots + \beta_{SD}S_{SDS} + \varepsilon_S \quad (6)$$

3.4.1. External debt – Investment – GDP growth model

In this model, growth and investment are considered dependent variables. However, due to the channels through which investment can be a driver for growth and, reciprocally, a high level of economic growth has the ability to attract more investment, both investment and growth can also be used as independent variables.

The methodology used in GLS-SUR is based on a simultaneous model. Hence, the investment and growth models of the study are given in Equations (7) and (8) and estimated together.

$$INV_{it} = \alpha_0 + \alpha_1 ED_{it} + \alpha_2 ED^2{}_{it} + \alpha_3 DSR_{it} + \alpha_4 INF_{it} + \alpha_5 GDPGR_{it} + \alpha_6 POLITY2_{it} + \alpha_7 OPPN_{it} + \alpha_8 EXCH_{it} + \alpha_9 DMCR_{it} + \eta_{it} \quad (7)$$

$$GDPGR_{it} = \varphi_0 + \varphi_1 INV_{it} + \varphi_2 ED_{it} + \varphi_3 ED^2{}_{it} + \varphi_4 DSR_{it} + \varphi_5 LAB_{it} + \varphi_6 OPPN_{it} + \varphi_7 INF_{it} + \varphi_8 EXCH_{it} + \eta_{it} \quad (8)$$

In Equation 7, α_0 is an intercept term, η_{it} is stochastic error terms, and (-) α_1, (-) α_2, (-) α_3, (+) α_4, (-/+) α_5, (+) α_6, (-/+) α_7, (-/+) α_8 and (+) α_9 are the estimated long-run coefficients. However, φ_0 is an intercept term, and (+) φ_1, (-) φ_2, (-) φ_3, (-) φ_4, (+) φ_5, (+) φ_6, (-/+) φ_7, and (-/+) φ_8 are the estimated long-run coefficients in Equation (8). The signs in the parentheses are the expected hypothesized signs of the variables.

However, Equation 7 and 8 do not address unobserved heterogeneity, and therefore, we must account for the cross-section and time heterogeneity in these models. This can be done by using a two-way error component assumption for the disturbances, η_{it}, with

$$\eta_{it} = \mu_i + \lambda_t + v_{it} \quad (9)$$

where $\mu_i \; and \; \lambda_t$ (called within components) represent the unobservable individual (cross-section) and unobservable time heterogeneities, respectively. However, v_{it} (called panel or between component) is the remaining random error term.

Therefore, Equation 7 and 8 written as:

$$INV_{it} = \alpha_0 + \alpha_1 ED_{it} + \alpha_2 ED^2{}_{it} + \alpha_3 DSR_{it} + \alpha_4 INF_{it} + \alpha_5 GDPGR_{it} + \alpha_6 POLITY2_{it} + \alpha_7 OPPN_{it} + \alpha_8 EXCH_{it} + \alpha_9 DMCR_{it} + \mu_i + \lambda_t + v_{it} \quad (10)$$

$$GDPGR_{it} = \varphi_0 + \varphi_1 INV_{it} + \varphi_2 ED_{it} + \varphi_3 ED^2{}_{it} + \varphi_4 DSR_{it} + \varphi_5 LAB_{it} + \varphi_6 OPPN_{it} + \varphi_7 INF_{it} + \varphi_8 EXCH_{it} + \mu_i + \lambda_t + v_{it} \quad (11)$$

The fixed effects and random effects are the two types of models that will be estimated based on the assumptions about whether the error components are fixed or random. If the assumptions are – $\mu_i \; and \; \lambda_t$ are fixed parameters to be estimated and the random error term, v_{it}, is identically and independently distributed with zero mean and constant variance (homoscedasticity) – then Equation (9) gives a two-way fixed effects error component model or simply a fixed-effects model. However, Equation (9) gives a two-way random effects error component model or a random-effects model, if we assume $\mu_i \; and \; \lambda_t$ are random much like the random error term or $\mu_i, \lambda_t \; and \; v_{it}$ are all identically and independently distributed with zero mean and constant variance or all of them are independent of each other and explanatory variables (Vijayamohanan 2016).

Instead of both the error components, $\mu_i \; and \; \lambda_t$, if we consider either of the components only at a time (fixed or random), then we will have a one-way error component model, fixed or random effects. In this case, the stochastic error term η_{it} in (9) will become:

$$\eta_{it} = \mu_i + v_{it} \; , or \quad (12)$$

$$\eta_{it} = \lambda_t + v_{it} \quad (13)$$

3.4.2. External debt – National saving – GDP growth model

Using the framework developed by Hall (1978) as a benchmark, Oageng – Boitumelo (2017) developed a model that ensures that all the variables that affect the savings decisions are included, in which saving is a function of income and other factors (including borrowing)

that affect consumption directly and saving indirectly. Further, Aliyu – Usman (2013) examined the impact of external debt, public debt, and debt servicing on Nigeria's national savings. Hence, this study combined and adopted the model of Aliyu – Usman (2013) and Oageng – Boitumelo (2017) to examine the effect of external debt on national saving. However, our model differs from the others; it considers the non-linear impact of external debt on national savings (see Equation 14).

$$\mathrm{SAV_{it}} = \theta_0 + \theta_1 \mathrm{ED_{it}} + \theta_2 ED^2{}_{\mathrm{it}} + \theta_3 \mathrm{DSR_{it}} + \theta_4 GDPGR_{it} + \theta_5 DEPEN_{it} + \theta_6 INF_{it} + \theta_7 LAB_{it} + \theta_8 POP_{it} + \eta_{\mathrm{it}} \quad (14)$$

Where θ_0 is an intercept term, η_{it} the stochastic error term, and the parameters θ_1, θ_2, $\theta_3, \theta_4, \theta_5, \theta_6, \theta_7$, and θ_8 are the coefficients of $ED, ED^2, DSR, GDPGR, DEPEN, INF, LAB,$ *and* POP, respectively.

This study also analyzed the impact and channels through which external debt affects economic growth, and it used Equation (15) as a model. This model has two different purposes – it examines the impact of external debt on growth, and it also shows the effect of the national saving channel on growth.

$$GDPGR_{it} = \sigma_0 + \sigma_1 SAV_{it} + \sigma_2 ED_{it} + \sigma_3 ED^2{}_{it} + \sigma_4 DSR_{it} + \sigma_5 LAB_{it} + \sigma_6 OPPN_{it} + \sigma_7 INF_{it} + \sigma_8 EXCH_{it} + \eta_{it} \quad (15)$$

Where, the parameters σ_1, σ_2, σ_3, σ_4, σ_5, σ_6, σ_7, and σ_8 are the coefficients of SAV, ED, ED^2, DSR, LAB, $OPPN$, INF, *and* $EXCH$, respectively.

Unlike the previous and the following studies, this study estimated the national saving and growth models independently due to basic panel econometric results. Therefore, for the saving model, the study applied the panel Autoregressive distributed lag (ARDL) called PMG estimation approach, which combines pooling and averaging of coefficients. According to Pesaran et al. (1999), the PMG is efficient compared to others (for more details, see Beyene – Kotosz 2020). Furthermore, the PMG estimator is less sensitive to outliers when the number of observations is small. It can also correct serial autocorrelation and endogenous regressors by choosing an appropriate lag structure for both dependent and independent variables (Pesaran et al. 1999; Beyene – Kotosz 2020). Therefore, the estimated saving model using PMG is specified as follows:

$$SAV_{it} = \alpha_i + \sum_{j=1}^{p} \lambda_{ij} \mathrm{ED}_{i,t-j} + \sum_{j=0}^{q} \delta'_{1ij} ED^2_{i,t-j} + \sum_{j=0}^{q} \delta'_{2ij} \mathrm{DSR}_{i,t-j} + \sum_{j=0}^{q} \delta'_{3ij} \mathrm{GDPGR}_{i,t-j} + + \sum_{j=0}^{q} \delta'_{4ij} DEPEN_{i,t-j} + \sum_{j=0}^{q} \delta'_{5ij} \mathrm{INF}_{i,t-j} + \sum_{j=0}^{q} \delta'_{5ij} \mathrm{LAB}_{i,t-j} + \sum_{j=0}^{q} \delta'_{6ij} \mathrm{POP}_{i,t-j} + \mu_{it} \quad (16)$$

The re-parameterized form of Equation 16 can be formulated as follows:

$$\Delta \mathrm{SAV}_{it} = \alpha_i + \varphi_i \mathrm{ED}_{i,t-1} + \beta'_{1i} ED^2_{it} + \beta'_{2i} \mathrm{DSR}_{it} + \beta'_{3i} \mathrm{GDPGR}_{it} + \beta'_{4i} \mathrm{DEPEN}_{it} + \beta'_{5i} \mathrm{INF}_{it} + \beta'_{6i} \mathrm{LAB}_{it} + \beta'_{7i} \mathrm{POP}_{it} + \sum_{j=1}^{p-1} \lambda_{ij} \Delta \mathrm{SAV}_{i,t-j} + \sum_{j=0}^{q-1} \delta'_{1ij} \Delta \mathrm{ED}_{i,t-j} + \sum_{j=0}^{q-1} \delta'_{2ij} \Delta ED^2_{i,t-j} + \sum_{j=0}^{q-1} \delta'_{3ij} \Delta \mathrm{DSR}_{i,t-j} + \sum_{j=0}^{q-1} \delta'_{4ij} \Delta \mathrm{GDPGR}_{i,t-j} + \sum_{j=0}^{q-1} \delta'_{5ij} \Delta \mathrm{DEPEN} + \sum_{j=0}^{q-1} \delta'_{6ij} \Delta \mathrm{INF}_{i,t-j} + \sum_{j=0}^{q-1} \delta'_{7ij} \Delta \mathrm{LAB}_{i,t-j} + \sum_{j=0}^{q-1} \delta'_{8ij} \Delta \mathrm{POP}_{i,t-j} + \mu_{it} \quad (17)$$

However, for the growth model, this study used the PCSE regression estimation technique. Therefore, the study used Equation 15 to analyze the impact of external debt on growth and the saving channel through which external debt affects growth.

3.4.3. External debt – Human capital development – GDP growth model

Similar to external debt – investment – GDP growth model, the external debt – HCD – growth model performs a simultaneous equations model – GLS-SUR. In this model, GDP growth and HCD (proxies as HDI) considered dependent variables. However, due to the channels through which HCD can be a driver for growth and that, reciprocally, a high level of economic growth has a capacity to enhance HCD, the two variables can also be used as an independent variable. Hence, the study specified the following models:

$$HDI_{it} = \psi_0 + \psi_1 ED_{it} + \psi_2 ED^2{}_{it} + \psi_3 DSR_{it} + \psi_4 GDPGR_{it} + \psi_5 POP_{it} + \psi_6 NBTOT_{it} + \psi_7 INSQ_{it} + \eta_{it} \quad (18)$$

$$GDPGR_{it} = \Phi_0 + \Phi_1 HDI_{it} + \Phi_2 ED_{it} + \Phi_3 ED^2{}_{it} + \Phi_4 DSR_{it} + \Phi_5 LAB_{it} + \Phi_6 OPPN_{it} + \Phi_7 INF_{it} + \Phi_8 EXCH_{it} + \eta_{it} \quad (19)$$

Where, ψ_0 and Φ_0 are an intercept terms, η_{it} is the stochastic error terms, and (+) ψ_1, (-) ψ_2, (-) ψ_3, (+) ψ_4, (-) ψ_5, (+) ψ_6, and (+) ψ_7 are the estimated long-run coefficients of Equation (18). However, (+) Φ_1, (+) Φ_2, (-) Φ_3, (-) Φ_4, (+) Φ_5, (+) Φ_6, (-/+) Φ_7, and (-/+) Φ_8 are the estimated long-run coefficients of Equation (19).

3.4.4. External debt – Total factor productivity – GDP growth model

To examine the link between external debt, TFP, and GDP growth, this study employed GLS-SUR approach. In this model, the dependent variables are TFP and GDPGR. Besides, the study used both variables as independent variables due to their reciprocal relationship; hence, the study specified the following models:

$$TFP_{it} = \Upsilon_0 + \Upsilon_1 ED_{it} + \Upsilon_2 ED^2{}_{it} + \Upsilon_3 DSR_{it} + \Upsilon_4 GDPGR_{it} + \Upsilon_5 GCF_{it} + \Upsilon_6 NBTOT_{it} + \Upsilon_7 POP_{it} + \Upsilon_8 OPPN_{it} + \Upsilon_9 INF_{it} + \Upsilon_{10} UNEMP_{it} + \Upsilon_{11} HC_{it} + \Upsilon_{12} POLITY2_{it} + \eta_{it} \quad (20)$$

$$GDPGR_{it} = \Omega_0 + \Omega_1 TFP_{it} + \Omega_2 ED_{it} + \Omega_3 ED^2{}_{it} + \Omega_4 DSR_{it} + \Omega_5 LAB_{it} + \Omega_6 OPPN_{it} + \Omega_7 INF_{it} + \Omega_8 EXCH_{it} + \eta_{it} \quad (21)$$

Where, Υ_0 and Ω_0 are an intercept terms, and (+) Υ_1, (-) Υ_2, (-) Υ_3, (+) Υ_4, (+) Υ_5, (+/-) Υ_6, (-) Υ_7, (+) Υ_8, (-) Υ_9, (-) Υ_{10}, (+) Υ_{11}, and (+) Υ_{12} are the estimated long-run coefficients of Equation (20). However, (+) Ω1, (+) Ω2, (-) Ω3, (-) Ω4, (+) Ω5, (+) Ω6, (-/+) Ω7, and (-/+) Ω8 are the estimated long-run coefficients of Equation (21).

CHAPTER FOUR

DETERMINANTS OF EXTERNAL INDEBTEDNESS IN HIPCs

Introduction

Developing countries borrow from abroad to finance their resource gaps for development needs. Nevertheless, once the debt grows more prominent and unmanageable, it becomes a major macroeconomic problem. Regarding this, the countries classified as HIPCs suffer a lot because of their substantial external debt stock. It has been on researchers' and policymakers' agendas to identify the causes that lead them. However, the potential empirical studies of the determinants of external indebtedness with the latest methodology have received little attention in the case of HIPCs, and it has resulted in a lack of knowledge and methodology in the available literature. Therefore, this chapter aimed to examine the determinants of external debt accumulation in HIPCs employing the recent estimation technique known as PCSE for the period between 1990 and 2017. A sample of 15 countries for which relevant data are available was used. This chapter is organized as follows: Section 4.1 provides background information, while section 4.2 reviews the literature on the causes of external indebtedness. Section 4.3 covers empirical results and discussion, while section 4.4 summarizes the chapter.

4.1. Background of the study

Countries aim to achieve rapid and sustainable economic growth. However, the economic problem of developing countries, such as in Africa, Asia, and Latin America can be a composite of interrelated factors of both internal and external nature and these factors become a cause for the HIPCs debt crisis. Developing countries, especially at the early stage of economic growth, need foreign borrowing to finance their domestic resource gaps and to achieve economic growth and development. However, if external debt becomes unsustainable, it will adversely affect the macroeconomy.

The external debt accumulation of developing countries in general and HIPCs (SSA, Latin America and Caribbean countries) in particular has increased since the early 1970s (for more, see the background of the study). Similarly, determinants of external indebtedness of developing countries have been an issue for researchers, academicians, and policymakers (Maghyereh – Hashemite 2003; Berensmann 2004; Menbere 2004; Bader 2006). Commonly, the causes of foreign debt are classified into domestic (Sachs 1989; Osei 1995; Uzun et al.

2012; Berensmann 2019) and external (Cline 1985; Iyoha 2000; Easterly 2002; Berensmann 2019) factors and both are interrelated with each other.

Most developing countries borrow from abroad to finance their resource gaps and domestic investment, thereby enhancing their economic growth and development (Umaru et al., 2013; Siddique et al., 2016). According to the neoclassical economic growth model, each state should achieve a steady-state level of capital. Thus, any investment injection could lead them to have accelerated economic growth. However, once the debt grows more prominent and unmanageable, it adversely affects countries' socio-economic growth. To keep countries away from the macroeconomic instability generated by the unsustainable external debt, identifying the primary causes of external indebtedness of HIPCs requires a precise empirical analysis.

Even though there is one empirical study using panel time-series data, Chiminya – Nicolaidou (2018), about determinants of external debt in African countries, it did not focus specifically on HIPCs. From the HIPCs perspective, Menbere (2004) examined the determinants of external debt in HIPCs and developing countries, whiles Mensah et al. (2017) investigated for HIPCs in Africa. This implies that empirical studies on the determinants of external debt in African and HIPCs are few (leading to knowledge and literature gap). Furthermore, previous studies did not consider serial correlation, heteroskedasticity, and CD among the error terms, which leads to spurious results. Besides, even though Menbere (2004) examined the determinants of external debt for HIPCs, it is outdated. As a result, this study filled the literature, methodology, and time gaps of previous studies by considering both HIPCs in Africa and non-Africa countries, taking serial correlation, heteroskedasticity, and CD into account, and employing the PCSE estimation technique. Therefore, this study's main objective is to examine the determinants of external indebtedness of 15 HIPCs in general and 12 HIPCs in SSA using time series data from 1990 to 2017.

4.2. Literature review

This section reviews theoretical and empirical literature about the topic. Specifically, the theoretical framework and literature that explain the causes of external debt of a given/group country/countries are discussed, besides, empirical findings which describe the causes of external indebtedness are presented.

4.2.1. Theoretical framework and causes of external indebtedness

This section discusses theoretical and empirical literature about the above-mentioned topic. The theoretical framework that justifies the need for external borrowing developing links the increase in gross external debt (current account deficit - direct and long-term portfolio capital inflows) + (official reserve increases + other private capital outflows) (Dornbusch 1984; McFadden et al. 1985; Menbere 2004). The model starts by summarizing the determinants of the current account (CA) balance, where CA is the difference between items that generate foreign exchange and those that require foreign exchange expenditure.

$$CA = X - M - ILF - OTP \quad (22)$$

where: $\mathrm{X} = \text{exports}$, $\mathrm{M} = \text{imports}$, $\mathrm{ILF} = \text{interest paid on loans from foreigners}$ and $\mathrm{OTP} = \text{other net factor payments and transfers to foreigners.}$

We can write Equation (22) as:

$$CA = \Delta NIR + \Delta BF - \Delta LF - FDI \quad (23)$$

where: $\Delta NIR = change\ in\ international\ reserves$,

$\Delta BF = change\ in\ foreign\ bonds\ held\ domestically$,

$\Delta LF = change\ in\ loans\ from\ foreigners$,

$FDI = foreign\ direct\ investment$, and

$\Delta NIR = NIR - NIR_{-1}$ denotes a net addition to stock

Let NFL = new foreign loans and PLF = payments of foreign loan principal due. Then ΔLF = NFL - PLF and then, the demand for new foreign loans (NFL) would be:

$$NFL = PLF + ILF + \Delta NIR + \Delta BF - FDI + OTP - X + M \quad (24)$$

debt service paid is a summation of interest and principal payments on foreign loans (ILF + PLP = DSP). Debt service paid can also be written as debt service due (including past arrears outstanding) less current arrears, DSP = DSD - A. Substituting these definitions in (24) yields:

$$NFL + A = DSD + \Delta NIR + \Delta BF - FDI + OTP - X + M \quad (25)$$

According to Menbere (2004), the assumption here is that countries prefer to protect their reputation by rolling over their external debt rather than by arrears. This gives an equation for a one period – ahead ex-ante demand for new loans, which satisfies:

$$NL^D = DSD^e + \Delta NIR^e + \Delta BF^e - FDI^e + OTP^e - X^e + M^e \quad (26)$$

where: NL^D stands for new loan demanded, and the superscripts *e* stands for expectations.

Equation (26) implies that the demand for overseas borrowing is a function of total debt service, the change in international reserves, the change in foreign bonds placed domestically, trade balance, and net factor payments and transfers to foreigners (which partly reflects Current account balance). Using this theoretical framework, Imimole et al. (2014) analyzed the determinants of external debt for Nigeria's case. Besides Dornbusch (1984), McFadden et al. (1985) and Menbere (2004) – the two-gap model which is prepared by Chenery – Strout (1996) and its elongated Bacha (1990) fiscal gap model is the well-known models for how external debt is accumulated. Hence, this study adopted the theoretical framework of Dornbusch (1984), McFadden et al. (1985), Menbere (2004) and Imimole et al. (2014) in analyzing determinants of external indebtedness of HIPCs.

As discussed previously, the causes for external indebtedness fall into two categories – domestic factors and external factors. Regarding this, poverty (savings-investment gap) is one of the domestic factors for developing countries' external indebtedness. According to growth economists, poverty has a leading role in the external indebtedness of a country. The wide gap between savings and investment because of different factors, especially during a depressed economy, leads to the accumulation of foreign debt (Solomon et al. 1977; Menbere 2004). Besides, Ayadi – Ayadi (2008) and Uzun et al. (2012) argued that since developing countries' saving is low relative to investment and investment is essential for growth, it is rational to look for external funds.

The foreign trade performance is another factor for the external borrowing of developing countries. The import structure of developing countries focuses on imports of capital goods which are vital for further expanding the tradable sector. Moreover, export earnings of developing countries are usually insufficient to generate enough foreign exchange for financing imports; external borrowing is the essential means of gaining access to the technology that is vital for the expansion of the export sector and rapid economic growth (Menbere 2004). Also, developing countries' worse trade balance is one of the causes of external debt accumulation (Helkie – Howard 1990; Ng'eno 2000).

Furthermore, because of wrong macroeconomic policies, extensive and repeated fiscal deficit and the current account deficit can accumulate external debt in developing countries (Ajayi 1991). Fischer – Easterly (1990) set four ways (printing money, running down foreign exchange reserves, borrowing abroad, and borrowing domestically) of financing the budget deficit. They argue that the budget deficit in developing countries aggravates the current account deficit and leads to external indebtedness.

Moreover, political economy models explain how countries get indebted (Chiminya – Nicolaidou 2018). Strategic considerations by politicians can produce inefficiently high public deficits and lead to debt accumulation (Snider 1990). The theory of strategic debt accumulation suggests that the current policymakers can restrain future policymakers spending by increasing debt levels. For many developing nations, irresponsible political leaders make countries indebted (Alesina –Tabellini 1990, Easterly 2002). Besides, governments accumulate more debt during transitions, thereby leaving the burden to the next government.

The oil price shocks and policies of developed countries and their banks are the external factors for foreign borrowing. Due to the Egypt-Israel war, the increase in oil prices during 1973 and 1979 was one of the factors for the 1970s international debt crises. At that time, the non-oil-producing developing countries were knocked by macroeconomic imbalance. The fall in primary commodities TOT worsened the trade balance and made things complex. Because of the rise in oil price, the revenue of oil exporters increased, which was more than their demand. Hence, they deposited these “petrodollars” in the Eurodollar markets by OPEC (Organization of the Petroleum Exporting Countries) (Menbere 2004, Ali – Mustafa 2012).

According to Suma (2007) and Dymski (2011), the developed countries and their banks' policies are other factors for the debt crisis during the 1970s and early 1980s. With the rise in oil price, oil exporter countries deposited a large amount of petrodollar, which is above their economy, in the banks of developed countries. On the contrary, developing countries needed funds for their economic development programs, which these banks 'recycled' in loans to developing countries.

4.2.2. Empirical literature

This section presents the empirical findings (studies) related to the topic. These studies have different methodologies, time scope, case studies, and empirical results.

Table 4.1 Empirical literature

Authors and publication year	Model Type Adopted	The scope and case study	Results
Ajayi (1991)	Ordinary Least Square (OLS)	From 1970 to 1988, Nigeria	Deteriorating the TOT, the rise in foreign real interest rates, and a fall in industrial countries' growth increase external debt. However, the reverse is true for improvement in the fiscal positions.
Mbire – Atingi (1997)	OLS	From 1970 to 1995, Uganda	An increase in the foreign interest rate, appreciation in the real effective exchange rate, deterioration of the fiscal position, and worsening of trade terms significantly worsens the debt to export ratio.
Menbere (2004)	Random effects (RE) and Fixed effects (FE)	From 1982 to 1999, 60 developing countries	Poverty (saving gap), income instability, debt service payment and capital flight are the leading causes of external borrowing.
Greenidge et al. (2010)	Dynamic OLS	From 1987 to 2005, 12 Caribbean Community	An increase in the output gap, the decline in government spending, a rise in the real effective exchange rate leads to a reduction in the stock of external debt, but the higher the difference between actual and expected government expenditure, and depreciation of currency leads to more accumulation of foreign debt.
Sulley (2010)	OLS	From 1975 to 2008, Tanzania	Domestic factors such as budget deficit and low domestic saving have a significant share in explaining external debt compared to external factors, such

Authors and publication year	Model Type Adopted	The scope and case study	Results
			as trade deficit, real exchange rate, and interest payment even though all are the causes of foreign debt.
Awan et al. (2011)	Johansen Cointegration	From 1972 to 2008, Pakistan	The fiscal deficit has no significant impact on external debt. However, three channels of uni-directional causality were found running from fiscal deficit to foreign debt, TOT to exchange rate and fiscal deficit to terms of trade.
Bittencourt (2015)	Pooled OLS, FE, difference-Generalized Method of Momentum (GMM) and system-GMM estimators	From 1970 to 2007, nine Young Democracies of South America	Economic growth, Trade openness, liquid liability, and inflation reduces the debt burden. However, income inequality increases the external debt.
Awan et al. (2014)	ARDL	From 1976 to 2010, Pakistan	The budget deficit, nominal exchange rate, and trade openness increase the debt burden.
Imimole et al. (2014)	Error correction and the Johansen cointegration test	From 1986 to 2010, Nigeria	The debt service and exchange rate significantly increase external debt, while GDP reduces it.
Al-Fawwaz (2016)	ARDL	From 1990 to 2014, Jordan	TOT lead to indebtedness in the long run. However, GDP per capita has a negative impact.
Adamu – Rasiah (2016)	ARDL	From 1970 to 2013, Nigeria	Oil price, exchange rate debt service, gross domestic saving and fiscal deficit

Authors and publication year	Model Type Adopted	The scope and case study	Results
			are causes for external debt accumulation.
Mensah et al. (2017)	Accounting and panel VAR	From 1980 to 2010, 24 African countries	In the long run, external debt growth rates respond positively to changes in government investment spending, consumption spending, and domestic borrowings, while in the medium term, external debt growth rates respond negatively to a change in tax revenue, inflation, and output growth rates.
Chiminya – Nicolaidou (2018)	Pooled OLS and FE	From 1975 to 2012, 36 SSA countries	Political factors – democratic governments accumulate more debt than autocratic, while countries which a parliamentary system accumulate more debt than presidential. However, constrained executives' governments tend to accumulate less debt than unconstrained and countries with more open and competitive electoral systems are likely to accumulate less debt. Furthermore, other factors, such as GDP growth rates, trade openness, a dummy of HIPCs initiatives reduce external debt while real interest rate and gross capital formation increased external debt.
Beyene – Kotosz (2019)	Johansen cointegration	From 1981 to 2012, Ethiopia	Current account deficit, fiscal deficit, capital flight, debt service and the interest rate contributed to external indebtedness. However, appreciation

Authors and publication year	Model Type Adopted	The scope and case study	Results
			of the TOT significantly reduced external debt.
Bayo et al. (2020)	Fully modified OLS	From 1981 to 2018, Nigeria	Insecurity level and exchange rate significantly increase external debt while debt service and trade openness reduce it.

Source: Constructed by the author

Most of the studies in the determinants of external debt have some similarities, even though their time scope, case studies, and methodologies are different. However, only a few works, such as Menbere (2004), Greenidge et al. (2010), Bittencourt (2015), Mensah et al. (2017), and Chiminya – Nicolaidou (2018) used the panel data along with different methodologies. Also, only Menbere (2004), Mensah et al. (2017), and Chiminya – Nicolaidou (2018) examined it for the case of HIPCs and African countries. Menbere (2004) analyzed it for HIPCs and developing countries using static models of FE and RE 15 years ago. Mensah et al. (2017) and Chiminya – Nicolaidou (2018) are the latest studies, even though the first one focused only on African HIPCs while the latter focused on SSA countries. Generally, none of the studies considered serial correlation, heteroskedasticity, and CD among the error terms in their estimation with static models.

4.3. Empirical results and discussion

Econometric results, interpretations, and the theoretical and empirical support of this chapter are featured in this section. More specifically, the descriptive statistics, the CD test, unit root test, and the estimated determinants of external indebtedness are presented.

4.3.1. Descriptive statistics of the variables

The descriptive statistics of the variables in the models found in Table 4.2 and described as: the average value of the variables is indicated by the mean values. The distribution of the data from the mean value is also expressed by the standard deviation. Furthermore, the range of the variables (the difference between the maximum and the minimum value), showing the spread of data and being an indicator of the level of variation in the variables used for the study,

can be implicitly calculated from the table. Due to the different number of countries in the models, the number of observations (420 or 336) also varies. For both sampled countries, the range of the dependent variables is between 10.2 and 279, implying that the variation is not high since the variable is external debt. Similarly, the debt service variable has a mean of 3.44 and 2.74 for HIPCs and HIPCS in SSA, respectively, and the range is between 0.06 and 47 for HIPCs and 0.06 and 20 for HIPCs in SSA (see Table 4.2 for other variables).

Table 4.2 Descriptive statistics of the variables

Variables	Obs	Mean	Std. Dev.	Min	Max
ED	420(336)	57.88(55.63)	41.46(37.77)	10.23(10.23)	278.97(278.97)
DSRN	420(336)	3.44(2.74)	3.42(2.42)	0.061(0.06)	47.1(19.9)
IMP	420(336)	37.34(34.71)	15.46(14.06)	12.53(12.53)	84.76(84.76)
EXP	420(336)	24.15(21.34)	12.24(10.18)	4.68(4.68)	59(56.13)
FDI	420(336)	3.46(3.25)	5.5(5.97)	-2.49(-2.13)	41.8(41.8)
POP	420(336)	2.48(2.61)	1.17(1.25)	-6.76(-6.76)	8.11(8.11)
GDPGR	420(336)	3.79(3.78)	5.79(6.39)	-50.24(-50.24)	35.22(35.22)
INF	420(336)	31.9(9.10)	328.87(14.42)	-9.15(-9.15)	5016.1(128.76)
POLITY2	420(336)	1.87(0.46)	5.23(4.89)	-8(-8)	9(9)
GRMAC	420(336)	1.7(1.70)	1.40(1.40)	-4.2(-4.2)	3.75(3.75)

Note: the values in the bracket are for HIPCs in SSA; however, the other values are for HIPCs

Source: Computed by the author using Stata15.

4.3.2. Serial correlation, heteroscedasticity and cross-sectional dependence, unit root, and cointegration tests

The existence of serial correlation in linear panel-data models biases the standard errors and causes the results to be less efficient; researchers need to identify serial correlation in the idiosyncratic error term in a panel-data model (Drukker 2003). Similarly, in many panel datasets, due to differences in the dependent variable scale between units, the variance among cross-sectional units can differ. Also, panel-data models probably include CD in the errors. Hence, this study conducted a serial correlation (using Wooldridge (2002) test), heteroscedasticity (using modified Wald test), and a CD test using Pesaran (2004) (see Table 4.3). The result strongly rejects the null hypothesis of cross-sectional independence, which means there is a CD in both models of HIPCs and HIPCs in SSA. However, the result fails to

reject the null hypothesis of cross-sectional independence for the case of HIPCs in non-SSA. As a result, hereafter, this chapter only focuses on HIPCs and HIPCs in SSA.

Table 4.3 Serial correlation, heteroskedasticity, and cross-sectional dependence

Serial correlation and heteroscedasticity tests						
Tests	HIPCs		HIPCs in SSA		HIPCs in non-SSA	
	F-stats (chi2)	Prob	F-stats (chi2)	Prob	F-stats (chi2)	Prob
Serial correlation: Wooldridge test for autocorrelation	210.179	0.000***	626.352	0.000***	116.90	0.000***
Heteroskedasticity: Modified Wald test for GroupWise Heteroskedasticity	1559.62	0.000***	429.01	0.000***	1451.6	0.000***
Cross-Sectional Dependence test						
Tests	HIPCs		HIPCs in SSA		HIPCs in non-SSA	
Pesaran's test of cross-sectional independence	10.028		7.999		-1.282	
The average absolute value of the off-diagonal elements	0.313		0.286		0.157	
Probability	0.0000*		0.0000*		0.2000	

Note: * ⇒ presence of cross-sectional dependence; *** ⇒ presence of serial correlation and heteroscedasticity

Source: Computed by the author using Stata 15

Following the cross-sectional dependency test, the study checked the stationarity of the variables in the model. Due to the existence of CD in our models, this study uses the second-generation panel unit root test – 'CIPS' test of Pesaran (2007) (see Table 4.4). The result fails to reject the null hypothesis of unit root (non-stationary) for all variables at a 1% level of significance at the first difference. Since all the variables are highly statistically significant at the first difference, we notice that all measures are integrated of order one (I (1)). Thus, we might expect there is a long-run connection between these variables collectively.

Table 4.4 Pesaran (2007) Unit Root Test

Variables	CIPS (intercepts only)				Critical values		
	HIPCs		HIPCs in SSA				
	Levels Statistic	1st diff. Statistic	Levels Statistic	1st diff. Statistic	10 %	5 %	1 %
ED	-2.086	- 4.691***	-2.458***	-4.781***	-2.14	-2.25	-2.45
DSRN	-2.678***	-5.731***	-2.935***	-5.207***			
IMP	-2.528***	-4.843***	-2.539***	-4.877***			
EXP	-1.665	-4.618***	-1.635	-4.735***			
FDI	-3.293***	-5.544***	-3.433***	-5.662***			
POP	-1.910	-3.533***	-3.239***	-3.705***			
GDPGR	-4.584***	-3.533***	-4.681***	-6.175***			
INF	-3.968 ***	-5.897***	-4.548***	-6.190***			
POLITY2	-2.661***	-2.663***	-3.012***	-5.503***			
GRMAC	2.610***	2.610***	2.610***	2.610***			

Note: ***⇒ significant (stationary) at 1% level.

Source: Computed by the author using Stata 15.

Following the unit root test, this study conducted a cointegration (long-run relationship) test and since our models have many variables, using McCoskey and Kao (1998) cointegration test. Table 4.5 shows a long-run relationship among the variables in both models of HIPCs and HIPCs in SSA at a 5% level of significance.

Table 4.5 Panel cointegration test

	HIPC		HIPCs in SSA	
	Statistic	p-value	Statistic	p-value
Modified Dickey-Fuller t	-2.1792	0.0147**	-3.9264	0.0000***
Dickey-Fuller t	-1.8534	0.0319**	-2.8336	0.0023***
Augmented Dickey-Fuller t	-3.6145	0.0002***	-2.2659	0.0117**
Unadjusted modified Dickey-Fuller t	-3.0198	0.0013***	-4.3243	0.0000***
Unadjusted Dickey-Fuller t	-2.2408	0.0125**	-2.9673	0.0015***

Note: **, *** ⇒ significant at 5% and 1% level, respectively.

Source: Computed by the author using Stata 15

4.3.3. PCSE estimation results

Even though HIPCs constitute Latin American countries, this chapter did not estimate the empirical model for HIPCs in non-SSA countries due to (1) the existence of CD in our model's errors (see Table 4.3). (2) HIPCs in non-SSA are only three countries, and hence the observations will be n*T = 84. However, in econometrics, the minimum rule for estimation is 5*parameters < observations. The parameters for three countries (n+T) are 31, and estimation for HIPCs in non-SSA did not fulfil the minimum rule of econometrics and hard to accept the estimated results. Therefore, this study estimated only for HIPCs and HIPCs in SSA using the PCSE regression (see Table 4.6). The result shows that debt services, imports and growth of major advanced countries significantly increase the external debt accumulation of HIPCs and HIPCs in SSA. A one percentage point increase in debt servicing leads to the rise of external debt of HIPCs and HIPCs in SSA by 5% and 6%, respectively. This is because the debt service payment incites further demand for external borrowing, especially when the debt service is announced suddenly. This result is similar to Menbere (2004), Adamu – Rasiah (2016), Beyene – Kotosz (2019). This study differs from Menbere (2004), which is the latest in time and methodology. For example, the current HIPCs are not similar to those 15 years ago. Furthermore, the methodologies (FE and RE) of Menbere (2004) cannot consider the dynamic nature of the variables with unobserved heterogeneity (for more details, see Hill et al. 2019), while this study considered the dynamic nature of the variable. Unlike Menbere (2004), this study also considered serial correlation, heteroskedasticity, and CD among the error terms. Similarly, this study is different from Adamu – Rasiah (2016) and Beyene – Kotosz (2019), which examined a group of countries rather than one country case. Also, as for the result, this study coincides with the sign of our hypothesis and the theoretical framework.

Equally, one percentage point rise in imports increases the indebtedness of HIPCs and HIPCs in SSA by 1.6% and 1.4%, respectively. When imports of goods and services increase, HIPCs lack foreign exchange and reserves to undertake different development. As a result, the countries are forced to borrow from abroad even at worth terms and loan conditions. This result also coincides with Menbere (2004). Also, a percentage point increase in major advanced countries' growth rate increases the external debt stock of HIPCs and HIPCs in SSA countries by 3.3% and 2.5%, respectively. This condition, for instance, happened during the 2007/8 global financial crisis – when most developed counties were knocked by financial crises, their economy reduced and hence the external debt of HIPCs also declined – implying that when the economy of major advanced countries increases, they can borrow money to demanders, and

the external debt accumulation of HIPCs rises. Previous studies, such as Ajayi (1991) and Mbire –Atingi (1997) also included the growth rate of industrialized countries as an independent variable, even though its contribution is negative and insignificant, it makes our result different from the previous findings. Furthermore, this study is the latest and included many countries relative to Ajayi (1991) and Mbire – Atingi (1997).

On the other hand, a one percentage point increase in goods and services exports reduces the indebtedness of HIPCs and HIPCs in SSA by 2% and 1.5%, respectively. When exports of HIPCs increase, they will have enough foreign exchange to fill the existing resource gap and hence their demand for external debt will reduce. Furthermore, this result is in line with our hypothesis, the sign of the theoretical framework and with the work of Greenidge et al. (2010) in the case of 12 Caribbean communities. Furthermore, the foreign direct investment and political stability significantly reduce the external debt of HIPCs but not HIPCs in SSA. A one percentage point rise in foreign direct investment and political stability reduces the external debt of HIPCs by 1% and 0.6%, respectively. Foreign direct investment can reduce the resource gap, especially the saving-investment gap of countries and hence their demand for overseas borrowing will reduce. Likewise, when countries have political stability, their overall economy will increase and then their resource gap declines, and finally, the external debt accumulation of countries will be reduced. Also, when countries have a stable political environment, the lenders expect (a guarantee) that borrowers can quickly repay their liability. Due to a stable political environment, the foreign direct investment will increase, and hence all these can reduce the external debt accumulation. However, surprisingly, both foreign direct investment and political stability are insignificant in reducing the external debt accumulation of HIPCs of SSA. This implies that the inflow of (the incumbent) foreign direct investment is not enough to reduce the external debt. Besides, due to frequent political instability in SSA, the countries use the resources for unproductive purposes. Hence, the countries' external indebtedness could not be reduced. Nevertheless, a one percentage point increment of inflation increases the external debt of HIPCs in SSA by 0.7 percentage points.

Table 4.6 Estimated determinants of external indebtedness in HIPS and HIPCs in SSA

Variables	HIPC		HIPCs in SSA	
	Coefficient	Std. Err	Coefficient	Std. Err
DSRN	4.933***	0.832	6.089***	0.972
IMP	1.663***	0.216	1.481***	0.215

EXP	-2.027***	0.240	-1.561***	0.203
FDI	-1.044*	0.585	-0.855	0.539
POP	-0.303	1.330	1.878	1.212
GDPGR	0.100	0.299	0.071	0.264
INF	0.013	0.010	0.727***	0.140
POLITY2	-0.635*	0.269	-0.418	0.312
GRMAC	3.309**	1.526	2.546*	2.547
CONSTANT	26.857	5.74	7.644	6.764

Note: *, **, *** ⇒ significant at 10 %, 5% and 1% level, respectively

Source: Computed by the author using Stata 15

4.4. Chapter summary

Borrowing from abroad is a common characteristic of developing and emerging countries at the early stage of development. However, unmanageable and unsustainable external debt accumulation can adversely affect the macroeconomic variables and can be a bottleneck for the economy. This chapter thus examined the determinants of external indebtedness in the case of HIPCs using two models – HIPCs and HIPCs in SSA using panel time-series data ranging between 1990 and 2017. Therefore, this chapter set the following hypothesis – **both internal and external factors determine the level of external debt of HIPCs.** The study in this chapter partially filled the literature, methodological, and time gaps of previous studies by considering both HIPCs in Africa and non-Africa countries, taking serial correlation, heteroskedasticity, and CD into account, and employing PCSE estimation technique. For both models, the debt service, imports, and growth rate of major advanced countries significantly increase external debt. At the same time, exports reduce external debt. Furthermore, foreign direct investments and political stability significantly reduce the external debt of HIPCs, but these variables are insignificant in reducing the external debt for HIPCs in SSA. Therefore, based on the empirical result, **this chapter fails to reject the hypothesis that both internal and external factors determine the level of external debt of HIPCs.**

CHAPTER FIVE

IS EXTERNAL DEBT SUSTAINABLE IN HIPCs AFTER THE INITIATIVES?

Introduction

In recent years, the accumulation and sustainability issues in external debt have been exciting for researchers and policymakers in developing and emerging countries. However, external debt sustainability has not been addressed in HIPCs. Therefore, this chapter focused on examining the sustainability of external debt in HIPCs, especially after the 1990s initiative, employing an indicator-based, CPIA policy rating, and intertemporal approaches to the current account. To get robust and assertive results, in the intertemporal approach to the current account, this chapter classifies countries into three strata – HIPCs in general, HIPCs in SSA countries and HIPCs in non-SSA. For the indicator-based and CPIA policy rating approaches, this chapter used a sample of 36 HIPCs; however, 32 HIPCs were included for an intertemporal approach to the current account. The chapter begins with background information in section 5.1. Section 5.2 reviews the literature about HIPC initiative, external debt sustainability and its approaches, and the study's theoretical framework along with empirical literature. Section 5.3 presents descriptive results on external debt burden and debt servicing capacity (sustainability) indicators. The study's empirical results are presented and discussed in section 5.4. Section 5.5, the last section, provides a summary of the chapter.

5.1. Background of the study

The IMF (1997, 17) defined external debt sustainability by saying that "A country can be said to achieve external debt sustainability if it can meet its current and future external debt service obligations in full, without recourse to debt rescheduling or the accumulation of arrears and without compromising growth."

External debt sustainability is a burning issue and a topic of debate due to the worldwide debt crisis in Latin America and other developing regions. External borrowing is increasing radically day by day and across the world, which implies there is no guarantee about the non-existence of foreign debt crises in the future. Developing countries, including HIPCs, borrow

from abroad to finance their domestic investment (Bulut 2011), maintain economic growth, and refinance their existing debt. However, once the debt grows more prominent, unmanageable, and unsustainable, it becomes a major macroeconomic destabilizing factor and a severe bottleneck to the promotion of both domestic and foreign investment.

Although debt has been substantially reduced after enhanced HIPC debt relief, debt sustainability has not been achieved for a long time. There are different interrelated factors, such as inappropriate eligibility criteria, unrealistic growth assumptions, insufficient provision of interim debt relief, delivery of HIPC debt relief through debt rescheduling, lack of creditor participation and financing problems, and currency-specific short-term discount rates, and their combination makes it unlikely that the enhanced HIPC initiative could remove the excess external debt (Gunter 2003). For example, Nigeria and Equatorial Guinea were originally considered to be HIPCs but have been dropped from the list, as they were later considered to be no more IDA only countries. On the other hand, Malawi, Comoros, and Gambia have been added, as it became clear that their debt is higher than initially estimated. Besides, the Cote d'Ivoire criterion shows that the HIPC framework's debt sustainability criteria were also heavily influenced by political considerations. Lack of using more comprehensive measures of poverty and indebtedness would give us a considerably different group of HIPCs. For example, using (a) the UNDP's human poverty index for developing countries and the net present value (NPV) external debt-to-GNP ratio as reference criteria for poverty and overall external indebtedness, countries, such as Algeria, Angola, Cambodia, Cape Verde, Djibouti, El Salvador, Gabon, Indonesia, Kenya, Lesotho, Mongolia, Morocco, Nepal, Nigeria, Pakistan, Papua New Guinea, Sri Lanka, Syrian Arab Republic, Vietnam, Yemen, and Zimbabwe are all poorer and more indebted than Bolivia and Guyana, the two highest-ranking eligible HIPCs.

According to IMF estimates, for 27 countries that reached their decision points, the NPV of the external debt-to-exports ratio was 274% before enhanced HIPC relief. Even though the IMF and WB argued that this ratio should not have exceeded 128% at the completion point in 2005, after enhanced HIPC relief, some individual countries are still faced with ratios of debt to export earnings of over 150%, which exceeds the limit for debt sustainability set by the IMF and WB under the HIPC initiative. Furthermore, due to structural deficiencies (widespread unemployment, massive and frequent budgeted deficit, and fiscal cliff) in developing countries, several scholars contend that new external debt may be unsustainable in HIPCs (Yang – Nyberg 2008; Beddies et al. 2009; Ellmers – Hulova 2013; Vaggi – Prizzon 2014). Hence, having a glance at the figures above, no one can understand whether this external borrowing will be a

blessing or a curse for the borrowing countries (Sheikh et al. 2014). To predict this, it is essential to analyze the sustainability of the external debt of HIPCs after the initiative.

Regarding the recourse of foreign capital, there are two alternatives: either accepting or refusing external financing. The first option can be the choice due to the general argument that since there is limited national saving, foreign capital is vital for financing investments that are necessary for economic growth. Hence, it is ideal for a country to borrow from abroad if it can carry out profitable investment projects promising the intertemporal solvency of the country and thus to repay the debt later on. However, a major obstacle of borrower countries is external financing may not always be available easily. The second option is based on a national economy's careful choice to emphasize the current account balance (Bayoumi 1990). This implies that current account surplus plays an important role in reducing foreign debt through its potential to increase a higher share of exports, promote job creation in export sectors, and increase the accumulation of foreign assets. This can also be due to the difficulty of depending on foreign financing, thus forcing economic agents to depend solely on their internal funding sources (Essayem 2015). However, the debt overhang theory of Krugman (1988), Sachs (1989) and Cohen (1995) state that when external debt reaches a certain level, foreign debt discourages consumption and investment; thus, there is declining growth of the economy, which causes external debt to rise further; hence, the focus will be on its sustainability (Essayem 2015).

External debt sustainability has become a necessary condition for sustainable economic growth in open economies, and it is crucial to enhance the theoretical expansion as well as the advancement of world economies in the third millennium. That is why this analysis is significant for the economic development of any economy, which is considered as the primary function of financial capital availability, among other factors. Countries that face a shortage of domestic financial capital can finance development by dint of the countries' access to the international financial markets and the international lending institutions. These countries borrow from other countries to finance their projects (Sheikh et al. 2014). Unlike neo-classical models, such as Modigliani – Miller (1958), who argue that there is full availability of finance in the development process, Kalecki (1937, 1990) believes that there is a shortage of finance for growth. Regarding this, Sawyer (1999) discussed the Kaleckian analysis about the importance of financial markets in the growth process and how the expansion of an economy is financed. The investment equations in the Kaleckian model include the influence of profits, which could be seen to reflect views about the roles of internal versus external finance. Kalecki suggested that the financial system as largely passive in its relations with the real sector because

of lending to individual enterprises is limited by the principle of increasing risk (Kalecki 1937), which means finance is not readily available to all enterprises at the single prevailing price (Sawyer 1996; 1999).

Therefore, the general objective of this chapter is to analyze the external debt sustainability using panel data in the case of HIPCs after the 1990s initiative. This chapter attempts to conduct an external debt sustainability analysis using both descriptive data and econometrics for HIPCs. This chapter used three categories to test the sustainability of external debt: indicator-based and CPIA policy rating approaches (descriptive statistics) and an intertemporal approach to the current account using the econometrics (empirical) approach. Besides, unlike other findings in the literature, our study fills the time gap by considering the situations after and before the 2007/8 global financial crisis. Furthermore, this chapter differs from others in filling the literature (knowledge) and scope gap, focusing on the most concerned countries which experienced excessive external debt accumulation and qualified for repeated debt cancellations and reliefs.

5.2. Literature review

This section presents the literature about the HIPC initiative, external debt sustainability and its approaches, and the theoretical framework of the study. Additionally, it discusses the empirical literature.

5.2.1. HIPC initiative

Due to the unsustainability of external debt in HIPCs, the HIPC initiative was launched in the mid-1990s, aiming to reduce the debt burden of developing countries. Long-term debt sustainability had been brought to the point of being a leading economic decision in the 1980s. The issue of external debt sustainability was addressed through several schemes. The Paris Club debt treatment of Toronto (1988), London (1991) and Naples (1995) were the leading schemes, and the IMF and the WB HIPCs Initiatives (HIPC I and II) and the Multilateral Debt Reduction Initiatives (MDRI) were the other structures (Isar 2012).

HIPC I (launched in 1996) and HIPC II (in 1999) were prominent schemes. These initiatives became unique because of the involvement of multilateral institutions, such as the IMF and the WB (Spratt 2007). The initiatives went through two stages – the HIPC I (original HIPC) and the HIPC II (enhanced HIPC) (Isar 2012).

HIPC I was started in response to increasing pressure of debt relief for HIPCs. It also aimed to end repeated rescheduling of debts (Addison et al. 2004; Isar 2012). Initially, it was planned to reduce the debt burden of the poorest economies. To be qualified for debt relief, the macroeconomic policy of developing countries had to appear to be robust from the IMF and WB perspective, and many complex criteria had to be met (Esquivel et al. 1998; Isar 2012).

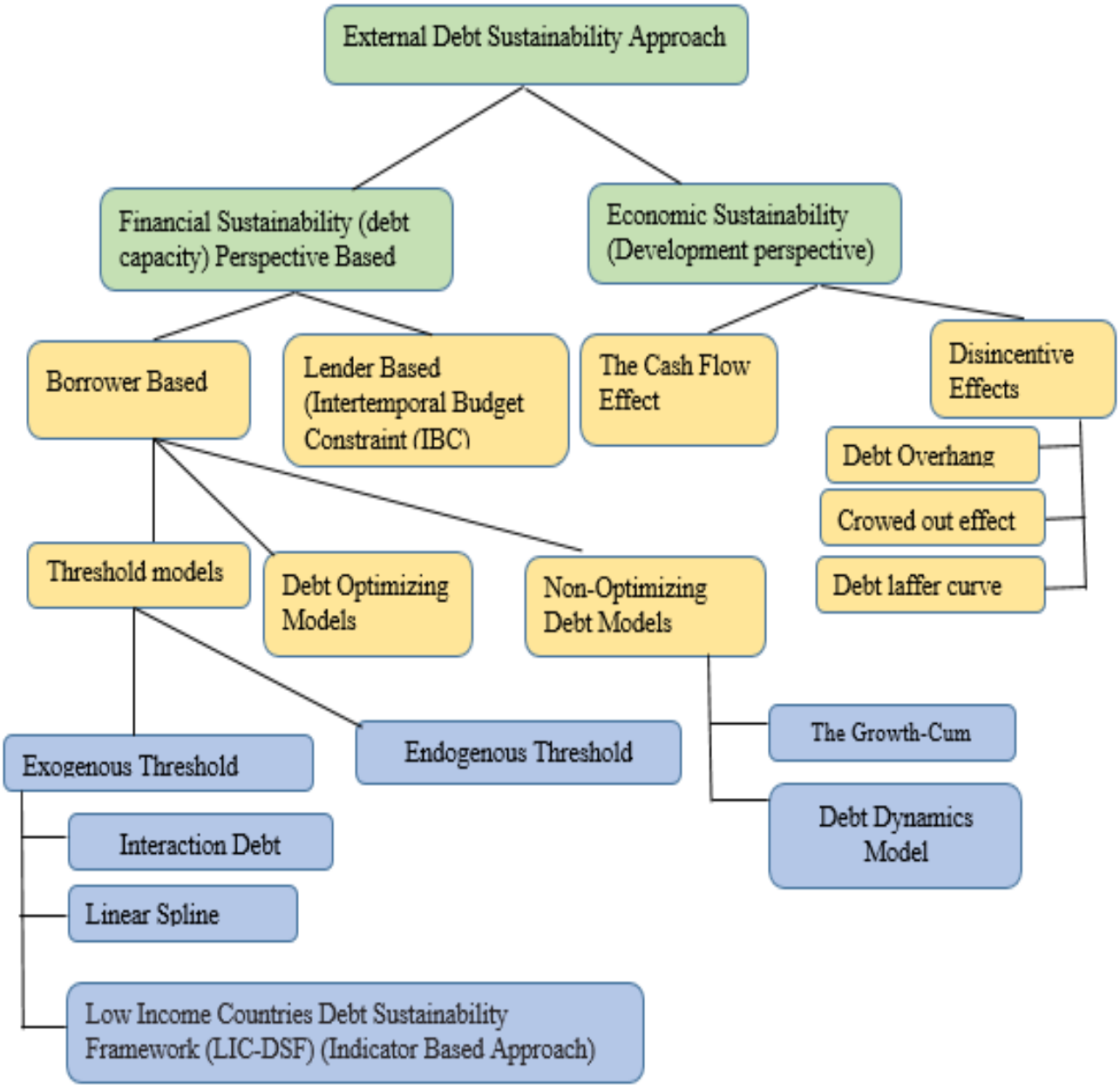
Three years later, the HIPC initiative was enhanced. HIPC I was improved and represented as the enhanced HIPC, or HIPC II (Isar 2012; Mustapha – Prizzon 2014). The new initiative had three key objectives: ensuring debt sustainability, providing a permanent exit from rescheduling, and ensuring an increasing long-term growth rate by removing overhung debts & reducing the poverty rate by reducing cash debt-service payments (Gautam 2003).

HIPC II has two stages: firstly, countries should complete a three-year term of good economic performance and a strategy paper on sustained poverty reduction. Then the WB and the IMF can decide the sustainability of the countries' debt (Forum on Debt and Development 2004). After three years, if the countries' debt is considered unsustainable, they move on to the second stage, and creditors pledge the delivery of debt relief to the floating completion point. Finally, if the second stage is considered fruitful, the process reaches the completion point (Gautam 2003; Forum on Debt and Development 2004; Spratt 2007; Isar 2012).

5.2.2. External debt sustainability and its approaches

A country's external debt can be sustainable if the country can complete all its current and future debt-service payments without having to restructure its debt and without impairing its economic growth prospects. Figure 5.1 shows the detailed structure of external debt sustainability approaches.

Figure 5.1 External Debt Sustainability Approaches



Sources: Author's construction based on Ossemane (2007) and Sheikh et al. (2014)

The financial sustainability perspective-based approaches are mainly concerned with the financial position of the borrowing country regarding the repayment of its debt (Sheikh et al. 2014). It has two types of approach: borrower- and lender-based approaches. The borrower-based approach focuses on the behavior of the borrowing country concerning its capacity and willingness to retire its external debt obligations. It also concentrates on the internal and external gaps which the borrower country faces. These gaps ultimately determine the debt capacity of a country (Ossemane 2007; Sheikh et al. 2014). The lender approach, on the other

hand, focuses on the lenders' liquidity and investment alternatives available in international markets (Ossemane 2007).

Borrower-based financial sustainability is classified into three types of model: threshold, debt optimizing, and non-optimizing models. The threshold models are based on the notion of a non-linear relationship between external debt and growth. According to these models, there are one or more critical levels of external debt sustainability indicators. When external debt reaches these levels, it hampers the economic activity and turns out to be detrimental to economic growth and considered to be unsustainable, and the reverse is true when it is below these levels (Sheikh et al. 2014). According to Nasa (2009), concerning the method of determination of the threshold level, the threshold models are divided into two categories: exogenous threshold and endogenous threshold models.

The exogenous threshold models include the models which are built using the concept of a non-linear relationship between external debt and growth, and the use of the critical levels of external debt to analyze the sustainability of external debt. However, these models do not determine the critical levels of endogenously and specifically to the country. Widely used exogenous threshold models include the interaction debt dummy model, the linear spline model, and the Low-Income Countries Debt Sustainability Framework (LIC-DSF) indicator-based approach (Sheikh et al. 2014). But the endogenous threshold models determine the threshold level of debt endogenously. Hansen's threshold model (1999, 2000) is the predominant and most accurate category of this model, which does not require a specific functional form for applying the methodology of estimating the coefficients and the threshold level of debt simultaneously. However, the Hansen models in the strict sense of endogeneity of threshold variables do not resolve or address the potential endogeneity issues such as reverse causation between the dependent variable and the threshold variable. In Hansen, thresholds are assumed exogenous, even though they are not imposed or selected from outside the model. The exogeneity here means the thresholds are not allowed to, for example, bear reverse causation with the dependent variable. However, newer models addressing threshold endogeneity have been developed by Seo – Shin (2016) (Seo et al. 2019).

The other kind of financial sustainability perspective, which is based on the borrower-based approach, is the debt optimizing model. This model deals with the question of the optimal level of debt and how much a country should borrow so that the mobilized resources would be beneficial for the country after retiring the debt. The underlying notion in these models is

similar to the threshold models, but these models determine the optimal level of debt where the marginal cost of external borrowing is equal to the marginal benefit. If the marginal cost of external borrowing is higher than its marginal benefit, it is beneficial for a borrower not to borrow, and vice versa (Sheikh et al. 2014).

The last type of borrower-based financial perspective of external debt sustainability is the non-optimizing debt model (Sheikh et al. 2014). These models examine the sustainability of particular debt situations and policies in light of the expected future growth path of the economy. The non-optimizing models are classified into two groups. The growth-cum-debt model and its derivative (the debt cycle model) are extensions of the intertemporal borrowing/lending model to multiple periods (Nissanke – Ferrarini 2001). Similarly, the debt dynamic model compares the benefits from external borrowing to its costs, but unlike the growth-cum-debt model (which focuses on domestic capacity), it considers the value of exports as the best indicator of the repayment capacity of a country (Sheikh et al. 2014). This approach directly addresses the issue of the borrowing country's external solvency by taking the country's external performance into account while neglecting the domestic savings-investment gap (Nissanke – Ferrarini 2001).

The financial sustainability perspective approach can be analyzed by the lender-based approach/Intertemporal Budget Constraint (IBC). According to the IBC debt sustainability model, the external debt of a country is considered to be sustainable if the country satisfies the condition of no Ponzi Game, which requires the equivalence of actual external debt and present discounted value of the country's future trade surpluses (Sheikh et al. 2014).

5.2.3. Empirical literature

This section presents the empirical literature about external debt sustainability. Table 5.1 displays the authors' names together with the year, their model, the time scope of their case studies, and their findings.

Table 5.1 Empirical Review

Author Name and Year	Model Type Adopted	Scope and Case Study	Results
Mohammadi et al. (2007)	Cointegration, ECM, and threshold and momentum threshold autoregressive models	From 1962 to 2003, Turkey	Sustainable
Yilanci – Özcan (2008)	Two-regime threshold autoregressive model with an autoregressive unit	From 1990:Q1 to 2007:Q2, Turkey	Unsustainable
Emilia – Emilian (2008)	Phillips Perron unit root test and OLS regression	Monthly data from January 1992 to December 2007, Romania	Weak sustainability
Mahmood et al. (2009)	Debt ratios and debt sustainability conditions approach	From 1971 to 2008, Pakistan	Sustainable
Boengiu et al. (2011)	Quantile autoregression model	From 1990: Q4 to 2010: Q4, Romanian	Sustainable
Nasir – Noman (2012)	Non-linear ADF unit root test	From 1973 to 2008, 36 and 55 countries	Sustainable
Lau et al. (2013)	Intertemporal budget constraint model	From 1981 to 2010, 19 Asian countries	Sustainable
Lin (2014)	Quantile autoregression model and ADF regression model	From 1980: Q1 to 2013: Q3, 21 OECD countries	Unsustainable
Sheikh et al. (2014)	Panel unit root test and Engle–Granger residual-based panel cointegration approach	From 2000 to 2013, 8 SAARC economies	Unsustainable

Essayem (2015)	Unit root and causality test	From 1983 to 2010, Tunisia	Sustainable
Kiran (2015)	Multiple structural break model	From 1970 to 2010, Turkey	Unsustainable
Goktas – Hepsag (2015)	Periodic unit root test with a structural break	From 1990:Q1 to 2012:Q3, Turkey	Unsustainable
Llorca (2017)	Panel unit root and cointegration test	From 1993 to 2014, 24 Asian emerging and developing countries	Sustainable

Source: Constructed by the author

Although empirical studies on external debt sustainability followed different methodologies – case study and time scope – most studies found sustainability of external debt (Mohammadi et al. 2007; Mahmood et al. 2009; Boengiu et al. 2011; Nasir – Noman 2012; Lau et al. 2013; Essayem 2015; Llorca 2017), while some confirmed external debt as unsustainable (Yilanci – Özcan 2008; Lin 2014; Sheikh et al. 2014; Kiran 2015; Goktas – Hepsag 2015).

Table 5.1 also shows that few studies, e.g., Mohammadi et al. (2007); Yilanci – Özcan (2008); Emilia – Emilian (2008) did not consider the period after the 2007/8 global financial crisis. Even though others tried to conduct analysis after the financial crisis, the latest study of Llorca (2017) examined the topic only until 2014. Unlike others, our study combined the time scope before as well as after the crisis with the latest dataset, which can fill the time gap in the literature. Besides, the previous empirical papers did not consider the most vulnerable regions (HIPCs) and countries which experienced excessive external debt accumulation and qualified for repeated debt cancellations and reliefs. This implies studies concerning external debt sustainability for concerned countries is given limited attention, which leads to a knowledge (literature) gap. Hence, investigating the sustainability external debt situation in the case of HIPCs is a critical research area and vital to providing policy recommendations. Furthermore, except for few, the scope of most studies is limited to a single country case, and hence their finding and recommendations cannot represent the broad regions in which they are located. Nevertheless, our study differs from others by incorporating a broad group of countries stratified into three sub-groups along with both descriptive and econometric findings.

5.2.4. Theoretical framework of the study

There are two types of approaches (financial sustainability perspective and economic sustainability) in analyzing the sustainability of external debt. The financial sustainability approach alone can be examined by three different methods: borrower, lender, and comprehensive approaches. However, this study focused only on the borrower approach.

5.2.4.1. Indicator-based approach and the intertemporal approach to the current account

Although there are few prominent studies – Bulut (2011) and Ibhagui (2018) – related to the relationship (link) between external debt and the current account, the issue of external debt sustainability using the current account approach is not investigated. However, this study used two different approaches to analyze the debt sustainability of HIPCs. The first approach is the threshold debt ratios (indicator-based) approach. The second approach based on theoretical models derives debt sustainability conditions of external debt. This approach is based on the framework of the intertemporal approach to the current account. According to Llorca (2017), some of the available empirical studies about external debt sustainability are based on the intertemporal approach to the current account. Llorca's benchmark was Husted (1992), who offered a simple small-economy framework in which a representative household can borrow and lend freely in international financial markets at a given world rate of interest. Individuals or countries may acquire debt to increase short-run consumption (Arnade et al. 1989). Regarding this, Winters (1985) believes that countries assume debt to increase imports when there are liquidity constraints. Besides, Eaton – Gersovitz (1980) claim that countries use international loans as much as households use credit cards. Like households, countries can consume beyond their budget by acquiring debt. Countries also pay off internationally acquired debt out of their export earnings just as households pay off debt out of income (Arnade et al. 1989). Studies show that most developing countries prefer and find it easier to borrow from abroad than domestically. For example, in SSA countries, unlike domestic loans, the foreign loan is highly concessional. Although numerous countries have a medium or long-term domestic debt, in most cases, it stems from loans imposed on terms that were incompatible with market conditions, implying that external borrowing has lower interest rates compared to domestic. Moreover, due to the low saving rate in SSA countries, loanable funds are very limited. Furthermore, institutions, such as insurance companies and the social security system were supposed to generate financial surpluses, but some of them invested in government

securities (Beaugrand et al. 2002). Therefore, domestic borrowing in SSA is not easily possible, effective, and sufficient, and hence countries prefer to look for external borrowing.

The household faces the following current period budget constraint:

$$C_0 = Y_0 + B_0 - I_0 - (1 + r_0)B_{-1} \tag{27}$$

where C_0 and Y_0 represent current consumption and output, respectively. Furthermore, B_0 and I_0 represent international borrowing and investment, respectively. Also, r_0 is the one-period world interest rate and $(1 + r_0)\, B_{-1}$ is the initial debt of the representative agent, corresponding to the country's external debt.

Equation (27) must hold for every time period. According to Husted (1992), iterating (27) forward yields the economy's intertemporal budget constraint.

$$B_0 = \sum_{t=1}^{\infty} \delta_t TB_t + \lim_{n\to\infty} \delta_n B_n \tag{28}$$

where $\delta_t = \prod_{s=1}^{t} \rho_s$ where $\rho_s = 1/(1 + i_s)$. $TB_t = X_t - M_t = Y_t - C_t - I_t$ represents the trade balance, X_t and M_t are exports and imports, respectively, while δ_t is the discount factor and the subscript n is the n^{th} period.

Equation (28) implies that the amount a country borrows or lends in international markets equals the present value of the future trade surpluses or deficits, assuming the last term equals zero. If the limit term is nonzero and B_0 is positive, then it implies "bubble financing" of external debt, while a negative B_0 suggests the country could improve welfare by lending less (Binatli – Sohrabji 2012).

The necessary and sufficient condition for external sustainability is that as $n \to \infty$, the discounted value of the external debt converges to zero (see Equation 29) – called the transitivity condition.

$$\lim_{n\to\infty} \delta_n B_n = 0 \tag{29}$$

Equation (29) implies that to finance the trade deficit (surplus) a country cannot borrow (lend) indefinitely. If this transversality condition holds, then the amount a country borrows (lends) equals the present value of the future trade surplus (deficits) (Llorca 2017).

Assuming that the world interest rate is stationary, Husted (1992) expresses (28) as:

$$Z_t + (1 + r)B_{t-1} = X_t + B_t \qquad (29a)$$

Where $Z_t = M_t + (r_1 - r)B_{t-1}$. When we solve Equation (29a) forward as Hakkio – Rush (1991), we obtain the following equation.

$$M_t + r_1 B_{t-1} = X_t + \sum_{j=0}^{\infty} \lambda^{j-1} \left[\Delta X_{t+j} - \Delta Z_{t+j}\right] + \lim_{j \to \infty} \lambda^{t+j} B_{t+j} \qquad (29b)$$

Where $\lambda = \frac{1}{1+r}$, the interest rate r_1 is stationary around the mean r (taken around the zero mean). The left-hand side consists of spending on imports and interest payments (receipts) on net foreign debt (assets). If we subtract X_t from both sides, the left-hand side becomes the economy's current account

$$M_t - X_t = \sum_{j=0}^{\infty} \lambda^{j-1} \left[\Delta X_{t+j} - \Delta Z_{t+j}\right] + \lim_{j \to \infty} \lambda^{t+j} B_{t+j} \qquad (29c)$$

Assuming that X and Z are non-stationary at level, but the first differences of them are stationary, and that the last right-hand term of Equation (29c) is zero, then Equation (29c) will be Llorca's (2017) Equation.

$$M_t - X_t = \sum_{j=0}^{\infty} \lambda^{j-1} \left[\Delta X_{t+j} - \Delta Z_{t+j}\right] \qquad (30)$$

Given the right-hand variables from Equation (30) are the first-difference stationary, the left-hand side must be stationary in order to satisfy the present-value external constraint. Thus, M_t and X_t must be examined for stationarity. If M_t and X_t are I(1), then they must be cointegrated so that the current account deficit is stationary (Llorca 2017). Due to problems with data availability, however, this study used different sources of data for current account balance and export and imports (trade balance). Nevertheless, some studies in the literature, such as Osakwe – Verick (2007) and Moussa (2016) show that exports and imports (trade balance) play a dominant part of the current account balance in many SSA countries. Similarly, evidence shows that SSA had current account deficits from 1986 until 2000, when large shifts in the trade balance contributed to sizeable current account deficits. The region also experienced current account deficits in the period between 2001 and 2003 and from 2008 to 2013. Besides, SSA had trade surpluses in the period between 1985 and 1990; this was due to the reduction in imports as a result of the goal of structural adjustment policies to have a trade surplus. Also, between 2000 and 2008, SSA had a trade surplus because of a strong flow in

exports (Moussa 2016). Therefore, from the evidence above, and because most HIPCs are found in SSA countries, we might consider that the trade balance is the dominant part of the current account balance in the countries that have been analyzed. Thus, a test for the sustainability of the external debt can be concluded to check the cointegration of these two variables, M_t and X_t – if they are I(1). This cointegration regression takes the following form:

$$X_t = a + bM_t + u_t \tag{31}$$

Formally, if M_t and X_t are I(1), the null hypothesis is that M_t and X_t are cointegrated and b = 1. If the null hypothesis is not rejected, then the external debt is said to be sustainable (Llorca 2017).

Hence, this study followed the theoretical framework of Husted (1992) and Llorca (2017) to analyze the external debt sustainability of HIPCs.

5.3. External debt burden, debt servicing capacity (sustainability) indicators, and CPIA policy rating

In 2005, the WB, in collaboration with the IMF, developed the debt sustainability framework, aiming to support low-income and developing countries in their struggles to attain the Millennium Development Goals without generating future debt problems and to place countries that have received debt relief under the HIPC initiative on a sustainable path (WB 2019). The Debt Sustainability Framework (DSF) was reviewed twice (in 2012 and 2017) with different values of indicators (see Table 5.2). The new framework was developed in September 2017 and has been implemented since July 2018 (IMF 2019). However, these DSFs are for low-income countries (LICs). Since this study focuses on HIPCs and different alternative options for debt burden thresholds, we used the "narrower band with upper bound equivalent to the HIPC initiative threshold approach set by the IMF in 2005". This debt sustainability framework classifies countries into one of three debt-carrying capacity categories (strong, medium, and weak) using CPIA policy rating. Countries with values in strong categories imply that these countries, with sound macroeconomic performance, policies, and institutions, can generally handle higher debt accumulation (IMF 2005; IMF 2019).

Table 5.2 Indicative External Debt Burden Indicators (in %), Debt Burden, and CPIA under Narrower Band with Upper Bound Equivalent to HIPC Initiative Threshold

Quality of Policies and Institutions	NPV of External Debt in % of			External Debt Service in % of	
	GDP	Exports	Revenue	Export	Revenue
Weak policy (CPIA ≤ 3.25	20	50	150	10	20
Medium policy (3.25 < CPIA < 3.75)	30	100	200	15	25
Strong policy (CPIA ≥ 3.75)	40	150	250	20	30

Source: IMF 2005

Table 5.3 External Debt Burden, Servicing Capacity Indicators, and CPIA in All Post-completion-point HIPCs[23+24] (see IMF 2019), 2000 to 2018

Years	EDT/GDP	EDT/XGS	TDS/XGS	Average CPIA
2000	25.39	353.535	14.545	---
2001	26.55	342.210	12.244	---
2002	27.78	313.512	12.161	---
2003	28.36	291.532	10.232	---
2004	29.5	249.492	8.903	---
2005	29.9	202.410	7.764	3.083
2006	29.2	130.624	6.561	3.069
2007	29	115.978	7.426	3.138
2008	28.8	99.372	6.952	3.208
2009	25.6	124.727	6.440	3.277
2010	29	95.525	4.976	3.333
2011	32.9	81.208	4.427	3.388
2012	32.3	80.917	4.315	3.444
2013	29.65	94.975	4.989	3.472
2014	28.9	102.910	5.919	3.5138
2015	25.68	133.293	7.439	3.472

[23] Benin, Burkina Faso, Burundi, Cameroon, Central African Republic, Chad, Comoros, Congo Democratic Republic, Congo Republic, Côte d'Ivoire, Ethiopia, The Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Madagascar, Malawi, Mali, Mauritania, Mozambique, Niger, Rwanda, São Tomé & Príncipe, Senegal, Sierra Leone, Tanzania, Togo, Uganda, and Zambia (IMF 2019).

[24] Afghanistan, Bolivia, Guyana, Haiti, Honduras, and Nicaragua

2016	24	148.064	9.772	3.291
2017	25.8	143.910	10.249	3.236
2018	20.2	180.155	14.023	3.152
2019	---	---	---	3.097

Source: Computed by the author using WB 2019

Total external debt as a percentage of gross domestic product (EDT/GDP) is one of the indicators which measures the external debt sustainability and macroeconomic and institutional performance in handling external debt accumulation. The result shows that the EDT/GDP value was above the weak indicator value (20), and also, in 2011/12, it exceeded the medium indicator. Since HIPCs external debt as a percentage of GDP shows over the lower and medium (in 2011/12), their debt considered unsustainable (see Table 5.3).

Moreover, between 2000 and 2003, the total external debt as a percentage of the export of goods and services (EDT/XGS) shows that HIPCs had very high external debt and categorized in the above strong threshold. However, in 2004 and 2005, HIPCs external debt as a percentage of the export of goods and services reduced but was still above a medium threshold level. Surprisingly, there was no time that the magnitude of EDT/XGS of HIPCs went below the weak threshold level. Therefore, this indicator was breaching the thresholds; it suggests that HIPCs have budgetary problems in servicing their debt, leading to unsustainable state (see Table 5.3).

Initially, the total debt service as a percentage of exports of goods and services (TDS/XGS) of HIPCs was above the lower threshold (10) level. However, from 2004 to 2016, it went below the lower threshold level. Similar to the early 2000s, the TDS/XGS started to breach the lower threshold (see Table 5.3). The other external debt sustainability indicator is total external debt as a percent of revenue (EDT/REV). However, due to difficulties in getting revenue data, this study did not use the indicator for the analysis.

According to OIC Outlook Series (2012), debt stress (unsustainability) depends not only on the debt indicators of the present value approach but also on other macroeconomic fundamentals such as the quality of institutions. Debt sustainability can be affected by institutional factors through policy credibility and consistency (Manasse et al. 2003). The CPIA can be a proxy variable for institutional quality. According to the World Bank Groups (2019), the CPIA debt policy rating examines whether the debt management strategies of countries are efficient to reduce budgetary risks and provides debt sustainability in the long run.

Due to the lack of availability of the data, unlike the present value approach, this study analyzed HIPCs debt sustainability from 2005. The result shows that the average CPIA was below 3.25 between 2005 and 2008, which means HIPCs had weak macroeconomic performance and policies and institutions in general. However, there were some improvements to medium institutional quality between 2008 and 2016, while from 2017 to 2019, HIPCs turned to weak performance in handling the debt accumulation (see Table 5.3).

5.4. Empirical results and discussion

Econometric results and their interpretations, along with the theoretical and empirical support of the study, are presented in this section. More specifically, it includes descriptive statistics, the CD test, unit root test and the cointegration tests.

5.4.1. Descriptive statistics of the variables

The descriptive statistics of the variables of the external debt sustainability model for HIPCs, HIPCs in SSA and HIPCs in non-SSA countries are presented in Table 5.5. The justification behind evaluating external debt sustainability in HIPCs in SSA and HIPCS in non-SSA is that around 30 out of 36 countries of HIPCs are found in SSA, but the remaining ones are found in Latin America and Asian countries. Since these groups are located in different continents, they may have different macroeconomic policies and institutional structures to handle external debt stock. Besides, even though the share of the total external debt of Asia and Latin American countries is small, their per capita foreign debt is higher than the per capita debt of other regions of HIPCs. Furthermore, we must check the robustness of the result of HIPCs by examining for HIPCs in SSA and non-SSA countries.

Due to the different number of sampled countries in the models, the number of observations is 576 (for HIPCs), 486 (for HIPCs in SSA), and 90 (for HIPCs in non-SSA). For both HIPCs and HIPCs in SSA models, the current account range is between -84 and 19.6, showing that the variation is not high because the variable is the current account deficit. However, the range of HIPCs in non-SSA countries is between -18.3 and 12.2. The mean value of the external debt variable is around 46.5 for HIPCs and HIPCs in SSA, while it is 48.8 for HIPCs in non-SSA. Besides, it ranges between 8.6 and 288 for HIPCs and HIPCs of SSA, whereas the range is between 11 and 104 for HIPCs in non-SSA (see Table 5.5 for other variables).

Table 5.5. Descriptive Statistics of the Variables

Variables	Obs	Mean	Std. Dev.	Min	Max
CA	576 (486) 90	-7.06(-7.41)-5.	9.2(9.6)6.13	-84.10(-84.1) -18.3	19.67(19.67) 12.2
ED	576 (486) 90	46.8(46.5)48.8	35.2(36.8)24.9	8.60(8.6) 11.1	288.3(288.33) 104
IMP	576 (486) 90	43.3(40.6) 57.5	23.5(23) 20.7	13.05(13.05) 25.2	236.3(236.39)110.6
EXP	576 (486) 90	29.3(27.4)39.5	16.4(14.9) 19.9	6.04(6.04) 12.12	96.07 (94.03) 96.07

Note: the first, second, and third values in the table are for HIPCs, HIPCs in SSA and HIPCs in non-SSA countries, respectively.

Source: Computed using Stata 15.

5.4.2. Unit root, cross-sectional dependence and cointegration tests

This study conducted the CD test using the Pesaran (2004) test and found the null hypothesis of cross-sectional independence rejected at a 1% level of significance in both HIPCs and HIPCs in SSA (see Table 5.6). Hence, it is a must to employ the second-generation panel unit root test. However, except for external debt, the result fails to reject the null hypothesis of cross-sectional independence in HIPCs in non-SSA for other variables (current account, exports, and imports). The existence of cross-sectional independence only on one variable does not represent the whole model. Thus, to clearly understand the model, we need a further cointegration test. Therefore, this study tested the cointegration for the whole model by including all variables collectively. The result shows the test fails to reject the null hypothesis of cross-sectional independence at a 1% level of significance in HIPCs in non-SSA, suggesting the presence of cross-sectional independence in this sub-group (see Table 5. 6). In this case, to analyze the external debt sustainability, it is necessary to employ the first-generation panel unit root test.

Table 5.6 Pesaran (2004) Test for Cross-sectional Dependence

Panel	Variables (% of GDP)	CD-test	P-value
HIPCs	Current account	8.884	0.0000

	External debt	36.182	0.0000
	Imports	13.797	0.0000
	Exports	9.043	0.0000
HIPCs in SSA	Current account	8.846	0.0000
	External debt	33.970	0.0000
	Imports	11.339	0.0000
	Exports	8.089	0.0000
HIPCs of non-SSA	Current account	0.383	0.7011
	External debt	3.398	0.0007
	Imports	1.05	0.2933
	Exports	-1.354	0.1756
Further cross-sectional dependence tests for HIPCs of non-SSA using Stata			
Pesaran's test of cross-sectional independence			(1.701)
The average absolute value of the off-diagonal elements			(0.254)
Probability			(0.0890)

Source: computed using EViews 10 and Stata 15

Following the CD test, the study examined the stationarity of variables in the model. Due to the presence of CD, this study used the Pesaran (2007) CIPS test for HIPCs and HIPCs in SSA (see Table 5.7).

Table 5.7 Pesaran (2007) Unit Root Test

	CIPS result (only intercept)		Critical Values		
	Levels	1st diff.			
Variables	Statistic	Statistic	10 %	5%	1%
CA	-2.422***	- 4.071***			
	(-2.411)***	(-4.318)***			
ED	-2.279***	-3.67***			
	(-2.542)***	(-3.497)***	-2.03 (-2.07)	-2.11(-2.15)	-2.25 (-2.32)
IMP	-2.077*	-4.115***			
	(-2.148)*	(-4.105)***			
EXP	-1.626	-3.767***			
	(-1.789)	(-3.933)***			

Note: the values in brackets are for HIPCs in SSA; however, the other values are for HIPCs

*, *** ⇒ Significant at the 10 and 1 % level, respectively.

Source: Computed using Stata 15

The results in Table 5.7 show that the current account and external debt are stationary at a level at 1 % level of significance, which is a necessary condition (but not sufficient) for external debt sustainability. However, imports and exports are significant at the first difference, and hence we can proceed to the next step to examine the sustainability of external debt using the panel cointegration test between exports and imports. Therefore, the study checked the long-run relationships among the variables in the models using Westerlund (2007) cointegration test due the presence of CD and only two variables (exports and imports) in the model (see Table 5.8).

Table 5.8 Westerlund (2007) Panel Cointegration Test between Exports and Imports

Statistic	Value	Z-value	P-value	Bootstrap P-value
Group-mean statistics				
G_t	-2.072 (-2.308)	2.051 (0.374)	0.980 (0.646)	0.560 (0.280)
G_a	-5.452 (-6.170)	5.456 (4.463)	1.000 (1.000)	0.690 (0.540)
Panel statistics				
P_t	-11.00 (-10.95)	1.086 (0.025)	0.861 (0.510)	0.460 (0.240)
P_a	-5.432 (-5.988)	3.230 (2.495)	0.999 (0.994)	0.320 (0.210)

Note: the values in brackets are for HIPCs in SSA; however, the other values are for HIPCs

Source: computed using Stata 15.

The G_t and G_a statistics test whether cointegration exists for at least one individual series. The p_t and p_a statistics pool information over all the individual series to test whether cointegration exists for the panel as a whole. To account for cross-section interdependence, the robust p-value is computed with bootstrapping with 100 replications. For both HIPCs and HIPCs in SSA, our result fails to reject the null hypothesis of no cointegration between exports and imports (see Table 5.8). Therefore, we can conclude that external debt is unsustainable in both HIPCs and HIPCs in SSA countries.

However, the CD test in Table 5.6 confirmed that there is no CD in the case of HIPCs in non-SSA. Hence, this study used the first-generation panel unit root test for HIPCs of non-SSA (see Table 5.9).

Table 5.9 First-generation Panel Unit Root Test

Variables (in % of GDP)	LLC		IPS		ADF	
	level	1st diff	level	1st diff	level	1st diff
CA	-2.86***	-6.11***	-2.15***	-5.629***	19.72**	47.1***
ED	-2.124**	-4.93***	-2.44***	-3.85***	24.04***	32.67***
IMP	-1.79**	-7.7***	-0.379	-6.26***	8.93	51.49***
EXP	-0.929	-5.12***	0.443	-4.725***	5.40	38.88***

, * ⇒ Significant at the 5 and 1 % level, respectively.

Source: Computed using EViews 10.

The panel unit root test in Table 4.9 shows that for all types of tests, none of the variables are stationary at a level at 1 % level of significance but stationary at first difference. This is an indication of the existence of an unsustainable external debt. However, to confirm it, we have to conduct the cointegration test for all I(1) variables in general and between exports and imports in particular. Therefore, since there is cross-sectional independence and a small number of variables in the model, this study employed the Pedroni residual-based test.

Table 5.10 Pedroni Cointegration Test for HIPCs in Non-SSA

		Statistic	Prob.	Weighted statistic	Prob.
Within dimension	Panel v-statistic	-0.03(0.35)	0.512(0.361)	0.085(0.172)	0.465(0.431)
	Panel rho statistic	0.779(0.06)	0.782(0.525)	0.677(-0.13)	0.751(0.448)
	Panel PP statistic	-0.430(-0.053)	0.333(0.478)	-0.738 (-0.19)	0.23(0.424)
	Panel ADF statistic	-0.957(-0.05)	0.169(0.479)	-1.488 (-0.195)	0.068*(0.42)
Between-dimension	Group rho statistic	1.475(0.969)	0.93(0.833)		

	Group PP statistic	-1.987(0.52)	0.02**(0.69)	
	Group ADF statistic	-1.621(0.365)	0.052*(0.64)	

*, ** ⇒ Significant at the 10 and 5 % level, respectively.

Note: the values in brackets are the cointegration result between exports and imports; however, the other values are the result for all I (1) variables

Source: Computed by the author using EViews 10.

In this model, employing the Pedroni cointegration test for all I(1) variables, the null hypothesis of no cointegration fails to be rejected at a 1 % level of significance for HIPCs in non-SSA (see Table 4.10). Similarly, the cointegration test between exports and imports fails to reject the null hypothesis of no cointegration at a 1 % level of significance. Therefore, the above cointegration results among all I(1) variables and between exports and imports lead us to conclude that external debt is not sustainable in these countries.

To summarize our results, all the indicator-based, CPIA policy rating, and the intertemporal approach to the current account confirmed that external debt is not sustainable in HIPCs. There are different reasons for this: failure of domestic policies to develop robust and stable economies, whereby critical industries fail to develop and generate sufficient export earnings; weak (ineffective) public finance, leading governments to look for additional overseas borrowing; persistent budget deficits due to excessive spending on unproductive sectors and limited revenue because of limited tax bases; collapse in primary and semi-finished commodity prices, leading to reduced export revenues and increased need to borrow; and a rise in the oil price, which may lead to an adverse effect on economies which are dependent on oil imports and hence need to borrow more to finance their development. Moreover, the findings of chapter three also confirmed that an increase in debt service, an increase in imports, a reduction in exports and a reduction in foreign direct investment, and political instability lead to resource gap in HIPCs Therefore, all these reasons and empirical evidence led countries to demand more foreign borrowing, and their debt accumulation became unsustainable. Furthermore, even though the case studies are different, our results are in line with other findings, such as those from Yilanci – Özcan (2008), Lin (2014), Sheikh et al. (2014), Kiran (2015) and Goktas – Hepsag (2015).

5.5. Chapter Summary

External debt sustainability is vital in achieving a stable macroeconomic environment and sustainable economic growth. Due to unsustainability of external debt in HIPCs, there were two main initiatives – HIPC I (original HIPC) and HIPC II (enhanced HIPC) – in the 1990s. However, after the enhanced HIPC relief, some countries had a debt to export earnings beyond the IMF and WB limit for debt sustainability. Hence, it is vital to know and investigate whether HIPCs external debt is sustainable after the 1990s initiatives based on the stated hypothesis (H2) – **external debt is sustainable for HIPCs after their initiatives**. Therefore, this chapter's primary objective was to analyze the sustainability of external debt in HIPCs using the indicator-based approach (for the period between 2000 and 2018 for 36 HIPCs), the CPIA policy rating (for the period between 2005 and 2019 for 36 HIPCs), and intertemporal approach to the current account (between 2000 and 2017 for 32 HIPCs). The indicator-based and CPIA policy rating approaches examined the quality (weak, medium, strong) of policies and institution based on different debt indicators and found that HIPCs' macroeconomic policies and institutional performance are weak to handle and service the borrowed fund, and hence their external debt is unsustainable. However, the intertemporal approach to the current account used the current account, external debt, import, and export variables in the analysis and confirmed that external debt is unsustainable in all HIPCs, HIPCs in SSA, and HIPCs in non-SSA. As a result, this chapter **fails to accept the hypothesis that external debt is sustainable for HIPCs after their initiatives.**

CHAPTER SIX

THE IMPACTS OF EXTERNAL DEBT ON GROWTH FACTORS AND GROWTH IN HIPCs: THE CHANNELS THROUGH WHICH EXTERNAL DEBT AFFECT GROWTH

INTRODUCTION

This chapter has a broad scope that focuses on the impact of external debt on growth factors and growth to investigate the channels through which external debt affects the growth of HIPCs. In other words, it focuses on exploring the channels and impacts of external debt on growth; hence, this chapter contains four different sub-chapters dealing with different objectives. Due to a lack of relevant data and for consistency, this chapter used a sample of 15 HIPCs[25] from 1990 to 2017 and this scope (time and sampled countries) is sufficient to represent HIPCs in general. Each chapter has n*T=420 observation which is fulfilled above the minimum rule – 5*parameters < observations in econometrics. Therefore, the estimated results and policy recommendations of all chapters can represent and work for the other HIPCs. Furthermore, the time scope of this chapter is also appropriate since it captures both before and after the decline of most HIPCs economies in 2000, the two main HIPCs initiatives in 1996 and 1999, the Millennium Development Goals in 2000, the global financial crisis in 2007/8, and Sustainable Development Goals since 2015. Therefore, the findings of this chapter considered various global development programs and events related to the title. Even though human capital is included in the calculation of TFP, this study prefers to examine chapter 6.3 and 6.4 separately instead of combining them. In the TFP calculation, human capital is measured as years of schooling, which is narrower than the HDI we used in chapter 6.3. Hence, if we combine the two chapters, the scope of the study will be limited. Besides, the study goes far to calculate or exclude the human capital from the TFP using the (Inklaar – Timmer 2013) formula, but it could not find the accurate value due to some hidden information on how TFP is calculated. Furthermore, although we asked the concerned body, we did not get any tangible and detailed information about how the TFP is calculated. Therefore, due to the unavailability of data on TFP without human capital, there is a huge difference between the measurement of

[25] Post-completion-point countries: Benin, Burundi, Cameron, Central Africa Republic, Mauritania, Mozambique, Niger, Rwanda, Senegal, Sierra Leone, Tanzania, Togo, Honduras, Bolivia, and Nicaragua.

HDI in chapter 6.3 and human capital in chapter 6.4; this study examined the two chapters independently to provide a detailed and broad analysis. Thus, this chapter is organized as follows: The first chapter (chapter 6.1) deals with the impact of external debt on investment and growth. The second chapter (chapter 6.2) examines the impact of external debt on national saving and growth, while the impact of external debt on HCD and growth is investigated in chapter 6.3. The fourth chapter, chapter 6.4, evaluates the impact of external debt on TFP and growth. Besides, all chapters examine the channels through which external debt is transmitted to the economy and affects growth in HIPCs.

6.1. THE IMPACT OF EXTERNAL DEBT ON INVESTMENT AND GROWTH

Introduction

External debt accumulation is a common characteristic of developing and emerging countries at the early stage of economic growth and development. Regarding the debt – growth relationships, the Keynesian and Classical economists are the leading and contradicting school of thoughts. Besides, scholars noted that the relationship between external debt and growth can be non-linear rather than linear and also, external debt can affect growth indirectly through the investment channel. However, empirical studies about the channels and impact of external debt on the growth of HIPCs is given limited attention. Therefore, this chapter aims to examine the impact of external debt on investment and economic growth in the case of HIPCs by taking the non-linear relationship between the variables and the second- generation panel data analysis into account. The study uses panel time-series data ranging from 1990 to 2017 and employed SUR estimation techniques. This chapter starts by providing background information in section 6.1.1. Section 6.1.2 discusses the literature review regarding the topic. The empirical results along with discussion are also found in section 6.1.3. Finally, section 6.1.4. offers a summary of the chapter.

6.1.1. Background of the study

Scholars argue that an excessive amount of foreign debt is a common characteristic of most developing countries at the early stage of their economic development. Most developing countries borrow from abroad to finance their domestic investment and thereby economic growth. According to the neoclassical economic growth model, each state should achieve a steady-state level of capital. Thus, any additional investment could lead them to have faster economic growth and development. However, once the debt grows more significant (see the magnitude in chapter one) and unmanageable, it becomes a major cause of macroeconomic instability and hinders investment and growth promotion. Regarding this, the results in chapter five also confirmed that external debt is unsustainable in HIPCs.

There are different factors (natural resources, labor, physical capital, human capital, savings, etc.) of economic growth. Physical and human capital accumulation, TFP, and savings are the channels through which external debt is likely to impact economic growth. According

to Pattillo et al. (2002), the effect of debt on growth can occur through all the primary sources of growth. The two arguments that support the capital accumulation channel are (a) the debt overhang theory of Krugman (1988) and Sachs (1989) implies that when external debt grows large, investors will be discouraged to invest because of fear of high taxes to repay the debt. Furthermore, the new investment will be discouraged due to the uncertainties regarding what portion of the debt will be repaid with the country's resources, and this, in turn, reduces capital accumulation (Agénor – Montiel 1996; Serven 1997; Serieux 2001; Pattillo et al. 2002; Hwang et al. 2010). (b) The other theory suggesting that a huge amount of external debt obligations can adversely affect physical capital accumulation is the crowding out effect. It mainly occurs due to high real interest rates, worse TOT of borrowed countries, and lack of (shut-off) foreign credit markets. Thus, investments are expected to decline because of a shortage of available resources for financing investment. Similarly, Abdullahi et al. (2016) noted that the crowding out effect concept assumes that government debts expend a more significant part of the national savings intended for investment due to an increase in demand for savings while supply remains constant; therefore, the cost of money increases. Crowding out effect sets in at a point when only the government and its agencies would be able to borrow due to excessive interest charges. Individual entrepreneurs and firms are thus unable to compete and crowded out from the market. Therefore, economic growth is affected due to the inability of economies to generate enough capital for investment.

However, the early post-Keynesian models of growth, the neoclassical growth model, the AK[26] theory, and the endogenous growth models have emphasized the importance of savings and investment in furthering growth. Nevertheless, there are resource gaps for developing countries, and they need foreign borrowing to fill these gaps and achieve the required investment for growth. According to these theories, indebtedness stimulates demand, resulting in a more proportionate increase in investment through the accelerator effect and increased production and growth.

[26] Due to diminishing return in factors of production, accumulation of factors will not provide sustainable per capita income. Hence, neoclassical model assumes the steady state growth will be achieved only by exogeneous rate of technological progress. However, the AK theory postulate that the possibility to overcome the diminishing returns without considering the exogeneous rate of technological progress (i.e., $g \equiv \dot{A}/A = 0$) and assuming $\alpha = 1$, modified the Cobb-Douglas form of Solow production function to linear (Y=AK). Here A refers to the level of technology, assumed constant and K refers capital stock. Thus, in this model, the rise in saving rate has a proportional effect on the growth rate of per capita income, which contradicts the level effect argument of Solow model (Jones 1998).

Besides the above-mentioned contradictory theories, empirical findings that show the relationship between external debt, investment, and GDP growth provide mixed and inconclusive results. Results of findings using a linear econometric approach can be classified into two categories - the first groups support that external debt decreases investment and growth (Borensztein 1990; Iyoha 1999; Were 2001; Maghyereh et al. 2002; Hameed et al. 2008; Guei 2019). However, other studies, such as (Jayaraman – Lau 2009; Ahlborn – Schweickert 2015; Egbetunde 2012; Sánchez-Juárez – García-Almada 2016; Owusu-Nantwi – Erickson 2016) claim external debt has a positive impact on investment, as well as on growth. Currently, however, an essential feature of the research in this area indicates that the impact of external debt on investment and growth can be non-linear rather than linear. Hence, there is a threshold below or above which external debt can affect either investment or growth (Krugman 1988; Sachs 1989; Reinhart – Rogoff 2010a, 2010b; Checherita-Westphal – Rother 2012; Mupunga – Roux 2015). However, while some studies examined the non-linear relationship between external debt and investment (and growth), there is no empirical study in the case of HIPCs. Besides the direct impact, external debt can affect growth indirectly through investment channel, but there is no empirical evidence in HIPCs. Also, although the issue of the impact of foreign debt on investment and growth gained a great interest of researchers, the potential empirical studies have received little attention in the case of HIPCs that consider both the SSA and Latin American countries. Moreover, except for a few, most empirical studies employed conventional estimation techniques and did not consider the existence of CD in their methodologies. Also, except for Abdelaziz et al. (2019), who used a linear model, none of the studies estimated their models simultaneously, but rather estimated separately. Furthermore, except for a few, most empirical studies in the area employed outdated data, which leads to literature, methodology, and time gaps.

Thus, based on the existing contradictory theories along with empirical findings, literature, time, and methodological gaps, this chapter aimed to confirm which theory works and fill the existing research gaps. Therefore, this chapter's primary objective is to investigate the impact of external debt on investment and growth in 15 HIPCs by considering the non-linear and the investment channel in which external debt affects growth. The chapter used panel time series data ranging from 1990 to 2017 and employed a simultaneous equations technique called the SUR method.

6.1.2. Literature review

This section discusses both theoretical and empirical literature regarding the link between external debt, investment, and growth. The theoretical literature explains the relationship with or impact of external debt on investment (growth). Meanwhile, in the empirical literature, different findings (differing in the case studies, type of data, and methodologies) have shown the impacts of external debt on investment (growth).

6.1.2.1. External debt, investment, and growth

This section begins with the broad concept of the impact of external debt on growth through the investment channel to show the link between external debt and investment. As we explained so far, the Keynesians and Classical economists are the two main contradictory schools of thought concerning the relationship between external debt and growth. The Keynesians believe that external debt has a positive contribution to growth, but the Classicals are against it. The early post-Keynesian models of growth (e.g., the Harrod-Domar model) and the neoclassical growth model (Solow-Swan model) have emphasized the importance of savings and investment in furthering growth. However, for developing countries, there is a savings-investment gap. Hence, they need foreign borrowing to fill this gap and to achieve the required investment for growth. Similarly, the neoclassical growth model of absolute and conditional convergence hypothesis argues an increase in saving, which increases investments and generates growth. Nevertheless, currently, in most developing countries, including HIPCs, there is a lack of saving to fulfil the required investment, which is one of the obstacles for countries not to converge. Therefore, to fill this gap, imported foreign capital, such as foreign debt or aid plays a vital role in growth. Besides, the AK theory, the first version of the endogenous theory, explained the importance of saving for growth through investment. Furthermore, the endogenous growth model argues that capital mobility or a country's ability to lend or borrow increase transitional growth (Oleksandr 2003). According to this theory, indebtedness stimulates demand, results in a more proportionate increase in investment through the accelerator effect and increases production.

To the reverse, based on the debt overhang and crowding out effect theories, the classical economists argue that the impact of indebtedness on growth is negative. The debt overhang theory implies that investors expect lower returns when external debt grows beyond certain limits because of fear of higher and progressively more distortionary taxes being imposed to

service the debt. Furthermore, due to the uncertainties about what portion of the external debt will be serviced relative to the countries' resources, new investment is discouraged, and this, in turn, reduces capital accumulation (Hwang et al. 2010). Also, they consider indebtedness as a future tax. It is a negative connotation because public indebtedness hinders capital accumulation and consumption by present and future generations (Diallo 2009). Likewise, the crowding out effect theory argues that external debt negatively affects economic growth by crowding out investment. Due to high real interest rates, adverse TOT of borrowed countries, and the absence of a foreign credit market, the investment will decline because of fearing the government's expected higher tax to service the debt. In the crowding out effect, if a more significant portion of external resources is used to repay foreign debt, very small is available for investment activities and growth (Pattillo et al. 2002; Clements et al. 2005).

At the early stage of economic growth and development, developing countries have limited capital stock, and they have many investment opportunities with a higher rate of return relative to developed nations. In solving the lack of capital accumulation, which is vital for growth, developing countries borrow from abroad. If they use this fund for productive purposes along with a stable macroeconomic environment, their economy will increase, and they can repay the borrowed fund timely (Pattillo et al. 2004). However, due to debt overhang, a massive amount of external debt reduces the growth of a country since the forthcoming debt will be bigger than the repayment capacity of a country, and it thus discourages investment (Krugman 1988; Sachs 1989; Agénor – Montiel 1996; Serven 1997; Serieux 2001; Pattillo et al. 2002; Hwang et al. 2010). Furthermore, the "debt Laffer curve" shows the relationship between massive external debt accumulation and the probability of repaying the debt. Based on this curve, more massive debt stocks are associated with lower probabilities of debt repayment. As a result, even though there is an expectation of debt relief, investors will not be willing to invest due to their fear of a creditor's distortionary tax on their products to service the external debt (Pattillo et al. 2004).

6.1.2.2. Empirical literature

This section presents empirical literature about the relationship or impacts of external debt on investment (growth). Specifically, it has the author's name along with the year, the adopted models, the time scope with case studies, and their findings (see Table 6.1).

Table 6.1 Empirical Literature

Author Name and year	Model Type Adopted	The scope and case study	Results
The impact of external debt on investment			
Greene – Villanueva (1991)	Pooled time-series and cross-section approach	From 1975 to 1987, 23 developing countries.	Private investment is negatively related to external debt stock and debt service.
Warner (1992)	OLS for an individual country and FE for the panel.	From 1982 to 1989, 13 developing countries	Debt crisis does not depress investment.
Cohen (1993)	Pooled data for each sub-period and used Halbert White's (1980) heteroscedasticity-consistent covariance matrix	The study periods are classified into three: from 1965 to 1973, 1974 to 1981, and from 1982 to 1987, for 81 developing countries.	External debt does not affect investment
Serven – Solimano (1993)	Pooled cross-section	From 1976 to 1988, 15 developing countries	External debt harms private investment.
Rockerbie (1994)	OLS	From 1965 to 1990, 13 Latin American countries	The post-1981 debt crisis period significantly reduced the path of investment.
Deshpande (1997)	Least Squares Dummy Variable model	From 1971 to 1991, 13 countries.	External debt adversely affects investment.
Fosu (1999)	OLS	From 1980 to 1990, 35 SSA countries.	Little evidence of a negative correlation between debt and

			investment levels, but it harms growth.
Karagol (2002)	VAR	From 1956 to 1996, Turkey	The debt service burden harms investment.
Safdari – Mehrizi (2011)	VAR	From 1974 to 2007, Iran	External debt hurts private investment.
Checherita-Westphal – Rother (2012)	GMM Arellano–Bond estimator	From 1970 to 2010, 12 Euro area countries	There is a negative association between public debt and public investment
Tuffour (2012)	Least Squares estimation	From 1970 to 2009, Ghana	External debt adversely affects investment.
Apere (2014)	2SLS	From 1981 to 2012, Nigeria	The impact of external debt on private investment is U-shaped.
Sánchez-Juárez – García-Almada (2016)	GMM	From 1993 to 2012, 32 states in Mexico	Public debt exerts a positive effect on public investment, which, in turn, positively affects economic growth.
Siddique et al. (2016)	Panel ARDL	From 1970 to 2007, 40 HIPCs	Debt harms investment and growth.
Adamu (2016)	ARDL	From 1970 to 2013, Nigeria	External debt and debt service exert a negative impact on public capital investment
Abdelaziz et al. (2019)	SUR	From 2000 to 2017, Low-income countries	External debt negatively affects investment
Picarell et al. (2019)	GMM	From 1995 to 2015, 26 EU countries	External debt negatively affects investment
Turan – Yanıkkaya (2020)	GMM	Nine five-year periods: from 1970 to 2014, 89	External debt reduces investment levels

		developing countries	
The impact of external debt on growth (linear models)			
Afxentiou (1993)	Granger Causality Tests	From 1971 to 1988, 20 Middle income developing countries	There is a negative relationship between indebtedness and GDP growth rate.
Cohen (1993)	OLS	From 1965 to 1987, 81 Developing Countries	External debt does not affect the GNP growth rate.
Iyoha (1999)	Simultaneous equation method	From 1970 to 1995, SSA countries	Large stock of external debt depresses investment and lowers the rate of economic growth.
Chowdhury (2001)	Sensitivity and Causal Analysis	From 1982 to 1999, 35 HIPC and 25 non-HIPC	The long-term economic growth is negatively affected by external debt.
Befekadu (2001)	OLS	From 1964 to 1986, Ethiopia	External debt does not affect growth
Were (2001)	ECM	From 1970 to 1995, Kenya	Economic growth is negatively affected by external debt accumulation.
Maghyereh et al. (2002)	OLS and 2SLS	From 1970 to 2000, Jordan	External debt negatively affects GDP growth when it exceeds to 53 % of GDP.
Suma (2007)	Maximum likelihood estimation	From 1980 to 1999, ECOWAS SSA countries	Mixed results – the external debt service has an inverse relationship with economic growth in most periods under investigation, and the total debt stock only affects growth in fewer periods.

Patenio – Tan-Cruz (2007)	VAR	From 1981 to 2005, Philippines	Economic growth is not very much affected by external debt servicing.
Ayadi – Ayadi (2008)	OLS and GLS	From 1980 to 2007, A comparative study of Nigerian and South African economies	External debt and its servicing requirements hurt growth.
Hameed et al. (2008)	GLS approach	From 1970 to 2003, Pakistan	Debt service tends to affect GDP negatively and, thereby, the rate of economic growth in the long run.
Jayaraman – Lau (2009).	Fully Modified OLS	From 1988 to 2004, Six Pacific Island countries	In the short-run, external borrowing contributes to growth.
Diallo (2009)	Cointegration Technique for time series resulting in the ECM	From 1972 to 2005, Guinea	External debt negatively affects per capita growth.
Choong et al. (2010)	OLS	From 1970 to 2006, Malaysia	An increase in the foreign debt level adversely influences economic performance.
Safdari – Mehrizi (2011)	VAR	From 1974 to 2007, Iran	The external debt hurts GDP.
Hailemariam (2011)	Cointegrated VAR model	From 1960 to 2008, Ethiopia	Both external debt stock as well as debt servicing have a negative and significant impact on economic growth.
Gohar et al. (2012)	Least squares multiple regression	From 1990 to 2008, 36 low-income countries	External debt service harms the growth of the countries

Shah – Pervin (2012)	Cointegration Analysis	From 1974 to 2010, Bangladesh	In the long run, external public debt service negatively affects GDP growth, while foreign public debt stock positively affects the GDP growth.
Egbetunde (2012)	VAR	From 1970 to 2010, Nigeria	Public debt and economic growth have a positive long-run relationship.
Ajayi – Oke (2012)	OLS	From 1985 to 2012, Nigeria	The external debt burden harms the nation's income and per capita income of the nation.
Sichula (2012)	OLS	From 1970 to 2011, HIPC of the five Southern African Development Community	Debt service does not have any direct effect on GDP or private capital.
Rocha – Oreiro (2013)	System GMM	From 1980 to 2000, 55 emerging countries	In the long run, external debt negatively affects growth.
Shabbir (2013)	FE and RE	From 1976 to 2011, 70 developing countries	An increase in external debt stock reduces both private fixed capital formation and growth
Owusu-Nantwi – Erickson (2016)	Johansen cointegration and the Vector error correction model (VECM)	From 1970 to 2012, Ghana	There is a positive and significant long-run relationship between public debt and economic growth.
Shittu et al. (2018)	Fully modified OLS and dynamic OLS techniques	From 1990 to 2015, five SSA countries	External debt negatively and significantly related to GDP growth.

Guei (2019)	Panel ARDL	From 1990 to 2016, 13 emerging countries	In the short run, external debt is negatively and significantly correlated to economic growth but not in the long run.
Abdelaziz et al. (2019)	SUR	From 2000 to 2017, low-income countries	External debt negatively affects growth
Turan – Yanıkkaya (2020)	FE and System GMM	Nine five-year periods: from 1970 to 2014, 61 developing countries	External debt stock adversely affects developing countries' growth, and the study also did not support the existence inverted non-linear relationship between external debt and growth.
The impact of external debt on growth (non-linear models)			
Elbadawi et al. (1997)	OLS	From 1970 to 1994, 99 developing countries	Excessive indebtedness hurts the growth rate and follows an inverted U-shape.
Siddiqui – Malik (2001)	OLS and FE	From 1975 to 1998, 3 South Asian countries	There is a non-linear relationship between economic growth and all the indicators of the debt burden.
Pattillo et al. (2002)	OLS, instrumental Variable, FE and system GMM	From 1969 to 1998, 93 developing countries	There is a non-linear relationship between external debt and growth and follows an inverted U-shape.
Oleksandr (2003)	OLS	From 1970 to 2012, Pakistan	External debt expands the growth of the economy to a certain point; after that, the debt starts becoming fatal to economic growth.

Clements et al. (2003)	FE	From 1970 to 1999, 55 low-income countries	Excessive indebtedness hurts the growth rate, and debt service has no direct effect on real per capita GDP growth.
Pattillo et al. (2004)	System GMM	From 1969 to 1998, 61 developing countries	The negative impact of high debt on growth operates both through a strong negative effect on physical capital accumulation and TFP growth.
Schclarek (2005)	System GMM	5-year periods from 1970 to 2002, 59 developing and 24 industrial countries	No evidence of an inverted U-shape relationship between external debt and growth.
Kumar – Woo (2010)	Pooled OLS, Between Estimator (BE), fixed effects (FE), and SGMM	From 1970 to 2007, 38 advanced and emerging economies	There is some evidence of non-linearity with higher levels of initial debt having a proportionately larger negative effect on subsequent growth
Afonso – Jalles (2011)	Pooled OLS, OLS with least absolute deviation robust version, MM estimator a la Yohai (1987) Bias corrected least squares dummy variable, Within FE, two-step robust difference GMM, and two-step robust system GMM	From 1970 to 2008, 155 OECD countries	Government debt has a non-linear impact on growth.

Checherita-Westphal – Rother (2012)	FE, 2SLS, GMM	From 1970 to 2010, 12 Euro countries	There is an inverted U relationship between debt and per capita growth.
Lawanson (2014)	FE and GMM	From 1970-2008, 14 West African countries	Debt appears to have a non-linear effect on growth and follows an inverted U-shape using GMM but not using FE method.
Doğan – Bilgili (2014)	Markov-switching maximum likelihood method	From 1974 to 2009, Turkey	Economic development and borrowing variables follow a non-linear path.
Casares (2015)	Statistical analysis	From 1980 to 2013, OECD countries	There is an inverted U-shaped relationship between the external public debt and growth rate
Riffat – Munir (2015)	FE	From 1991 to 2013, South Asia Countries	There is a non-linear relationship between debt and economic growth and follows an inverted U-shape.
Thieu Dao – Oanh (2017)	OLS and ECM	From 2000Q1 to 2012Q4, Vietnam	There is a non-linear (inverted U-shaped) relationship between external debt and economic growth
Senadza et al. (2017)	System GMM	From 1990 to 2013, 39 SSA countries	External debt directly impedes economic growth in SSA. However, the study did not confirm a non-linear relationship between them.
Haron – Maingi (2018)	GMM	From 1970 to 2017, Kenya	The relationship between external debt and growth is U-shape
Zaghdoudi (2018)	Dynamic panel threshold model	From 2002 to 2016, 109 middle and	The nexus between external debt and economic growth is non-

		low-income countries	linear. Besides, a statistically negative relationship between external debt and economic growth above the threshold level of 15.28%.

Source: Constructed by the author

The empirical findings in Table 6.1 used a different time frame, case study, and methodology for their studies, and their findings are mixed and inconclusive. Most of the results confirm the negative impact of external debt on investment (Borensztein 1990; Greene – Villanueva 1991; Serven – Solimano 1993; Rockerbie 1994; Deshpande 1997; Safdari – Mehrizi 2011; Tuffour 2012; Siddique et al. 2016). However, few findings (Cohen 1993; Warner 1992) did not support the debt overhang and the crowding out effect of external debt on investment. Similarly, except for a few, such as Cohen (1993), Befekadu (2001), Patenio – Tan-Cruz (2007), and Jayaraman – Lau (2009), most empirical findings confirmed that external debt adversely affects growth.

Among empirical studies about debt – growth relationship, only Clements et al. (2003), Pattillo et al. (2004), Schclarek (2005), Kumar – Woo (2010), Afonso – Jalles (2011), Checherita-Westphal – Rother (2012), Riffat – Munir (2015), Abdelaziz et al. (2019), and Silva (2020) examined the channels through which external debt is transmitted to the economy and affect the economic growth of nations. Among the channels studies, Clements et al. (2003), Schclarek (2005), Pattillo et al. (2004), Kumar – Woo (2010), Checherita-Westphal – Rother (2012), Riffat – Munir (2015), and Silva (2020) investigated the investment (either private or public or total) channel through which external debt affects growth using a non-linear model, while Abdelaziz et al. (2019) employed a linear model. Based on the above evidence, we can conclude that there is no empirical study that considers the non-linear effect of external debt on investment and growth in the case of HIPCs. Also, the investment channel through which external debt affects growth is not investigated in HIPCs, leading to a literature gap.

Concerning the methodologies, except for a few studies, most used conventional static models (pooled OLS, OLS, FE, RE) and some of them used dynamic models (GMM, panel ARDL). Even though the GMM is a dynamic model, it only captures the short-run relationship between variables and ignores the long run one. Only a few studies used panel ARDL, but they are either outdated or did not consider CD in the errors. However, similar to this study, only

Abdelaziz et al. (2019) used both simultaneous and dynamic model, but their model did not consider the non-linear relationship between external debt and investment (growth) and also the study missed basic results in panel data econometrics such as CD, unit root test, and cointegration tests.

6.1.3. Empirical results and discussion

Econometric results and their interpretations, together with the study's theoretical and empirical support, are presented in this section. More specifically, the descriptive statistics, unobserved heterogeneity test, the CD test, unit root test, cointegration test, and the estimated SUR results for investment and growth are presented.

6.1.3.1. Descriptive statistics of the variables

The descriptive statistics of the two models' variables (investment and growth) are presented in Table 6.2. For both models, the range of the dependent variable (investment) is between -5.67 and 61.46 shows that the variation is not high while the range of GDPGR is between -50.24 and 35.22. The mean value of external debt is 57.88, and its range varies between 10.23 and 278.97. The mean, minimum, and maximum values of external debt service are 2.49, 0.051, and 13.84, respectively (see Table 6.2 for other variables).

Table 6.2 Descriptive Statistics of the Variables

Variables	Obs	Mean	Std. Dev.	Min	Max
INV	420	20.62	10.38	-5.67	61.46
GDPGR	420	3.79	5.79	-50.24	35.22
ED	420	57.88	41.46	10.23	278.97
ED^2	420	5065.9	10090.14	104.77	77829.37
DSR	420	2.49	1.96	0.051	13.84
INF	420	31.9	328.87	-9.15	5016.1
POLITY2	420	1.87	5.23	-8	9
OPPN	420	61.49	25.89	19.68	136.48
EXCH	420	553.04	835.95	0.140	7384.4
DMCR	420	18.548	13.347	1.60	64.53

LAB	420	40.61	6.328	26.12	50.67

Source: Computed by the author using Stata15.

6.1.3.2. Capturing unobserved heterogeneity

One major problem with cross-section, time series, and panel data regression is that they fail to control heterogeneity among countries and across time periods (Vijayamohanan 2016). Currently, these unobserved differences among the countries and across the time-specific period are vital in the way the error term is specified and how the model is estimated (Ampah 2020). But these unobserved heterogeneities can be captured by including both country and time dummies in the regression. However, if the number of observations is lower than the number of parameters, it is impossible, and the estimation will be broken down (Vijayamohanan 2016). Nevertheless, in our study, it is possible to estimate the models with countries and time dummies since the number of observations is greater than the number of parameters to be estimated. If we included both country and time dummies, our assumption would be the slope coefficients were constant, but intercept varied over countries and time, which would give the two-way error components model. Therefore, this study tests the null hypothesis if intercepts are different across countries and time in general. In this case, we can do the poolability test of the null hypothesis of zero cross-section and time effects using Stata.

Table 6.3 shows the result of this study about whether the cross-sectional specific and time-specific fixed effects specified in Equations 20 and 21 are valid. The result reveals that the null hypothesis of the captured unobserved heterogeneity is homogenous across the countries and time is rejected at 1%, which implies Equations 20 and 21 are correctly specified. Besides, to check the two-way error component model's robustness relative to the pooled OLS estimator, this study conducted an additional poolability test. The result shows the null hypothesis that intercepts homogeneity (pooling) is rejected at 1% level; therefore, the LSDV or the FE model is most applicable, but the pooled OLS is biased. Therefore, this study estimated the LSDV(FE) model (see Table 6.3) besides the SUR model.

Table 6.3 Test for individual cross-sections and time-specific effects

Tests	Investment model		Growth model		Decision
	Test statistic	Prob.	Test statistic	Prob.	s

Null hypothesis (H0): zero cross section and time effects: Poolability test (F-test)	F(41, 369) = 7.16	0.0000	F(41, 370) = 1.87	0.0015	reject H0 at 1% level
H0: Pooled OLS model is appropriate: Poolability test (F-test)	F(41, 369) = 8.71	0.0000	F(41, 370) = 3.19	0.0000	reject H0 at 1% level

Source: Computed by the author using Stata15

6.1.3.3. Cross-sectional dependence, unit root, and cointegration tests

Since neglecting cross-section dependence can lead to biased estimates and spurious results, this study conducted a CD test using Pesaran (2004) test. The result fails to reject the null hypothesis of cross-sectional independence at a 5 and 1% of level of significance for investment and growth model, respectively (see Table 6.4).

Table 6.4 Cross-sectional dependence test

Tests	HIPCs	
	Investment model	Growth model
Pesaran's test of cross-sectional independence	2.511	5.071
The average absolute value of the off-diagonal elements	0.329	0.179
Probability	0.0121*	0.0000*

Note: * ⇒ existence of cross-sectional dependence

Source: Computed by the author using Stata 15

The study also examined the stationarity of the variables in the model. Due to the existence of cross-section dependence in the models, this study uses the second-generation unit

root test rather than the traditional tests. The result fails to reject the null hypothesis of unit root (non-stationary) for all variables at a 1% level of significance at the first difference, which led us to notice all measures are integrated of order one (I(1)). Thus, we might expect there is long-run relationships among the variables together.

Table 6.5 Pesaran (2007) Unit Root Test

Variables	CIPS (intercepts only)				Critical values		
	Investment model		Growth model				
	Levels	1st diff.	Levels	1st diff.			
	Statistic	Statistic	Statistic	Statistic	10 %	5 %	1 %
INV	-2.834***	-5.384***	-2.834***	-5.384***	-2.14	-2.25	-2.45
ED	-2.086	- 4.691***	-2.086	- 4.691***			
ED^2	-1.785	-4.149***	-1.785	-4.149***			
DSR	-2.678***	-5.731***	-2.678***	-5.731***			
INF	-3.968 ***	-5.897***	-3.968 ***	-5.897***			
GDPGR	-4.584***	-3.533***	-4.584***	-3.533***			
POLITY2	-2.661***	-2.663***	----	-----			
OPPN	-2.266**	-4.650***	-2.266**	-4.650***			
EXCH	-1.748	-3.460***	-1.748	-3.460***			
DMCR	-2.353**	-4.525 ***	----	----			
LAB	-----	-----	-0.996	-2.629***			

Note: *** ⇒ significant (stationary) at 1% level

Source: Computed by the author using Stata 15

Besides the panel unit root test, this study conducted a cointegration test. However, unlike chapter five, this chapter used the McCoskey – Kao (1998) cointegration test. Table 6.6 shows a long-run relationship among the variables in both models at a 1% level of significance.

Table 6.6 Panel cointegration test

	HIPC

	Investment Model		Growth Model	
	Statistic	p-value	Statistic	p-value
Modified Dickey-Fuller t	-5.7910	0.0000***	-20.1295	0.0000***
Dickey-Fuller t	-4.1312	0.0000***	-16.2846	0.0000***
Augmented Dickey-Fuller t	-2.9589	0.0015***	-10.4095	0.0000***
Unadjusted modified Dickey-Fuller t	-6.3601	0.0000***	-28.2302	0.0000***
Unadjusted Dickey-Fuller t	-4.2905	0.000***	-17.1237	0.0000***

Note: *** ⇒Significant at 1% level

Source: Computed by the author using Stata 15

6.1.3.4. SUR estimation results

Chapter five found that external debt is unsustainable in HIPCs and also, there is a theoretical argument that explains that unsustainable external debt can adversely affect growth and other macroeconomic variables. Therefore, to confirm this, this chapter empirically examined the impact of external debt on investment and growth (see Table 6.7).

The long-run result of the investment model shows that external debt stock negatively and significantly affects the investment level of HIPCs. The coefficient for external debt indicates that a percentage point increase in external debt accumulations reduces investment level by 0.0612 percentage point, which substantially supports the prediction of the debt overhang hypothesis. This result also implies that the borrowed funds have not been allocated efficiently to productive investment projects. This result also in line with Greene – Villanueva (1991); Serven – Solimano (1993); Rockerbie (1994); Deshpande (1997); Safdari – Mehrizi (2011); Tuffour (2012); Siddique et al. (2016); Adamu (2016); Abdelaziz et al. (2019); Picarell et al. (2019); and Turan – Yanıkkaya (2020). Nevertheless, the above studies did not consider a non-linear impact of external debt on investment.

Furthermore, the result shows that the coefficient of the square of external debt positively and significantly affects the investment level, which implies that the relationship between external debt and investment is non-linear. Up to 153 % of external debt stock to GDP, the relationship between the external debt stock and investment is negative; over this limit, it is positive. This means the external debt has a positive effect on investment above the 153 debt

threshold. However, it is difficult to conclude the relationship between external debt and investment follows U-shape. Because, except for Mozambique (1990-1999) and Nicaragua (1990-1995), HIPCs external debt in all periods remained below the threshold values; hence, the relationship is dominantly negative. Therefore, we can say that the relationship between external debt and investment is negative and non-linear. Furthermore, after a deep check of country-by-country analysis, the study found that the relationship between external debt and investment is inverted U-shape (in four countries), U-shape (in one country), positive and non-linear (in two countries), and insignificant (in eight countries).

The result of this study coincides with other non-linear findings, such as Checherita-Westphal – Rother (2012) and Apere (2014). However, Checherita-Westphal – Rother (2012) examined the impact of public debt on public investment, and Apere (2014) studied the impact of external debt on private investment. Unlike the above non-linear studies, this study examined the impact of external debt on total investment. Furthermore, the case study of the above studies is not HIPCs. Therefore, this result is different from the above studies due to its broader scope in measuring the investment variable and the number of countries included in the model. Even though many studies show negative/positive impact of external debt on investment (private or public), to the best of the writer's knowledge, there is no empirical study on the non-linear effects of external debt on investment in the case of HIPCs, which makes the result of this study has a potential to fill the literature gap.

In the long run, the result revealed that external debt service significantly reduces the investment level of HIPCs in the study period. A one percentage point increase in debt service reduces the investment by 0.95 percentage point, which supports the crowding out effect. This means that substantial foreign debt service has led to domestic borrowing by the government. This raises the domestic lending interest rate, constraining private domestic borrowing as demand for loanable funds increases. The increased interest rate raises the cost of borrowing, thereby reducing investment. Furthermore, this study correlates with the hypothesized sign and match with previous findings, such as Greene – Villanueva (1991), Iyoha (1999), Karagol (2002), Shabbir (2013), and Adamu (2016). However, this study's result is different from the above studies; it is the latest one and filled the time gap. Also, the model of this study is non-linear rather than linear.

Trade openness significantly increases the investment level of HIPCs. In the long run, a percentage point increment in trade openness increases the investment level of HIPCs by 0.22

percentage points. International trade openness leads to increased investment by allowing import of investment goods, particularly if it is developing. Imports can increase, owing to two reasons. Firstly, the demand for exporting firms is high. The second is the effect of foreign exchange earnings from exports; particularly, if the need for investment is emanating from the exporting sector, the process will follow self-generating circular causation. The exporting sector can import capital goods that are likely to promote technological advancement and export more.

The estimated result of the growth model shows that external debt significantly reduces the GDP growth of HIPCs. A percentage point increase in external debt reduces the GDP growth by 0.0401 percentage point, which supports both the debt overhang and crowding out effect theories of classical economists. The result of this finding also coincides with Afxentiou (1993); Elbadawi et al. (1997); Fosu (1999); Iyoha (1999); Chowdhury (2001); Were (2001); Ayadi –Ayadi (2008); Diallo (2009); Choong et al. (2010); Safdari – Mehrizi (2011); Hailemariam (2011); Ajayi – Oke (2012); Shabbir (2013); Senadza et al. (2017); Shittu et al. (2018); Abdelaziz et al. (2019); and Turan – Yanıkkaya (2020).

However, the square of external debt significantly increases the GDP growth of HIPCs, which implies there is a non-linear relationship between external debt and growth. Up to 200 % of external debt stock to GDP, the relationship between the external debt stock and GDP growth is negative; over this limit, it is positive. This means the external debt has a positive effect on growth above the 200-debt threshold. However, the relationship between external debt and GDP growth does not follow a U-shape. As most HIPCs external debt in most periods remained below the threshold values, the relationship between external debt and GDP growth is negative and non-linear. Furthermore, the country-by-country analysis shows that the relationship between external debt and GDP growth is inverted U-shape (in one country), U-shape (in four countries), and insignificant (in ten countries).

The negative and non-linear relationship between external debt and growth of this study contradicts the theoretical expected inverted U-shape. The existence of an inverted U-shape relationship or the decline in the growth rate resulting from a high debt cannot hold in an imperfect market. If there is a rigidity of wages in the labor market, leading to unemployment, public debt is neutral (Greiner 2013). A higher debt ratio can then lead to higher growth and less unemployment if the deficit is used for productive public investment (Greiner – Flaschel 2010; Greiner 2013). However, an inverted U-shaped relation between debt and growth does

not exist, but the growth rate rises until the economy reaches the full employment state. Besides, under the Golden Rule of Public Finance (GRPF), Greiner (2013) derived an inverted U-shaped relationship between debt and growth by assuming the amount of public investment must always be equal to that of newly issued bonds, i.e., public investment must be financed only by newly issued bonds. Moreover, Ueshina – Nakamura (2019) argues that the inverted U-shaped relationship emerges when public investment is partly financed by other sources than government bonds, such as taxes. Therefore, based on the above evidence, since HIPCs have incomplete market structures and limited domestic resources to finance their deficit and public investment, an inverted U-shape relationship may not exist. This result coincides with other findings that used a non-linear model, such as Pattillo et al.[27] (2002), Afonso – Jalles[28] (2011), Eberhardt – Presbitero (2013), and Haron – Maingi (2018). Furthermore, the findings of Schclarek (2005), Cordella et al. (2005), and Daud – Podivinsky (2012) did not support the existence of an inverted U-shape relationship between debt and growth, and the result of this study is also partially in line with these studies. However, it contradicts with Elbadawi et al. (1997); Siddiqui – Malik (2001); Pattillo et al. (2002); Clements et al. (2003); Oleksandr (2003); Pattillo et al. 2004; Kumar – Woo (2010), Afonso – Jalles[29] (2011); Checherita-Westphal – Rother (2012); Lawanson (2014); Casares (2015); Riffat – Munir (2015); Thieu Dao – Oanh (2017); Zaghdoudi (2018).

The other significant result is the reciprocal interrelationship between investment and GDP growth. An increase of one percentage point in investment leads to a 0.214 percentage point increase in GDP growth, and a one percentage point increase in GDP growth increases investment by 0.53 percentage point. Considering investment as a production factor, this result is consistent with the neoclassical (Solow – Swan) growth model. In their model, they assumed higher investments lead to more accumulated capital per worker, contribute to wealth accumulation, create more job opportunities, and increase wages. This subsequently enhances economic growth and development. Also, in an endogenous growth model, the concept of capital is broad. According to this model, physical capital positively impacts growth through direct or indirect investment in human capital formation, domestic, and foreign direct investment. Besides, this result is also similar to other empirical findings - Chowdhury (2001),

[27] when the total external debt-to-GDP ratio is below 35-40%.
[28] when debt-to-GDP ratio is below 30%
[29] when debt-to-GDP ratio is above 90%

Patenio – Tan-Cruz (2007), Hameed et al. (2008), Ayadi – Ayadi (2008), and Abdelaziz et al. (2019).

The rise (depreciation) in the official exchange rate significantly increases the GDP growth of HIPCs. A one percentage point increment in the official exchange rate increases the GDP growth rate by 0.0007 percentage point due to its impact on increasing exports and decreasing the quantity of imports, which results in a positive trade balance and growth in the long run.

Table 6.7 Results of SUR Model for the Total (HIPCs) Sample

Equations	Variables	Coef.	Std. Err.	P>|z|
INV (Equation 7)	ED	-0.0612	0.0333	0.066*
	ED^2	0.0002	0.0001	0.099*
	DSR	-0.9523	0.2843	0.001***
	INF	0.00078	0.0013	0.566
	GDPGR	0.5335	0.0723	0.000***
	POLITY2	-0.2428	0.0886	0.006***
	OPPN	0.2286	0.0201	0.000***
	EXCH	-0.001	0.0005	0.066*
	DMCR	-0.010	0.0424	0.803
	Constant	10.575	1.724	0.000***
GDPGR (Equation 8)	INV	0.2142	0.0308	0.000***
	ED	-0.0401	0.0210	0.056*
	ED^2	0.0001	0.00008	0.044**
	DSR	0.304	0.1837	0.097*
	LAB	0.075	0.0456	0.099*
	OPPN	-0.02	0.0144	0.150
	INF	-0.001	0.0008	0.203
	EXCH	0.0007	0.0003	0.029**
	Constant	-2.086	2.441	0.393

Equation	Obs	Parms	RMSE	R-sq	Chi2	P
INV	420	9	8.623	0.308	240.31	0.0000
GDPGR	420	8	5.661	0.044	68.00	0.0000

Notes: *, **, *** ⇒ significant at 10, 5, 1% level, respectively.

Source: Computed by the author using Stata 15

Generally, this study confirmed that external debt adversely affects both investment and growth, which supports the hypothesis of the debt overhang and crowding out effect. This result also indirectly confirms the conclusion of chapter five – external debt is unsustainable in HIPCs and the hypothesis that unsustainable external debt adversely affects investment and growth. Besides, it revealed a non-linear relationship between external debt and investment (GDP growth) but does not follow a U-shaped form in HIPCs, and it contradicts with the theoretical expectation of (inverted U-shape) relationship. This result implies that initially, the effect of external debt on investment and growth is negative, and then it may have a positive impact in the future. This is due to weak macroeconomic policies and institutions to handle the accumulated external debt; mismanagement and misuse of external finance to productive sectors; corruption due to week rule and regulation and irresponsible government officials' action in capital flight can be reasons for the current ineffectiveness of external debt on investment and growth. Due to the unsustainability of external debt, we have evidence[30] in which external debt had a negative contribution to investment and growth. This implies that if the external debt had a positive impact on investment and growth, countries could meet their current and future external debt service obligations without recourse to debt rescheduling or the accumulation of arrears without compromising growth. However, this does not happen in HIPCs. Therefore, this study could not agree with the inverted U-shape relationship between external debt and investment (growth) and questioned why HIPCs external debt was unsustainable in the 1990s and 2000s if the external debt had a positive contribution to growth and investment.

The other impressive result of this study is external debt affects growth through investment channel. Since external debt negatively affects investment and there is a positive relationship between investment and growth, we can say that external debt affects investment and growth indirectly through the investment channel. The investment channel result of this study coincides with Clements et al. (2003), Schclarek (2005), Pattillo et al. (2004), Checherita-Westphal – Rother (2012), Riffat – Munir (2015), and Abdelaziz et al. (2019).

[30] Two HIPCs Initiatives in the late 1990s and the Multilateral Debt Relief Initiative (MDRI) in 2005 aiming to reduce the debt burden.

To ensure the robustness of the above result, this study divided the dataset into two sub-regions (HIPCs in SSA countries[31] and HIPCs in non-SSA[32]), but similarly to chapter three and four, this chapter also did not provide an empirical result for HIPCs in non-SSA. This is because there are only three HIPCs in non-SSA, and they did not fulfil the minimum rule (5*parameters < observations) of econometrics. Therefore, the estimation in this study is carried out for only HIPCs in SSA. The results of HIPCs in SSA countries are similar to the findings in the case of all HIPCs. The impact of external debt on investment is negative and non-linear for HIPCs in SSA countries, and its turning point is 95.75 % of external debt stock to GDP (See Table 5.9).

Similarly, the growth model result for HIPCs in SSA revealed that the impact of external debt on growth is negative and non-linear. This implies, up to 215 % of external debt stock to GDP, the relationship between the foreign debt stock and GDP growth is negative; over this limit, it is positive. When we see the relationship between investment and growth, the GDP growth significantly increases the investment level of HIPCs in SSA and also, the reciprocal effect is positive and significant for the sub-region (see Table 6.8). Generally, the total sample (HIPCs) and the HIPCs in SSA have similarities in both investment and growth models. This implies that the linear coefficient of external debt confirmed the debt overhang and crowding out effect of external debt on investment and growth. Besides, since the coefficient of the square of external debt is significant, there is a non-linear relationship between external debt and investment (growth). This means initially, the effect of external debt on investment (growth) is negative, but it will positively affect the future.

Table 6.8 Results of the SUR model for HIPCs in SSA countries

Equations	Variables	Coef.	Std. Err.	P>|z|
INV (Equation 7)	ED	-0.0766	0.036	0.035**
	ED^2	0.0004	0.0001	0.003***
	DSR	-0.9754	0.334	0.004***
	INF	0.00072	0.036	0.984
	GDPGR	0.4647	0.0725	0.000***
	POLITY2	0.0150	0.1021	0.883
	OPPN	0.2354	0.0265	0.000***

[31] Benin, Burundi, Cameron, Central African Republic, Mauritania, Mozambique, Niger, Rwanda, Senegal, Sierra Leone, Tanzania, and Togo

[32] Honduras, Bolivia, and Nicaragua.

	EXCH	-0.0013	0.00059	0.022**	
	DMCR	0.1859	0.0752	0.013**	
	Constant	8.512	1.844	0.000***	
GDPGR (Equation 8)	INV	0.232	0.0388	0.000***	
	ED	-0.043	0.026	0.094*	
	ED^2	0.0001	0.0001	0.097*	
	DSR	0.3614	0.2468	0.143	
	LAB	0.084	0.0546	0.120	
	OPPN	-0.028	0.020	0.180	
	INF	-0.029	0.025	0.257	
	EXCH	0.000	0.0004	0.019**	
	Constant	-2.41	2.94	0.413	

Equation	**Obs**	**Parms**	**RMSE**	**R-sq**	**Chi2**	**P**
INV	336	9	8.46	0.38	249.48	0.0000
GDPGR	336	8	6.19	0.05	58.99	0.0000

Source: Computed by the author using Stata 15

Moreover, to confirm the SUR model's robustness and compare it with other standard approaches, this study estimated the models using the LSDV (FE) (see Table 6.9). Unlike the SUR model, the target variables – external debt and its square – have an insignificant effect on investment for both HIPCs and HIPCs in SSA countries. However, the other target variable (debt service) negatively and significantly affect investment. Similarly to the SUR model, the effect of other variables, such as GDP growth rate, trade openness, and exchange rate on investment for both HIPC and HIPCs in SSA countries is the same.

Furthermore, for HIPCs, we can observe similar results with the SUR model regarding the effect of the main targeted variables (investment, external debt and its square) on economic growth. However, the impact of debt service on growth is insignificant using the LSDV model. When we see the growth model of HIPCs in SSA countries, the only significant variables are investment and external debt when we use the LSDV model. However, the impact of both variables on growth is similar to the SUR model. Unlike the SUR model, the quadratic term of external debt does not affect growth in HIPCs in SSA countries.

Table 6.9 Results of LSDV (FE) model for the HIPCs and HIPCs in SSA countries

Equations	Variables	HIPCs		HIPCs in SSA countries	
		Coef.	P>|z|	Coef.	P>|z|
INV (Equation 7)	ED	0.0541	0.249	0.0792	0.101
	ED^2	-0.00017	0.257	-0.00001	0.937
	DSR	-1.370	0.000***	-1.466	0.000***
	INF	0.0029	0.012**	-0.0487	0.168
	GDPGR	0.1678	0.010**	0.174	0.007***
	POLITY2	-0.1092	0.455	-0.33495	0.026**
	OPPN	0.218	0.000***	0.3023	0.000***
	EXCH	-0.0013	0.095*	-0.0019	0.019**
	DMCR	-0.164	0.010**	-0.128	0.226
	Constant	10.646	0.001***	4.136	0.266
GDPGR (Equation 8)	INV	0.114	0.006***	0.1323	0.012**
	ED	-0.072	0.053*	-0.0806	0.064*
	ED^2	0.0002	0.056*	0.0002	0.155
	DSR	0.065	0.777	0.064	0.834
	LAB	0.186	0.322	0.561	0.192
	OPPN	-0.0417	0.097*	-0.053	0.122
	INF	-0.0005	0.594	-0.0038	0.902
	EXCH	0.0010	0.077*	0.0010	0.124
	Constant	-3.479	0.644	-17.91	0.302

Notes: *, **, *** ⇒ significant at 10, 5, 1% level, respectively.

Source: Computed by the author using Stata 15

6.1.4. Chapter summary

External debt accumulation is a common characteristic of developing countries and HIPCs at the early stage of economic growth and development. However, once the debt grows more prominent and unsustainable, it will hurt both investment and growth. Most studies examined the linear impact of external debt on investment and growth. However, there is a lack of studies that show the non-linear impact of external debt on investment and growth. Besides,

most studies examined the direct impact of external debt on investment or growth, i.e., the investment channel through which external debt affects growth was not analyzed for HIPCs. Therefore, this chapter's central focus was to examine the non-linear impact of external debt on investment and growth (considering an investment is an important channel that affects growth) in HIPCs employing the GLS-SUR estimation techniques for the period ranging from 1990 to 2017. The evidence indicates that the relationship between external debt and investment (GDP growth) is negative and non-linear. The turning point between external debt and investment is at 153% (for HIPCs) and 95.75% for HIPCs in SSA. Similarly, the turning point for the external debt-GDP growth model is at 200% for HIPCs and 215% for HIPCs in SSA. Furthermore, investment has a positive and significant effect on growth in HIPCs and HIPCs in SSA. This implies that external debt affects growth through the investment channel in both HIPCs and HIPCs in SSA. Consequently, **this chapter does not reject the hypotheses of H3, H3a, and H3b. Specifically, it does not reject the hypotheses that external debt has (H3) a direct or indirect impact on investment and economic growth of HIPCs, (H3a) a significant and non-linear impact on both investment and economic growth in HIPCs, and (H3b) a significant impact on the growth of HIPCs through investment channel.**

6.2. THE IMPACT OF EXTERNAL DEBT ON NATIONAL SAVING AND GROWTH

Introduction

The main objective of this chapter is to investigate the impact of external debt on national saving and economic growth in the case of HIPCs. Besides, it examines the effect of external debt on growth through the national saving channel. Similarly to the previous chapter, this chapter also considered the non-linear relationship between the variables. In order to achieve its objective, this chapter estimated two models by employing dynamic estimation techniques – PMG estimation and PCSE regression – for the period ranging from 1990 to 2017. This chapter begins by providing background information in section 6.2.1. Section 6.2.2 discusses the literature review regarding the topic. The estimated results along with discussion found in section 6.2.3. Finally, section 6.2.4. offers a chapter summary.

6.2.1. Background of the study

In the initial stages of a country's development, national savings may not be adequate to finance the domestic investment necessary to ensure sustained growth. It becomes essential to look for overseas borrowing to supplement domestic savings. When dealing with external debt, savings, and growth, the Keynesian, Classical, Investment – Saving (IS) gap and debt overhang can be important theories (Oageng – Boitumelo 2017). The early post-Keynesian models of growth (e.g., the Harrod – Domar) and the neoclassical growth model (Solow – Swan) have emphasized the importance of savings in furthering growth. Besides, the AK theory, the first version of the endogenous theory, explained the importance of saving for growth. Furthermore, the endogenous growth model argues that capital mobility or a country's ability to lend or borrow increase transitional growth (Oleksandr 2003). However, for developing countries, there is the savings-investment gap. Hence, they need foreign borrowing to fill this gap and to achieve the required investment for growth.

Nevertheless, the relationship between savings and economic growth is still an open debatable issue to academicians and policymakers. According to Solow (1956), savings affect countries' economic growth because higher savings lead to an increase in capital accumulation, which in turn expands the GDP growth rate of a nation. Theoretically, since the growth models

of Harrod (1939) and Domar (1946), the relationship between savings and GDP growth has been a researcher's agenda. According to Harrod (1939) and Domar (1946) growth models argues that economic growth is based on savings, and as a result, increases in savings lead to significant increases in the rate of economic growth. However, the neoclassical growth models, such as the Solow (1956) and Swan (1956) believe that saving has a positive impact on growth only in the short run and also the endogenous growth theories of Romer (1986), Lucas (1988), and Rebelo (1991) specified that a rise in savings could generate a permanent increase in economic growth.

When we construct the association between external debt, savings, and growth, since savings are the primary sources of growth, there is a channel through which external debt is likely to impact economic growth. According to Pattillo et al. (2002), the effect of debt on growth could occur through all the primary sources of growth like savings. The main arguments that support the saving channel are the debt overhang theory of Krugman (1988), and Sachs (1989) implies that when the government holds all foreign debt, the debt overhang problem may spill over to savings. This is because the government would have little incentive to pursue policies that stimulate private savings and investment when debt payments absorb most of the country's gains. Therefore, the external debt burden affects saving and then economic growth.

Concerning this, even though most empirical findings focus on the linear impact of external debt on growth, in recent times, some studies and scholars have argued that the impact of external debt on growth can be non-linear. Thus, studies, such as Elbadawi et al. (1997); Siddiqui – Malik (2001); Pattillo et al. (2002); Clements et al. (2003); Oleksandr (2003); Pattillo et al. (2004); Schclarek (2005); Kumar –Woo (2010); Afonso – Jalles (2011); Checherita-Westphal – Rother (2012); Lawanson (2014); Doğan – Bilgili (2014); Casares 2015; Riffat – Munir (2015); Thieu Dao – Oanh (2017); Senadza et al. (2017); Haron – Maingi (2018); and Zaghdoudi (2018) analyzed the impact of external debt on growth using non-linear models.

Furthermore, Pattillo et al. (2002) argue that the effect of external debt on growth can occur through all the primary sources of growth like savings. However, only Schclarek (2005), Pattillo et al. (2004), Checherita-Westphal – Rother (2012), Riffat – Munir (2015), and Silva (2020) investigated the saving (either private or domestic or national) channel through which external debt affects growth using a non-linear model. Nevertheless, surprisingly, there is no empirical study about the non-linear impact of external debt on national saving (growth) in the

case of HIPCs. Besides, the saving channel through which external debt is transmitted to the economy and growth is not analyzed for HIPCs, leading to gaps in the literature (knowledge). Moreover, regardless of the model type and the channels employed. The existing empirical findings have inconclusive and contradicting results concerning the impact of external debt on growth. Furthermore, most of the studies about the impact of external debt and growth employed either static models or dynamic models but did not capture the long-run relationships or take the CD into account or analyzed it for a single country which may/may not be in the list of HIPCs but could not represent HIPCs or used outdated data. Thus, this chapter attempts to fill the gap in scope, literature, and methodology. Therefore, the primary objective of this chapter is to investigate the impact of external debt on national savings and growth along with the national saving channel in which external debt affects growth in the case of HIPCs.

6.2.2. Literature review

This section presents the theoretical framework and empirical findings on the topic. The theoretical framework discusses the effect of external debt on national savings and growth. Besides, the empirical literature presents different studies that support or contradict the existing theories.

6.2.2.1. Theoretical framework of the study

This section discusses different theories, such as the Keynesian, Classical, IS gap, and debt overhang theories, which show the relationship between external debt and savings. Furthermore, on the relationship between external debt on growth, this section also presents the Keynesians (early post-Keynesian, neoclassical, and endogenous growth models) and the classical model (debt overhang) theories.

6.2.2.1.1. The effect of external debt on national saving and growth

The Keynesian, Classical, IS gap, and debt overhang theories are the most important in discussing savings and external debt. Besides, the two opposing schools of thought – Keynesian and Classical theories – are useful when dealing with the relationship between external debt and economic growth. The Keynesian theory hypothesizes that indebtedness motivates demand, which leads to a rise in investment and production. However, the classical theory considers that debt is a future tax and hence it hinders capital accumulation and consumption

(Oleksandr 2003; Pattillo et al. 2004; Diallo 2009; Sheikh et al. 2014; Oageng – Boitumelo 2017).

The theories mentioned above also work in explaining the savings behaviors of individuals and nations. The Keynesian theory states that when there is an increment in income, some part of it can be saved, which implies that there is a positive relationship between savings and income. However, the classical theory argues that there is a positive association between interest and savings, which can be observed in the theories of life cycle or inter-temporal consumption and savings (Oageng – Boitumelo, 2017). From these theories, Chaudhry et al. (2009) argue that the rise in interest rate has income and substitution effects. When countries have small net assets, the substitution effect is expected to be higher than the income effect; thus, there will be a positive correlation between savings and interest rate. This implies the cost of borrowing will increase in a given economy; therefore, the level of investment spending is severely affected (Chaudhry et al. 2009; Oageng – Boitumelo 2017). Similarly, McCallum (1993) suggested that the effect of a one-dollar increment in government consumption which is financed by borrowing can reduce the national savings by the same amount (McCallum 1993; Oageng – Boitumelo 2017). Besides, the Life Cycle Theory of Hall (1978) states at the beginning of their work, and individuals are rational to borrow to finance their consumptions needs and to repay later the borrowed money when their income increase and save some part of their income for future consumption during retirement (Oageng – Boitumelo 2017).

There are also many schools of thoughts, such as early post-Keynesian, neoclassical, and endogenous growth models that support the importance of external debt, which helps provide resources required for savings and investment and achieve economic growth. However, the classical or debt overhang theories and crowding out theorists do not support external debt for growth due to its adverse effect.

6.2.2.2. Empirical literature

This section presents the most selected and basic findings related to the title. However, since empirical findings about the impact of external debt on growth were discussed in chapter 6.1, this section only provides empirical findings of the impact of external debt on savings and the impact of savings on growth (see Table 6.10).

Table 6.10 Empirical Literature

Author Name and year	Model Type Adopted	The scope and case study	Results
The impact of external debt on saving			
Griffin – Enos (1970)	OLS	From 1962 to 1964, 32 developing countries	Domestic savings was inversely related to foreign capital
Weisskopf (1972)	OLS	From 1953 to 1966, 44 least developed countries	Foreign capital inflow negatively reduces domestic savings.
Chaudhry et al. (2009)	Johansen cointegration	From 1973 to 2006, Pakistan	Foreign debt hurts saving.
Okafor – Tyrowicz (2009)	OLS, FE, RE, panel GLS, and 2SLS	From 1975 to 2004, SSA, Latin America with Caribbean countries	There is a causal and negative link from foreign debt to domestic savings.
Checherita-Westphal – Rother (2010)	GMM Arellano–Bond estimator	From 1970 to 2010, for 12 Euro area countries	The public debt and its square have a positive and negative impact on private saving rate, respectively.
Aliyu – Usman (2013)	Johansen Cointegration	From 1970 to 2010, Nigeria	External Debt has an adverse and statistically significant effect on national savings.
Oageng – Boitumelo (2017)	VECM	From 1980 to 2014, Botswana	External debt hurts national savings.
The impact of savings on growth			
Anoruo – Ahmad (2001)	VECM	From 1960 to 1997, seven African countries	Savings and economic growth have a long-run causal relationship.

Romm (2002)	VECM	From 1946 to 1992, South Africa	Savings enhanced growth and at the same time growth increased savings.
Tinaromm (2005)	VECM	From 1946 to 1992, North Africa	Economic growth is directly and indirectly affected by private savings
Mohan (2006)	Granger Causality	From 1960 to 2001, 13 countries	For low-income countries, the Keynesian theory of savings is confirmed. In contrast, for countries with high and more than average incomes, the Solow hypothesis of savings is a determinant of economic growth was confirmed.
Sajid – Sarfaraz (2008)	VECM	From 1973 to 2003, Pakistan	The study confirmed that the Keynesian view, i.e., saving is a function of income levels
Odhiambo (2008)	Granger causality	From 1991 to 2005, Kenya	Economic growth Granger causes savings, while savings drive the development of the financial sector. The study, therefore, warns that any argument that financial development unambiguously leads to economic growth should be treated with extreme caution
Sheggu (2009)	VAR	From 1960 to 2003, Ethiopia	Domestic savings caused higher growth rates
Masih – Peters (2010)	VAR	From 1960 to 1996, Mexico	Savings have a positive effect on economic growth

Singh (2010)	ARDL	From 1950 to 2002, India	An increase in savings leads to higher income and economic growth.
Najarzadeh et al. (2014)	ARDL	From 1972 to 2010, Iran	Savings and economic growth have a long-run causal relationship.
Jagadeesh (2015)	ARDL	From 1980 to 2013, Botswana	There is a significant relationship between savings and economic growth and the study supported Harrod-Domar growth Model.

Source: Constructed by the author

All empirical findings in Table 6.10 confirmed that external borrowing adversely affects either domestic or national savings and has a positive relationship with the growth of countries. However, in general, there are few studies about the impact of external debt on saving and nothing for HIPCs specifically. Even though Okafor – Tyrowicz (2009) examined SSA, Latin America with Caribbean countries (most HIPCs constitutes), they employed conventional estimation techniques and outdated data set, which ended in 2004. Besides, some of the countries in the list of HIPCs in 2004/9 may not be found today. Hence, the results and recommendations of this study may not be appropriate and work for these days. Furthermore, almost all studies about the impact of external debt on savings are outdated. For example, the latest study is Oageng – Boitumelo (2017), which used the dataset that ended in 2014. However, the study employed a conventional estimation technique for Botswana, which is not found in the current list of HIPCs. Also, a single country (which has a population of around 2 million and 581,726 km^2 area) study and policy recommendations cannot represent HIPCs.

Table 6.10 also shows all empirical studies that found the positive relationship between saving and growth. However, there are no empirical findings in the case of HIPCs, and except for few, all applied conventional estimation techniques. Although Singh (2010), Najarzadeh et al. (2014), and Jagadeesh (2015) employed the latest methodology (ARDL), the case studies are for a single country that is not HIPC.

Among debt-growth studies, only Clements et al. (2003), Pattillo et al. (2004), Schclarek (2005), Kumar – Woo (2010), Afonso – Jalles (2011), Checherita-Westphal – Rother (2012),

Riffat – Munir (2015), Abdelaziz et al. (2019), and Silva (2020) examined the channels through which external debt is transmitted to the economy and affect the economic growth of nations (see Table 6.1). Among studies that investigated the channels Schclarek (2005), Pattillo et al. (2004), Checherita-Westphal – Rother (2012), Riffat – Munir (2015), and Silva (2020) investigated the saving (either private or domestic or national) channel through which external debt affects growth using a non-linear model. This implies that, to the best of the writer's knowledge, no study shows the non-linear effect of external debt on national saving and growth in the case of HIPCs. Also, the national saving channel through which external debt affects growth is not investigated in HIPCs, leading to a literature gap.

6.2.3. Empirical results and discussion

This section presents the empirical results of the study and their interpretation. Specifically, the descriptive statistics, the unit root test (both first and second-generation tests), the co-integration test (using Kao and McCoskey – Kao (1998)) and the long-run and short-run estimations.

6.2.3.1. Descriptive statistics of the variables in the model

Table 6.11 shows the descriptive statistics of the variables which are included in the models. The mean of national saving is 12.8, and the range is between -18.03 and 44.7, showing that the variation is not significant. Similarly, the mean value of GDP growth has a small variation in its range. However, one of the target variables, external debt, ranges between 10.23 and 278.9, which is high. Likewise, the square of foreign debt has a high range between 104.7 and 77829.37. The mean of external debt service is 2.49, and its range is between 0.051 and 13.84, which implies that the variation is small. When we see the skewness and Kurtosis of the variables in the model, all the variables are positively skewed except GDP growth, dependency ratio, labor force, and population growth. Besides, all the variables have positive kurtosis with values between 2.7 and 209.4. The standard deviation, which is the deviation of the variables from their means of all variables except a square of external debt, have a small growth rate (fluctuation) over the study period. All other descriptive statistics of the other variables appear in Table 6.11.

Table 6.11 Descriptive statistics of the variables

	Mean	Median	Max.	Min.	Std Dev.	Skewness	Kurtosis	Prob.
SAV	12.80	13.23	44.70	-18.03	8.86	0.010	3.308	0.433
GDPGR	3.791	4.461	35.22	-50.24	5.7994	-2.464	29.166	0.0000
ED	57.88	48.388	278.9	10.23	41.463	2.723	12.483	0.0000
ED^2	5065.9	2341.4	77829.37	104.7	10090.14	4.765	27.484	0.0000
DSR	2.4913	1.896	13.84	0.051	1.960	1.642	7.0917	0.0000
INF	31.990	5.897	5016.10	-9.156	328.877	14.403	209.42	0.0000
OPPN	61.49	55.511	136.4	19.68	25.896	0.911	3.192	0.0000
EXCH	553.04	476.99	7384.43	0.140	835.956	4.017	24.427	0.0000
DEPEN	88.425	89.842	112.8	55.28	10.947	-0.478	3.89	0.0000
LAB	40.619	41.408	50.67	26.12	6.328	-0.800	2.755	0.0000
POP	2.480	2.674	8.117	-6.766	1.173	-2.564	23.882	0.0000
Observations	N (total observations) = 420 n (total number of countries) = 15 T (total number of years) = 28							

Source: Computed by the author using EViews 10.

6.2.3.2. Cross-sectional dependence, unit root, and cointegration tests

This study conducted the CD test using the Pesaran (2004) test. Unlike the previous chapter's investment model, the result fails to reject the null hypothesis of cross-sectional independence in the saving model, which led us to employ the first-generation panel unit root test. However, the result strongly rejects the null hypothesis of cross-sectional independence in the growth model, suggesting the presence of CD; therefore, it is required to use the second-generation panel unit root test. The growth model's cointegration test results are similar to the previous chapter, even though this study substituted investment variables by national saving. Furthermore, the study conducted a serial correlation and heteroskedasticity test for the growth model to confirm the PSCE estimation's appropriateness. Based on Table 6.12 results, we strongly reject the null hypothesis of no serial correlation and homoscedasticity (or constant variance) with a 5 and 1% level of significance, respectively. This implies both serial

correlation and heteroscedasticity have existed in the growth model at 5 and 1% of significance, respectively (see Table 6.12).

Table 6.12 Cross-sectional dependence test

Tests	HIPCs	
	Saving model	Growth model
Pesaran's test of cross-sectional independence	0.109	4.093
The average absolute value of the off-diagonal elements	0.272	0.182
Probability	0.9134	0.0000*
Serial correlation and heteroscedasticity tests for a growth model		
Tests	F statistics(chi2)	Prob
Serial correlation: Wooldridge test for autocorrelation	6.381	0.0242**
Heteroskedasticity: Modified Wald test for GroupWise Heteroskedasticity	8732.61	0.0000***

Note: * ⇒ existence of cross-sectional dependence, ** and *** ⇒ presence of serial correlation and heteroscedasticity at 5 and 1 % of significance, respectively.

Source: Computed by the author using Stata 15

The growth model of this chapter strongly rejects the null hypothesis of cross-sectional independence; hence, this study uses the 'CIPS' test to examine the panel unit root. Table 6.13 summarizes the second-generation panel unit root test, both in level and first difference. Based on Table 5.15 results, we strongly fail to reject the null hypothesis of unit root for all variables at a 1% level of significance at the first difference. Hence, all the variables are statistically significant at the first difference with a 1% level of significance, we notice that all measures are integrated into order one (I(1)). Thus, we might expect there is a long-run connection between these variables together.

The saving model of this study confirms that there is no CD in the errors, and therefore, the study employed the first-generation panel unit root test, which is different from the previous chapter. The unit root test result confirms that national saving, external debt service, GDP growth, dependency ratio, inflation, and labor force are integrated at level (I(0)). In contrast, other variables such as external debt and its square and population growth are an integration of

order one (I(1)) (see Table 6.13). This implies that the model variables have a mixed order of integration, leading to use the panel ARDL–PMG estimation technique.

Table 6.13 Unit root test

Saving model					
Variables	Statistics	Values	Order of integration		
SAV	LLC	-3.566***	I(0)		
	ADF	75.730***	I(0)		
ED	LLC	-12.944***	I(1)		
	ADF	183.605***	I(1)		
ED^2	LLC	-13.237***	I(1)		
	ADF	183.836***	I(1)		
DSR	LLC	-4.831***	I(0)		
	ADF	93.992***	I(0)		
GDPGR	LLC	-11.020***	I(0)		
	ADF	177.256***	I(0)		
DEPEN	LLC	-6.075***	I(0)		
	ADF	80.383***	I(0)		
INF	LLC	-12.869***	I(0)		
	ADF	187.876***	I(0)		
POP	LLC	-2.59010***	I(1)		
	ADF	147.235***	I(1)		
LAB	LLC	-5.42494***	I(0)		
	ADF	60.6491***	I(0)		
Growth Model (Pesaran (2007) test)					
	CIPS (intercepts only)		Critical values		
	Levels	1st diff.			
	Statistic	Statistic	10 %	5 %	1 %
GDPGR	-4.584***	-6.123***			
SAV	-3.223***	-5.553***			
ED	-2.086	-4.691***			
ED^2	-1.785	-4.149***			
DSR	-3.049***	-5.727***			

INF	-3.968***	-5.897***	-2.14	-2.25	-2.45
OPPN	-2.266**	-4.650***			
EXCH	-1.748	-3.460***			
LAB	-0.996	-2.629***			

Note: **,*** ⇒ Significant (stationary) at 5 and 1% level, respectively

Source: Computed by the author using EViews 10 (for saving model) and Stata 15 (growth model)

The cointegration test is an essential task to confirm whether the variables in the model have a long-run relationship or not. Hence, for a saving model, this study used the Kao residual cointegration test due to cross-sectional independence and many variables in the saving model. It is also relatively more comprehensive than the Fisher type. Furthermore, due to eight independent variables in the growth model, this study used McCoskey and Kao (1998) cointegration tests. The result confirms a long-run relationship between the variables in both models (see Table 6.14).

Table 6.14 Cointegration test

Tests	Saving Model (Kao residual)	
	t-Statistic	Prob
ADF	-6.513380	0.0000***
Residual variance	29.04981	___
Augmented Dickey-Fuller Test Equation	26.17813	___
Growth Model (McCoskey and Kao (1998))		
Modified Dickey-Fuller t	-19.9209	0.0000***
Dickey-Fuller t	-16.0968	0.0000***
Augmented Dickey-Fuller t	-10.3045	0.0000***
Unadjusted modified Dickey-Fuller t	-27.9912	0.0000***
Unadjusted Dickey-Fuller t	-16.9439	0.0000***

Note: *** ⇒Significant at 1% level

Source: Computed by the author using EViews 10 (for saving model) Stata 15 (for growth model).

6.2.3.3. PMG estimation results for national saving model

Once the cointegration test confirmed a long-run relationship among the variables in the saving model, the next step is the long-run and Error correction model (ECM) using PMG estimation technique (see Table 6.15). The result shows that external debt significantly increases the national saving of HIPCs, which does not support the debt overhang hypothesis of a negative impact of external debt on national savings. This means a percentage point increase in external debt leads to a 0.1469 percentage point increment in national savings. However, the square of external debt negatively and significantly affects the national savings of HIPCs; this implies there is an existence of a non-linear relationship between external debt and national savings. That means, up to 81.61 of external debt to GDP ratio, the relationship between external debt and saving is positive; over this limit, it is negative. However, their relationship does not follow an inverted U-shape. This is because around 82% of sampled countries (HIPCs) external debt in most periods remained below the threshold values; hence, the relationship is dominantly positive. Therefore, the relationship between external debt and national savings is positive and non-linear. Furthermore, the individual country analysis found identical long-run results, such as the panel regression since the PMG considers all countries to be homogenous; however, the short-run results are different. The result shows that the ECM value is insignificant at a 1% level of significance in eight HIPCs.

This chapter (national saving) and chapter 6.1 (investment) are dependent variables and considered a channel in which external debt affects growth. However, unlike chapter 6.1, the impact of external debt on national saving is positive and non-linear. The reason for the variation may be due to differences in estimation techniques and the variables included in the models. For example, chapter 6.1 used the SUR model, which simultaneously estimates both investment and growth models, but this chapter used the PMG estimator for the saving model alone. Hence, this factor may lead to a different result.

The debt service and GDP growth of countries significantly increase national savings. One percentage point increment in debt service increases the national savings by 2.1531 percentage point, while a percentage point increment in GDP growth increases the national saving by 0.63 percentage point. Nevertheless, the dependency ratio and labor force significantly reduce the countries' national savings (see Table 6.15).

Table 6.15 Estimated long-run coefficients and ECM using the PMG approach

Variables	Coefficients	Std. Error	Z-Statistic	Prob.
ED	0.1469	0.0376	3.90	0.000***
ED^2	-0.0009	0.0002	-4.92	0.000***
DSR	2.1531	0.5523	3.90	0.000***
GDPGR	0.6329	0.1129	5.61	0.000***
DEPEN	-0.578	0.0954	-6.06	0.000***
INF	-0.0032	0.0032	-1.00	0.318
POP	-0.6597	0.9853	-0.67	0.503
LAB	-3.420	0.4133	-8.28	0.000***
ECM	**-0.4031**	**0.0988**	**-4.08**	**0.000*** **

*** ⇒ Significant at 1 % level

Source: Computed by the author using Stata 15

Table 6.15 also shows that the coefficient of the lagged error correction term (ECM) is negative (between zero and negative one) and highly significant at 1 % level of significance. This confirms the existence of the cointegration relationship among the variables in the model. It stands for the rate of adjustment to restore equilibrium in the dynamic model following a disturbance. The coefficient of the error correction term is -0.403, which means around 40 % of deviation from the long-term is adjusted each year. In other words, the significant error correction term suggests that about 40 % of disequilibrium in the previous year is corrected in the current year.

6.2.3.4. PCSE estimation results for growth model

To examine the effect of external debt and the saving channel through which external debt affect growth, similarly to chapter four, this chapter also adopts the two-stage modified OLS estimator – PCSE estimator (see Table 6.16). The result shows that external debt has a significant adverse effect on the growth of HIPCs. A percentage point increment in external debt results in a reduction of GDP growth by 0.044 percentage points, which supports the debt overhang and crowding out effects hypothesis of classical economists. From the above results, we can observe that more external debt simultaneously leads to higher savings and lower growth; this contradiction is theoretically supported by the overlapping generation model, which explains high debt leads to lower economic growth (Modigliani 1961; Diamond 1965; Blanchard 1985). Although debt increases the national saving in the short run, a more increasing debt will partly use up (reduce) national savings reserved for the future generation,

which leads to increase the interest rate, discourage investors, reduce capital accumulation and growth (Rahman et al. 2019; Jalil 2020).

The results also show the quadratic term of external debt is positive and significant, which confirms the presence of a non-linear but not a U-shaped relationship between external debt and growth. This implies that up to 220 % of external debt to GDP the relationship between external debt and GDP growth is negative; it is positive over this limit. Since most HIPCs external debt in most periods is below the threshold, the relationship between external debt and growth is negative and non-linear. The study also estimated the model for each country and found that the relationship between external debt and GDP growth is U-shaped (in two countries), only the quadratic term of external debt is positive and significant (in one country), and insignificant (in 12 countries).

The saving channel through which external debt affects growth shows that saving has significantly increased the GDP growth of HIPCs. That means one percentage point increase in saving increases the GDP growth of HIPCs by 0.082 percentage point. Even though the turning points, the methodology, and the channel variables included in the growth model vary, a negative and non-linear relationship between external debt and growth is obtained in both chapter 6.1 and this chapter. Besides, the results of both this and the previous chapter confirmed that external debt affects the growth of HIPCs through the channels. Similarly, the one percentage point increment in labor force increases the GDP growth of HIPCs by 0.09 percentage point, while inflation significantly reduces it. That means the one percentage point increase in inflation reduces the GDP growth by 0.0012 percentage points.

Table 6.16 Estimated Growth Model in HIPCs

Variables	Growth model		
	Coefficient	Std. Err	Prob.
SAV	0.082	0.0321	0.010**
ED	-0.044	0.0230	0.052*
ED^2	0.0001	0.00008	0.028**
DSR	0.078	0.1857	0.673
INF	-0.0012	0.00048	0.010**
OPPN	0.017	0.0127	0.167
EXCH	0.00078	0.00058	0.178

LAB	0.0917	0.0379	0.016**
CONSTANT	-1.048	1.999	0.600

Note: *, ** ⇒ Significant at 10 and 5 % level, respectively

Source: Computed by the author using Stata 15

6.2.4. Chapter summary

At the early stage of economic development, the accumulation of external debt is a common phenomenon of developing and emerging countries. However, once the debt grows more prominent and unmanageable, it will hurt macroeconomic variables, including saving and growth. Regarding this, the Keynesian, Classical, investment – saving (IS) gap and debt overhang theories are well known. Furthermore, few scholars argue that the relationship between external debt with growth is non-linear. However, the potential empirical studies about the non-linear relationship between external debt and growth have received little attention in HIPCs, which has resulted in a literature gap. In addition, most studies focused on the direct impact of external debt on growth but did not analyze the saving channels through which external debt affects growth. Therefore, this chapter examined the impact of external debt on national saving and growth using panel time-series data between 1990 and 2017 for HIPCs employing the PMG and PCSE estimation techniques. The evidence indicates that external debt positively contributes to national savings and there is no evidence of Classical economists' hypothesis. However, the effect of external debt on growth is negative and significant, which supports classical economists' hypothesis. Also, the result confirmed that there is a non-linear relationship between external debt and national saving (and growth). However, the relationship between external debt and national saving is positive and non-linear but there is negative and non-linear relationship between external debt and GDP growth. Furthermore, external debt affects GDP growth through the national saving channel. Having the above evidence, we can conclude that the **hypothesis of external debt has (H4) a direct or indirect impact on the national saving and economic growth of HIPCs, (H4a) a significant and non-linear impact on both national saving and economic growth in HIPCs, and (H4b) a significant effect on the growth of HIPCs through saving channel does not reject in this chapter.**

6.3. THE IMPACT OF EXTERNAL DEBT ON HUMAN CAPITAL DEVELOPMENT AND GROWTH

Introduction

The objective of this chapter is to explore the impact of external debt on HCD and economic growth in HIPCs. Similarly to chapter 6.1, the chapter also considers the non-linear relationship between the variables and employs the second-generation panel data analysis. The chapter used the panel time series data ranging from 1990-2017 along with SUR estimation technique to achieve its objective. This chapter starts by providing background information in section 6.3.1. Section 6.3.2 discusses the literature review regarding the topic. Section 6.3.3. presents the stylized facts about the human development index and its components, external debt, and growth in HIPCs. The estimated results along with discussion are also found in section 6.3.4. Finally, section 6.3.5. offers a summary of the chapter.

6.3.1. Background of the study

The OECD (2001, 18) broadly defined human capital as "the knowledge, skills, competencies and attributes embodied in individuals that facilitate the creation of personal, social and economic well-being." Due to the demerits of conventional[33] measurement of human capital, a new measurement approach is proposed by UNDP and ILO (Kwon 2009). Hence, since 1990 UNDP has developed a new and more comprehensive measure of human capital called the Human Development Index (HDI) (Ivanova et al. 1999; Kwon 2009). Therefore, according to UNDP (2019), HDI is a summary measure of average achievement in key dimensions of human development: a long and healthy life, being knowledgeable, and having a decent living standard.

The issue of human capital in history of economic is dated back to the late 15th century. Concerning this, Petty (1690), Smith (1776), and Farr (1853) argue that human beings and their acquired abilities were considered as the main input for national wealth. Besides, after the works of Schultz (1961), Becker (1964) and Mincer (1974), the concept of human capital regained recognition and started to be applied in various economic issues (Liu – Fraumeni 2014). Even since the new millennium, the two main development plans – Millennium

[33] Out-put based, cost based, income based, OECD approaches.

Development Goals (MDGs) and Sustainable Development Goals (SDGs) – have broadly focused on achieving either of the three elements of HDI.

Besides, endogenous growth models emphasized the role of endogenous factors (i.e., human capital stock and research & development activities) as the main engines of economic growth. According to Lucas (1993), the accumulation of human capital serves as an engine of growth. Countries vary in their quality of life because of the differences in their accumulated human capital. Furthermore, Mankiw (1992) argues that the increase in human capital accumulation directly increases growth rate (Hasan – Butt 2008). The two broad categories of studies that examine the relationship between economic growth and human capital accumulation are: (a) the growth accounting framework theorist (e.g., Baumol 1986; Barro 1991; Barro – Lee 1993) argues that human capital accumulation due to education increases individuals' productivity and is a pillar for growth (b) endogenous growth theorists, such as Lucas (1988), Romer (1990), and Grossman (1991), argue that human capital creates new ideas which are transformed into scientific knowledge and ultimately leads to accelerating the process of economic growth. Human capital is an important source of long-term growth, either because it is a direct input into research (Romer 1990) or because of its positive externalities (Lucas 1988). The inclusion of human capital variable in endogenous growth models is intended to capture quality differences in the labor force, as non-physical capital investment increases the productivity of the existing labor force (Barro – Lee 1993).

However, human capital accumulation and its effect on economic growth depend on the level of external debt accumulation. According to Haaparanta – Virta (2007), Pattillo et al. (2004), and Tabengwa (2014), at low levels of debt, external borrowing boosts investment in human capital, thereby increasing growth. However, if the debt burden is very high, debt overhang and crowding out effect conditions may occur, which will adversely affect both human capital and growth. Concerning this, evidence shows that the high external debt level is one of the causes for the failure to achieve the MDGs because debt servicing absorbs resources that could be used for essential spending on poverty reduction and diverts resources away from investment in education and health.

There is a contradictory school of thoughts concerning the impact of external debt on growth – the Keynesians and Classical economists. The Keynesians argue that external debt has a positive contribution to growth but the Classicals postulate the reverse. Besides, based on the type of functional model, empirical findings concerning the impact of external debt on

economic growth can be broadly categorized into two groups. The first groups consider a linear relationship between external debt and growth, while the second groups use a non-linear model. However, similar to the theories, empirical studies about the impact of external debt on growth is mixed and inconclusive. Besides the direct effect of external debt on growth, scholars noted that there are channels in which external debt is transmitted to the economy and affects nations' economic growth.

The existing empirical studies regarding the impact of external debt on human capital/welfare can be categorized into two groups. The first group used a composite HDI as a dependent variable (Egungwu 2018; Zaghdoudi 2018; Ampah 2020). The other group examined the effects of external debt on either of the three components of the HDI, i.e., health, education and living standards (poverty) (Pattillo et al. 2004; Tabengwa 2014; Fosu 2007, 2010; Eduardo – Mauricio 2007; Shabbir – Yasin 2015; Zaghdoudi – Hakimi 2017; Emerah – Ogege 2013; Saungweme – Mufandaedza 2013). However, there are no empirical studies about the impact of external debt on HCD in the case of HIPCs even though the countries have experienced a bad history in external debt accumulation and its adverse effect on macroeconomic variables since the 1970s debt crisis.

Besides, except for Pattillo et al. (2004), Zaghdoudi (2018) and Ampah (2020), all other studies neglected the optimal threshold beyond which external debt can affect positively or negatively the human capital, which means previous studies examined the linear relationships between the variables. Also, except for Zaghdoudi (2018), Egungwu (2018), and Ampah (2020), all the others narrowly investigated the effect of external debt on either of health or education or living standards. Furthermore, most previous studies evaluated the direct impact of external debt on economic growth rather than an indirect effect through the human capital channel. Also, except for a few studies, most of the previous findings did not consider a non-linear relationship between external debt and growth and also neglected the most concerned countries – HIPCs. For example, only Pattillo et al. (2004) examined the human capital channel through which external debt affects growth using a non-linear model for 61 developing countries from 1969 to 1998. This implies empirical studies that analyzed the non-linear impact of external debt on growth, considering the human capital channel, are not found in HIPCs.

Therefore, unlike other findings in this area, this chapter focuses on the most concerned countries. Hence, investigating the impact of foreign debt on HCD and growth in the case of HIPCs is vital to provide policy recommendations that help overcome the adverse effect of

debt accumulation. Besides, since the 1970s external debt crisis, HIPCs have experienced external debt accumulation, making their debt unsustainable and qualified for repeated debt cancellation and relief. Therefore, examining the effect of external debt HCD and growth is an important research area for HIPCs. Also, unlike other studies, this chapter used a more comprehensive[34] measurement called HDI to measure HCD. Furthermore, recently, an essential feature of the research in this area has indicated that the impact of external debt on HCD and growth can be non-linear rather than linear; therefore, this chapter considered the non-linear relationship. Also, previous studies did not show the HCD channel through which external debt affects growth and did not consider the CD in the errors in their methodologies. Therefore, this study's primary objective is to investigate the impact of external debt on HCD and growth using time series data ranging from 1990 to 2017 in the case of HIPCs employing the SUR method.

6.3.2. Literature review

This section presents theoretical and empirical literature related to the relationship between external debt, human capital/welfare, and growth.

6.3.2.1. External debt, human capital, and growth

Since the human capital can be measured using HDI, which considers better achievements in education, health, and living standards, any activities that hinder either of these elements adversely affect countries' human capital. Besides, the scope of HDI is broad and even sometimes considered as human welfare. Regarding this, Veltmeyer – Rushton (2012) noted that human welfare is primarily a matter of education, health, and income, as reflected in the HDI, a composite of three social welfare variables.

[34] Even though HDI is average measurement of only three indices and may not show a comprehensive picture, the UNDP (1990) provided the following arguments in its yearly report – lack of data that impose some limits on its measurements and comprehensiveness is not always and completely achievable. Including too many variables provides complex and confusing picture and disturb policy makers. Besides, some indicators may overlap with existing indicators (e.g., infant mortality with life expectancy indicator) (Nayak 2009). Even in recent years Jahan (2016) has also argued that the composite indices (HDI) provide a specific value (number) and are extremely good for advocacy, for initiating healthy competition among societies and for raising awareness compared to Human Development Accounting measurement.

The two main theories which link external debt accumulation with human capital (welfare) and growth are the debt overhang and crowding out effect theories. According to the debt overhang theory, the accumulation of external debt adversely affects both welfare and growth. When there is excessive external debt accumulation, domestic and foreign investors perceive that the government will finance the accumulated debt by distortionary measures, such as heavy taxes seigniorage or cut in productive public investment. Therefore, investors will prefer to withhold or invest less or invest abroad, which adversely affects welfare-related investments (education and health) and then growth.

Similarly, the crowding out theory argues that excessive external debt accumulation leads to massive debt servicing, which shifts resources away from the social sector, especially health and education (Fosu 2008). Concerning this, Shabbir – Yasin (2015) also added that government expenditure is a vital factor for economic growth and governments in developing countries have to spend effectively in social sectors. However, debt servicing can adversely affect constructive fiscal allocations in these countries. The very objective underlying foreign borrowing (to promote growth and development) is depressed by servicing liabilities, which consumes a sizeable part of the scarce resources generated through exports and/or foreign remittances, and little is left behind to finance growth.

6.3.2.2. Empirical literature

Table 6.17 presents the empirical findings concerning the impact of external debt on HDI or either of its components. Specifically, the author(s) name(s), the model type they adopted, the time scope with the case studies, and their results. However, similar to chapter 6.2, this section skipped the empirical literature about the impact of external debt on economic growth.

Table 6.17 Empirical review

Author Name and year	Model Type Adopted	The scope and case study	Results
The impact of external debt on human capital or human development or welfare measured using HDI			
Egungwu (2018)	OLS	From 1986 to 2015, Nigeria	Both external debt stock and external debt servicing had a

			significant adverse effect on HCD
Zaghdoudi (2018)	Panel Smooth Threshold Regression (PSTR)	From 2002 to 2015, 25 countries	The relationship between external debt and human development is non-linear and the optimal threshold of external debt is 41.7775% and below this threshold, external debt has a positive effect on human development
Ampah (2020)	Driscoll and Kraay standard errors panel estimation method	From 1990 to 2015, 24 SSA countries	The relationship between external debt and welfare is non-linear and U-shaped.
The impact of external debt on education or health or both			
Fosu (2007)	Pooled OLS and RE	Five-year panel data from 1975 to 1994, 35 SSA countries	While actual debt service has little or no effect on education spending, predicted debt service that reflects the debt burden exhibits a substantial adverse impact.
Eduardo – Mauricio (2007)	Arellano Bond - GMM	From 1985 to 2003, 50 countries	Public debt hurts both education and health expenditures.
Fosu (2010)	SUR	Five-year panel data from 1975 to 1994, 35 African countries	While observed debt service is a poor predictor of expenditure allocation, constraining debt servicing shifts spending away from the social sector, with similar impacts on education and health.

Shabbir – Yasin (2015)	GMM	From 1980 to 2010, seven developing Asian countries	Debt servicing liability harms social sector spending, e.g., education and health.
The impact of external debt on living standards			
Pattillo et al. (2004)	Five estimation methods (OLS, IV, FE, diff-GMM, and system GMM)	From 1969 to 1998, 61 developing countries	A high level of external debt has an adverse effect on Human capital growth.
Emerah – Ogege (2013)	OLS	From 1980 to 2010, Nigeria	Both the external debt and debt servicing cause poverty
Saungweme – Mufandaedza (2013)	OLS	From 1980 to 2012, Zimbabwe	An adverse relationship between poverty and external debt service
Tabengwa (2014)	Calibrated and Estimated parameters models	From 1980 to 2013, selected developing countries	Public debt impacts negatively on HCD
Zaghdoudi – Hakimi (2017)	Integrated modified OLS(IM-OLS) technique	From 2000 to 2015, 25 developing countries	External debt increase poverty

Source: Constructed by the author

From Table 6.17, we can easily observe that there are only three empirical studies that use the comprehensive measure of human capital or human development or welfare – Egungwu (2018), Zaghdoudi (2018), and Ampah (2020). However, Egungwu's (2018) study is only for Nigeria, and the country is not found in the current IMF list of HIPCs. The study also neglected the optimal threshold beyond which external debt can positively or negatively affect human capital. Furthermore, the study used conventional estimation techniques that overlooked the

dynamic nature of the model, included I(0), I(1) and I(2) variables in its estimations, and it neglected the cointegration test. Hence, the policy recommendations based on a single country and other limitations discussed above may not be appropriate for and represent HIPCs. Therefore, this study overcomes Egungwu's (2018) limitations by considering the most concerned countries, non-linear relationship between external debt and human capital, a better estimation technique which takes dynamic behavior into account along with basic steps in econometrics such as cross-sectional dependence, unit root, and cointegration tests.

Zaghdoudi (2018) used HDI to measure human development, considered the non-linear relationship between external debt and HDI, used a good estimation technique, and incorporated many countries in his study. However, the study mixed countries that are suffering from massive & unsustainable external debt with others. That means around 70% of the case studies are not in the list of HIPCs and hence its results and policy recommendations may not represent HIPCs. Besides, the study neglected two basic tests – CD and panel cointegration– in its econometric estimation. The panel data models may have CD in the errors and ignoring these conditions leads to get biased estimates and spurious inference. Furthermore, the CD test determines the type of panel unit root and cointegration tests which the study should follow. Therefore, unlike Zaghdoudi (2018), this study focuses on the most concerned countries experiencing accumulated & unsustainable external debt and repeated debt cancellations & relief and conducts basic econometric tests before estimation.

Ampah (2020) also used HDI to measure welfare, considered the non-linear relationship between external debt and HDI, and applied basic panel econometric tests. However, the Driscoll – Kraay (1998) technique of the study estimated by pooled OLS/ weighted least-squares regression and FE (within) regression (Driscoll – Kraay 1998) which implies that Ampah's (2020) study was a static model. Therefore, our study differs in considering the dynamic nature of the model and it is the relatively latest one (until 2017).

Unlike the above studies, studies, such as Pattillo et al. (2004), Fosu (2007), Eduardo – Mauricio (2007), Fosu (2010), Emerah – Ogege (2013), Saungweme – Mufandaedza (2013), Tabengwa (2014), Shabbir – Yasin (2015), and Zaghdoudi – Hakimi (2017) examined the relationship between external debt on either of three HDI elements. This implies these studies did not use a broad and comprehensive measurement of HCD, which can limit their scope of analysis.

Concerning empirical studies about debt-growth relationship, Clements et al. (2003), Pattillo et al. (2004), Schclarek (2005), Kumar – Woo (2010), Afonso – Jalles (2011), Checherita-Westphal – Rother (2012), Riffat – Munir (2015), Abdelaziz et al. (2019), and Silva (2020) examined the channels through which external debt is transmitted to the economy and affects the economic growth of nations (see Table 6.1). Among studies that investigated the channels, only Pattillo et al. (2004) investigated the human capital channel through which external debt affects growth using a non-linear model for 61 developing countries. This implies that, to the best of the writer's knowledge, no study shows the non-linear effect of external debt on human capital development and growth in the case of HIPCs. Also, the human capital development channel through which external debt affects growth is not investigated in HIPCs, leading to a literature gap.

6.3.3. Stylized facts of HDI and its components, external debt, and growth in HIPCs.

This section presents the magnitude of HDI along with its components, external debt and its service, and GDP growth of 36 post-completion-point HIPCs from 1990 to 2017. Based on the three elements of HDI – education, health, and standard of living – and following the statistical table of HDI and its components of the UNDP human development report (2019), this section constructed Table 6.18. It has HDI and life expectancy at birth (represents health), expected & mean years of schooling (denotes education), and GNI per capita (represents living standard).

Table 6.18 HDI and its components, external debt, and GDP growth of HIPCs

Year	HDI	Life expectancy at birth (years)	Expected years of schooling	Mean years of schooling	GNI per capita*	GDP growth (% annual) *	Total external debt (% GDP) *	Total external debt service (% GDP) *
1990	0.289	51.342	5.647	2.269	402.500	1.127	60.854	3.223
1991	0.290	51.356	5.717	2.344	397.222	1.659	62.637	3.130
1992	0.281	51.392	5.756	2.417	412.778	-0.239	65.275	2.451
1993	0.293	51.461	5.889	2.500	409.444	1.029	67.181	2.444
1994	0.294	51.597	5.986	2.583	378.333	-0.494	71.449	2.910

1995	0.299	51.794	6.203	2.661	382.500	4.865	71.163	3.869
1996	0.303	52.053	6.369	2.719	398.611	4.409	65.514	2.983
1997	0.307	52.336	6.525	2.786	411.667	3.708	61.251	2.640
1998	0.311	52.644	6.728	2.842	404.444	2.612	61.462	2.586
1999	0.325	52.989	7.189	2.908	393.889	2.953	56.125	2.397
2000	0.366	53.361	7.431	3.308	392.778	2.342	52.639	2.145
2001	0.372	53.792	7.653	3.381	386.389	3.695	48.310	1.711
2002	0.386	54.261	7.872	3.453	389.722	3.644	47.992	1.842
2003	0.390	54.803	7.997	3.508	433.333	3.431	49.585	1.714
2004	0.411	55.381	8.222	3.581	494.444	5.333	47.718	1.685
2005	0.429	55.997	8.444	3.722	555.278	5.100	41.852	1.587
2006	0.437	56.661	8.669	3.800	616.111	5.505	29.334	1.456
2007	0.445	57.328	8.847	3.872	685.556	5.166	29.044	1.833
2008	0.453	58.006	9.094	3.978	803.611	5.351	28.382	1.955
2009	0.461	58.669	9.328	4.042	876.944	4.239	30.541	1.551
2010	0.468	59.311	9.436	4.164	922.778	5.837	27.238	1.392
2011	0.475	59.922	9.711	4.222	969.167	4.730	28.125	1.504
2012	0.481	60.511	9.825	4.317	1041.11	5.888	28.069	1.468
2013	0.487	61.067	9.958	4.439	1104.16	4.586	32.044	1.651
2014	0.492	61.594	10.044	4.519	1141.66	4.874	33.446	1.892
2015	0.497	62.075	10.133	4.608	1144.44	3.525	34.990	1.921
2016	0.500	62.522	10.178	4.703	1110.27	3.850	35.728	2.327
2017	0.504	62.919	10.258	4.792	1114.72	4.305	38.433	2.716

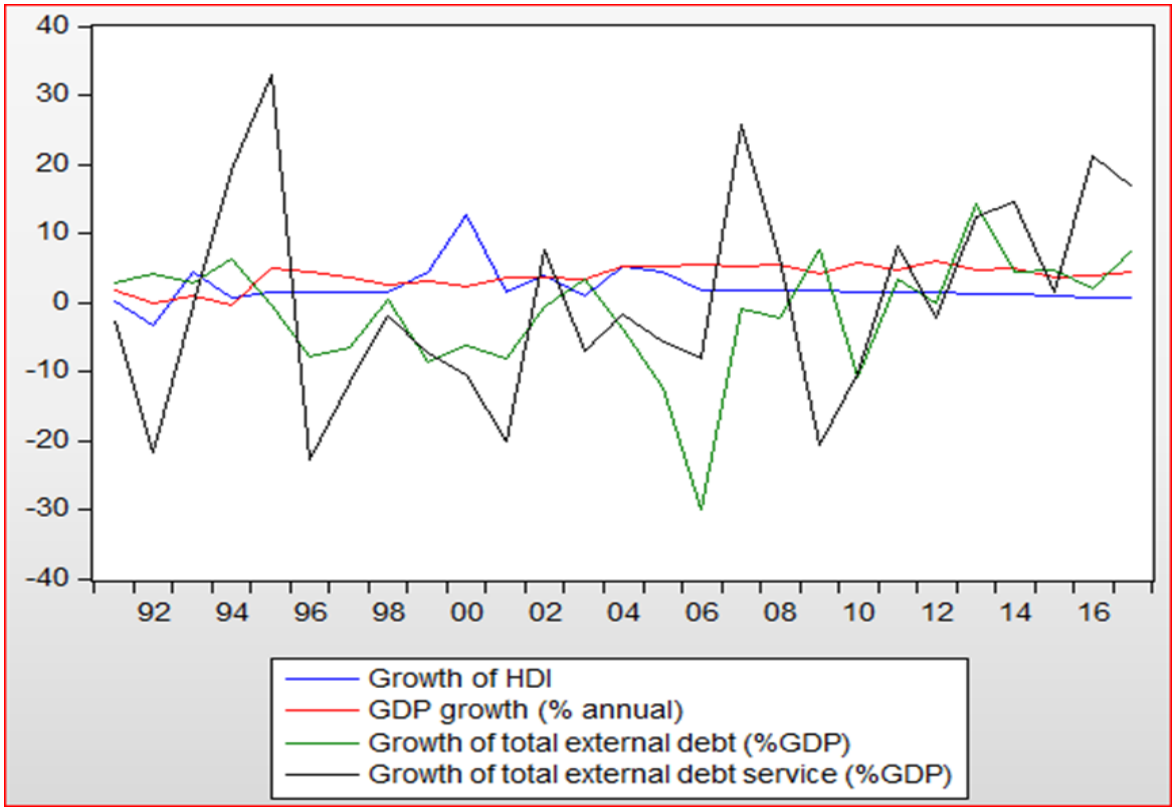
Source: Computed by the author using UNDP and WDI* databases.

Table 6.18 shows HDI, life expectancy, expected and mean year of schooling have increased since 1990. For example, the HDI was 0.289 in 1990, and it grew to 0.5 in 2017. Similarly, the life expectancy of HIPCs has risen from 51 to 63 years in the studied period. The two education indicators, i.e., expected and mean years of schooling, also showed an improvement from 5.6 to 10.2 and 2.2 to 4.7 years, respectively. Unlike other HDI indicators, the GNI per capita has had a fluctuating trend since 1990, which can hinder the progress of HDI. Even though the performance of HDI, life expectancy, expected and mean year of schooling was good, their growth rate was not satisfactory, which implies the growth rates of

all the above indicators were fluctuating in the studied period. For example, the growth rate of HDI was fluctuating between -3.2 and 12.7 % and the highest score in 2000. Similarly, the growth rate of mean years of schooling was not stable in the studied period, fluctuating between 1.4 and 13.7 years and the maximum years of schooling took place in 2000. The growth rate of life expectancy was relatively good during the second half of the 2000s, but it became worse after 2010. Table 6.18 also shows unstable GDP growth, external debt stock, and debt services in the HIPCs. All GDP growth, total external debt, and debt services were relatively worse and better in the 1990s and since 2000, respectively.

Besides the above nominal relationships, Figure 6.1 shows the relationship between annual growth rates of HDI, GDP, external debt, and external debt service of HIPCs between 1991 and 2017. The Figure confirms that the adverse effect of external debt and its service on HDI and GDP growth has mostly been observed since 2012.

Figure 6.1 Annual growth rates of HDI, GDP, external debt, and external debt service from 1991-2017.



Source: Computed by the author using UNDP and WDI databases and EViews 10.

6.3.4. Empirical results and discussion

This section presents the econometrics results, i.e., descriptive statistics of the variables, CD, panel unit root, cointegration tests, and the long run estimation result of Equation 18 and 19.

6.3.4.1. Descriptive statistics of the variables

Table 6.19 describes the descriptive statistics of the variables in both the human capital and growth model. The mean of HDI is 0.427, and its range is between 0.199 and 0.693, which implies the variation is not high. Similarly, the range of ED is between 10.23 and 278.97, which also shows the variation is not high when considering the variable's behavior. That means such a type of range is common for the variables, such as ED. However, the range is too high for its square. The other basic variable in this study is GDPGR; its mean is 3.79 and the range is between -50.24 and 35.22, which has a small range (see Table 6.19 for other variables).

Table 6.19 Descriptive Statistics of the Variables

Variables	Obs	Mean	Std. Dev.	Min	Max
HDI	420	0.4272	0.112	0.199	0.693
GDPGR	420	3.79	5.79	-50.24	35.22
ED	420	57.88	41.46	10.23	278.97
ED^2	420	5065.9	10090.14	104.77	77829.37
DSR	420	2.49	1.96	0.051	13.84
INF	420	31.9	328.87	-9.15	5016.1
INSQ	420	1.87	5.23	-8	9
OPPN	420	61.49	25.89	19.68	136.48
EXCH	420	553.04	835.95	0.140	7384.4
POP	420	2.480	1.173	-6.766	8.117
NBTOT	420	119.18	38.94	21.39	283.17
LAB	420	40.61	6.328	26.12	50.67

Source: Computed by the author using Stata15.

6.3.4.2. Cross-sectional dependence, unit root, and cointegration tests

Similarly to previous chapters, this chapter also conducted a CD test using Pesaran (2004). According to Table 6.20, we strongly reject the null hypothesis cross-sectional independence in both models at a 1% level of significance.

Table 6.20 Cross-sectional dependence test

Tests	HIPCs	
	Human capital model	Growth model
Pesaran's test of cross-sectional independence	23.253	4.366
The average absolute value of the off-diagonal elements	0.458	0.175
Probability	0.0000*	0.0000*

Note: * ⇒ Existence of cross-sectional dependence

Source: Computed by the author using Stata 15

Besides the cross-sectional dependency test, the study examined the panel unit root of the variables in the model. Due to cross-section dependence in the models, similarly to chapter 6.1, this study used the second-generation unit root test. Table 6.21 summarizes the panel unit root tests, both for the variables in level and first difference. The result fails to reject the null hypothesis of unit root (non-stationary) for all variables at the first difference at a 1% level of significance. Since all the variables are highly significant at the first difference, we might expect a long-run relationship between these variables.

Table 6.21 Pesaran (2007) Unit Root Test

Variables	CIPS (intercepts only)				Critical values		
	Human capital model		Growth model				
	Levels	1st diff.	Levels	1st diff.			
	Statistic	Statistic	Statistic	Statistic	10 %	5 %	1 %
HDI	-2.073	-3.656 ***	-2.073	-3.656 ***			
ED	-2.086	- 4.691***	-2.086	- 4.691***			
ED^2	-1.785	-4.149***	-1.785	-4.149***			
DSR	-2.678***	-5.731***	-2.678***	-5.731***			

INF	----	----	-3.968 ***	-5.897***	-2.14	-2.25	-2.45
GDPGR	-4.584***	-3.533***	-4.584***	-3.533***			
INSQ	-2.661***	-5.175***	----	-----			
OPPN	---	---	-2.266**	-4.650***			
EXCH	---	---	-1.748	-3.460***			
LAB	-----	-----	-0.996	-0.996***			
POP	-1.91	-3.533***	-----	-----			
NBTOT	-1.925	-5.167***	---	----			

Note: *** ⇒ Significant (stationary) at 1% level

Source: Computed by the author using Stata 15

Since all variables are highly significant and stationary at the first differences, we can proceed to the cointegration test. Based on CD results and the number of variables in each model, this study employed Westerlund (2007) cointegration test for human capital model. On the other hand, it used McCoskey – Kao (1998) for growth model. Table 6.22 shows a long-run relationship among the variables in both models at a 1% level of significance.

Table 6.22 Panel cointegration test

	HIPCs			
	Human capital model (Westerlund (2007))		Growth Model (McCoskey and Kao (1998))	
	Statistic	p-value	Statistic	p-value
Variance ratio	6.9837	0.0000***	-----	-----
Modified Dickey-Fuller t			-20.2288	0.0000***
Dickey-Fuller t			-16.4146	0.0000***
Augmented Dickey-Fuller t			-10.5852	0.0000***
Unadjusted modified Dickey-Fuller t			-28.4548	0.0000***
Unadjusted Dickey-Fuller t			-17.2657	0.0000***

Note: *** ⇒ Significant at 1% level

Source: Computed by the author using Stata 15

6.3.4.3. SUR estimation results

Table 6.23 shows the estimation result of the impact of external debt on HCD and growth by considering the human capital channel in which external debt affects growth. The result supports the hypothesis that external debt has a negative relationship with human capital measured using HDI. The coefficient for external debt indicates that a percentage increase in external debt accumulations reduces human capital by 0.18 %. This means when external borrowing of HIPCs increases their human capital becomes worse compared to the previous years. This negative relationship supports the hypothesis of the debt overhang and the crowding out effect theories. This result is also consistent with the findings of Egungwu (2018) and Ampah (2020).

The relationship between external debt and human capital is also non-linear, expressed by the coefficient of the quadratic term of external debt, even though their relationship is contrary to the theoretical expectation of an inverted U-shape. The result confirms that up to 236 % of external debt stock to GDP, the relationship between the external debt stock and human capital is negative; over this limit, it is positive. This means above the 236% debt threshold, external debt has a positive effect on HCD. Hence, in this study, the relationship between external debt and HCD is negative and non-linear but does not follow a U-shaped form. Moreover, the individual country estimation shows that the relationship between external debt and HCD is inverted U-shape (in four countries), U-shape (in two countries), positive and non-linear (in one country), only non-linear (in three countries), only linear (in one country), and insignificant (for four countries).

Similar to chapter 6.1 but different from chapter 6.2, this chapter found a negative and non-linear relationship between external debt and one of its channel variables through which external debt affects growth. This result is also consistent with Ampah's (2020) findings but contrary to Zaghdoudi (2018). The reason for the existence of an inverted U-shape relationship between external debt and human development in Zaghdoudi (2018) can be the countries included in the study. Around 70% of Zaghdoudi (2018) case studies were non-HIPCs, and even some of them are emerging and European countries with better debt management strategies. Besides, Zaghdoudi (2018) measured the square of external debt as (external debt *

growth of external debt) rather than our measurement (external debt * external debt), which may explain the difference in the estimated results.

The result in Table 5.28 also confirmed that, in the long run, external debt service significantly increases the human capital of HIPCs over the studied period. A percentage point increase in debt service raises the human capital by 2.2 percent. Regarding this, Fosu (2007; 2010) independently examined the impact of actual and predicted debt service on social spending's, such as education and health, and concluded that relative to actual debt service, the predicted debt service that reflects the debt burden exhibits adverse impact on social spending. Hence, in our study, the debt service is the actual debt service rather than the expected one. Therefore, when the government paid its liability in the long run, potential investors prefer to invest more, which positively affects welfare-related investments (education and health).

The net barter TOT and institutional quality significantly increases the human capital development of HIPCs in the study period. A one-point increment in the net barter TOT and institutional quality increases the human capital development by 0.00023 and 0.0057 points, respectively. Improvement in TOT means the export price index of countries is better than their imports and hence countries can get enough foreign exchange, which helps to invest in either of HDI elements. However, the population growth of HIPCs significantly reduces the human capital of nations. The result reveals that a percentage increases in population lead to about 0.96 reductions in human capital. This means population growth of HIPCs can hinder households and governments' spending on education, health, poverty reduction activities, and individuals' per capita income.

Table 6.23 Results of SUR model for HIPCs

Equations	Variables	Coef.	Std. Err.	P>|z|
HDI (Equation 18)	ED	-0.0018	0.00035	0.000***
	ED^2	3.80e-06	1.39e-06	0.006***
	DSR	0.0225	0.00272	0.000***
	GDPGR	0.0031	0.00082	0.000***
	POP	-0.0096	0.0040	0.017**
	NBTOT	0.00023	0.00011	0.045**
	INSQ	0.0057	0.0009	0.000***
	Constant	0.4302	0.0226	0.000***
GDPGR	HDI	9.601	3.190	0.003***

(Equation 19)	ED		-0.0303		0.0223	0.175
	ED^2		0.00016		0.00008	0.061*
	DSR		-0.1508		0.1887	0.424
	LAB		0.0882		0.0468	0.060*
	OPPN		0.02075		0.0140	0.140
	INF		-0.0012		0.00090	0.186
	EXCH		0.0005		0.00035	0.107
	Constant		-4.1454		2.6565	0.119
Equation	Obs	Parms	RMSE	R-sq	Chi2	P
HDI	420	7	0.0920	0.328	220.72	0.0001
GDPGR	420	8	5.661	0.044	68.00	0.0000

Notes: *, **, *** ⇒ Significant at 10, 5, 1% level, respectively.

Source: Computed by the author using Stata 15

The estimated result of the growth model shows that external debt insignificantly reduces the GDP growth of HIPCs, which does not support either the debt overhang or crowding out effect theories. However, the positive and statistically significant quadratic term of external debt only (since the coefficient of the linear term of external debt is insignificant) shows the existence of a non-linear relationship between external debt and GDP growth. Furthermore, a single country estimation result confirmed that the relationship between external debt and GDP growth is U-shape (in two countries), insignificant (in 12 countries), and only non-linear (in one country).

The other significant result is the reciprocal interrelationship between human capital and GDP growth. An increase of one point in HDI leads to a 9.6 percentage point increase in GDP growth, and a one percentage point increase in GDP growth increases human capital by 0.31 percent. Higher levels of human capital affect the economy by enhancing citizens' capacities and, consequently, their creativity and productivity. Many studies argue that as people hold either of HDI elements, they indirectly contribute more to economic growth through labor productivity, improved technology, attracting more foreign capital, and higher exports. Therefore, considering human capital as a production factor, this result is consistent with the

classical theories of economic growth[35], growth accounting framework, and endogenous growth theorist who argue the vital role of human capital for economic growth. Similarly, the result confirms that the GDP growth of HIPCs positively contributes to their human capital development. This means when the economy grows, governments can have enough resources to spend on education and health. Furthermore, ceteris paribus, the GDP growth of countries leads to raising citizens' per capita income, which improves their living standard. Concerning this, using the endogenous growth model, Mulligan – Sala-i-Martin (1992) noted that economic growth can increase the return rate on human capital and individuals can invest more in it. Furthermore, the strong connection between human capital and economic growth is explained by the two chains model of Ranis – Stewart (2005). They argue that economic growth provides the resources to permit sustained improvements in human development. Similarly, human development improvements raise the capacities of economic agents who make critical contributions to growth.

The results in Table 6.23 also reveals that external debt affects growth through the HCD channel. This means we observed that external debt negatively affects human capital. There is a positive relationship between human capital and growth; therefore, we can conclude that external debt affects growth indirectly through the human capital channel. This conclusion was also obtained in the previous findings, even though the channel variables are different. While in chapter 6.1 and 6.2, investment and national saving were considered the channels in which external debt affects growth, in this chapter, human capital development was examined as a channel. Therefore, regardless of these variations, all commonly confirmed that there is a channel through which external debt affects growth.

Finally, to ensure the robustness of the above result, this study divided the dataset into two sub-regions (HIPCs in sub-Saharan Africa (SSA) and HIPCs in non-SSA), but the estimation was carried out only for 12 HIPCs in SSA. This is because HIPCs in non-SSA are only three countries and hence the observations will be n*T = 84. However, in econometrics, the minimum rule for estimation is 5*parameters < observations. The parameters for three countries (n+T) are 31, and estimation for HIPCs in non-SSA did not fulfil the minimum rule of econometrics and hard to accept the estimated results. Therefore, the results in Table 6.24 show, except for numerical differences in the coefficients, the impact of external debt on human

[35] Adam Smith had a significant influence, in whose vision the accumulation of human capital, technological advancement and specialization of labor are considered the main sources of economic growth (Daniela-Mihaela – Oana-Georgiana 2015).

capital (negative and non-linear) and growth (only non-linear), and the human capital channel effect of external debt on growth which was observed for HIPCs also existed for HIPCs in SSA countries.

Table 6.24 Results of SUR model for HIPCs in SSA countries

Equations	Variables	Coef.	Std. Err.	P>|z|
HDI (Equation 18)	ED	-0.0018	0.00031	0.000***
	ED^2	3.89e-06	1.27e-06	0.023**
	DSR	0.0091	0.00267	0.001***
	GDPGR	0.003	0.00064	0.000***
	POP	0.011	0.0033	0.001***
	NBTOT	-0.0001	0.00011	0.328
	INSQ	-0.0027	0.00084	0.001***
	Constant	0.428	0.0197	0.000***
GDPGR (Equation 19)	HDI	22.159	5.320	0.000***
	ED	-0.0302	0.0277	0.276
	ED^2	0.00024	0.00001	0.025**
	DSR	0.0081	0.247	0.974
	LAB	0.090	0.054	0.098*
	OPPN	0.022	0.0196	0.261
	INF	-0.0284	0.0261	0.276
	EXCH	0.00055	0.00039	0.163
	Constant	-9.258	3.443	0.007***

Equation	Obs	Parms	RMSE	R-sq	Chi2	P
HDI	336	7	0.07115	0.27	157.74	0.0000***
GDPGR	336	8	6.223	0.048	47.58	0.0000***

Notes: *, **, *** ⇒ Significant at 10, 5, 1% level, respectively.

Source: Computed by the author using Stata 15

Finally, we observed that although external debt and external debt service are strongly related, they have opposing effects on HDI. That means an increase in the stock of external debt negatively affects the human capital development (until a very high threshold value), while the external debt service has a positive effect on HDI. These opposing results might be due to huge differences in their magnitude. For instance, in Table 6.18, the amount of the average external

debt service reduces over time (it was below 2% of GDP between 2001 and 2015), which is almost insignificant amount. This might be the reason behind the positive effect of debt service on HDI. However, when we see the trends of total external debt, although it is reducing, on average, it is more than 40% of GDP from 1990 to 2005 and oscillating between 27 and 38% of GDP from 2006. This implies external debt is substantial and leads to an adverse effect on HDI. Furthermore, it is possible that debt service is a proxy of solvency. If a highly indebted country can pay the debt service, it means things are going relatively well (e.g., no civil war, no coup d'état, tax offices are working and can collect taxes) (Kotosz 2016).

6.3.5. Chapter summary

Both the growth accounting framework and endogenous growth theorists argue that human capital accumulation (development) is vital for economic growth. However, human capital accumulation and its effect on economic growth depend on the level of external debt accumulation. Besides, since the contradicting arguments between the Keynesian and Classical economists, the impact of external debt on growth is still a debatable issue. Furthermore, scholars noted that the relationship between external debt and growth can be non-linear rather than linear and also external debt can affect growth through the human capital channel. However, empirical studies about the channels and impact of external debt on the growth of HIPCs is given limited attention. Therefore, this chapter aimed to investigate the impact of external debt on HCD and growth by considering the HCD channel through which external debt affects the growth of HIPCs by employing the SUR model for the period from 1990 to 2017. The result indicates that external debt has a negative and significant impact on HCD. This chapter also found that the relationship between external debt and HCD is negative and non-linear, but only non-linearity is observed between external debt and growth. Besides, the result confirmed that external debt affects HIPCs growth through the HCD channel. As a result, **this chapter does not reject the stated hypotheses – H5, H5a, and H5b. Specifically, it does not reject the hypotheses that external debt has (H5) a direct or indirect impact on human capital development and the economic growth of HIPCs, (H5a) a significant and non-linear impact on both HCD and economic growth in HIPC, and (H5b) a significant impact on HIPCs growth of HIPCs through the HCD channel.**

6.4. THE IMPACT OF EXTERNAL DEBT ON TOTAL FACTOR PRODUCTIVITY AND GROWTH

Introduction

The main goal of this chapter is to analyze the impact of external debt on TFP and economic growth in the case of HIPCs. Similarly to the previous chapter, this chapter also considered the non-linear relationship between the variables, employed the second-generation panel analysis, the SUR estimation technique, for the time between 1990 and 2017. This chapter is organized as follows: Section 6.4.1 discusses background information, while section 6.4.2 offers the literature review. Section 6.4.3. presents the stylized facts about TFP, external debt, and growth in HIPCs. The estimated results and discussion and summary of the chapter are presented in section 6.4.4 and section 6.4.5, respectively.

6.4.1. Background of the study

Issues about how high and sustainable economic growth can be achieved are the concerns of economists, governments, and policymakers. Established growth literature argues that factors of production and TFP are the two main factors for output growth. Factors of production refer to physical capital and labor forces, while TFP denotes other things that affect growth other than physical capital and labor. Since the days of Adam Smith (theory of specialization), the concept of TFP has become the focus of studies on economic growth and production efficiency, and it measures how well inputs are used in production. Factors, such as innovation in technology, sound economic policies, and institutional quality can improve the performance of produced output per unit of inputs, which enhances productivity. Furthermore, the level of productivity can increase investments rate of returns and then lead to economic growth (Garzarelli – Limam 2019).

Economists and growth theorists commonly argue that factor productivity plays a vital role in economic growth rate, global competitiveness, the welfare of a nation (Klenow et al. 1997; Easterly – Levine 2001; Garzarelli – Limam 2019). Regarding this, the first two popular models which discussed the economy responds to changes in technological progress along with other factor inputs (investment and labor) are the Solow (1956) and Swan (1956) which led to the neoclassical model – Solow or Solow – Swan model. The neoclassical growth model is the

method of growth accounting[36], and the growth accounting offers a breakdown of observed economic growth into its main components, namely the changes due to the growth in factor inputs, such as capital and labor and the residual or unexplained technological component. In the analysis of growth accounting, this component is called the 'Solow residual' or TFP or multi-factor productivity (Erken et al. 2009).

There is a contradictory school of thoughts concerning the impact of external debt on growth – the Keynesians and Classical economists. The Keynesians argue that external debt has a positive contribution to growth, but the Classicals postulate the reverse. Besides, based on the type of functional model, empirical findings concerning the impact of external debt on economic growth can be broadly categorized into two groups. The first group considers a linear relationship between external debt and growth, while the second group uses a non-linear model. However, similarly to the theories, empirical studies about the impact of external debt on growth are mixed and inconclusive. Besides the direct effect of external debt on growth, in recent times, an essential feature of the research in this area indicates that there is a channel (e.g., TFP) in which external debt is transmitted to the economy and affects the economic growth of nations (Pattillo et al. 2004; Schclarek 2005; Checherita-Westphal – Rother 2012; Riffat – Munir 2015; Silva 2020).

At the early stage of development, most developing and emerging countries borrow from abroad to finance their resource gap, domestic investment, and economic growth. Concerning this, the Keynesians argue that external debt positively contributes to growth, but the classicals postulate the reverse. The Classical economists argue that once the debt grows more prominent and unmanageable, it becomes a major bottleneck for growth. This implies that even though the TFP plays a vital role in countries' economic growth, external debt can depress economic growth by lowering TFP growth. The efficiency of investment and productivity can be affected by a lousy policy environment. Also, a large amount of external debt (the debt overhang) can hinder the incentive for technological advancement or use limited resources efficiently, and this leads to slower productivity growth (Pattillo et al. 2002, 2004; Clements et al. 2005; Schclarek 2005; Akinlo 2005; Kumar – Woo 2010; Checherita-Westphal – Rother 2012; Riffat – Munir 2015; Shahzad – Javid 2015).

Among the existing empirical studies about the impact of external debt on TFP, Schclarek (2005), Akinlo (2005), Kumar – Woo (2010), Afonso – Jalles (2011), and Silva (2020)

[36] It has its roots in work by Abramovitz (1956) and Solow (1957) and, in an earlier stage, Tinbergen (1942).

examined the linear impact of external debt on TFP. However, Pattillo et al. (2004), Checherita-Westphal – Rother (2012), Riffat – Munir (2015), and Adeve (2016) focused on the non-linear one. Differently, Shahzad – Javid (2015) used both linear and non-linear models in their study. However, as far as the author's knowledge, there are no empirical studies in the case of heavily indebted poor countries (HIPCs) specifically, which leads a literature (knowledge) gap in the area. For example, Akinlo (2005) examined 34 sub-Saharan African (SSA) countries; however, currently, around 30% of the sampled countries are not found in the list of HIPCs. Furthermore, the study is outdated and employed a conventional estimation technique. Similarly, Adeve (2016) investigated Togo, which is one of HIPCs. However, a single country study, especially for Togo (smallest in area and 33rd in population size in Africa), cannot represent HIPCs and its policy recommendations. Only a few studies used the dynamic model, mostly GMM, but it captures only the short-run dynamics and ignores the long-run relationships between the variables. Besides, except for Afonso – Jalles (2011), all the other studies mistakenly missed the possible inter-dependences among the cross-sectional unit and their regressors. However, according to Pesaran (2007), neglecting the CD among regressors and across countries when it is present in the data can lead to misleading inferences. Therefore, this study fills the previous findings' limitations by employing a dynamic model that captures the long-run results along with the CD test, for most concerned countries (HIPCs), and using the latest data.

Based on the above evidence, it is possible to conclude that the empirical studies about the TFP channel through which external debt of a country affects economic growth are limited in general and non-existent for HIPCs in particular. Even the existing studies about the impact of external debt on economic growth that considered the non-linear relationship between them are not found in HIPCs. This leads to a literature (knowledge) gap in the area.

Hence, having contradictory theories and mixed and inconclusive empirical studies, gaps in the literature, methodologies, and scope; this study aims to examine these theories and fill the existing gaps. Therefore, this study's primary objective was to investigate the impact of external debt on TFP and growth in HIPCs using time series data ranging from 1990 to 2017. This study also employed a non-linear model and investigated the TFP channel through which external debt affects growth using the Seemingly Unrelated Regression (SUR) method.

6.4.2. Literature review

This section begins by discussing the theoretical relationship between external debt, TFP, and growth. Besides, since the empirical relationship between external debt and economic growth was discussed in chapter 6.1, this section selectively presents empirical findings on the impact of external debt on TFP.

6.4.2.1. The link between external debt, TFP, and growth

One of the leading theories which links external debt and growth is debt overhang hypothesis. It also takes the TFP into account as one of the channels through which external debt affects economic growth. According to this theory, a massive external debt accumulation adversely affects economic growth by reducing the TFP growth. Due to excessive external debt, governments fear that foreign creditors will take a significant part of the future profit and then they will be inactive to undertake reforms, which will make a country unfavorable for investment, affecting growth (Akinlo 2005; Riffat – Munir 2015; Shahzad – Javid 2015). Besides, due to debt overhang, investors will be uncertain about the feature which hinder their investment in technological improvement and hence the efficient use of factor inputs (Pattillo et al. 2004; Riffat – Munir 2015; Shahzad – Javid 2015). This is because investors will spend on short term projects (have quick return) rather than the long term when a high uncertainty emerges from debt overhang. This misallocation of resources and less productive investment projects may result in slower productivity growth (Shahzad – Javid 2015), and hence external debt affects economic growth through TFP. Moreover, after reviewing several studies, Akinlo (2005) noted that external debt could adversely affect TFP through its effects on investment (through debt overhang) and exports (via debt service). Furthermore, various debt burden indicators could reduce expenditures on public sectors and thus productivity. However, external debt stock can increase TFP when taken as evidence of creditworthiness, indicating higher expected foreign exchange availability and a positive contribution on investment (Akinlo 2005).

6.4.2.2. Empirical literature

Table 6.25 presents empirical studies about the impact of external debt on TFP and economic growth while the impact of external debt on growth is already discussed in chapter 6.1. Therefore, for precise and easy understanding, the Table classified each study according to the author's name with year of publication, the adopted model, the scope of study in terms of time and case studies, and their findings.

Table 6.25 Empirical review

Author Name and year	Model Type Adopted	The scope and case study	Results
The impact of external debt on TFP			
Pattillo et al. (2004)	Five estimation methods (OLS, IV, FE, diff-GMM, and system GMM)	From 1969 to 1998, 61 developing countries	A high level of external debt harms TFP growth.
Akinlo (2005)	FE	From 1980 to 2002, 34 SSA countries	External debt significantly reduces TFP.
Schclarek (2005)	System-GMM	Seven 5-year periods from1970 to 2002, 24 industrial and 59 developing countries	Limited evidence found on the relationship between external debt and TFP growth
Kumar – Woo (2010)	Between estimator (BE) and GMM	From 1970 to 2007, 38 advanced and emerging economies	Initial government debt has no significant impact on TFP growth.
Afonso – Jalles (2011)	Pooled OLS, FE-within, and two-	From 1970 to 2008, 155 countries	Higher debt ratios are beneficial to TFP growth

	step robust system GMM	(OECD vs. emerging and developing)	
Checherita-Westphal – Rother (2012)	GMM	From 1970 to 2010, 12-Euro area countries	Public debt affects TFP negatively.
Riffat – Munir (2015)	Pooled OLS	From 1991 to 2013, South Asia countries	Debt affects economic growth through TFP
Shahzad – Javid (2015)	FE and GMM	From 1984 to 2007, developing Asian countries	Debt is negatively and significantly affecting the TFP
Adeve (2016)	Stochastic production frontier	From 1980 to 2012, Togo	The external public debt improves the productive efficiency of the economy
Silva (2020)	OLS	From 1999 to 2019, Portugal	There is no evidence that gross external debt affected the private TFP

Source: Constructed by the author

Based on Table 6.25, concerning the impact of external debt on TFP, we can easily see that there are no empirical studies in the case of most concerned countries (HIPCs) even though there is tangible evidence in which their external debt stock led them unsustainability and frequent debt cancellation and relief. Of course, Akinlo (2005) examined 34 SSA countries; however, the sampled countries, such as Angola, Botswana, Gabon, Kenya, Lesotho, Mauritius, Nigeria, Sudan, Swaziland, and Zimbabwe are not found in the current IMF list of post-completion-point HIPCs. Furthermore, the study's time scope ends in 2002, which is outdated, and the study also employed a conventional estimation technique that does not consider the dynamic nature of the model. Similarly, Adeve (2016) examined one of HIPCs (Togo); however, a single country study cannot represent HIPCs. Therefore, the findings and policy recommendations of previous studies may not represent and be applicable to HIPCs.

Concerning the methodology, except for few studies, such as Pattillo et al. (2004), Schclarek (2005), Kumar – Woo (2010), Afonso – Jalles (2011), Checherita-Westphal – Rother (2012), and Shahzad – Javid (2015) applied the dynamic estimation technique – GMM or system-GMM. However, the GMM method provides only the short-run relationship among the model variable and ignores the long-run one. Besides, except for Afonso – Jalles (2011), all the previous studies mistakenly ignored the possible inter-dependences among the cross-sectional unit and their regressors. Furthermore, except for Silva (2020), whose case study is in Portugal, the time scope of previous studies is somehow outdated. Therefore, we can say that due to the limitations of the employed estimation technique and outdated data of previous findings, their estimated results and policy recommendations are doubtful and may not work these days, not only for HIPCs but also for others.

Besides, empirical studies about the TFP channel through which a country's external debt affects economic growth are limited in general and non-existent for HIPCs in particular. Although there are several studies about the impact of external debt on economic growth, studies that focus on the non-linear relationship between them are limited in general and specifically in HIPCs. These lead to the literature (knowledge) gap in the area. For example, there are many empirical findings of the linear or non-linear impact of external debt on growth. However, only Pattillo et al. (2004), Schclarek (2005), Kumar – Woo (2010), Checherita-Westphal – Rother (2012), Afonso – Jalles (2011), Riffat – Munir (2015), and Silva (2020) investigated the TFP channel through which external debt affects growth using a non-linear model.

Furthermore, Table 6.1 also presented findings that used a non-linear model to analyze external debt's impact on economic growth. As observed, empirical studies in the case of HIPCs are not found, leading to the literature gap. Besides, except for a few studies, most studies used conventional estimation techniques that ignore the dynamic nature of the data and countries. Even though some of them used a dynamic estimation technique such as GMM, but it also has a limitation. Moreover, except Zaghdoudi (2018), all other studies are outdated in time scope. Therefore, this study fills the existing gaps in scope (both time and case studies), methodology, and literature.

6.4.3. Stylized facts of TFP, external debt, and growth in HIPCs

Due to a lack of available data, especially on TFP, this section is constrained to present the existing facts only for 17 post-completion-point HIPCs between 1990 and 2017.

Table 6.26 TFP, external debt, and GDP growth of 17 HIPCs[37]

Year	TFP	GDP growth (% annual)*	Total external debt (% GDP)*	Total external debt service (% GDP)*
1990	0.473	0.878	65.997	3.561
1991	0.456	1.532	66.653	3.771
1992	0.418	-0.881	69.471	3.089
1993	0.396	0.189	71.591	3.154
1994	0.380	-0.877	75.477	3.536
1995	0.380	5.693	74.069	3.486
1996	0.377	4.429	67.227	3.700
1997	0.372	4.471	60.945	3.299
1998	0.366	4.883	60.052	3.346
1999	0.356	3.489	56.615	3.124
2000	0.361	2.233	53.002	2.823
2001	0.364	3.668	46.718	2.274
2002	0.376	5.484	48.085	2.129
2003	0.390	3.856	49.053	1.989
2004	0.384	4.878	48.057	2.010
2005	0.386	4.431	42.603	1.977
2006	0.401	5.872	30.364	1.904
2007	0.390	4.455	29.793	2.318
2008	0.377	4.856	29.536	2.413
2009	0.361	3.022	32.602	2.167
2010	0.346	4.955	31.430	2.059
2011	0.340	4.509	32.890	2.259
2012	0.340	6.710	32.641	2.056

[37] Benin, Bolivia, Burkina Faso, Burundi, Cameroon, Central African Republic, Côte d'Ivoire, Honduras, Mauritania, Mozambique, Nicaragua, Niger, Rwanda, Senegal, Sierra Leone, Tanzania, and Togo

2013	0.335	4.009	36.368	2.197
2014	0.331	5.366	36.785	2.384
2015	0.327	3.360	38.058	2.490
2016	0.326	4.682	38.125	2.775
2017	0.323	4.731	41.717	3.666

Source: Computed by the author using Penn World Table 9.1 and WDI* databases.

Table 6.26 shows that the TFP of HIPCs was better in the early 1990s, which was above 0.41. However, from 1993 it declined and fluctuated between 0.356 and 0.396 until it grew to 0.4 in 2006. But, since 2007, the TFP of HIPCs has continuously deteriorated. Table 6.26 also shows that the HIPCs recorded negative GDP growth for a few years in the early 1990s. However, after better performance in 1995, HIPCs had a deteriorated GDP growth for a decade. In 2006 and 2012, the GDP growth was good, even though it was not sustained after those years. Both the total external debt and debt services of HIPCs were relatively worse and better in the 1990s and after 2000, respectively.

6.4.4. Empirical results and discussion

This section presents the study's empirical results, such as descriptive statistics of the variables, basic panel econometric tests (CD, panel unit root, panel cointegration), and the SUR estimation results.

6.4.4.1. Descriptive statistics of the variables

The descriptive statistics of the variables in both TFP and growth models are presented in Table 6.27. From the Table, we can observe that TFP has a small variation, which is indicated by its range (gap) between the minimum (0.1278) and maximum (0.87) values. Besides, the variable also has a mean of 0.356. Similarly, when we consider external debt variable behavior, its variation is not significant, and its range lies in 10.23 and 278.97. This chapter's other target variable is GDPGR and DSR, and their means are 3.79 and 2.49, respectively. The range of GDPGR is between -50.24 and 35.22, while between 0.051 and 13.84 for DSR; this implies both variables have a small range (see Table 6.27 for other variables).

Table 6.27 Descriptive Statistics of the Variables

Variables	Obs	Mean	Std. Dev.	Min	Max

TFP	420	0.3567	0.12615	0.1278	0.8703
GDPGR	420	3.79	5.79	-50.24	35.22
ED	420	57.88	41.46	10.23	278.97
ED^2	420	5065.9	10090.14	104.77	77829.37
DSR	420	2.49	1.96	0.051	13.84
INF	420	31.9	328.87	-9.15	5016.1
POLITY 2	420	1.87	5.23	-8	9
OPPN	420	61.49	25.89	19.68	136.48
EXCH	420	553.04	835.95	0.140	7384.4
POP	420	2.480	1.173	-6.766	8.117
NBTOT	420	119.18	38.94	21.39	283.17
LAB	420	40.61	6.328	26.12	50.67
GCF	420	21.001	9.743	-2.424	61.468
OPPN	420	61.498	25.896	19.684	136.48
UNEMP	420	4.115	2.935	0.266	12.482
HC	420	0.4272	0.1124	0.199	0.693

Source: Computed by the author using Stata15.

6.4.4.2. Cross-sectional dependence, unit root, and cointegration tests

This study conducted a CD test using Pesaran (2004) and the result strongly rejects the null hypothesis of cross-sectional independence at a 1 % level of significance in both models. Besides, the average absolute correlation of the residuals is 0.375 and 0.181 in TFP and growth models, respectively, which are very high values. Hence, there is enough evidence suggesting the presence of CD (see Table 6.28).

Table 6.28 Cross-sectional dependence test

Tests	HIPCs	
	TFP model	Growth model
Pesaran's test of cross-sectional independence	7.189	4.616
The average absolute value of the off-diagonal elements	0.375	0.181
Probability	0.0000*	0.0000*

Note: * ⇒ existence of cross-sectional dependence

Source: Computed by the author using Stata 15

Once we confirmed CD in the models, the next step is checking the stationary behavior of all variables included in the models. Hence, due to the presence of CD, like in chapters 6.1 and 6.3, this chapter employed the second-generation panel unit root test – Pesaran (2007) of CIPS test (see Table 6.29). The result shows that all the variables are stationary and highly significant at the first difference (I(1)), making us predict a long-run relationship between the variables.

Table 6.29: Pesaran (2007) Unit Root Test

Variables	CIPS (intercepts only)				Critical values		
	TFP model		Growth model				
	Levels	1st diff.	Levels	1st diff.			
	Statistic	Statistic	Statistic	Statistic	10 %	5 %	1 %
TFP	-2.074	-4.969***	-2.074	-4.969***	-2.14	-2.25	-2.45
ED	-2.086	- 4.691***	-2.086	- 4.691***			
ED^2	-1.785	-4.149***	-1.785	-4.149***			
DSR	-2.678***	-5.731***	-2.678***	-5.731***			
INF	----	----	-3.968 ***	-5.897***			
GDPGR	-4.584***	-3.533***	-4.584***	-3.533***			
POLITY2	-2.661***	-5.175***	----	----			
OPPN	----	----	-2.266**	-4.650***			
EXCH	----	----	-1.748	-3.460***			
LAB	----	----	-0.996	-0.996***			
POP	-1.91	-3.533***	----	----			
UNEMP	-1.389	-3.957***	----	----			
HC	-2.073	-3.656 ***	----	----			
NBTOT	-1.925	-5.167***	----	----			
GCF	-2.737***	-5.151***	----	----			

Note: *** ⇒ significant (stationary) at 1% level

Source: Computed by the author using Stata 15

This study conducted a panel cointegration test to confirm our expectation of a long-run relationship among the variables in the models. Therefore, since our models exhibit CD and have more than seven regressors in each model, this study employed McCoskey – Kao (1998) type of cointegration test (see Table 6.30). The result confirms, at a 1% level of significance, there is a long-run relationship among the variables in both models.

Table 6.30 Panel cointegration test, McCoskey – Kao (1998)

	HIPC			
	TFP Model		Growth Model	
	Statistic	p-value	Statistic	p-value
Modified Dickey-Fuller t	-3.0439	0.0012***	-19.5188	0.0000***
Dickey-Fuller t	-3.8873	0.0001***	-16.1764	0.0000***
Augmented Dickey-Fuller t	-2.8811	0.0020***	-10.2125	0.0000***
Unadjusted modified Dickey-Fuller t	-3.5029	0.0002***	-28.2299	0.0000***
Unadjusted Dickey-Fuller t	-4.0612	0.0000***	-17.1410	0.0000***

Note: *** ⇒Significant at 1% level

Source: Computed by the author using Stata 15

6.4.4.3. SUR estimation results

The SUR estimation results about the impact of external debt on TFP and economic growth is found in Table 6.31. Besides, the result considered the non-linear relationship between the variables and the TFP channel through which external debt is transmitted to the economy of HIPCs. Our target variable – external debt – negatively and significantly affects both TFP and GDP growth. A linear coefficient of external debt indicates that a percentage increase in external debt stock reduces TFP and GDP growth by 0.176 % and 0.043 percentage point, respectively. Therefore, this negative relationship between external debt and TFP (GDP growth) supports the debt overhang hypothesis. In line with this study, the result of chapter 6.1 also supports debt overhang hypothesis, which means external debt significantly reduces both investment and growth of HIPCs. When we consider the impact of external debt on TFP alone, this result is consistent with the findings of Akinlo (2005), Checherita-Westphal – Rother (2012), and Shahzad – Javid (2015), and Adeve (2016), but contradicts with Kumar – Woo (2010); Afonso – Jalles (2011); Riffat – Munir (2015); Silva and (2020). Furthermore, the

negative impact of external debt on the growth of this study also coincides with Afxentiou (1993); Elbadawi et al. (1997); Fosu (1996); Iyoha (1999); Chowdhury (2001); Were (2001); Ayadi – Ayadi (2008); Diallo (2009); Choong et al. (2010); Safdari – Mehrizi (2011); Hailemariam (2011); Ajayi – Oke (2012); Shabbir (2013); Senadza et al. (2017); Shittu et al. (2018); Abdelaziz et al. (2019).

However, the coefficient of the square of external debt has a positive and significant effect on both TFP and GDP growth, which confirms a non-linear relationship between the variables. However, it does not coincide with the theory of an inverted U-shape relationship. The result in Table 6.31 shows that up to 126.4 and 128.8% of external debt stock to GDP, the relationship between the external debt stock and TFP and GDP growth is negative; over this limit, it is positive, respectively. This means the external debt positively affects TFP and GDP growth above 126.4 and 128.8 debt threshold, respectively. However, it is difficult to conclude that the relationship between external debt and TFP (GDP growth) is U-shaped. As, except for Mozambique (between 1990 and 2000) and Nicaragua (between 1990 and 1995), all HIPCs external debt in most periods remained below the threshold values, the relationship is dominantly negative. Therefore, the relationship between external debt and TFP (GDP growth) is negative and non-linear. Besides, the individual country estimation confirmed that the relationship between external debt and TFP is U-shape (in one country), inverted U-shape (in two countries), insignificant (in nine countries), only linear (in one country), and only non-linear (in two countries). Furthermore, the relationship between external debt and GDP growth is inverted U-shape (in one country), insignificant (for 13 countries), and only linear (in one country).

Similarly to this finding, chapter 6.1 and 6.2 also obtained a negative and non-linear relationship between external debt and growth. A positive and significant effect of quadratic external debt on TFP of this result matches with Adeve (2016) findings but contradicts with Pattillo et al. (2004); Checherita-Westphal – Rother (2012); and Riffat – Munir (2015). Likewise, a positive and significant impact of quadratic external debt on GDP growth of this study coincides with Pattillo et al.[38] (2002); Afonso – Jalles[39] (2011); and Haron – Maingi (2018). Besides, since the findings of Schclarek (2005), Cordella et al. (2005), and Daud – Podivinsky (2012) did not support the existence of an inverted U-shape relationship between debt and growth, the result of this study is partially in line with these studies. However, it

[38] when the total external debt-to-GDP ratio is below 35-40%.
[39] when debt-to-GDP ratio is below 30%

contradicts with Elbadawi et al. (1997); Siddiqui – Malik (2001); Pattillo et al. (2002); Clements et al. (2003); Oleksandr (2003); Pattillo et al. (2004); Kumar – Woo (2010), Afonso – Jalles[40] (2011); Checherita-Westphal – Rother (2012); Lawanson (2014); Casares (2015); Riffat – Munir (2015); Thieu Dao – Oanh (2017); and Zaghdoudi (2018).

The result in Table 6.31 also confirms that, in the long run, external debt service significantly increases the TFP, but it is insignificant on the GDP growth of HIPCs in the studied period. A percentage point increase in debt service raises the TFP by 2.4 %, which does not support the crowding out effect. Similarly, both unemployment and political stability significantly increase the TFP of HIPCs. A one percentage point and percent increase in population and political stability result in a 2.1 and 0.19 % increment in TFP, respectively. Unemployment significantly increases TFP, which is an unexpected result but not surprising. This may be due to the inappropriateness of the global definition and measurement of unemployment for developing countries. Even though unemployed is generally defined as a person who is actively searching for employment but unable to find work, due to lack of a well-structured and more formalized labor market, most "unemployed" people in developing countries, e.g., in Africa, are participating in the informal economy and are productive, which hides the adverse effect of unemployment. For example, according to ILO (2018), 85.8 % of employment is informal in Africa. This implies unemployed people in Africa can be productive by participating in the informal economy. However, demographic factor-like population growth negatively and significantly reduces the TFP of HIPCs. The coefficient value implies that a percentage point increase in population leads to a 1.2 % reduction in TFP.

Table 6.31 Results of SUR Model for the Total (HIPCs) Sample

Equations	Variables	Coef.	Std. Err.	P>|z|
TFP (Equation 20)	ED	-0.00176	0.0004	0.000***
	ED^2	6.96e-06	1.53e-06	0.000***
	DSR	0.0246	0.003245	0.000***
	GCF	-0.000316	0.0006409	0.622
	GDPGR	0.00224	0.0008775	0.011**
	NBTOT	1.67e-06	0.0001262	0.989
	POP	-0.01238	0.00430	0.004***

[40] when debt-to-GDP ratio is above 90%

	OPPN		-0.00039		0.0002617	0.135
	INF		0.0000261		0.000022	0.245
	UNEMPL		0.02166		0.001823	0.000***
	HC		0.01991		0.05837	0.733
	POLITY2		0.00198		0.001	0.049**
	Constant		0.3131		0.03281	0.000***
GDPGR (Equation 21)	TFP		6.345		2.7737	0.022**
	ED		-0.0438		0.02133	0.040**
	ED^2		0.00017		0.000084	0.037**
	DSR		-0.138		0.198	0.486
	LAB		0.1463		0.052	0.005***
	OPPN		0.03359		0.0127	0.008***
	INF		-0.00123		0.00131	0.350
	EXCH		0.0007		0.00036	0.057*
	Constant		-4.855		3.197	0.129

Equation	**Obs**	**Parms**	**RMSE**	**R-sq**	**Chi2**	**P**
TFP	420	12	.0955845	0.4246	313.11	0.0000
GDPGR	420	8	5.661957	0.0446	22.18	0.0046

Notes: *, **, *** ⇒ Significant at 10, 5, 1% level, respectively.

Source: Computed by the author using Stata 15

The growth model result shows that both the labor force and trade openness significantly contribute to the economy of HIPCs. A one percentage point increase in labor and openness results in raising the GDP growth by 0.14 and 0.033 percentage points, respectively. The other impressive result is the reciprocal interrelationship between TFP and GDP growth. A point increment in TFP leads to a 6.34 percentage point increase in GDP growth, and a one percentage point increase in GDP growth increases TFP by 0.22 percent. Both neoclassical and new endogenous growth theories argue that TFP is vital for sustainable growth. The neoclassical growth model assumes that due to decreasing returns to scale of capital stock and population growth, their long-run impact on economic growth is relatively less. Therefore, in the long run, exogenous TFP is the main economic growth factor (Solow 1956). Besides, endogenous growth theories confirm that TFP is the primary endogenous economic growth

factor (Romer 1986; Lucas 1988). Similarly, economic growth can provide basic infrastructures that help to enhance factors productivity.

Furthermore, this study also estimated the impact of external debt on TFP and economic growth for HIPCs in SSA countries to ensure the robustness of the above HIPCs result. Therefore, Table 6.32 shows that debt negatively and significantly affects both TFP and GDP growth of HIPCs in SSA countries, which implies the debt overhang hypothesis also holds for the sub-region. Besides, we can say that there is a non-linear relationship between external debt with TFP because the coefficients of debt squared term have shown a significant sign. Therefore, similarly to HIPCs, the relationship between external debt and TFP is negative and non-linear. Correspondingly, the relationship between external debt and GDP growth is negative and non-linear in HIPCs in SSA. Like HIPCs, we can observe that external debt affects economic growth through the TFP channel in HIPCs in SSA countries (see Table 6.32). Concerning the channels, all chapters 6.1 – 6.4 commonly agree that external debt can affect the growth of HIPCs not only directly but also indirectly, through the growth factors (investment, national saving, HCD, and TFP).

Table 6.32 Results of SUR Model for the HIPCs in SSA countries

Equations	Variables	Coef.	Std. Err.	P>|z|
TFP (Equation 20)	ED	-0.00211	0.0004	0.000***
	ED^2	7.85e-06	1.81e-06	0.000***
	DSR	0.0257	0.00374	0.000***
	GCF	-0.00028	0.000722	0.691
	GDPGR	0.00261	0.0008887	0.001***
	NBTOT	0.0003	0.000155	0.049**
	POP	-0.01151	0.00468	0.014**
	OPPN	-0.0005	0.0003338	0.132
	INF	0.00146	0.0004161	0.000***
	UNEMPL	0.02472	0.001923	0.000***
	HCD	-0.0519	0.09372	0.580
	POLITY2	0.00181	0.0011	0.125
	Constant	0.2902	0.04487	0.000***
GDPGR	TFP	7.988	3.284	0.015**

(Equation 21)	ED		-0.0604		0.0263	0.022**
	ED^2		0.00027		0.0001	0.012**
	DSR		-0.0470		0.2612	0.857
	LAB		0.1782		0.0630	0.005***
	OPPN		0.0469		0.0175	0.008***
	INF		-0.0462		0.0263	0.080*
	EXCH		0.0007		0.0004	0.063*
	Constant		-6.624		3.9	0.090*
Equation	**Obs**	**Parms**	**RMSE**	**R-sq**	**Chi2**	**P**
TFP	336	12	0.0946757	0.4585	289.03	0.0000
GDPGR	336	8	6.176509	0.0630	26.15	0.0010

Notes: *, **, *** ⇒ Significant at 10, 5, 1% level, respectively.

Source: Computed by the author using Stata 15

6.4.5. Chapter summary

Every country aims to achieve high, rapid, and sustainable economic growth and development. Regarding this, in addition to factor inputs accumulation, both the neoclassical and new endogenous growth theories argue that TFP is vital for sustainable growth. Likewise, foreign borrowing is also essential to fill resource gaps and achieve economic growth. However, scholars argue that the impact of TFP on economic growth is determined by the level of external debt stock of countries, which implies external debt can affect growth through TFP channel – debt overhang theory. Besides, in recent times, scholars argue that the relationship between external debt and TFP (economic growth) is non-linear. Therefore, this chapter's main objective was to investigate the impact of external debt on TFP and growth (considering TFP channel and non-linearity) for the HIPCs from 1990 to 2017 by employing the SUR model. The result confirms that external debt negatively and significantly affects both TFP and GDP growth. The result showed a non-linear relationship between them. Therefore, the relationship between external debt and TFP (GDP growth) is negative and non-linear. Furthermore, the result reveals that external debt affects the economic growth of HIPCs indirectly via TFP channel. Therefore, **this chapter does not reject the hypotheses that external debt has (H6) a direct or indirect impact on total factor productivity and economic growth of HIPCs, (H6a) a significant and non-linear impact on both total factor productivity and growth in HIPCs, (H6b) a significant impact on economic growth through the TFP channel.**

CHAPTER SEVEN

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

This chapter presents the summary along with conclusions, contributions to the topic, and policy implications of the study. Therefore, this chapter is organized as follows: summaries of the studies focused on the key findings presented in section 7.1, while section 7.2 evaluates hypotheses and the study's objectives. Section 7.3 provides the contributions of this dissertation in terms of the existed research gaps in the topic. Section 7.4 offers policy recommendations and the limitations of the study, respectively.

7.1. Summary of the study

This dissertation began by introducing the general structure of the study in chapter one. It provided the study's background, statement of the problem, objectives, and hypothesis of the study. Besides, chapter one discussed the significance, scope, and organization of the study. Chapter two provided detailed information about the definitions of external debt, a description of the study area, the debt crisis, and the conditions after the debt crisis in HIPCs. Methodology of the study specifically data type, sources, and data analysis, panel econometrics procedures, and model specification, justifications, and estimation techniques are presented in chapter three.

The empirical studies in the case of HIPCs began in chapter four. Before estimation, all models passed through basic steps in panel data econometrics, such as cross-sectional dependence, panel unit root and panel cointegration tests. All empirical chapters, except for chapter five, examined the period between 1990 and 2017 in the case of 15 HIPCs. Specifically, chapter four investigated the determinants of external debt, while chapter five examined whether the external debt is sustainable in HIPCs after the 1990s initiatives. It employed an indicator-based (from 2000-2018), CPIA policy rating (from 2005-2019) and intertemporal approach to the current account (from 2000-2017). To get robust and assertive results, in the intertemporal approach to the current account, this chapter classified countries into three strata—HIPCs in general, HIPCs in SSA countries and HIPCs in non-SSA. For the indicator-based and CPIA policy rating approaches, it used a sample of 36 HIPCs, while 32 HIPCs for the intertemporal approach to the current account.

Chapter six is broad and investigated the impact of external debt on growth factors and growth in HIPCs, and also covered the examination of the indirect channels through which external debt affects growth. This chapter has four different sub-chapters (studies), and all of them are in the case of 15 HIPCs for the period from 1990 to 2017 and considered the non-linear relationship between the variables. The first sub-chapter (chapter 6.1) examined the impact of external debt on investment and growth, employing the SUR estimation technique, while chapter 6.2 investigated the impact of external debt on national savings and growth in HIPCs and due to different results in CD test, it employed two estimation techniques: PMG and PCSE. Besides, chapter 6.3 explored the impact of external debt on HCD and growth in HIPCs by using the SUR estimation technique. Finally, chapter 6.4 examined the impact of external debt on TFP and growth in HIPCs by employing the SUR model.

7.2. Conclusions of the study

Based on the empirical result in chapter 4, 5, and 6, this study concludes that:

1. The debt service, imports, and growth rate of advanced countries significantly increase external debt, while exports reduce it. Furthermore, foreign direct investment and political stability significantly reduce the external debt of HIPCs.
2. External debt is not sustainable in either HIPCs in general or in sub-regions of HIPCs.
3. External debt significantly reduces both investment and growth, which supports the debt overhang and crowding out effect theories of classical economists. Besides, the relationship between external debt and investment (and growth) is negative and non-linear.
4. There is a positive and non-linear impact of external debt on national saving, and the turning point is at 81.61 % of external debt to GDP. However, the effect of external debt on growth is negative and non-linear with the turning point at 220 % of external debt to GDP.
5. External debt has a negative and significant impact on HCD which supports the debt overhang hypothesis, and also, the relationship between external debt and human capital is non-linear. Besides, the quadratic coefficient of external debt (positive and significant) indicates a non-linear relationship between external debt and growth.
6. External debt negatively and significantly affects both TFP and GDP growth, and also it is observed that there is a non-linear relationship between them.
7. Finally, external debt can indirectly affect the growth of HIPCs through all the channels.

Furthermore, based on the listed activities in sections 1.2 and 1.3, this section concludes and evaluates whether the objectives and hypotheses of the study are achieved or not. Hence, this study achieved its objectives by:

I. Showing the magnitude and components of foreign debt in HIPCs and in sub-regions.
II. Examining the determinants of external indebtedness in HIPCs
III. Investigating the debt sustainability condition of HIPCs after the initiatives.
IV. Examining the impact of external debt on growth factors and growth: the channels through which external debt affect economic growth in HIPCs
V. Providing policy recommendations.

Besides achieving the objectives, the study also evaluated its hypotheses listed in section 1.3.

I. H1: Both internal and external factors determine the level of external debt of HIPCs.

Chapter four focused on examining this hypothesis and found that debt service, imports, and growth rate of advanced countries significantly increase external debt while exports reduce it. Furthermore, foreign direct investment and political stability significantly reduce the external debt of HIPCs. This implies that compared to external factors, domestic factors played a major role in determining the level of external debt in HIPCs. **Therefore, this study fails to reject the hypothesis that both internal and external factors determine the level of external debt of HIPCs.**

II. H2: External debt is sustainable for HIPCs after the 1990s initiatives.

By employing indicator-based and CPIA policy rating approaches (for 36 HIPCs) and intertemporal approach to the current account (for 32 HIPCs), chapter five evaluated the second hypothesis for the period between 2000/05 and 2017/18/19. All approaches confirmed that external debt is not sustainable; therefore, **this study rejects the hypothesis that external debt is sustainable for HIPCs after the 1990s initiatives.**

III. H3: External debt has a direct or indirect impact on investment and economic growth of HIPCs.

H3a: External debt has a significant and non-linear impact on both investment and growth in HIPCs.

H3b: external debt has a significant impact on growth of HIPCs through investment channel.

Chapter 6.1 examined the impact of external debt on investment and growth in 15 HIPCs using the SUR estimation technique from 1990-2017. Besides, it considered both a non-linear relationship between the variables and the investment channel through which external debt affects growth. The result shows that external debt significantly reduces both investment and growth. Also, the relationship between external debt and investment (and growth) is non-linear. Furthermore, the result confirmed that investment is a channel through which external debt affects the growth of HIPCs. **Hence, this study fails to reject the hypotheses that external debt has (H3) a direct or indirect impact on investment and economic growth of HIPCs, (H3a) a significant and non-linear impact on both investment and growth in HIPCs, (H3b) has a significant effect on the growth of HIPCs through investment channel.**

IV. H4: External debt has a direct or indirect impact on the national saving and economic growth of HIPCs.

H4a: External debt has a significant and non-linear impact on both national saving and growth in HIPCs.

H4b: External debt has a significant impact on growth through saving channel.

Chapter 6.2 shows the reciprocal relationship between external debt and national saving (and growth). To make it clear, the relationship between external debt and national saving is positive and non-linear, but we observed a negative and non-linear relationship between external debt and growth. However, the result also noted that national saving is a channel through which external debt affects growth. **Consequently, the hypothesis of external debt has (H4) a direct or indirect impact on the national saving and economic growth of HIPCs, (H4a) a non-linear impact of external debt on both national saving and growth in HIPCs, (H4b) a significant impact on growth through saving channel fails to reject in this study.**

V. H5: External debt has a direct or indirect impact on human capital development and the economic growth of HIPCs.

H5a: External debt has a significant and non-linear impact on both HCD and growth in HIPCs.

H5b: External debt has a significant impact on growth through the HCD channel.

Similarly to chapter 6.1, chapter 6.3 also employed the same estimation technique, time scope, and sampled countries to examine the above hypothesis. The result confirmed a non-linear relationship between external debt and HCD (and growth) because the coefficient of the

quadratic term of external debt is significant. Besides, the result shows that external debt affects the growth of HIPCs indirectly through the HCD channel. Based on this evidence, **this study fails to reject the stated hypotheses (H5, H5a, and H5b).**

VI. H6: External debt has a direct or indirect impact on total factor productivity and economic growth of HIPCs.

H6a: External debt has a significant and non-linear impact on both total factor productivity and growth in HIPCs.

H6b: External debt has a significant impact on growth through the TFP channel.

The final hypothesis of this study examined in chapter 6.4., which explored the impact of external debt on TFP and economic growth along with considering the TFP channel. The chapter also considered a non-linear relationship between the variables and used the SUR estimation technique for 15 HIPCs for the time period ranging from 1990 to 2017. The chapter found that both TFP and GDP growth of HIPCs are negatively and significantly affected by their external debt accumulation. Besides, the relationship between external debt and TFP (and growth) is negative and non-linear. Furthermore, the result confirmed that external debt could affect the growth of HIPCs through the TFP channel; **therefore, this study fails to reject the stated hypothesis (H6, H6a, and H6b).**

7.3. Contributions to the literature

This dissertation can contribute to the existing literature concerning determinants, sustainability, channels, and impacts of external debt in the case of HIPCs. More specifically, its contributions are presented below:

a. This study contributes to filling the existing literature (knowledge) gaps in the topic. For example, it empirically examined the determinants of external debt, specifically for HIPCs. Besides, it is the only study in analyzing the external debt sustainability condition in the case of HIPCs. Furthermore, this study is the only study that considers the non-linear relationship between external debt and growth factors (and growth) in HIPCs. In addition to the non-linearity model, it considers the channels through which external debt affects growth.

b. This study also contributes to filling the methodological limitations of previous findings. Therefore, this study employed dynamic models with the latest estimation technique, and also it considered the CD in its empirical models.

c. Concerning the scopes – this study is the latest study on the determinants, sustainability, channels, and impacts of external debt in HIPCs. Furthermore, it is the most specific (for only HIPCs), still holistic (considered all HIPCs regions, such as SSA, Latin America, and Asia).

7.4. Policy recommendations, limitations, and future studies

This section provided the following policy recommendations based on the findings (descriptive and empirical) of the studies and intuitive knowledge.

a. Chapter four confirmed that the debt service, imports, and growth rate of advanced countries significantly increase the external debt of HIPCs, while exports reduce it. Furthermore, foreign direct investment and political stability significantly reduce the external debt of HIPCs. Based on the above evidence, this study recommends increasing the export volume and revenue through export diversification, simplifying regulation related to exports, and providing short and long-term credits to the exporters. Also, the international trade communities should keep international standards developed by the International Organization for Standardization for exports of developing countries, which simplify unnecessary regulatory hurdles. For instance, according to World Economic Forum (2016) and United Nations Conference on Trade and Development (2016), due to the difference between the regulations of the European Union and international standards, African exporters of textiles and clothes lost 50% of their potential export revenues. Even though all sampled countries are members of the world trade organization (WTO), the trade rules of WTO still unfavorable towards developing countries. Hence, it is better to improve the rules to promote HIPCs exports. Similarly, attracting foreign direct investment by reducing foreign direct investment restrictions, providing open, transparent, and dependable conditions for all kind of firms that assure basic and quality infrastructures, reforming domestic financial markets and political stability of countries, increasing FDI are essential. Finally, reducing luxury imports by increasing tax on them and the import substitutions are crucial to reduce the external debt stock of HIPCs.
b. The results of chapter five revealed that external debt is not sustainable in either HIPCs or sub-regions of HIPCs. Domestic policy failures, ineffective control of public finances, collapse in primary and semi-finished commodity prices, and rise in some basic imported commodity prices can be potential causes for external debt's unsustainability. Therefore, this study recommends that because HIPCs cannot repay their external debt in the future

without raising more debt (e.g., currently, the IMF has approved $ 2.9 billion in loans for Ethiopia) and risk their future development, HIPCs need to strengthen their macroeconomic policies and institutions or implement other initiatives to overcome the problem. Furthermore, since HIPCs external debt is unsustainable, another initiative from creditors can protect the adverse effect of unsustainable external debt on HIPCs macroeconomics.

c. Both chapters 6.1 and 6.4 found that the impact of external debt on investment (and TFP) and growth is negative, supporting the debt overhang and crowding out effect hypothesis. The results show that the relationships between external debt and investment (and TFP) (and growth) are negative and non-linear. However, unlike the above studies, the findings of chapter 6.2 and 6.3 obtained a mixed relationship between the target variables. For example, the relationship between external debt and national savings is positive and non-linear, but there is a negative and non-linear relation between external debt and growth. However, chapter 6.3 found a negative and non-linear relationship between external debt and HDI, but only non-linear relationships were observed between external debt and growth. Nevertheless, all chapters commonly confirmed that external debt affects growth through the channels. From the above evidence, we can conclude that currently external debt has a negative and significant effect on both growth factors and growth, which supports the hypothesis of the Classicals economists. Therefore, even though it is difficult and not applicable to suggest governments in HIPCs to stop or reduce their foreign borrowing directly, this study recommends that HIPCs should adopt strong macroeconomic policies, strengthen institutional performance, appropriate debt management strategies to handle their accumulated external debt and reduce the adverse effect on growth factors and growth. Besides, HIPCs should invest the borrowed funds in projects that are productive and provide foreign exchanges instead of non-productive activities. Moreover, creditors should provide loans to feasible and development projects of HIPCs and also, they have to follow up their implementations. In addition, by examining the status of HIPCs projects, creditors should provide the funds step by step instead of once. Furthermore, improving the skills and knowledge of HIPCs by providing different short- and long-term trainings concerning resource and debt related issues, such as resource allocation, debt management, and project management.

d. The studies found that investment, national saving, HCD, and TFP significantly increase the growth of HIPCs. Therefore, besides policies that reduce the adverse effect of growth factors, governments should develop strategies that improve the growth factors.

Even though this study tried to fill the existing gaps (scope, methodology, literature) in determinants, sustainability, channels, and impacts of external debt in HIPCs, it also has limitations that will be addressed by future studies. Due to a lack of data on some important variables and to make the study consistent, except for chapter five, the study is constrained to 15 HIPCs.

This study is limited to macroeconomic and political factors when examining the determinants of external debt in HIPCs. However, there are other factors, such as natural disasters and capital flights, which contribute a lot for indebtedness but not included (due to constrained data) in this study. Hence, taking these into account, future studies can examine the issue further. Furthermore, to analyze the sustainability of external debt empirically, the study was restricted to the current account elements (like exports and imports) and external debt, and therefore, other variables — such as political instability (fragile and nonfragile states), natural disasters, landlockedness, and other macroeconomic factors — were not included in the model. Hence, future researchers can extend the Llorca (2017) model in their investigation by taking these factors into account.

This study focused on investment, national saving, HCD, and TFP channels to investigate the indirect effect of external debt on growth. However, interest rate and private saving also some of the channels. Besides, the study used total investment rather than its components (private and public investment). Moreover, this study did not consider the structural breaks in its analysis. Therefore, future studies can extend their investigation by considering interest rate, private saving, the decomposed investments (to capture the accelerator principle), and structural breaks in their models.

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LIST OF PUBLICATIONS

This section presents peer-reviewed publications that are part of this dissertation and other studies related to it and conference proceedings. Besides, most parts of this dissertation and other related studies are under review.

Peer-reviewed journal publications

1. Beyene, S. D. – Kotosz, B. (2020). Testing the environmental Kuznets curve hypothesis: an empirical study for East African countries. *International Journal of Environmental Studies*, *77*(4): 636-654.
2. Beyene, S. D. – Kotosz, B. (2020). Macroeconomic determinants of external indebtedness of Ethiopia: ARDL approach to co-integration. *Society and Economy*, *42*(3): 313-332.
3. Beyene, S. D. – Kotosz, B. (2020). Determinants of External Indebtedness in Heavily Indebted Poor Countries: An Empirical Evidence Using Panel-Corrected Standard Error Regression. *Journal of Applied Economic Sciences.* Volume XV, Spring 1(67): 229-242
4. Beyene, S. D. – Kotosz, B. (2020). Is Fiscal or Monetary Policy More Effective on Economic Growth? An Empirical Evidence in The Case of Ethiopia. *Journal of African Research in Business & Technology*, Vol. 2020 (2020), Article ID 124855, DOI: 10.5171/2020.124855
5. Beyene, S. D. – Kotosz, B. (2020). Testing the Ricardian equivalence hypothesis in the case of Ethiopia: An autoregressive-distributed lag approach. *Hungarian Statistical Review*, *3*(2): 26-49.
6. Beyene, S. D. – Kotosz, B. (2021). Empirical Evidence for the Impact of Environmental Quality on Life Expectancy in African Countries. *Journal of Health and Pollution.* 11(29).

Conference Presentations

1. Beyene, S.D. – Kotosz, B. (2019): The determinants of external indebtedness of Ethiopia, Udvari B. and Voszka É. (eds), Proceedings of the 3rd Central European PhD Workshop on Economic Policy and Crisis Management, University of Szeged, Doctoral School in Economics, Szeged, 90 – 107. https://eco.u-szeged.hu/english/research/conferences-workshops/challenges-in-national-and-internaitonal-economic-policies/challenges-in-national-and-internaitonal-economic-policies

2. Beyene, S.D. – Kotosz, B. (2019): Is the Ricardian Equivalence Hypothesis Valid? An Empirical Study for Ethiopia Udvari B. (ed) 2020: Proceedings of the 4th Central European PhD Workshop on Technological Change and Development. University of Szeged, Doctoral School in Economics, Szeged, pp 397–414. https://eco.u-szeged.hu/english/research/conferences workshops/2019/technological-change-and-development/technological-change and-development
3. Beyene, S.D. – Kotosz, B. (2019): External Debt and Private Investment: The Case of Heavily Indebted Poor Countries (HIPCs) in Sub-Saharan Africa (SSA). 34th IBIMA Conference, Madrid, Spain https://ibima.org/accepted-paper/external-debt-and-private-investment-the-case-of-heavily-indebted-poor-countries-hipcs-in-sub-saharan-africa-ssa/
4. Beyene, S.D. – Kotosz, B. (2019): The Relative Effectiveness of Fiscal and Monetary Policies on Ethiopian Economy: Johansen Cointegration Approach. 34th IBIMA Conference, Madrid, Spain https://ibima.org/accepted-paper/the-relative-effectiveness-of-fiscal-and-monetary-policies-on-ethiopian-economy-johansen-cointegration-approach/