

University of Zawia

Postgraduate Studies and Training Administration Faculty of Economics Health Management Department Title; The Impact of Political Instability on Healthcare Expenditure in Libya: An Econometric Analysis (1990–2022)

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Abstract

This thesis examines the impact of political instability on public healthcare expenditure in Libya over the period 1990–2022. Since the 2011 uprising, Libya has experienced protracted political and security instability that has progressively eroded the institutional and fiscal foundations of the state, undermining the government's capacity to sustain adequate financing for the healthcare sector; yet this relationship had not previously been quantified for Libya using long-run econometric evidence. Accordingly, the thesis measures the size, direction, and statistical significance of this effect and explains how political instability, oil revenues, and government financial capacity interact to shape healthcare spending in Libya. The thesis consists of six chapters: it reviews the main theories related to the study, including Public Choice Theory, State Fragility Theory, and Resource Curse Theory, and traces the development of Libya's healthcare system from its establishment in 1969 through the post-2011 period of fragmentation, examining how political instability has affected healthcare financing through unstable public finances, weak institutions, rising security expenditure, and poor long-term planning. Chapter Five applies the Autoregressive Distributed Lag (ARDL) model, estimated in EViews 12, to study the relationship between real per capita public healthcare expenditure and political instability, oil revenue, GDP, government expenditure, the exchange rate, and population. The results confirm a statistically robust long-run relationship between the variables, with the error correction model showing that about 38.7 per cent of short-run deviations are corrected toward long-run equilibrium each year. Political instability has the largest negative effect on healthcare expenditure (−0.931); government expenditure has the second-largest positive effect (0.544), followed by GDP (0.45); the exchange rate (−0.337) and population (−0.277) exert negative effects; and oil revenue has a positive effect in the short run (0.387) but a negative effect in the long run (−0.245), reflecting a resource-curse dynamic. Chapter Six presents practical recommendations for improving public financial management, insulating health financing from oil-price and exchange-rate volatility, and improving budget planning in line with population growth. The main contribution of this thesis is that it provides the first long-run econometric evidence showing how political instability has affected public healthcare financing in Libya.

Keywords: Political Instability; Public Healthcare Expenditure; Libya; ARDL Model; Resource Curse; Wagner's Law; Oil Revenues; Fiscal Policy

الملخص

تتناول هذه الرسالة أثر عدم الاستقرار السياسي على الإنفاق العام على الرعاية الصحية في ليبيا خلال الفترة 1990–2022. فمنذ اندلاع أحداث عام 2011، شهدت ليبيا حالة ممتدة من عدم الاستقرار السياسي والأمني أدت إلى تآكل تدريجي في الأسس المؤسسية والمالية للدولة، وأضعفت قدرة الحكومة على تأمين تمويل كافٍ لقطاع الرعاية الصحية؛ إلا أن هذه العلاقة لم يسبق قياسها كميًا في الحالة الليبية بالاعتماد على أدلة قياسية اقتصادية طويلة الأجل. وعليه، تقيس هذه الرسالة حجم هذا الأثر واتجاهه ودلالته الإحصائية، وتوضح كيفية تفاعل عدم الاستقرار السياسي مع الإيرادات النفطية والقدرة المالية للحكومة في التأثير على الإنفاق على الرعاية الصحية في ليبيا. وتتكون الرسالة من ستة فصول: تستعرض أهم النظريات المرتبطة بموضوع الدراسة، وهي نظرية الاختيار العام، ونظرية هشاشة الدولة، ونظرية لعنة الموارد، وتتتبع تطور قطاع الرعاية الصحية في ليبيا منذ تأسيسه عام 1969 وحتى مرحلة التشرذم التالية لعام 2011، مع بيان كيف أثر عدم الاستقرار السياسي على تمويل الرعاية الصحية من خلال عدم استقرار المالية العامة، وضعف المؤسسات، وزيادة الإنفاق الأمني، وضعف التخطيط طويل الأجل. ويستخدم الفصل الخامس نموذج الانحدار الذاتي للإبطاءات الموزعة (ARDL) باستخدام برنامج EViews 12 لدراسة العلاقة بين الإنفاق العام الحقيقي على الرعاية الصحية للفرد وكل من عدم الاستقرار السياسي، والإيرادات النفطية، والناتج المحلي الإجمالي، والإنفاق الحكومي، وسعر الصرف، وعدد السكان. وتؤكد النتائج وجود علاقة طويلة الأجل ذات دلالة إحصائية قوية بين هذه المتغيرات، إذ يشير نموذج تصحيح الخطأ إلى أن نحو 38.7% من الاختلالات قصيرة الأجل تُصحَّح سنويًا باتجاه التوازن طويل الأجل. وكان عدم الاستقرار السياسي هو العامل الأكثر تأثيرًا سلبًا على الإنفاق الصحي (−0.931)؛ يليه الإنفاق الحكومي بأثر إيجابي (0.544)، ثم الناتج المحلي الإجمالي (0.45)؛ في حين كان لكل من سعر الصرف (−0.337) وعدد السكان (−0.277) أثر سلبي؛ أما الإيرادات النفطية فكان لها أثر إيجابي في الأجل القصير (0.387) لكنه تحوّل إلى أثر سلبي في الأجل الطويل (−0.245)، بما يعكس ديناميكية لعنة الموارد. ويقدم الفصل السادس توصيات عملية لتحسين إدارة المالية العامة، وحماية تمويل الرعاية الصحية من تقلبات أسعار النفط وسعر الصرف، وتحسين التخطيط للموازنة بما يتناسب مع النمو السكاني. وتتمثل المساهمة الرئيسة لهذه الرسالة في أنها تقدم أول دليل قياسي اقتصادي طويل الأجل يوضح كيف أثر عدم الاستقرار السياسي على تمويل الرعاية الصحية العامة في ليبيا.

الكلمات المفتاحية: عدم الاستقرار السياسي؛ الإنفاق العام على الرعاية الصحية؛ ليبيا؛ نموذج الانحدار الذاتي للإبطاءات الموزعة (ARDL)؛ لعنة الموارد؛ قانون فاغنر؛ الإيرادات النفطية؛ السياسة المالية

شكر وتقدير

بسم الله الرحمن الرحيم. الحمد لله الذي بنعمته تتم الصالحات، وبتوفيقه تتحقق الغايات، والصلاة والسلام على سيدنا محمد وعلى آله وصحبه أجمعين.

أصحاب السعادة أعضاء لجنة المناقشة الموقرة، السادة الحضور الكرام، السلام عليكم ورحمة الله وبركاته. يسعدني أن أتقدم بخالص الشكر والتقدير إلى كل من كان له فضل في إنجاز هذا العمل، امتثالًا لقول رسول الله ﷺ: «لا يشكر الله من لا يشكر الناس».

وأخص بخالص الشكر والتقدير أستاذي الفاضل ومشرفي الكريم **الأستاذ الدكتور حسين علي الطاهر البوعيشي**، الذي لم يدخر وقتًا ولا جهدًا في توجيهي وإرشادي، وكان لملاحظاته وتوجيهاته العلمية بالغ الأثر في تطوير هذا العمل وإخراجه بصورته النهائية، فجزاه الله عني خير الجزاء، وبارك له في علمه وعمله.

كما أتقدم بجزيل الشكر والتقدير إلى **الأستاذ الدكتور وليد بشير شيوب، رئيس إدارة الدراسات العليا**، على ما قدمه من دعم ورعاية أسهمت في تيسير إتمام هذه الدراسة.

كما أتوجه بخالص الشكر والامتنان إلى أصدقائي وإخواني الذين لم ينقطع دعمهم ومساندتهم طوال مسيرتي العلمية، وإلى قيادات جامعة الزاوية وكلية الاقتصاد وإدارة الدراسات العليا، وإلى جميع أعضاء هيئة التدريس والعاملين بالجامعة، على ما قدموه من تعاون ودعم طوال فترة الدراسة، سائلًا الله تعالى أن يجزيهم جميعًا خير الجزاء.

وفي الختام، أتقدم بخالص الشكر والتقدير إلى أصحاب السعادة أعضاء لجنة المناقشة الموقرة على تفضلهم بقبول مناقشة هذه الرسالة، وإلى السادة الحضور الكرام على تشريفهم هذه المناسبة العلمية.

الإهداء

الحمد لله الذي بنعمته تتم الصالحات، وبتوفيقه تُنجز الأعمال. إذا كتب الله تعالى لهذا العمل القبول، فإنني أهدي ثمرة هذا الجهد إلى والدي العزيز، الغالي على قلبي، الذي كان يتطلع إلى هذه اللحظة منذ سنوات، وأدرك أن ما وصلت إليه اليوم كان حلمًا يراوده منذ نعومة أظفاري. وقد سعيت بكل ما أملك لتحقيق ذلك الحلم وبلوغ هذه الغاية، وإن تأخر الوصول إليها، فكما قيل» **:أن تأتي متأخرًا خيرٌ من ألا تأتي** .«أسأل الله تعالى أن يمد في عمره، ويبارك له في صحته، وأن يجزيه عني خير الجزاء، امتثالًا لقوله تعالى: ﴿وَاخْفِضْ لَهُمَا جَنَاحَ الذُّلِّ مِنَ الرَّحْمَةِ وَقُلْ رَبِّ ارْحَمْهُمَا كَمَا رَبَّيَانِي صَغِيرًا﴾ **) الإسراء: 24**

وأخص بالإهداء والدتي العزيزة الغالية، التي كانت ولا تزال نبع الحنان، ومصدر الدعاء، ورمز العطاء والتضحية، وأسأل الله تعالى أن يبارك في عمرها، ويمتعها بموفور الصحة والعافية، وأن يجزيها عني خير الجزاء، فما وصلت إلى ما أنا عليه بعد فضل الله تعالى إلا بدعائها وصبرها ودعمها المتواصل، مصداقًا لقوله تعالى: ﴿وَوَصَّيْنَا الْإِنسَانَ بِوَالِدَيْهِ إِحْسَانًا﴾ **)الأحقاف:**

كما أهدي هذا العمل إلى زوجتي الوفية، التي كانت نعم السند، وخير الرفيق، والتي تحملت بصبر ومحبة كثيرًا من التضحيات حتى يخرج هذا العمل إلى النور، فلها مني خالص المحبة وعظيم التقدير والامتنان، مصداقًا لقوله تعالى:

﴿وَمِنْ آيَاتِهِ أَنْ خَلَقَ لَكُمْ مِنْ أَنْفُسِكُمْ أَزْوَاجًا لِتَسْكُنُوا إِلَيْهَا وَجَعَلَ بَيْنَكُمْ مَوَدَّةً وَرَحْمَةً﴾ **)الروم: 21**

وإلى أبنائي وبناتي، قرة عيني، وسر سعادتي، الذين كانوا مصدر إلهامي، ودافعًا لهمتي، وسندًا لعزيمتي حتى إتمام هذا العمل، أهدي إليهم هذا الجهد، داعيًا الله سبحانه وتعالى أن يجعلهم من الصالحين، وأن يقر بهم عيني في الدنيا والآخرة.

وأخيرًا، أسأل الله تعالى أن يجعل هذا العمل خالصًا لوجهه الكريم، وأن يكتب له القبول، وأن ينفعني به في الدنيا والآخرة، وأن يجعله علمًا نافعًا ينتفع به طلاب العلم والباحثون، إنه ولي ذلك والقادر عليه.

الباحث

خالد خليفة رمضان

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Declaration
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نموذج رقم 21

إقرار

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"The Impact of Political Instability on Healthcare Expenditure in Libya: An Econometric Analysis (1990–2020)"

«تأثير عدم الاستقرار السياسي في الإنفاق على الرعاية الصحية في ليبيا: تحليل قياسي اقتصادي (1990–2020) »

hereby declare that the contents of this thesis are the result of my own scientific work, except where reference has been made whenever applicable, and in accordance with the principles of scientific research methodology, and that none of it has previously been submitted for the award of any academic degree, scientific title, or research qualification at any other educational or research institution. I bear full legal responsibility in accordance with the applicable laws and regulations should any violation of what is stated in this declaration be proven.

بأن ما اشتملت عليه هذه الرسالة إنما هو نتاج جهدي العلمي الخاص، باستثناء ما تمت الإشارة إليه حيثما ورد، ووفق ما تقرره مناهج البحث العلمي وان كل منها لم يسبق تقديمه لنيل درجة علمية، او لقب علمي أو بحثي لدى أي مؤسسة تعليمية أو بحثية أخرى, ,وأتحمل كامل المسؤولية القانونية المترتبة وفقًا للقوانين واللوائح النافذة في حال ثبوت مخالفة أي مما ورد في هذا الإقرار.

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LIST OF ABBREVIATIONS

ADF — Augmented Dickey–Fuller (unit root test)

ARDL — Autoregressive Distributed Lag

CBL — Central Bank of Libya

CEOBS — Conflict and Environment Observatory

COVID-19 — Coronavirus Disease 2019

ECM — Error Correction Model

EXR — Official Exchange Rate (Libyan Dinar)

GDP — Gross Domestic Product

GHE — Government (Public) Healthcare Expenditure

GHED — Global Health Expenditure Database (WHO)

GOV — Government Expenditure (% of GDP)

IMF — International Monetary Fund

L- (prefix) — Natural logarithm of the variable (e.g., LGDP, LGHE, LGOV, LEXR, LOILR, LPOL, LPOP)

LYD — Libyan Dinar

MENA — Middle East and North Africa

NCD — Non-Communicable Disease

NGO — Non-Governmental Organization

OECD — Organisation for Economic Co-operation and Development

OILR — Oil Revenue (% of GDP)

OLS — Ordinary Least Squares

OOP — Out-of-Pocket (payments)

PHC — Primary Healthcare

PHSA — Public Health Situation Analysis

POL — Political Instability Index

POP — Total Population

RESET — (Ramsey) Regression Equation Specification Error Test

SAHA — International SAHA Project ("RaiSe LibyAn Higher Education Health Sector for the Benefit of Local Society")

SIC — Schwarz Information Criterion

UCDP — Uppsala Conflict Data Program

UK — United Kingdom

UNDP — United Nations Development Programme

UNHCR — United Nations High Commissioner for Refugees

UNICEF — United Nations Children's Fund

US / USD — United States / United States Dollar

VAR — Vector Autoregression

VECM — Vector Error Correction Model

WAEMU — West African Economic and Monetary Union

WDI — World Development Indicators (World Bank)

WEO — World Economic Outlook (IMF)

WHO — World Health Organization

The Impact of Political Instability on Healthcare Expenditure in Libya: An Econometric Analysis (1990–2022)

Chapter One: General Framework

1: Introduction

1.1 Background of the Study

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Healthcare is a cornerstone of human development and a critical component of a nation's sustainable economic progress. A robust and accessible healthcare system directly influences the well-being and productivity of citizens, thereby impacting overall economic performance and social welfare (World Health Organization, 2010). The level and efficiency of healthcare expenditure are shaped by a complex interplay of factors, chief among them being the prevailing political and economic environment. Political stability, characterized by strong and effective institutions, fosters a conducive climate for developing long-term healthcare strategies, allocating resources rationally, and attracting the investment necessary for strengthening healthcare infrastructure (Kak et al., 2023).

In stark contrast, political instability—in its various forms, including armed conflict, governmental fragmentation, and frequent changes in leadership—poses an existential threat to healthcare systems. Such conditions frequently lead to the disruption of medical supply chains, the destruction or neglect of infrastructure, the exodus of qualified medical professionals ("brain drain"), and the fragmentation of national planning and oversight efforts. Crucially, instability severely weakens a state's capacity to mobilize and allocate financial resources in a consistent and equitable manner (Daw et al., 2016).

The recent history of Libya provides a poignant case study of this dynamic. The Libyan healthcare system, even before the 2011 conflict, faced significant structural challenges. A case study by Osborne (2010) highlighted a public perception of deteriorating quality, a lack of trust in public hospitals, and systemic issues related to staff training, inconsistent resource supply, and the necessity of informal

networks to access care. These pre-existing vulnerabilities were severely exacerbated following the pivotal events of 2011, after which the nation experienced profound political transformations followed by protracted periods of instability. This era has been defined by multi-sided armed conflicts, deep institutional schisms, and direct attacks on the healthcare sector itself. For instance, the Health Sector Bulletin (August 2019) documented ongoing shelling of healthcare facilities, obstruction of ambulances, and a constant threat to medical personnel, which directly hinder the delivery of care **(WHO Health Cluster, 2019)**.

The nation's near-total dependence on oil revenues renders its public finances, including the healthcare budget, extremely vulnerable to security-related disruptions in production and export. This volatility undermines long-term financial planning for the sector. Furthermore, the political and administrative division has often resulted in parallel and uncoordinated spending patterns, placing an additional burden on official state resources and making it exceedingly difficult to secure adequate and sustainable financing for the growing healthcare needs of the population (Allen et al., 2024).

Against this complex backdrop, a rigorous and in-depth understanding of the nature and magnitude of political instability's impact on healthcare expenditure in Libya is imperative. Such an analysis is not merely an academic exercise to assess past damages; it is a vital prerequisite for formulating resilient future strategies aimed at building a healthcare system capable of withstanding political shocks and ensuring the sustainable delivery of quality healthcare services to all Libyans.

Therefore, the general aim of this study is to econometrically investigate the impact of political instability on public healthcare expenditure in Libya. The research seeks to quantify this relationship using data from 1990–2022, providing robust empirical evidence. Ultimately, these findings will inform the development of more resilient healthcare financing strategies in a volatile context

1.2 Problem Statement

The central research problem this study addresses is the profound and protracted impact of the political instability experienced by Libya, particularly from 1990 to 2022, on the levels and structure of public expenditure on healthcare. In an environment marked by institutional fragmentation, intermittent armed conflict, and the absence of a unified national vision, the Libyan healthcare system faces critical challenges in securing adequate, predictable, and efficiently allocated funding.

This problem manifests through the following key indicators:

- **Disrupted and Volatile Funding:** Political fragmentation leads to budgetary paralysis and erratic spending tied to insecure oil revenues, making consistent financial planning for the healthcare sector impossible.

- **Deteriorating Infrastructure and Misaligned Priorities:** Healthcare facilities decay from neglect and direct conflict-related damage, as documented by attacks on primary healthcare centers and hospitals (Health Sector Libya, 2019). Financing is diverted from long-term strategic healthcare programs to short-term emergency responses for conflict casualties and disease outbreaks.

- **Inefficient Allocation and Supply Chain Collapse:** The misallocation of resources based on political pressures, combined with disrupted supply chains, results in chronic shortages of essential medicines—such as for HIV and TB—and a failure to meet public healthcare needs, necessitating emergency humanitarian interventions (Health Sector Libya, 2019).

While several studies have qualitatively described the decline of Libya's healthcare services (e.g., Daw et al., 2016) or focused on specific managerial aspects through a case-study approach (e.g., Osborne, 2010), there is a distinct scarcity of quantitative research that specifically isolates and measures the econometric impact of political instability as a primary independent variable on healthcare expenditure as the dependent variable. Existing research, including the work of the proposed supervisor (Elboiashi, 2023; Elboiashi, 2024), has established the detrimental impact of instability on other macroeconomic variables like the trade balance and economic growth, but this rigorous econometric approach has not yet been systematically applied to the healthcare sector in Libya over a long-term period. This study, therefore, aims to fill this critical knowledge gap by providing a rigorous, data-driven analysis of this relationship.

1.3 Main Research Question

What is the impact of political instability on public healthcare expenditure in Libya during 1990–2022?

Sub-question 1

What is the long-run impact of political instability on public healthcare expenditure?

Sub-question 2

Does political instability increase the volatility of healthcare expenditure?

Sub-question 3

Does political instability affect capital healthcare expenditure differently from recurrent expenditure?

1.4 Research Aim and Objectives

The primary objective of this research is to econometrically analyses and quantify the impact of political instability on public healthcare expenditure in Libya. The following specific objectives are derived from this central aim:

Objective 1

To estimate the long-run and short-run effects of political instability on public healthcare expenditure in Libya.

Objective 2

To evaluate the relationship between political instability and the volatility of healthcare expenditure.

Objective 3

To assess whether political instability has different effects on capital and recurrent healthcare expenditure.

1.5 Significance of the study

This research is expected to make significant contributions on scientific, practical, and societal levels.

- **Scientific Significance:**
    - **Enriching Literature:** It contributes to the growing body of literature on the economics of healthcare in fragile and conflict-affected states, a field where rigorous quantitative analysis is often challenging.
    - **Filling a Research Gap:** It addresses a specific gap in the literature concerning Libya by providing a long-term (32-year) econometric analysis, extending the supervisor's previous work on other economic sectors (Elboiashi, 2023; 2024) to the vital area of healthcare.
    - **Methodological Application:** It demonstrates the application of advanced time-series econometric models (e.g., ARDL) to analyses public policy issues in a data-scarce and volatile environment, offering a methodological reference for future research in similar contexts.
- **Practical and Policy Significance:**
    - **Evidence for Policymakers:** The findings will provide Libyan policymakers with quantitative evidence on the fiscal consequences of instability for the healthcare sector, which can inform budgeting processes and strategic planning.
    - **Designing Resilient Financing:** An understanding of the magnitude of the impact can help in designing more resilient healthcare financing mechanisms (e.g., stabilization funds, contingency plans) that can better withstand political and economic shocks.
    - **Informing International Partners:** The results will be valuable for international organizations, donors, and NGOs by helping them to better target their assistance and support capacity-building strategies for sustainable healthcare financing in Libya.
- **Societal Significance:**

- **Raising Public Awareness:** The study can raise awareness among the public and civil society about the tangible, indirect costs of political instability on a vital service like healthcare, strengthening calls for stability and good governance.

- **Advocating for the Right to Healthcare:** By highlighting how instability undermines access to healthcare, the research provides an evidence-based tool for advocating for the protection of healthcare as a fundamental human right.

- **Promoting Transparency:** By analyzing and presenting data on expenditure trends and their determinants, the study contributes to greater transparency and accountability in the management of public healthcare resources.

1.6 Research Hypotheses

Based on the theoretical framework and the existing literature, this study will test the following primary hypotheses:

- **H1: (Level Effect)** There is a statistically significant negative relationship between political instability and the level of real per capita government healthcare expenditure in Libya.
    - *Expectation:* An increase in indicators of political instability (e.g., conflict events, deterioration in governance scores) is expected to lead to a decrease in real government healthcare spending per capita.

- **H2: (Volatility Effect)** Political instability leads to a significant increase in the volatility (i.e., unpredictable fluctuations) of government healthcare expenditure in Libya.

    - *Expectation:* Periods of higher instability will be associated with greater year-to-year variance in healthcare spending levels.

- **H3: (Composition Effect)** Political instability has a more pronounced negative impact on capital (investment) healthcare expenditure compared to current (recurrent) healthcare expenditure.

    - *Expectation:* In times of crisis, governments are more likely to preserve essential recurrent spending (e.g., salaries) while postponing or cancelling long-term capital projects for infrastructure and development.

1.7 Research Gap

A thorough review reveals a critical gap, while the negative consequences of instability on Libya's healthcare system are qualitatively well-documented, and the macroeconomic impacts have been quantified by scholars like Elboiashi (2023; 2024), there is no long-term econometric study that specifically models and quantifies the direct and indirect impacts of political instability on public healthcare expenditure in Libya. This study will bridge the qualitative descriptions of healthcare collapse with the robust quantitative methods previously applied to other sectors of the Libyan economy, providing a novel, evidence-based analysis for this vital sector. The literature reveals several critical gaps that this research aims to address, justifying its necessity and contribution:

1. Methodological and Temporal Scarcity in the Libyan Context:

The majority of studies on Libya's healthcare system are either qualitative, descriptive (e.g., Daw et al., 2016), or cover short, post-2011-time frames (e.g., Osborne, 2010). There is a distinct lack of long-term, quantitative analysis that employs robust econometric techniques to establish causality. This study fills this gap by applying a time-series model (ARDL) over a 32-year period (1990–2022) to move beyond correlation and provide statistically rigorous evidence on the relationship between instability and healthcare spending.

2. Lack of Context-Specific Quantitative Models:

While global cross-country studies (e.g., Barro, 1991) have linked instability to economic outcomes, their general models often fail to capture the unique drivers of instability in a

resource-dependent, fragmented state like Libya. This research addresses this gap by developing a model that integrates variables specific to the Libyan political economy, such as the direct impact of oil revenue volatility and the effects of institutional schisms, providing a more nuanced and accurate analysis than a generic model would allow.

3. Absence of an Evidence-Based Bridge to Policy:

Existing studies on Libya often conclude with general recommendations for improved funding or governance. However, there is a significant gap in research that quantitatively models the specific transmission channels (e.g., revenue shocks, budget re-prioritization) and provides empirical estimates of their impact. By quantifying these effects, this study aims to move beyond broad advice to inform the design of specific, actionable policies, such as resilient financing mechanisms tailored to the measured risks of political and economic shocks.

1.9 Structure of the Thesis

Chapter One introduces the research background, problem statement, objectives, research questions, significance, hypotheses, and study scope.

Chapter Two reviews the theoretical and empirical literature and presents the conceptual framework.

Chapter Three provides an overview of Libya's political and healthcare context.

Chapter Four presents the research methodology, data sources, variables, and econometric model.

Chapter Five reports the empirical findings and discusses the results.

Chapter Six concludes the study, presents policy recommendations, limitations, and suggestions for future research.

Chapter Two

Theoretical and Empirical Literature Overview

2.1 Introduction

Healthcare economics has an expansive research repertoire in resources allocation, efficiency in the healthcare systems and socio-economic determinants of health. The purpose of this chapter is to present and discuss the key elements of the empirical and theoretical literatures upon which the present study draws, aiming to frame the question under investigation in its scholarly environment, highlight existing gaps and provide the foundation for subsequent analyses. It is organized around two major areas. Firstly, it surveys the theoretical literature in healthcare, starting with the foundational concepts such as health production functions, demand and supply models in healthcare, and the concept of market failure in health (Arrow, 1963; Phelps, 2017), to explain market behaviour under conditions of asymmetric information, externalities and the case for government intervention. Secondly, it discusses the empirical evidence on healthcare system reform, its performance, financing mechanisms, and models across the globe, focusing particularly on middle- and high-income country examples which can yield valuable comparisons of institutional response to cost, access and quality concerns (OECD, 2021; Wagstaff et al., 2018). Common threads such as efficiency, accessibility and value-based healthcare are interwoven in both sections. Finally, the chapter addresses various methodologies adopted by studies that investigate health financing systems (Drummond et al., 2015). The combined material establishes the contribution of this study to a broader debate in academic and policy circles.

2.2 Theoretical Literature Overview

Drawing on multiple theories ranging from those on economic growth to those in political economy, several lines of enquiry are relevant for exploring how political instability impacts the way in which public resources are generated and expended. The different theories presented below provide varying perspectives on these linkages.

2.2.1 Economic Growth Theories and Health Financing under Political Instability Political Instability and Economic Growth

In the economic literature, the relationship between political instability (a broader term for the uncertainty about government decisions or risk of rapid changes in political leadership) and economic growth has been an issue of perennial concern. Endogenous growth theory suggests that sustainable economic growth requires accumulation not only of physical capital but also of human capital and the fostering of technological innovation which are dependent on strong institutional frameworks (Romer, 1990). Political instability affects all these pillars: undermines institutional capacity, creates discontinuities in policy and policies, and discourages investment and private spending. As a result, political instability is associated with lower economic growth and poorer development outcomes (Alesina et al., 1996). The institutional theory posits that stable political institutions are key prerequisites for economic development (North, 1990). When political institutions are weak, governments are often incapable of formulating and implementing sound economic policies and are prone to less transparency and accountability in their spending. The healthcare sector, for instance, heavily relies on political stability both for a predictable flow of funds and a consistent policy environment, and can easily be negatively affected.

The Political Economy of Public Spending

The Political Economy perspective views the allocation of public spending, including the healthcare budget, as influenced by factors such as politics, self-interest and political bargaining among various interest groups (Persson & Tabellini, 2000). During times of political instability, policy makers are more likely to favor public expenditures that yield immediate and visible political dividends over long-term investments in social infrastructure. Hence, healthcare system development which relies on long-term consistent investment and has lagged, visible effects can be easily sidelined under volatile political conditions.

The health sector is more vulnerable to the adverse effects of political instability than other sectors for two key reasons. It requires a consistent stream of public funding and a reliable

institutional framework for service delivery. Political instability has often been associated with fluctuation in public spending and a disruption of health infrastructure and services provision (Rajkumar & Swaroop, 2008). As highlighted in Health economics literature, stability of health financing, predictability of expenditure and strong institutions are preconditions for efficient and equitable health services (Culyer & Newhouse, 2000). Macro-economic distortions such as inflation and currency devaluation which occur due to instability, in turn, erode the real value of the health budgets, even if the nominally allocated budgets seem unchanged. Moreover, this creates a negative climate of confidence for investors, international donors and hinder the efforts for recruiting and retaining quality health workers (World Health Organization, 2010).

The application of economic growth theories, institutional theory and the political economy perspective reveal a common message that uncertainty in the governance process translates into misallocation of resources, with the health sector being severely affected. This, in turn, leads to an underinvestment in healthcare, increasing poverty and inequality, thus potentially hindering both economic recovery and political stabilization processes. The need to manage political instability should therefore be considered part of broader strategies for sustainable development and improvement of population health.

2.2.2 Theories of Health Financing in Fragile States

Theories from this section highlight specific ways in which political instability has a negative impact on health financing in contexts. They focus on political and institutional processes that lead to inefficient resource utilization and underfunding.

1. Public Choice Theory suggests that political actors prioritize their own interests over the public good, leading them to allocate public funds towards expenditures that yield immediate, concentrated benefits and visible political gains, rather than to more diffuse, long-term investments like health services, even when a state has sufficient resources. (Mueller, 2003)

2. State Fragility and Conflict Theory argues that armed conflict and political violence destroy physical health infrastructure, displace skilled health workers and disrupt the

complex organizational and administrative processes needed to effectively deliver services. The cycle of disruption and partial recovery in fragile states impedes long-term health system strengthening. (Collier et al., 2003; OECD, 2022)

3. Public Healthcare Financing Theory postulates that effective, equitable and sustainable financing of health services requires institutional stability and political will which fragile states typically lack. Even with theoretically sound financing mechanisms such as social health insurance, these are likely to fail in practice if institutions are weak, compromised or non-existent. (McIntyre & Meheus, 2014; Saltman & Busse, 2002)

4. Resource Curse Theory, which is relevant for countries like Libya, depends heavily on resource revenues such as oil, suggests that the windfall of resource income distorts economic incentives, fosters patronage and corruption, and diminishes government accountability to citizens. Volatile resource prices or revenues (as is often the case in Libya due to the ongoing conflict disrupting production) create additional vulnerability. (Farzanegan & Markwardt, 2009) Collectively, these four theoretical frameworks provide a multi-faceted explanation for how political instability leads to poor health financing outcomes. These theoretical insights guide the empirical investigation in this research and assist in the selection of the variables that will be included in the econometric model. Resource Curse Theory predicts that oil rents would contribute to a patronage network and would not be sufficiently channeled to efficient development projects but rather dispersed on rents and would reduce the government accountability to citizens (Ross, 2012; Karl, 1997). The overall contribution of these theoretical perspectives is the evidence they lend to the case for reform aimed at improving, strengthening, and stabilizing health financing systems.

2.2.2.1 Public Choice Theory

Public Choice Theory makes an interdisciplinary application of economic principles to political behavior and government decision making. It departs from conventional thought simply by asserting that political actors do not consistently act in the public interest. Politicians, bureaucrats and voters all respond to incentives and operate out of self-interest

just as do consumers and firms in the marketplace (Mueller, 2003).

This body of thought explains how political decision processes can result in public outcomes that deviate from what the society requires. Rent-seeking, logrolling and bureaucratic expansion are common concepts, all of which rely on the assumption that government officials and citizens work towards their own interests and benefit within political frameworks. The political environment under Results The cumulative effect is consistently poor performance on both health and economic outcomes, for example, fragile states generally report lower levels of economic development, higher rates of poverty and poorer population health than their stable counterparts (World Bank, 2021). In healthcare this leads to a prevalence of child and maternal deaths, underperforming disease surveillance and limited emergency preparedness capacity. The impact of the COVID-19 pandemic highlights this vulnerability and fragility in no uncertain terms: "fragile and conflict-affected states faced significant challenges in containing the virus and continuing essential services simultaneously" (UNDP, 2021). Critical Perspective Many of the underlying assumptions in state fragility theory can be criticized for being based on Western normative ideals, such as those embedded in liberal democracy, efficient markets and Weberian bureaucracy, obscuring how resilience, order and legitimacy is maintained through other means (traditional leadership, religion, community networks etc) in non-Western settings (Boege et al., 2009; Call, 2011; Hagmann & Hoehne, 2009). The emphasis on formal institutions may therefore implicitly suggest fragile states are passive recipients rather than agents that seek solutions to the challenges they face (Mac Ginty, 2010).

2.2.3 Theories of public healthcare financing

Definition Public healthcare financing involves the generation, allocation, and management of government financial resources for the delivery of health services, ranging from tax-financed systems to social health insurance and donor funds, all of which are based on varying assumptions about state responsibility, markets and equity in health (McIntyre & Meheus, 2014). Core Themes and mechanisms the primary challenge within public healthcare financing theories is to reconcile equity, efficiency and sustainability. The

two historical models can be seen as extreme examples of this continuum; the Beveridge Model in the UK funds care through general taxation, delivers it through the public sector and treats healthcare as a right. The Bismarck Model is financed through mandatory employment-related insurance schemes pooled through sickness funds, where the financial risk is concentrated on contributors (Saltman & Busse, 2002). Both models are impacted by the instability of political environment they operate in, in fact in many unstable countries it is very hard to find institutional capacity that enables the implementation of either model. Intellectual Origins The field dates to contributions in public finance on the role of the state in redistribution (Musgrave, 1959) and to the ideas of Keynes on the necessity of increasing public spending to address recessionary pressures in the economy and society including healthcare (Keynes, 1936). Early contributions in health economics have discussed the optimal balance between financing schemes, equity and efficiency (Newhouse, 1992; Maynard, 1994).

Empirical Evidence between 1990 and 2020, low and middle-income countries made slow progress towards increasing domestic resource mobilization, however significant gaps persist. Health systems that generate their resources domestically and with appropriate allocation structures typically offer their populations better health outcomes and financial risk protection than those relying heavily on out-of-pocket expenditure (WHO, 2021), a key characteristic in many underfunded and fragile health systems that results in delayed care-seeking and high financial burdens of illness (Xu et al., 2003). Application For policy, an understanding of healthcare financing is crucial to determine how the health system responds to the disruptions that accompany political fragility. The reliability of tax-based systems depend on predictable state revenues, and the administration of social insurance, though requiring high institutional capacity, can create greater financial stability and a sense of ownership (Savedoff & Smith, 2011). In the context of resource constraints or political fragility, financing policy can offer guidance through principles of progressive universalism to guide public subsidies toward the most vulnerable people" (Gwatkin & Ergo, 2011).

A cohesive national financing strategy contributes to better health outcomes, equitable service delivery, and enhanced health system resilience. Thailand's universal coverage achieved through tax-funded scheme is a prime example of successful policy reforms that expanded access and reduced out-of-pocket costs (Evans et al., 2012). In contrast, states with fragmented and ad-hoc approaches to financing may have less resilience in the face of shocks and political instability.

Critical Perspective on public healthcare financing theories is not without critics. Some have criticized it for over-emphasizing idealized concepts of efficiency and equity without sufficient consideration for real-world political realities, governance capacities, and institutional constraints (Moore, 2004). For rentier states in particular, political elites are likely to distribute revenues in line with patronage and power dynamics rather than abstract economic efficiency arguments, a phenomenon exacerbated by weak linkages between taxation and revenue (Ross, 2001). Hence models based on efficient, universal provision through taxation or insurance schemes may be unrealistic where the state lacks effective tax collection capacity or is subject to external influence, a scenario common in fragile states (Savedoff & Smith, 2011). The field can also overlook the contribution of informal financing mechanisms (e.g. Community based financing, religious funding and support from relatives), and oversimplify state capacity in fragile and rentier contexts, promoting a narrative of state failure rather than exploring alternative modes of resilience (Hagmann & Pclard, 2010). Moreover, technocratic financing approaches may depoliticize the politics of resource allocation by presenting pragmatic solutions to issues of access and coverage in ways that obscure underlying struggles over legitimacy and state power (Moore, 2004).

2.2.4 Resource Curse Theory

The resource curse theory, also known as the paradox of plenty, is a phenomenon whereby countries with abundant natural resources seem to be less economically prosperous than countries with fewer resources (Auty, 1993). In rentier states where government income is derived primarily from external resource exports rather than taxes, such resources are particularly associated with stunted economic and institutional development and poor overall societal performance (Beblawi & Luciani, 1987). The Main Mechanism Resource

wealth, according to the theory, lessens government reliance on taxation for revenues, thereby undermining social accountability between government and citizens (Ross, 2001). Reduced accountability allows for rent-seeking behavior and patronage networks which tend to spread as government authorities use resource rents to buy loyalty, rather than investing in production, social welfare and services (Karl, 1997). The phenomenon can also lead to Dutch Disease, an economic phenomenon where the boom of a resource industry increases the value of the national currency, thus reducing competitiveness in other industries, such as manufacturing and agriculture (Corden & Neary, 1982). In the long run, this makes countries reliant on resource-dependent economic structures, rendering them highly vulnerable to the boom-and-bust cycles of international commodity markets. Origins the concept of the resource curse was first popularized by Richard Auty in the early 1990s through his study of oil-dependent developing countries. The research indicated a negative correlation between resource wealth and economic performance for those countries (Auty, 1993).

Empirical evidence, between 1970 and 2020, is broadly consistent with the expected links between resource wealth, weak institutions, and developmental underperformance. For example, evidence from cross-country studies based on World Bank and IMF data indicates that oil-exporting countries exhibit higher income inequality, lower economic diversification, and lower governance scores than diversified economies (Ross, 2012; Venables, 2016). Many rentier Middle Eastern and Sub-Saharan African states increased their public spending without significant improvements in social outcomes during oil booms in the 1970s and early 2000s, including in health (Karl, 1997; IMF, 2020).

The resource curse theory provides one explanation for why rentier states systematically underinvest in human capital. Because resource rents eliminate fiscal reliance on their citizens, the virements in these countries face less pressure to provide effective services in return for revenue. Visible infrastructure spending and military expenditures may crowd out investment in health and education (Stuckler et al., 2009), and when prices fall, health expenditures become particularly susceptible to austerity measures that can be less readily

implemented on defense or subsidies (Loayza & Rigolini, 2016).It also offers an explanation of why health and social spending in rentier systems may function primarily as a tool for securing legitimacy rather than a stable, long-term investment in the population's well-being (Ross, 2012).

As would be expected, countries subject to this curse often demonstrate persistent institutional weakness, volatility in government revenues and expenditures, and poor performance on health and human development indicators. Those that manage to overcome it (e.g., Norway) tend to do so via the strengthening of institutions and the adoption of fiscal rules and sovereign wealth funds to stabilize spending and ensure transparency (Mehlum et al., 2006). For those with weak institutions, however, the vicious cycle often continues.

There are strong counterarguments against the curse being a destiny rather than a tendency. Resource dependence is treated as almost an automatic route to fragility and corruption, potentially downplaying the significance of policy choices, institution-building efforts, and the ability of political actors to take decisive action (Rosser, 2006; Mehlum et al., 2006). Even the empirical data can be inconsistent with a pure curse narrative, showing that resource wealth does not uniformly predict weak institutions or underperformance. The actual outcome depends a great deal on the broader governance environment and the political decisions of national leaders (Robinson et al., 2006). For example, fiscal transparency and revenue-sharing mechanisms, coupled with a policy focus on public goods, can mitigate the impact of the curse, rendering it a manageable risk rather than a predetermined fate (Humphreys et al., 2007). The theory may also overlook the impact of informal governance mechanisms and historical factors that can be crucial in determining how resource revenues are allocated.

In general, each of the four theories of political instability and governance provides a distinct lens for viewing the links between these factors and healthcare financing.

Public choice theory helps explain how perverse political incentives can lead governments to overspend in areas that deliver more immediate electoral payoffs than investments in public health (Mueller, 2003)

State fragility and conflict theory sheds light on how political breakdown and internal conflict can create an unstable environment, directly impacting access to health services and weakening health-system management capacity (Collier et al., 2003).

Resource curse theory explains how economic dependence on resource revenues, particularly in rentier states, can reduce fiscal accountability and inhibit investment in human capital such as health (Ross, 2012; Karl, 1997).

Public healthcare financing theory focuses on operational and equity issues in financing health systems, emphasizing that stable funding and strong institutions are key to ensuring adequate and equitable access to care (McIntyre & Meheus, 2014; Saltman & Busse, 2002).

No single theory alone can adequately explain all of Libya's governance and health care challenges, but collectively, they provide a robust framework for selecting relevant variables and specifying the models to be estimated in subsequent chapters. Tables 2.1 and **2.3** below organize the four theories according to how they relate to the state of governance and the ability of the state to collect and allocate sufficient revenue to finance health systems. Economic Growth Theories links between Political Instability and Health Spending:

2.4 Unified Conceptual Framework

This study integrates four complementary theoretical perspectives to explain how political instability affects public healthcare expenditure in Libya.

- **State Fragility Theory** explains that political instability weakens state institutions, reduces government capacity, and disrupts public service delivery.
- **Public Choice Theory** explains how governments under political pressure tend to reallocate public resources toward security and short-term political priorities rather than long-term social sectors such as healthcare.
- **Rentier State Theory** explains that Libya's dependence on oil revenues makes public expenditure highly vulnerable to political crises and fluctuations in oil income.
- **Wagner's Law** explains that public expenditure, including healthcare expenditure, depends on economic performance and government fiscal capacity, both of which deteriorate during periods of political instability.

Together, these theories provide a unified explanation of the mechanisms through which political instability reduces public healthcare expenditure in Libya by weakening institutions, changing government spending priorities, reducing public revenues, and limiting fiscal capacity.

(Conceptual Framework)

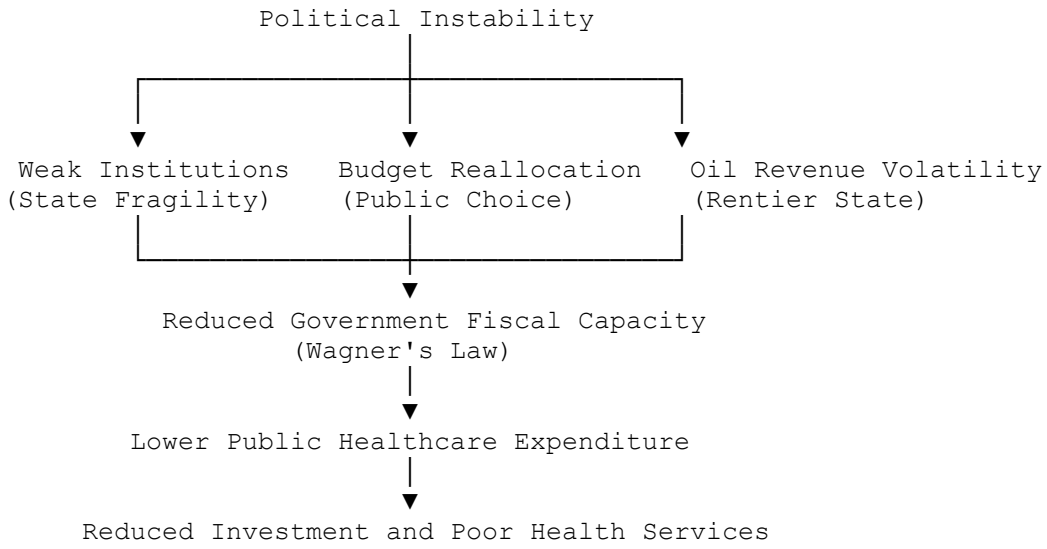


Figure X presents the unified conceptual framework of this study. Political instability is the main explanatory factor. It weakens state institutions, changes government spending priorities, and reduces oil-based public revenues. These mechanisms reduce government fiscal capacity, which ultimately leads to lower public healthcare expenditure and weaker healthcare services in Libya. The framework integrates State Fragility Theory, Public Choice Theory, Rentier State Theory, and Wagner's Law into one coherent explanation.

Cluster 1 links classical growth theory, endogenous growth theory, and institutional theory.

The focus of this cluster is on how political instability at the macro-level hinders a country's ability to generate revenue and ultimately affects financing to health.

Table 2.1: Economic Growth Theories links between Political Instability and Health Spending

Theory	Core Hypothesis	Mechanism linking instability to health spending	Key Limitation
Classical Growth Theory (Smith, 1776; Ricardo, 1817)	Capital accumulation drives growth; instability disrupts investment	Conflict destroys physical capital and deters foreign investment, reducing the tax base for health spending	Ignores the role of institutions and political risk in shaping economic outcomes
Endogenous Growth Theory (Romer, 1990; Lucas, 1988)	Human capital and innovation are central to growth; instability undermines both	Instability weakens education and health systems, eroding the human capital base and long-run growth potential	Downplays distributional concerns and the feedback from health to growth
Institutional Theory (North, 1990; Acemoglu & Robinson, 2012)	Stable institutions are a prerequiite for growth; instability erodes them	Weak institutions reduce fiscal capacity, transparency, and the predictability of public health budgets	Can overstate the determinism of institutions relative to agency and reform capacity

Note. Compiled by the author from the theoretical literature reviewed in this chapter. Sources: Smith (1776); Ricardo (1817); Romer (1990); Lucas (1988); North (1990); Acemoglu and Robinson (2012).

Cluster 2: Political Economy & Health Financing Theories

These emphasize political incentives, governance breakdowns, and resource dependence shaping health spending. Table 2.2 synthesizes Political Economy, Public Choice Theory, State Fragility & Conflict Theory, Public Healthcare Financing Theories, and Resource Curse Theory, highlighting how governance breakdowns, incentives, and rentier dynamics

distort health spending. Cluster 2 covers the political economy and health financing frameworks, examining how political incentives, governance failures, and resource dependence shape the allocation of public resources for healthcare.

Table 2.2: Political Economy and Health Financing Theories -Instability and Resource Allocation

Theory	Hypothesis	Mechanism	Main Limitation
Political Economy (Persson & Tabellini, 2000; Barro, 1991)	Public spending reflects political incentives and bargaining; instability shifts priorities away from healthcare.	Short-term political calculations, elite bargaining, and patronage networks leave healthcare underfunded because it generates diffuse long-term benefits rather than immediate political returns.	Can be reductionist; risks ignoring equity objectives and the role of civil society in shaping spending priorities.
Public Choice Theory (Buchanan & Tullock, 1962; Mueller, 2003)	Politicians and bureaucrats act in self-interest; instability amplifies misaligned incentives between public actors and societal needs.	Rent-seeking, patronage spending, and short-termism lead to systematic reprioritization of healthcare investment in unstable political environments.	Overly rationalist in its assumptions; undervalues public service motivation, ethical commitments, and the social norms that can constrain self-interested behaviour.
State Fragility & Conflict Theory (Collier et al., 2003; OECD, 2022)	Fragile and conflict-affected states experience institutional erosion that systematically undermines the capacity for	The conflict-poverty cycle weakens revenue mobilisation, forces governments to prioritise security spending, and disrupts the planning capacity	Relies on Western-centric benchmarks of governance; tends to overlook hybrid governance arrangements and local resilience strategies in

	consistent healthcare financing.	needed for long-term health investment.	conflict-affected contexts.
Public Healthcare Financing Theory (McIntyre & Meheus, 2014; Saltman & Busse, 2002)	Stable, equitable, and sustainable financing mechanisms are essential preconditions for effective healthcare; instability undermines all three.	Fiscal shocks, rentier revenue dynamics, and elite bargaining produce fragmented funding streams, heavy donor dependence, and erosion of the equitable financing principles the theories prescribe.	Tends to idealise efficiency and equity without sufficiently accounting for political realities, informal financing mechanisms, and the implementation constraints facing fragile states.
Resource Curse Theory (Auty, 1993; Ross, 2012; Karl, 1997)	Natural resource wealth undermines state accountability and discourages investment in human capital, including healthcare.	Resource rents reduce the state's reliance on taxation, weakening the social contract and creating incentives for patronage and fiscal volatility rather than sustained social investment.	Deterministic in framing; risks oversimplifying outcomes by downplaying the mediating role of governance quality, institutional design, and deliberate policy choices.

Note. Compiled by the author from the theoretical literature reviewed in this chapter. The 'Mechanism' column describes the causal pathway through which each theory links political instability to reduced or distorted healthcare expenditure. The 'Main Limitation' column identifies the primary criticism directed at each framework in the academic literature. Sources: Buchanan and Tullock (1962); Collier et al. (2003); Auty (1993); Ross (2012); Karl (1997); McIntyre and Meheus (2014); Saltman and Busse (2002); Mueller (2003); Persson and Tabellini (2000).

The growth economic literature shows how political instability has destroyed the structural foundation of development-namely, capital accumulation, innovation, and the quality of institutions-thus shrinking the fiscal space for health spending. But political economy and health finance literature brings a new perspective; instability pervert's incentives, weakens institutions, entrench rentier state dynamics, fragments budgeting, and

fosters long-term underinvestment in health. Even though each type of literature is focusing on a different aspect, the ultimate common message is undeniable: Sustainable health financing can't be decoupled from stability, the quality of institutions, and the good governance. Building on the foundations described in the theoretical literature, the empirical literature can trace how political instability operates on the ground and affects economic growth, and healthcare financing in different country contexts.

2.4 Overview of Empirical Literature

Identifying how political instability impacts economic performance and public health expenditure is particularly relevant in the very context of highest political instability: fragile states, conflict-affected states, and resource-dependent states. Although there is extensive literature on each topic, relatively few studies have integrated these domains to investigate the impact of instability on specific sectors, particularly health, in specific states. The objective of this chapter is to systematically review the most pertinent existing literature, tracking it from global perspectives to context-specific analyses, in states dependent on natural resources, like Libya.

2.4.1 Global and Regional Studies on Political Instability and Public Spending

Political instability is widely understood to contribute to poor fiscal performance and inadequate investment in basic public services, such as health, education, and infrastructure. Frequent government changes, weak institutions, social conflict, and uncertain policy continuity lead to disrupted budgeting processes and reduced capacity for the efficient allocation of resources. In an influential cross-country analysis, Barro (1991) found that political instability was a significant negative determinant of economic growth, which, in turn, constrained the size of the public revenue base from which healthcare financing is drawn. Extending this analysis, Gupta et al. (2000) showed that failure in governance and corruption (which tend to escalate during periods of instability) hinder the effectiveness of health and education spending, whilst recent studies confirm that armed conflict increases fiscal deficits and depresses investment in health (Novta and Pugacheva,

2021). Ahmed and Saidi (2023) confirmed that fiscal volatility negatively impacts health system resilience in fragile states during crises, while Al Khatib et al. (2023) demonstrated that persistent political fragmentation in the MENA region produces disjointed health financing systems and inefficiencies, which, in the case of Libya, have led to the perpetuation of service coverage gaps and operational weaknesses well beyond the initial post-conflict stage (Allen et al., 2024).

2.4.2 Healthcare Systems in Fragile and Conflict-Affected States

Numerous studies have demonstrated that political instability negatively affects the delivery of health services, the institutions responsible for their provision, and public trust in health systems. According to the World Health Organization (2010), resilient health systems require stable financing, effective governance and active community participation, none of which are compatible with chronic instability and conflict. These vulnerabilities are well documented in Libya, where even prior to 2011, the rigid centralized governance structure hindered local responsiveness in a poorly organized health system that was already susceptible to institutional rigidities, weak professional capacity, a prevalence of informally negotiated access to healthcare, and public distrust (Osborne, 2010). Post-2011 conflict, displacement and state fragmentation resulted in an acute decline in health coverage and increased barriers to access to essential services, particularly for remote and conflict-affected populations (Health Sector Libya, WHO, 2019; Allen et al., 2024).

2.4.3 Studies on the Libyan Healthcare System and Economy

Libya-specific literature first described the institutional weakness and internal dynamics of its health system (Osborne, 2010; Daw et al., 2016; Daw, 2017), and later provided evidence on the impact of instability on its macroeconomy. Using descriptive analysis and a mixed-methods approach, Daw et al. (2016) documented the post-conflict deterioration in organizational efficiency and geographical disparities in performance in Libya's health system, and Allen et al. (2024) have confirmed the continuation of these weaknesses to date. On the macroeconomic front, a growing number of studies have examined the effect

of instability on the Libyan economy, notably those by Elboiashi and colleagues. Their work using ARDL bounds testing confirms the strong negative relationship between political instability and Libya's trade balance, which is dominated by oil revenues (Elboiashi, 2023). They have also found significant negative impacts on GDP growth (Elboiashi, 2024), and documented the interplay of chronic disease burdens, inadequate health investment and economic stagnation (Elboiashi and Khpiza, 2025). Together, these studies mark an evolution from detailed descriptive accounts to econometric analyses, offering direct empirical precedent for the method adopted in this thesis.

2.4.4 Econometric Studies

The literature in fragile and resource-dependent economies, especially in times of political turmoil, has increasingly employed time-series econometrics, and particularly the ARDL bounds testing methodology, to establish the relationship between political instability, economic performance and public health financing. Elboiashi (2024) demonstrated that this methodology can produce statistically robust evidence on the negative impacts of instability on Libyan GDP even with limited annual time series. Applying a similar approach in Iran, Mehrara and Musai (2011) showed how volatility in oil revenues can translate into fluctuations in public health expenditure, highlighting relevance for Libya's oil-dependent fiscal system. Furthermore, Farzanegan and Markwardt (2009) demonstrated the high pro-cyclicality of fiscal policy in oil exporting countries using a VAR model and its consequent impact on healthcare budgets in Iran. In Tunisia, Chaabouni and Abednnadher (2014) used ARDL bounds testing to determine the main drivers of health expenditure, focusing on income and urbanization as key factors. These studies support the suitability of the ARDL approach for data- constrained environments characterized by instability and offer a methodological blueprint for this thesis. Broader evidence on political instability and public health expenditure comes from other time-series analyses (e.g., Aisen and Veiga, 2013) and analysis of World Bank (2023) data, reinforcing the conclusions about fiscal indiscipline and underinvestment in health in fragile countries.

2.5 Summary of Previous Studies

Table 2.3 presents a thematic summary of studies on political instability and public spending, with a focus on their methodological characteristics, regions/countries of application, and main findings relevant to the thesis topics.

Table 2.3: Summary of Selected Empirical Studies on Political Instability, Healthcare Expenditure, and Methodology

Author(s)	Year	Country / Region	Methodology	Key Finding
A. Global and Regional Studies				
Barro	1991	Global	Cross-country regression	Political instability significantly reduces economic growth, constraining the fiscal space available for healthcare.
Gupta et al.	2000	Global (IMF)	Case-based econometric analysis	Governance failures and corruption intensify during instability, reducing the effectiveness of health and education spending.
Gupta et al.	2005	Low-income countries	Public expenditure and panel econometrics	Poor governance reduces spending efficiency, particularly in healthcare and education.
Ross	2012	Multiple developing countries	Panel data regression (1990–2010)	Resource dependence is inversely associated with accountability and health expenditure quality.
Aisen & Veiga	2013	Global	Panel regression	Political instability erodes fiscal discipline and consistently reduces social spending, including healthcare.
Alesina et al.	2020	85 countries	Panel data econometrics	Regime instability reduces long-term public investment across sectors, including health.

Bertoli & Ticci	2021	Sub-Saharan Africa	Post-conflict institutional analysis	Transitional regimes systematically prioritise security spending over health investment.
Novta & Pugacheva	2021	Global	Panel regression (post-conflict states)	Armed conflict significantly widens fiscal deficits whilst crowding out public health investment.
Choi & Park	2022	East Asia	Political risk regression	Political risk premiums reduce budget allocations to health and education.
Ahmed & Saidi	2023	Fragile states	Fiscal risk modelling	Fiscal volatility weakens health system responsiveness and overall crisis resilience.
Al Khatib et al.	2023	MENA	Comparative policy review	Political fragmentation produces fragmented health financing structures and systemic inefficiencies.
Musa & Elmi	2024	Sub-Saharan Africa	Fiscal response modelling	Prolonged unrest leads to reactive, short-term, and inefficient health budgeting.
B. Studies on the Libyan Healthcare System				
Osborne	2010	Libya (Tripoli Medical Centre)	Qualitative case study	Pre-conflict weaknesses documented: informal access networks (wasta), low professional standards, and poor institutional trust.
WHO	2000–2015	Libya	Time-series analysis	Healthcare expenditure declined by approximately 40% following the 2011 conflict.
Daw et al.	2016	Libya	Mixed-method organisational assessment	Conflict conditions significantly weakened structural and organisational efficiency across the health sector.
Daw	2017	Libya (Tripoli & Benghazi, 2010–2012)	Comparative case study	Healthcare system performance declined markedly post-conflict, with Benghazi experiencing sharper deterioration than Tripoli.
International Crisis Group	2014–2019	Libya	Policy analysis and interviews	The existence of dual health authorities hinders effective and coordinated healthcare financing.

Chothia	2015–2021	Libya	Financial data analysis	Out-of-pocket health expenditure rose to approximately 30% of total health spending.
Global Health Cluster	2011–2022	Libya	Health needs assessment	Weak data collection infrastructure significantly impairs health planning and resource allocation.
Bertelsmann Stiftung	2011–2022	Libya	Case study and comparative analysis	Intermittent and unpredictable funding cycles adversely affect the quality of healthcare service delivery.
Mousa & Al-Fitouri	2023	Libya	Fiscal policy review	Budget centralisation limits equitable regional access to healthcare services.
Ateeq & Sharif	2024	Libya (post-war aid coordination)	Stakeholder interviews	Delayed aid disbursement and fragmented oversight hinder infrastructure recovery.
Allen et al.	2024	Libya	Mixed-methods assessment of PHC services	Widespread service gaps and system inefficiencies persist despite years of post-conflict recovery efforts.
Ben Saad & Hmidan	2024	Libya (national hospital data)	National hospital data analysis	Skilled workforce shortages are worsening regional disparities in health outcomes.
Bugaighis & Idris	2025	Libya	Health system performance metrics	East-west political divisions weaken service delivery accountability.
Elboiashi & Khpiza	2025	Libya	ARDL time-series model	Chronic disease burden, compounded by inadequate public health investment, significantly suppresses Libya's long-term economic growth.
C. Methodological and Econometric Studies				
Farzanegan & Markwardt	2009	Iran	VAR analysis	High oil revenue dependence generates procyclical fiscal behaviour, making healthcare budgets vulnerable to commodity price shocks.

Mehrara & Musai	2011	Iran	ARDL modelling	Oil revenue volatility contributes directly to fluctuations in public healthcare financing.
Chaabouni Abednnadher	2014	Tunisia	ARDL bounds testing	Income levels and urbanisation are the primary determinants of healthcare expenditure in transitioning economies.
Elboiashi	2023	Libya	ARDL modelling	Political instability and violence significantly worsen Libya's trade balance, disrupting the primary revenue source for public spending.
Elboiashi	2024	Libya	ARDL modelling	Political instability has a statistically significant negative effect on economic growth in Libya.
World Bank	2023	Global (fragile states)	World Development Indicators review	Fragile states consistently underperform in public health investment relative to comparable stable states.

Note. Studies are grouped into three thematic clusters. A = global and regional analyses; B = Libya-specific studies on the healthcare system and economy; C = methodological and econometric studies providing frameworks applicable to this thesis. ARDL = Autoregressive Distributed Lag; VAR = Vector Autoregression; PHC = Primary Healthcare; MENA = Middle East and North Africa; WDI = World Development Indicators

2.6 Research Gap

Summary and Implications Foundations like Barro (1991) and Gupta et al. (2000) confirmed the correlation between instability (political and fiscal) and deteriorating health service delivery. The work of Novta and Pugacheva (2021) and Ahmed and Saidi (2023) expanded on these findings by applying them to post-conflict settings, identifying conflict-related deficits, fractured institutions and a decline in trust as drivers of health system failure. The Libyan case is well-documented through case-based research on the failure of health institutions (Osborne, 2010; Daw et al., 2016; Allen et al., 2024) as well as the inverse relationship between the chronic disease burden, investment in health, and economic performance (Elboiashi and Khpiza, 2025).

Nevertheless, many gaps in knowledge exist. Few have explored a holistic framework that

accounts for the intersection of the political, economic, and health-care dimensions of health-financing systems in fragile and rentier economies such as Libya. Few have addressed the issue of how instability affects health-care financing directly through the use of long-run econometric analyses. This thesis aims to fill that void by using an ARDL framework with Libyan data for the period 1990-2022 to analyses the direct impact of political instability in the short and long run.

2.6 Chapter Summary

This chapter reviewed and discussed the literature regarding political and economic variables that can influence public healthcare spending, particularly in fragile and rentier economies like Libya. The theoretical review focused on four streams of research: public choice, which explains why misaligned political interests can distort public spending decisions; state-fragility, which captures the institutional breakdowns that lead to a lack of consistent public expenditure; resource curse theory, which highlights the tendency of dependence on natural resource wealth to weaken accountability and investment in human development; and public health financing theory, which outlines the equitable, sustainable and good governance conditions required for an effective healthcare financing system. The interaction between all these perspectives captures some aspects of the complexity of the Libyan situation and suggests relevant choices for variable and methodology for the rest of the analysis.

Chapter 3

Libya's Healthcare Sector - Historical Background and Current Challenges

3.1 Introduction

Libya has a health system that has in the past seven decades experienced boom, prolonged stagnation, and disruption. Oil revenue led to massive investment by the state in hospitals, clinics, and health workforces, but a collapse of central governance after the 2011 uprising resulted in the loss of the gains, as infrastructure was damaged, workers emigrated, and there was deep lack of control and mismanagement of resources (El Oakley et al., 2013). Libya has not fully recovered from the crisis. The country now operates on mixed basis where public provision largely dictates geography of coverage but suffer chronic underfunding, dilapidated equipment, and a bureaucracy bogged down in inefficiency (WHO, 2021). The private provision, while expanding in recent years, is highly concentrated in urban centers and is prohibitive for much of the population to access (Abudher, 2020). Both public and private sectors are marred by systemic weaknesses, including poorly distributed personnel, brain drain, insufficient data, and poor continuous education mechanisms. Libya has a young population, but the burdens of chronic disease such as diabetes, heart disease and cancers are on the increase (Ali & Erwin, 2020). Efforts to improve child and maternal health before 2011 have faced setbacks due to destroyed infrastructure and loss of health staff. A concerted reform effort, coupled with persistent international support will be required to build an equitable, accessible, and quality system. This chapter reviews the Libya’s health sector by examining its history, its institutional and financing mechanisms, and the main issues impeding the sector.

3.2 A Short History of Modern Healthcare Service in Libya

3.2.1 Post-independence Period (1950-1969)

In the years that followed independence in 1951, Libya embarked on building its infrastructure and health services from scratch. Through foreign technical assistance, the

new state initiated the construction of its first health facilities, starting with hospitals and primary health centers in major cities. These early steps significantly improved access to basic care and established a basis for a more comprehensive system, though rural areas and the periphery remained underserved.

3.2.2 Growth and Expansion during the period (1969-2011)

Libya experienced the most impressive growth in healthcare services during the years from 1969 to 2011. An extensive network of health centers and hospitals were constructed across the country, medical and nursing staff were educated nationally and in foreign countries, and specialized institutions were created. Health services were provided free to all citizens, a principle that expanded coverage and helped reduce the prevalence of communicable diseases. This period also witnessed a focus on preventive measures, including expansion of vaccination programs and primary health services, reaching health indicators that were in line with middle-income countries in the region.

3.2.3 Conflict and Fragmentation (2011-Present)

The downfall of central governance following the February 2011 uprisings has deeply undermined the health sector, the previous foundation of the health system. Division into competing political factions, conflict and the emergence of dual authorities have all been detrimental to progress. Infrastructure damage has been widespread; qualified medical professionals have sought security and career opportunities abroad; medicine and supplies disrupted; and national coordination, financing, and planning have collapsed. International organizations and NGOs have stepped in to fill some gaps, especially in crisis zones.Efforts to reform and rebuild health services are underway but remain limited and constrained by the political context and the continuation of violence.

3.3 Challenges of the Healthcare Sector

3.3.1 Political Instability and Conflict

The overarching challenge faced by Libya's health sector is the fractured political landscape. The division into competing authorities, each vying for control and budgetary

allocations, has resulted in highly uneven service delivery and access depending on location. In parallel, the ongoing conflict continues to directly impact the sector, leading to destruction of physical health facilities, displacement of healthcare professionals, and disrupted supply chains of essential medicines and equipment.

3.3.2 Poor Infrastructure

A significant part of Libya's existing hospital and health centre infrastructure is aged, poorly maintained, and requires either significant renovation or replacement. Much of the medical equipment used dates from before the 2011 uprisings and has received inadequate maintenance or updates. Some facilities have been damaged or completely destroyed by the conflict, while others, even in non-conflict areas, have suffered from a lack of continuous investment and general deterioration. There is a general shortage of health facilities, particularly relative to population growth and the rising burden of chronic disease.

3.3.3 Shortage of Healthcare Workers

Libya faces a severe and pervasive brain drain, with doctors, nurses, and specialists emigrating from the country to seek security and professional growth in more stable and rewarding environments. This emigration has led to a critical shortage of qualified health workers, particularly in remote, rural, and conflict-affected regions, but also affecting service delivery even in cities. This structural shortage needs to be addressed through substantial investment in national health training institutions and programs to train the next generation of health workers domestically.

3.3.4 Inadequate and Mismanaged Funding

The Libyan public healthcare system is underfunded, especially considering the scale of the health needs in the country. Allocations from the national budget are often insufficient, and, more importantly, have become volatile due to fluctuations in oil prices and disruptions from conflict. Beyond the issues of quantity, there are persistent concerns about how health resources are allocated, spent, and managed due to a lack of transparency,

effective oversight, and accountability mechanisms which can lead to significant waste.

3.3.5 Medicines and medical supplies.

Chronic shortages of essential medicines and medical supplies continue to afflict the healthcare sector, in large part due to the country's heavy reliance on imports which make the system susceptible to exchange rate fluctuations, supply chain interruptions and the scarcity of foreign currency that has marked post-2011 Libya. As a result, many patients do not receive the medications they require, and healthcare workers do not have the resources they need to provide basic services. Shortages of essential medications for chronic conditions like diabetes, heart disease and cancer are of great concern, given the growing burden of these diseases in the population.

3.3.6 Corruption and weak governance.

Corruption is cited as one of the greatest impediments to the functioning of Libya's health sector. Nepotism in resource allocation, lack of transparency in public health contracting and diversion of funds for unauthorized purposes all undermine the effectiveness of health expenditure. These problems are rooted not only in individual corruption, but also in broader institutional failures to adequately manage the health sector and ensure accountability for its activities. The health system's effectiveness will continue to be compromised by its lack of proper management structures and oversight, unless these weaknesses are systematically addressed and more funding is allocated effectively.

3.3.7 Public health literacy.

Most of the Libyan population is poorly informed about health and preventive care and lack knowledge on when and where to seek help. This situation leads to the burden of preventable diseases, delay in help-seeking behaviors and use of non-evidence-based traditional practices. Improving health information access and community-based health education must form a key component of any plan to strengthen public health.

3.3.8 Pressure on facilities.

The combination of a shortage of facilities and increased demand resulting from the rapid growth in population has increased pressure on existing health centers and hospitals, particularly in the largest cities such as Tripoli and Benghazi. Overcrowding has been a common phenomenon with direct impact on the quality of care provided. Health workers are overburdened, patient waiting times are lengthy, and general facility conditions are often poor. This vicious circle perpetuates low public confidence and encourages those who have the means to seek care outside the public system or abroad.

3.3.9 Limited adoption of technology.

Libya's health sector has a poor track record of adopting new technologies and falls far behind other systems in the region in its use of digital health applications. Many health facilities lack operational patient information systems and thus fail to ensure the efficient provision of, and continuity of, health care, as well as producing unreliable data and increasing redundancy. envelopment of sound health information systems is a pre-requisite for implementing an evidence-based approach to the management of health services and to achieving lasting improvement.

3.4 Historical context

The healthcare system before 2011 Before 2011, the Libyan health system operated as a state-run, centrally planned system heavily financed through oil revenues. In this context, Libya had provided a comprehensive and free-at-point of delivery health system for its population, with the Ministry of Health having complete authority over health planning, financing and provision of services. A lack of decentralization and local accountability characterized this hierarchical structure. While large investments were made to establish health facilities, the system’s architecture included significant weaknesses, such as a concentration of resources in urban areas (Tripoli and Benghazi), insufficient resources for primary health centers in other regions, poor quality of public hospitals, dated equipment, insufficient medication and weak maintenance. Management problems also characterized

workforce policies and planning. Training strategies were weak, while disparity in the distribution of skilled workers across the country was notable, with the South and remote areas being particularly understaffed. Preventive activities and health promotion activities were neglected, and no health information system had been established that could support planning and evaluation. Weak governance led to inefficiency and a failure of effective planning for purchasing of medicines, leading to reliance on a costly policy of paying for treatment for some individuals in overseas countries, whilst simultaneously facing severe deficiencies in domestic service delivery. In short, Libya's pre-2011 health system fit the profile of a rentier welfare state, characterized by generosity of commitment but structural fragility.

3.5 The impact of the 2011 conflict and its aftermath on healthcare infrastructure

The 2011 uprising and ensuing armed conflict dramatically impacted the Libyan state, with the health sector being one of the most adversely affected public services. Severe physical damage was sustained by health facilities. By 2017, more than 20 per cent of public hospitals were estimated to be non-operational or only operating partially in some cities, notably Tripoli, Benghazi and Misrata, significantly compromising emergency care and surgical procedures. Water and sanitation systems, electrical supply and hospital referral mechanisms were also disrupted, jeopardizing essential conditions for patient care. Supply chains were seriously compromised, impacting both ordinary services and emergency care due to shortages of medicines and equipment caused by disruptions at the borders and lack of foreign currency, alongside the breakdown of governance mechanisms. Consequently, large numbers of healthcare professionals have fled the country or left the public sector altogether due to personal insecurity, salary delays, and overall deterioration of working conditions. The continuation of conflict and political division have, moreover, hindered health sector reconstruction, while the proliferation of internationally supported health initiatives has lacked coherence, often resulting in fragmented assistance, a failure to set clear priorities and the absence of coordinated action on national reforms, issues that have often led to minimal results in fragile health systems such as Libya's.

3.6 Current Challenges facing the health sector

Libya's healthcare sector has under-performed more than a decade after the 2011 crisis, and a series of intertwined structural challenges have plagued the system and contributed to its overall underperformance. Challenges are present across different areas of health system operation.

The country is divided by political conflict and dual administration over the health system has generated parallel hierarchies of officials, ministries, and duplicated bureaucracy in two parts of the country. A lack of clear responsibility for the system has further compounded by the fractured nature of health governance. Donor coordination and strategy-level health investments are consequently compromised by the absence of unified national control over the health sector and a clear framework of accountability for the results of these investments. A lack of control over oil production due to insecurity in oil-producing regions impacts public financing and contributes to budget instability which has been evident through persistent payment delays to health workers and insufficient funding for medicines procurement and maintenance. Increased costs have been borne by households, which are paying increasingly for services out of pocket. Equipment, or adequate maintenance. These conditions directly undermine the quality and continuity of care (Hamza et al., 2020). The problem of uneven distribution, which pre-dated 2011, has been sharpened by years of fragmented governance. Hospitals in Tripoli and Benghazi are better equipped than those elsewhere, but even in those cities' services fall well short of need. Outside the main urban centers, secondary and tertiary facilities are often unable to provide the services their catchment populations require, placing impossible strain on referral systems and forcing patients to travel for care that should be available locally (Ismail et al., 2021).

Since 2011, direct conflict damage has reduced the number of operational facilities further. Medical equipment has been destroyed or has fallen into disrepair; power supply failures have rendered diagnostic and treatment systems inoperable; and the absence of

maintenance protocols have allowed deterioration to compound (Health Cluster Libya, 2022). Medical imaging, laboratory services, and intensive care capacity are all critically scarce, especially in the southern governorates (UNHCR, 2021). There is no national inventory system to track what equipment exists and where, which hampers emergency planning and makes efficient resource allocation effectively impossible. International aid has provided some relief, but it has been sporadic and has focused predominantly on immediate needs rather than structural investment (CEOBS, 2022).

3.6.1 Facilities and equipment

Libya's infrastructure has been profoundly damaged by the intermingling of war, prolonged neglect and erratic investment. Numerous health facilities in war zones and other parts of the country lack access to electricity, functioning equipment or regular maintenance. This impacts quality and constancy of care. Existing spatial inequality – prevalent in 2011 – has worsened with the uneven governance. Tripoli and Benghazi remain relatively well-equipped hospitals, yet the services provided do not fully respond to local needs. The services offered by secondary and tertiary hospitals outside the main cities are insufficient for the populations they serve, and they overwhelm referral pathways to local care sites (Ismail et al, 2021). Directly damaged by the war, operational capacities have dropped below their 2011 levels, and they have continued to be damaged or deteriorated by neglect since 2011. Medical equipment has been damaged, maintenance programmemes could not be consistently supported, power outages crippled essential services (Health Cluster Libya, 2022). Services such as medical imaging, lab tests, and ICUs are drastically needed everywhere in the country, with their scarcity especially visible in southern governorates. No central mechanism for registering and locating the available resources nor to manage an emergency response has been created; it limits efficient allocation. International support exists but is intermittent and priorities immediate needs over systemic changes (CEOBS, 2022).

3.6.2 Human Resources and Brain Drain

Libya's health sector faces a serious and growing shortage of skilled professionals. Prolonged conflict, economic uncertainty, and poor working conditions have driven a sustained emigration of doctors, nurses, and specialists, primarily to Gulf states and Europe (OECD, 2020; Docquier & Rapoport, 2012). Those who remain are concentrated in urban areas, leaving rural and remote communities with far fewer qualified staff and much weaker services (ILO, 2021).

The shortage is compounded by structural weaknesses in the system itself. Years of underinvestment in medical education and training have reduced the pipeline of new professionals. Delayed salaries, limited opportunities for professional development, and the absence of a coherent national workforce strategy mean that even qualified staff who have not yet emigrated face strong incentives to leave (Alnajem et al., 2022). Fragmented governance makes the problem harder to address competing authorities run parallel staffing structures and policies, with no unified picture of where staff are, what skills are available, or where the most urgent gaps lie. The loss of healthcare workers is not simply a staffing problem. It represents a loss of the public investment made in their education, erodes the institutional knowledge that effective health systems depend on, and weakens public trust in the care that remains available. Reversing this trend requires more than financial incentives: it demands sustained improvements in working conditions and personal security, credible career development pathways, and a stable economic environment that makes professional life in Libya viable for those who might otherwise leave or choose not to return.

3.6.3 Medical Supply Chain and Pharmaceutical Shortages

Libya's medical supply chain is structurally fragile. The country imports the great majority of its medicines and medical equipment, making it acutely vulnerable to foreign exchange shortages, import delays, and the governance disruptions that have characterised the post-2011 period (Mokdad et al., 2018). When oil revenues fall, the foreign currency needed to

pay for imports dries up; when governance is fractured, procurement is slow, duplicative, and poorly coordinated. The absence of a unified national procurement policy is a central problem. Competing authorities each pursue their own purchasing arrangements, producing duplication, inconsistent quality standards, and fertile conditions for corruption (El-Katiri, 2012; Baker et al., 2020). The result is visible in the shortages that have become endemic in the system: antibiotics, insulin, cancer treatments, and medicines for chronic conditions are frequently unavailable, particularly in rural areas and conflict-affected regions where logistics are difficult and supply chains thin (UNICEF, 2021). A further concern is the weakness of pharmaceutical regulation. Without robust oversight, counterfeit and substandard medicines have entered the supply chain, exposing patients to risks that are difficult to detect and measure (Rägo & Santoso, 2008). Inadequate storage facilities and unreliable cold-chain infrastructure compromise drug efficacy, particularly for vaccines and other temperature-sensitive products (MSF, 2020). Until procurement, regulation, and distribution are reformed along clear national standards with proper oversight, Libya's pharmaceutical system will continue to be a source of avoidable harm.

3.7 Healthcare Financing: Budgetary Processes and Revenue Dependency

Libya's healthcare financing is deeply exposed to the volatility of global oil markets. As a rentier state, the country raises most of its public revenue from hydrocarbon exports, and the health budget rises and falls with oil prices and production levels (Cammett & Diwan, 2013). This dependence on a single, unpredictable revenue source makes sustained investment in the health sector extremely difficult to plan and almost impossible to protect during periods of economic or political stress. Public health spending is heavily weighted towards recurrent costs, primarily salaries and subsidies, which leaves very little room for capital investment, infrastructure renewal, or innovation in service delivery (IMF, 2021). Budgetary planning tends to be reactive rather than strategic: there is no medium- or long-term health financing framework, and spending decisions are typically driven by immediate pressures rather than assessed population need. Expenditure tracking is weak, and budget data are rarely disaggregated by sector, region, or programs in ways that would allow

meaningful accountability for how health funds are used (Hertog, 2010).

When oil revenues fall whether because of price movements or conflict-related production disruptions the practical consequences for the health system are immediate: salaries are delayed, medicine procurement stalls, and facility maintenance is deferred (van Veen & Fliervoet, 2018). Households fill the gap through out-of-pocket spending, which falls most heavily on those least able to afford it. International donor support has provided partial relief, but it is typically directed at humanitarian emergencies rather than systemic reform, and it has not compensated for the structural shortfall in domestic health financing (World Bank, 2022). Building a more resilient financing system will require fundamental changes: greater fiscal transparency, a shift from input-based to performance- and needs-based budgeting, and credible steps towards diversifying the revenue base on which the health system depends. Without these, the health budget will remain hostage to oil price cycles and political disruptions that lie largely beyond the control of health authorities themselves.

3.8 Chapter Summary

This chapter has examined the historical development and current condition of Libya's healthcare sector, tracing a trajectory from the state-funded expansion of the Gaddafi era, through the 2011 conflict and its immediate destruction of infrastructure and governance, to the protracted systemic crisis that the country is still living with today.The picture that emerges is one of compounding vulnerabilities. Political fragmentation has produced dual governance structures and overlapping bureaucracies that make coherent policy-making and coordinated investment close to impossible. Oil revenue dependence exposes the health budget to shocks that have no connection to population health needs and that are beyond the control of health planners. A brain drain that has removed thousands of skilled professionals from the system has left it understaffed, especially in rural and conflict-affected areas. The supply chain for medicines and equipment remains fragile and prone to shortages. And the collapse of health data systems has deprived policymakers of the information they would need to address any of these problems systematically (Barakat & Milton, 2015; Abbara et al., 2020; El-Haddad, 2021; Gamba, 2017). These challenges are

not independent: they reinforce one another in ways that make piecemeal insufficient. Addressing the financing problem requires political stability; rebuilding the workforce requires stable financing; strengthening governance requires both. What the chapter demonstrates is that Libya's healthcare system cannot recover through isolated interventions. It requires a coordinated national health strategy built on institutional coherence, transparent governance, and a long-term commitment to equitable service delivery. Without that foundation, the system will remain unable to meet the health needs of the population it is meant to serve.

Chapter Four

Political Instability and Healthcare Financing in Libya

4.1 Introduction

Understanding how political instability affects healthcare financing matters most in the settings where instability is most severe. Libya is a case in point, since the 2011 revolution, the country has experienced prolonged armed conflict, governance fragmentation, economic disruption, and a political division between rival authorities that shows no clear sign of resolution. The combined effect of these forces has severely constrained the health sector's capacity to plan, fund, and deliver services (WHO, 2018). Before 2011, Libya's health system was sustained by a centralized and oil-funded welfare model. This model had well-known weaknesses, institutional rigidity, limited accountability, and a dependence on revenues that could disappear overnight, but it provided a basic framework for public provision. The collapse of centralized authority removed even that framework. In its place came institutional duality, with competing governments each controlling parts of the country and parts of the public budget. Healthcare investment declined. Regional inequalities widened. Out-of-pocket costs for patients rose. Early-2000s investments in infrastructure proved unsustainable without the governance structures needed to maintain and build on them. The academic literature on conflict-affected health systems identifies several mechanisms through which political instability disrupts healthcare financing. The erosion of fiscal governance, the breakdown of procurement systems, and the diversion of public funds are towards security spending (Pavignani & Colombo, 2009; Collier et al., 2003). All these mechanisms are visible in Libya. Oil revenue dependence, combined with sustained inflation, fragmented institutions, and weak fiscal coordination, has left the health sector chronically misaligned with both national priorities and population needs (World Bank, 2021; IMF, 2020).

From an institutional economics perspective, Libya's instability operates through three

interlocking weaknesses: governance volatility, fiscal unpredictability, and administrative fragmentation. Competing authorities and duplicated systems waste resources and prevent coordinated decision-making

4.2 Conceptual Relationship between Political Instability and Health Financing

The analytical relationship between political instability and health financing adopted in this chapter draws on three bodies of scholarship: institutional economics, health financing theory, and conflict studies. Political instability is defined in line with the Uppsala Conflict Data Program (UCDP, 2023) criteria, which classify armed conflict based on organized actors and battle-related death thresholds, supplemented by the World Bank's Fragile and Conflict-Affected Situations (FCS) classification. Under these definitions, Libya has been classified as a fragile state since 2011, owing to the presence of multiple armed groups, contested political authority, and persistently weak governance institutions (OECD, 2022). The health financing dimension draws on the WHO's framework of health system financing functions as set out by Kutzin (2008), which identifies three core activities: revenue raising (mobilizing funds for health), pooling (accumulating and managing prepaid revenues to spread financial risk), and purchasing (allocating pooled funds to service providers). Each of these functions is seriously disrupted in conditions of political instability. Revenue raising becomes unpredictable when fiscal volatility is high. Pooling collapses when governance is fragmented and unified financial management is absent. Purchasing is distorted when procurement is divided between competing authorities and accountability is weak. The institutional dimension draws on North's (1990) New Institutional Economics, which holds that the formal and informal rules governing political,

economic, and social interaction are the primary determinants of economic performance. In Libya, the post-2011 collapse of formal institutions created a vacuum that informal networks, militia governance, and parallel bureaucracies moved to fill. This institutional fragmentation is central to explaining why health financing outcomes have deteriorated so markedly despite the country's substantial oil wealth. The framework guides enquiry into four research questions: how political instability shaped healthcare expenditure in Libya

between 1990 and 2022 has; which channels transmit the effects of instability to the health sector; how Libya's trajectory compares with similar conflict-affected countries; and what reforms would be needed to restore equitable health financing. The sections that follow apply this framework to Libya's empirical context.

4.3 Transmission Channels

Political instability affects healthcare funding in Libya through several reinforcing channels. As a rentier state almost entirely dependent on hydrocarbon revenues, the health sector is acutely exposed to both domestic conflict and external economic shocks. Since the collapse of centralized authority in 2011, these vulnerabilities have deepened progressively, eroding the state's capacity to plan, fund, and deliver healthcare on any consistent basis.

4.3.1 Fiscal Volatility and Revenue Dependency

Dependency Oil revenues account for over 95 per cent of Libya's government income and effectively all its foreign exchange earnings. This concentration makes public financing highly sensitive to commodity price movements and to any disruption in oil production or export. Political instability creates exactly such disruptions: armed conflict damages infrastructure, forces field closures, and creates export bottlenecks. During the 2014-2016 blockade, oil revenues fell by more than 60 per cent, triggering severe austerity and cuts to health and social sector budgets (World Bank, 2021). These fiscal shocks translate directly into operational constraints for the Ministry of Health. Allocations for hospital operations, pharmaceutical procurement, and infrastructure maintenance have been delayed or cancelled repeatedly. Time-series analysis of Libya's fiscal data suggests that oil revenue fluctuations explain over 70 per cent of the variance in public healthcare expenditure between 2011 and 2020 (Elboiashi, 2020; World Bank, 2021). Without fiscal reserves or stabilization funds to absorb shocks, the health system is permanently reactive rather than strategic - a pattern well documented in oil-dependent states under political stress (Ross, 2012; IMF, 2020).

4.3.2 Institutional Fragmentation and Governance Duality

The country has operated since 2014 under a fractured political system in which rival governments in the east and west manage separate Ministries of Health and control separate slices of the national budget. This dual governance system has resulted in duplicative budgeting, disparate health strategies and overlapping procurement procedures. Planning became inconsistent, health activities were prioritized based on political alignment instead of need, and public money was increasingly unaccountable. Estimates suggest that overall budgetary efficiency has declined by more than 40 per cent in peripheral regions due to overlapping mandates and confusion over jurisdiction (Elboiashi, 2020; World Bank, 2021). Competing procurement procedures inflated costs and provided fertile ground for corruption, reducing value-for-money in spending and quality in health outcomes (Elhadi & Msallati, 2020; Pavignani & Colombo, 2009).

4.3.3 Security-Dominated Spending Priorities.

The ongoing political conflict has triggered a sharp shift in the government's spending priorities, toward defense and security spending. In some years since 2011, over 60 per cent of discretionary public expenditure was allocated to military and security needs, diverting resources away from health and social spending at a time when health demand from conflict-affected people was at its peak (World Bank, 2021). Competition for human capital further compounded these problems. Higher wages in the security sector have drawn skilled workers away from public health (WHO, 2022), further exacerbating an existing workforce deficit resulting from emigration.

4.3.4 Declining Donor Engagement.

International community has progressively shifted its focus from comprehensive long-term structural health reform to short-term emergency humanitarian aid. The lack of a viable governance system has rendered donors wary of supporting long-term systemic health reforms that require trustworthy implementers. In 2010, donors accounted for only 0.09 per cent of total health expenditures, and this percentage dropped after 2014

(WHO, 2018), precipitating a withdrawal from infrastructural and policy work and a focus on emergency interventions. This emergency work is necessary, but not sufficient to counteract the structural decline of the health system.

4.3.5 Household Financial Burden

As public support for health care provision has decreased, households have increasingly paid for it themselves, with out-of-pocket expenditures representing 30 per cent of the total health budget in 2018 (WHO, 2019). This puts a significant burden on low-income households and, as a result of continuous inflation and devaluation of currency, contributes to inequitable access to essential health services, moving much of health spending entirely outside public accountability mechanisms.

4.3.6 Loss of strategic planning capacity

The combination of budget unpredictability and fractured governance has hollowed out the health sector's strategic planning capacity. In the absence of predictable budget frameworks, contingency funds or performance-based resource allocation, long-term planning horizons beyond the current fiscal year are impossible. The political capture of oil revenues has also created and reinforced interregional inequalities and priorities, skewing resources toward areas with political clout rather than need. These six features of the institutional environment together determine the structural context in which Libya's health finance system currently operates, and the landscape in which any health reform strategy would need to perform.

4.4 Structural Economic Context: Libya’s GDP composition (1990-2022)

The structure of Libya’s GDP presents a core structural impediment to sustainable financing for public health. For the last 30 years, oil has dominated Libya’s economic structure, with agriculture and industry representing minor components of national GDP. This dependence means that public finances, including the health budget, are vulnerable to oil price fluctuations and to internal disruptions that can shut down production.

Table 4.1: Sectoral Contribution to Libya’s GDP (1990–2022)

Year	Oil Sector (%)	Industrial Sector (%)	Agricultural Sector (%)	Services Sector (%)	Total (%)
1990	60	10	4	26	100
1995	63	9	4.5	23.5	100
2000	67	8	4	20	100
2005	65	10	5	19	100
2010	70	8	5	16	100
2015	65	10	6	18	100
2020	55	12	6	25	100
2022	58	14	5	23	100

Source: World Bank, World Development Indicators (2023).

The oil sector has always comprised more than 50% of GDP throughout the period under review, with peak of 70% in 2010. The agricultural sector has never exceeded 6% of the production, and industrial sector has not undergone any significant changes in over 3 decades covered by this report. The two implications for health financing resulting from this structural concentration are: when oil prices fall, or when they are affected by conflicts that interrupt production, there is no other sector that is large enough to cover the gaps, causing government budgets to shrink. Secondly, the government's lack of a diversified revenue stream does not enable counter-cyclical fiscal policy: the government cannot compensate for declining revenues to support the health sector, since it has no other revenues to call on. As a result, health sector budget follows fluctuations of the price and quantity of oil rather than population health needs. Building a sustainable financing for health sector should be among preconditions for the health system rather than simply a long-term objective for diversification of the economy.

4.5 Healthcare Spending across Political Periods (1990-2022)

This section discusses the health sector expenditure in the context of the 7 different political periods that occurred in Libya from 1990-2022. It discusses the interdependence between the economic, political circumstances and financing for health, using government data of

health spending, inflation data and oil prices. Health financing in Libya closely follows political circumstances, and fiscal trends instead of needs of the health of the population.

Sanctions Era 1990-1995: Sanctions were imposed on Libya during the period under review. Libya was politically stable, under the Gaddafi government, although isolated international. Health sector budget was limited but functional, it was covered by oil revenues and government health care was accessible to many Libyans despite some limited access to high-end medical services. Average inflation was 4.3% during the period. Lack of international connection was the main constraint on the health finance, whereas the strong political grip enabled the state to maintain its consistent public spending in the health sector.

Gradual Opening 1996–2000: Partial withdrawal of sanctions allowed a moderate increase in government spending, especially for infrastructure, including in the health sector. The Libyan economy experienced moderate growth, with a steady rise in per capita income. Inflation dropped to 3.5% and government health allocation slightly rose. The relatively good political climate favored consistent, although modest, public provision of healthcare services.

Post-Sanctions Growth 2001–2005: This period saw the lifting of most international sanctions on Libya and the subsequent sustained and high economic growth powered by oil. Per capita income and GDP soared, and inflation remained below 3.5%. Health financing also increased in absolute values, and significant investments were made to upgrade public health facilities. In general, a period of political stability permitted mid-level public health system development, but system inefficiencies continued throughout this period.

Pre-Conflict Peak 2006–2010: Libya's GDP and per capita income reached unprecedented highs during this period. GDP increased to **LYD 93.74 billion**, per capita income hit **LYD 15,455**, while inflation stayed in the 3.5% to 4.8% range. With political stability at its height, this period witnessed some of the most robust funding for public health in the study

period, including for infrastructure development, but still, the health budget never surpassed 3.59% of GDP in 2010 (WHO, 2021).

Revolution and Institutional Collapse 2011–2015: Following the 2011 uprising, civil war and conflict led to a dramatic decline of 50% in GDP and per capita income of approximately **LYD 7,712**, and inflation went up to between 10% and 19.5%. Health institutions were fragmented and eventually collapsed due to the blockage of oil fields and military operations, causing an end to the government health budget and a shift from development financing to emergency aid from international donors.

Fragile Recovery and COVID-19 2016–2020: The period was characterized by partial and fluctuating recovery from conflict. Inflation surged to a high of 25% in 2020 due to the COVID-19 pandemic. This period saw health budget constraints, with funding focused on immediate crisis response rather than health systems infrastructure, and a sharp increase in out-of-pocket expenses among households.

Ceasefire and Early Rebuilding 2021–2022: With the establishment of a new unity government in 2021, some institutional coherence was restored and engagement from the international community was reinitiated. Economic growth gradually resumed and inflation eased to 15.4% by 2022, but the lack of fiscal cushion or economic diversification makes healthcare financing extremely vulnerable to future political instability.

Table 4.2: Government Health Expenditure and Political Context in Libya (1990–2022)

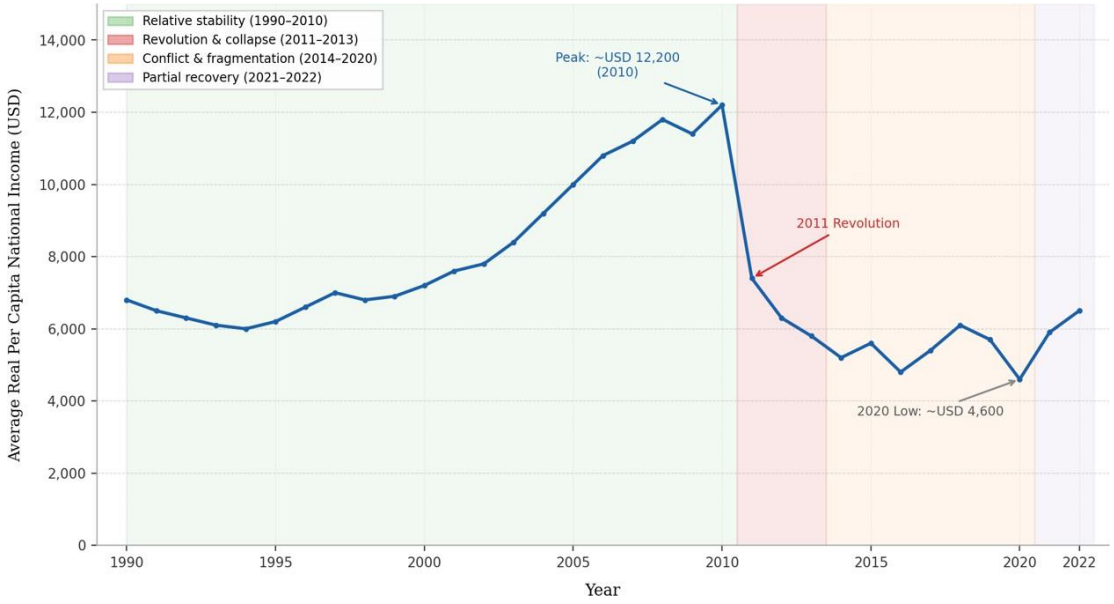
Year	Govt. Health Exp. (% of GDP)	Political Context
1990-1999	1.8	Relatively stable period; health spending modest but consistent under centralised governance.
2001-2005	2.4	Easing of international sanctions; modest but sustained increase in health investment.
2006-2010	2.9	Economic expansion and infrastructure development; strongest pre-conflict health spending share.

2010	3.0	Peak health spending share; GDP reaches LYD 93.74 billion and per capita income approximately LYD 15,455.
2011	2.2	Revolution begins; health financing starts to contract as state revenues collapse.
2012	2.0	Transitional government unable to stabilise institutions; health budgets under pressure.
2013	1.8	Oil production disrupted by armed groups; revenue shortfalls widen across all public budgets.
2014	1.6	Governance splits between east and west; health allocations reach their lowest share on record.
2015	1.7	Ongoing conflict and political fragmentation; dual health ministries operating in parallel.
2016	2.0	Partial progress towards political dialogue; fragility and instability continue.
2017	2.1	Continued conflict; oil production begins a partial, uneven recovery.
2018	2.3	Relative stabilisation in some areas; improved oil output supports modest budget recovery.
2019	2.0	Political tensions resurface; fragile peace agreements fail to hold.
2020	1.9	COVID-19 compounds existing economic and health system pressures.
2021	2.4	Government of National Unity formed; modest institutional recovery and renewed donor engagement.
2022	2.5	Ongoing institutional rebuilding; health spending remains vulnerable to renewed political tension.

Source: World Bank WDI (2023); WHO Global Health Expenditure Database (2022). GDP and per capita income values converted to Libyan Dinar (LYD) using the official exchange rate from the study database (EXR 2010 = 1.2668 LYD/USD).

Across the full period, Libya's healthcare expenditure has moved closely with political conditions: relatively stable under centralized governance, and sharply and erratically lower under conflict and fragmentation. Oil revenue dependence has made fiscal fragility a permanent feature of the system, and inflation has repeatedly eroded the real value of whatever health allocations were made. GDP and economic output have recovered partially since 2021, but Libya continues to face the same structural challenges — oil dependency, governance fragmentation, and the absence of fiscal buffers that made the post-2011 contraction so severe and so difficult to reverse.

Figure 4.2: Average Real Per Capita National Income in Libya (1990–2022)



Source: World Bank, 2021; Central Bank of Libya, 2022

4.6 Public Health Finance as a Function of Political and Economic Conditions

The shape of the line showing real per capita national income between 1990 and 2022 reflected Libya's political circumstances rather than its endowment of natural resources. During a period of relative stability between 2000 and 2010, incomes grew steadily, though modestly, to a peak in 2010 of around LYD 15,455. Libya experienced limited, controlled oil production, some state functionality, and contained inflation, enough to avoid wide-scale

public unrest and to provide a somewhat predictable fiscal environment for public spending, including for health A year of 2011 brought a dramatic and sharp contraction of real income as a consequence of physical destruction, displacement, and a collapse of oil revenues. Far from a brief shock from which Libya quickly recovered, this marked the start of a decade of economic precariousness from 2012 to 2020. With oil production volatile in these years due to conflicting political authority, blockades by armed factions, and contest for oil facilities, the figure captures income volatility and the consequent fiscal unpredictability for which state institutions are at a disadvantage. For the state, instability and lack of fiscal foresight meant limitations in its capacity for long-term investment in social infrastructure.

Following the creation of a government of national unity in early 2021 and partial stabilization of oil production, the figure captures signs of gradual recovery. Nonetheless, the level of per capita income remains significantly below the 2010 peak, and the fundamental constraints — dependence on oil revenues, institutional fragmentation, and lack of fiscal buffers, which contributed to a decade of economic instability following a political shock, have yet to be addressed.

4.7 Institutional Fragmentation and Its Consequences for Health Financing

Political instability has given rise to an institutional structure of which deep fragmentation in the capacity to govern and finance the health sector is the most damaging and visible manifestation. The competing formal government institutions that have emerged since 2011-each operating its own Ministry of Health, purchasing institution and budget authority-have created an impossible institutional and economic reality for co-ordinated national planning (UNDP, 2022; World Bank, 2021). Libya, the political institutions that underpinned the ability to carry out coherent public policy have dissolved.

Public Health Budgeting and expenditure: The budgeting landscape in the health sector from 2014 to 2020 was defined by disparate entities preparing separate national budget documents with varied accounting procedures and inconsistent priorities for health

spending across east and west Libya, making national budget aggregation practically meaningless. Funding became the subject of bargaining over, rather than need. Resource allocation to public health projects reflects the political power balances among various factions rather than actual population needs (UNDP, 2022). The overall efficiency of public health sector budgeting decreased by over 40% in the post-2011 era due to these fragmented jurisdictions and overlapping authorities. As with national-level institutions, the quality of data collection and of health service delivery decreased. Both the Ministry of health and the medical supply organization operated largely without consistent access to current epidemiological and health work force data or an integrated financial management system. (WHO, 2018).

Public hospitals lacked standardized financial reporting of expenditure and service used about 61% could not report to authorities between 2015 and 2019. They failed to meet standards of transparency and accounting in terms of expenditure (WHO, 2018). A comprehensive, integrated Health Management Information System (HMIS) has been conspicuously absent in Libya, hampering evidence-based health policy and planning processes that are dependent on accurate data on disease burdens, geographical distribution of disease and the need for health services (Pavignani and Colombo, 2009). It comes as no surprise that Libya's budget execution has been equally impaired. Delays in budget approval have led to unpredictable funding releases that have averaged a mere 58% of approved allocations to hospitals between 2016-2020. This meant persistent drug shortages, irregular salary payments for healthcare workers and a backlog of overdue facility maintenance (Elboiashi, 2020; World Bank, 2021). These effects were most severe in the remote regions such as Sabha, Ghat and Al Kufra where resource distribution became highly uneven (Elhadi and Msallati, 2020). The increasing burden on the security sector to the expense of social sectors-a characteristic of many post-conflict environments-means there has been a squeeze on health budget allocations. During the height of the conflict (2014-2016, 2019-2020) well over 60% of discretionary public outlays have been for defense and security and these costs have risen dramatically at the expense of social

budgets (World Bank, 2021; Central Bank of Libya, 2022). As illustrated by other contexts (Collier, Hoeffler, and Patella, 2003), there is an enduring risk that this can come to shape the composition of government budgets permanently after the conflict has passed.

In parallel to budget fragmentation and allocation issues, parallel procurement by rival administrations have inflated costs of drugs and equipment by as much as 30 percent, while a lack of audit capacity allowed for an unchecked level of corruption, further undermining public trust in the state (World Bank, 2021). The consequence of these developments is that the country is caught in a vicious cycle of fiscal paralysis and service decline: hospitals cannot invest, plan for personnel or infrastructure and cannot offer guarantees to their populations. As noted in a general discussion of conflict-affected health systems, even if nominal spending on health increased, outcomes would not necessarily improve, given how readily funds could be lost through mismanagement or rent-seeking before they reach their targets (Kutzin, 2008; Pavignani and Colombo, 2009). Accordingly, this section argues that, rather than attempting to pump more resources into the health sector at this stage, Libya needs structural reform that would first address its institutional challenges to budgeting, financing and accountability. Prioritized interventions are clearly needed to build new institutions or reform old ones to integrate health governance, develop integrated health information systems, to introduce performance-based budgeting and a transparent health procurement system and a robust system to monitor spending.

4.8 The Shift towards Security and Defense Spending

The most direct and damaging consequence of Libya's post-2011 institutional and political fragility has been the drastic shift of public resources toward defense and security spending and away from health and other social sectors. Facing ongoing security threats, rival governance structures that compete for legitimacy, and the demands of a heavily armed society, each successive administration has placed financing the myriad militias and their operations above all else. The state has, in essence, abdicated the responsibility of developing social infrastructure as a matter of national priority. The fiscal evidence is stark:

since 2012, defense and security spending as a proportion of discretionary outlays began to rise rapidly. By the time conflict peaked between 2014-2016, and then again in 2019-2020, the state had devoted more than 60 percent of discretionary public spending on the security sector; meanwhile health budget allocations stagnated or declined in real terms, at the very time demand for services escalated due to the pressures created by conflict and displacement. In short, from 2015-2020, the health sector accounted for under 2.5% of total government budgets, whereas the defense and security sectors together accounted for more than 10% (World Bank, 2021; Central Bank of Libya, 2022). The security emphasis has also severely depleted Libya's pool of highly trained health professionals. Some physicians, engineers and administrators have joined security and militia organizations because their wages are now considerably higher.

4.9 Public versus Private Health Financing

Libya's health system in 2010 the last year before the conflict began was predominantly state funded, with the government budget covering nearly 70 per cent of total health expenditure, as shown in Table 4.3 However, out-of-pocket payments by households accounted for nearly 30 per cent of spending, a proportion that is high by international standards and that indicates limited financial risk pooling even before the onset of instability. Donor and NGO contributions were negligible at 0.09 per cent.

Table 4.3: Health Financing Structure in Libya (2010 Benchmark)

Source of Financing	Share of Total Health Expenditure (%)
Government budget	69.94
Out-of-pocket (OOP) payments	29.97
Donor and NGO contributions	0.09

Source: WHO Global Health Expenditure Database (GHED), 2022.

This baseline reveals two vulnerabilities that would be severely exposed by the conflict. First, the near-total dependence on government revenue meant that any fiscal shock would translate immediately into a health financing crisis. Second, the high rate of out-of-pocket

spending, a sign of weak financial protection even in a relatively stable year meant that households were poorly placed to absorb additional healthcare costs when public provision contracted. Both structural weaknesses became acutely visible after 2011.

4.10 Health Economics Analysis

4.10.1 Health Expenditure as a Share of GDP

Libya’s health expenditure as a share of GDP has been persistently very low. It was estimated to reach approximately 4.1% at its recent peak, but this increase is due to the country's contracting GDP, not an increase in actual spending – the absolute health expenditure level has not risen substantially (WHO, 2022; World Bank, 2021). Both the absolute and percentage values are considerably lower than that of comparable countries in the upper-middle income group, which is generally more than 9%, and lower than countries such as Jordan and Tunisia in the region.

This chronic underspend cannot be explained by short-term budget constraints but points to underlying structural and institutional weaknesses in Libya's public finance management system including the central and rigid planning of several decades, a near total dependence on oil revenues and severe administrative fragmentation post-2011. Such circumstances have made it difficult to scale up health investment in good years and to safeguard it in times of crisis.

4.10.2 Consequences of Low Health Investment

The underspending and variability of public health financing has been detrimental to the health sector across a variety of aspects. Health Ministry budgets have been inconsistent, and health has consistently ranked far lower in government priorities compared to security which has hampered infrastructural development, retention of health personnel, provision of equitable services and driven increased reliance on private providers, out-of-country medical care and out-of-pocket payments, which exacerbate disparities (Kutzin, 2008; WHO, 2019; World Bank, 2021; WHO, 2022).The failure of public investment in health has caused decline in disease prevention services, vaccination coverage rates, and disease

surveillance capacities, making the population more susceptible to outbreaks. Meanwhile, chronic diseases including cardiovascular diseases, diabetes and cancer have emerged as leading causes of death and disability, accounting for more than 60% of premature deaths (WHO, 2022; UNDP, 2022) and are long-term, high-cost conditions requiring steady, large-scale investments and sustainable financing, which the current situation renders difficult. Although Libya has a high level of GDP per capita relative to countries in the region due to its oil wealth, the country's volatile oil prices make its fiscal base insecure. Empirical analysis has established that the elasticity of healthcare funding regarding oil prices is high and thus rendering financing inherently unstable in the absence.

4.10.3 Libya: GDP and Health Spending Comparative Analysis

The history of Libya's health expenditures over the last two decades tells a story of a nation stretched between political fragility, the dependence on hydrocarbons and a weak capacity in managing its finances. Although Libya qualifies for an upper-middle-income country, thanks to its oil resources, continued volatility in oil prices and the prolonged instability have prevented the government from spending the equivalent expected to its peers with similar income levels. This section analyses those factors from both comparative viewpoints - examining Libya's history over the years and comparing it to countries in the region. The government revenue and foreign exchange are overwhelmingly based on hydrocarbons since Libya is a rentier country (World Bank, 2021). As a result, during stable political times, the per capita income was high and many subsidies were offered; on the other hand, health spending (like any other sector financed by the government) was very sensitive to price fluctuations of oil and disruptions related to the conflict. Health expenditure, as % of GDP, remained particularly low from 2000-2005, at between 1.62-1.63, and was modest until 2010, standing at 2.29. An increase to 3.48 in 2018 may appear encouraging, however a time series study suggests that it's attributed mostly to the decline in GDP rather than an increase in investment in health sector, which has diminished (World Bank, 2023; IMF, 2020). By choosing a ratio with a denominator that falls, the result of increasing health spending becomes deceptive and misleading; this kind of effect is well

known in comparing the shares of health expenditure in volatile fragile and conflict affected countries (IMF, 2020).

4.10.4 Comparative Analysis within MENA Region

Libya's expenditures on health lag far behind those of other upper-middle-income countries, as the latter generally spent more than 9 percent of their GDP, and also below the regional average in the Middle East and North Africa. Iraq, which was subject to a similar political crisis following 2003, sustained higher levels of spending, mainly due to the fact it maintained a more coherent system of governance than Libya did after 2014. The country's neighbors Jordan and Tunisia may lack the wealth and revenues Libya commands, but their governments allocate far more GDP resources to health and deliver better results due to their greater capacity in public finance management

Table 4.4: Average Government Health Expenditure (% of GDP), Selected MENA Countries, 2011–2020

Country	Avg. Govt. Health Exp. (% of GDP) 2011–2020	Contextual Characteristics
Tunisia	6.8%	Gradual institutional reforms following the 2011 transition; stronger fiscal oversight.
Egypt	5.4%	Fiscal consolidation post-2016 supported sustained health investment.
Iraq	4.9%	Volatile security environment but more cohesive governance than Libya.
Syria	3.7%	Prolonged armed conflict; some institutional continuity preserved.
Libya	3.1%	Severe institutional fragmentation and oil-dependent fiscal volatility.
Lebanon	3.0%	Economic collapse and breakdown of public services from 2019 onwards.

Sudan	2.6%	Chronic underfunding and political instability.
Yemen	2.2%	Near-total collapse of the health system under ongoing conflict.

Source: World Bank WDI (2023); WHO Global Health Expenditure Database (2022).

These comparisons show one thing quite plainly. The reasons why health is so poorly invested in Libya are not simply due to lack of resources rather than political will is absent. Institutions are fragmented and there are no fiscal management tools in place. Better and more equitable health financing systems have been established by countries with far less oil revenue than Libya's. From the evidence of the region, it can be concluded that what really matters in health financing is not the amount of money raised but the institution of raising and managing the money.

4.10.5 Continuing Structural Challenges

Several chronic structural and policy constraints account for Libya's very low levels of health expenditure and its declining service quality. Health expenditure in Libya is low and volatile, and it directly explains why many public hospitals and clinics lack basic equipment, electricity, and clean water. As a result, the health expenditures fall directly on families and individuals, many of whom are forced to access health care either at high cost through private facilities, or in the relatively few, also expensive, treatment centers outside the country. Already in 2010, out-of-pocket payments constituted almost 30 per cent of health expenditure, an amount higher than in many countries (WHO, 2019). As Libya currently does not have a health insurance or a social risk-sharing mechanism, the health system and individuals will inevitably pay for the total health expenditure in direct payments. Studies on health expenditure efficiency have found it dropped by approximately 35% from 2012 to 2020 due to repeated procurements and procurement fragmentation and due to corruption (Elboiashi, 2020; World Bank, 2021). In Libya, the operation of parallel ministries of health in the eastern and western parts of the country

resulted in multiple budget lines, redundant bids, and the lack of central oversight, and that creates conditions ripe for misallocating public funds (OECD, 2022). Libya's national budget is characterized by its emphasis on recurrent expenses. In 2019, over 54% of total government spending went to personnel, while only about 3% was directed to public investment and to health infrastructure.

4.10.6 Interpretation of the 2018

It should be carefully interpreted when health expenditure in 2018 increased as a share of total expenditure relative to GDP. What has been changing is the denominator as total GDP significantly decreased, not health spending. During 2018 the health expenditures increased, but healthcare did not significantly improve. In addition, salaries were often delayed and medical shortages continued to exist, with deterioration in infrastructure across many health facilities (WHO, 2018; Central Bank of Libya, 2022).

4.10.7 Areas for Improvement of Health Services

To improve and increase public spending on health, it suggests that Libya must reform and implement, Establish a health stabilization fund that guarantees consistent levels of health funding despite volatility of oil revenues or production and political instability; Reform to result-based budgeting and implement targets for service delivery with indicators in terms of the number of citizens reached by these services and regional health inequities. Such a framework will create a more appropriate incentives to health sector expenditures;

Introduce and implement health insurance, in particular, health insurance with an effective risk-pooling mechanism, to protect citizens against large healthcare costs;

Implement standardized procurement procedures for medicines and equipment and an integrated national health accounting system. A transparent and digitized management of resources would allow for better monitoring, Finally, shift from a hospital-centric to a more primary health-centric approach that places a strong emphasis on community health and primary care, particularly in remote and peripheral areas that have historically been neglected.

4.10.8 The economic costs of ill health Chronic and prolonged underinvestment

Health sector translates into several adverse economic impacts on a nation's overall economic performance and prospects. These impacts include lower labour productivity, a higher dependency ratio due to a growing proportion of elderly citizens or due to permanent illness and disability, an increase in long-term disability-related costs, reduced economic growth rates, and the emigration of highly skilled health workers. The impact on private finance will be seen through an increase in out-of-pocket spending on healthcare in response to deteriorations in public care. An economic loss resulting from health impacts could be as large as several percent points of annual GDP. However, Libya's experience goes to demonstrate the interconnectedness of politics, the revenue generated from oil and its uses, and the social services sectors such as health care and the overall performance of its economy. Despite current international recommendations which urge governments to spend more than 5% of GDP on health, Libya's health sector has traditionally maintained expenditure levels in the range of 2-3% of GDP and this only, because of the inefficiencies and waste that plague the health sector. Evidence from the surrounding regions of the Middle East and North Africa confirms that the optimal health care performance relies more on the strength of institutions than on a substantial availability of financial resources. Therefore, to promote a significant improvement in public investment in health in Libya, there is a dire need for a coherent reform that establishes a clear governance system.

4.11 Chronic Disease Burden and Fiscal Consequences

Libya's health care system deteriorated in recent decades amid rising prevalence of non-communicable diseases (NCDs). From mainly cardiovascular diseases and other related problems in previous times, many new NCDs including cancer and diabetes are now more prevalent in the country. They are already representing the main drivers of morbidity and mortality among Libyans, the condition also found in other fragile states, such as for example many Sub-Saharan African countries where a few lifestyle-related risk factors became more important than infections.

4.11.1 Trends in Epidemiology

More than 70 percent of the total number of deaths in Libya have already been attributable to NCDs, with cardiovascular diseases alone accounting for almost a third of all the deaths. Due to the lack of structured preventive programmed, limited public awareness campaigns, and broken supply chains for medicines needed by chronic disease patients, a significant increase in prevalence for such diseases like diabetes has occurred – estimated in 2020 at between 14 and 16 per cent among adults – , while detection of cancer still relies upon insufficient capacity of screening equipment and diagnostic resources, so many cases are only identified at a later stage when prognosis becomes worse (WHO, 2018).

4.11.2 Economic Implications of Chronic disease

The rise in prevalence of NCDs imposes significant costs for individual households, as they will have to spend on average more on medical treatments and medications to combat these chronic diseases, costs that become even more prohibitive when effective risk, pooling mechanisms are lacking. On macro level, it affects labor productivity through increase in sick leaves and reduced participation in the workforce and increased demand for health care services and treatments. In 2020 the NCDs were estimated to have caused a total loss of 1.7 to 2.4 percent of the Libyan GDP annually through direct health care costs and indirect effects on labor productivity and workforce participation (UNDP, 2022;

WHO, 2022), an amount which disproportionately affects the population living in the rural regions and the periphery where health services are more deprived.

4.11.3 Lack of Health System Readiness for NCDs' Burden

As with most health care systems in fragile settings, the Libyan system has several structural impediments that make it particularly unprepared for the NCD epidemic. Multiple parallel authorities with their own agendas and respective ministries of health create discontinuities in service provision and patient care journeys. Patients often do not have readily accessible health records and as a result, fragmented and duplicated medical services often result. Public hospitals, and even more so clinics, suffer from regular shortage

of drugs that are needed for patients suffering from chronic illnesses, as the system's procurement processes are frequently hampered by fiscal uncertainties and corruption. The migration of skilled health workers from Libya , who seek better professional development, salaries and job security abroad, with the loss of critical specialists, including on oncologists, endocrinologists and nephrologists – puts an even higher burden on the country's capacity to address NCDs.

4.11.4 Linking Political Instability to the Chronic Disease Crisis

Strategic responses in the current environment Addressing chronic diseases would need to be undertaken through an integrated strategic approach addressing the clinical, institutional and fiscal dimensions, including; Reinforcing institution-coordination mechanisms to ensure a coherent design and implementation of a national NCD policy under one health authority; Increasing the capacity of primary care, focusing on family doctors trained in the detection of the main NCDs and their management; Strengthening drug procurement and supply through a consolidated and transparent pharmacy service operating independently of political volatility. Implementing an electronic medical record system and a disease registry to allow for effective care continuity and evidence-based planning; Enhancing financial protection through chronic diseases' subsidies and developing insurance mechanisms to reduce patients' out-of-pocket expenditure; Strengthening coordination with international donors to assist in reconstructing chronic care infrastructure and services and addressing regional inequity. As Libya faces considerable challenges to address chronic disease prevalence in the context of the prevailing circumstances, a comprehensive plan that covers the clinical, institutional and fiscal aspects will be required. NCD management would require institutional reforms, stronger coordination between fragmented health authorities, enhancement of primary care services, improved access to drugs, effective financial protection mechanisms, and international support for infrastructure recovery. The significant rise in the chronic disease burden is an impending health risk and a considerable fiscal burden on Libya in several aspects, and requires strategic planning for prevention, early detection, effective management, affordable access

to treatment and a focus on institutional strengthening.

4.11.5 Regional Equity and Disparities

The burden of chronic diseases also reflects and exacerbate existing regional inequalities. In Tripoli and Benghazi, private hospitals offer some chronic disease treatment, but at prohibitively expensive levels. In southern and rural areas, chronic disease specialist capacity (oncology, nephrology, endocrinology) is largely absent. These disparities are not simply a health problem; they are deeply political and likely to contribute to existing social grievances, political instability, and further Fragmentation. Failure to address the crisis of chronic diseases could well represent a both symptom and cause of a brittle state.

4.11.6 Strategic Responses

Tackling Libya's chronic disease burden requires a coordinated clinical, institutional and fiscal response that prioritizes long-term solutions. Such an approach should comprise rebuilding mechanisms of institutional co-ordination to create a single NCD strategy led by a single health authority. Enhancing the role of the primary health care system in detecting and managing patients with chronic diseases through training in chronic care for family physicians. Reforming the drug supply chain through the creation of an integrated and transparent drug procurement and distribution mechanism that is responsive to fiscal conditions and shortages. Instituting health information technology in the form of medical records and disease registers. Expanding chronic disease financial protection through subsidies and the creation of affordable insurance options. Engaging international donors to assist with investment in physical chronic care infrastructure based on criteria of sustainability and equity.

4.12 Key Findings

Table 4.5 demonstrates the consistent and severe decline in hospital performance during the period of instability.

Table 4.5: Hospital Performance Indicators Before and During the Instability Period

Indicator	Change during the Instability Period (2011–2022)
Average operating budget	−43%
Availability of essential medicines	−40%
Physician density (per 1,000 population)	−44%
Emergency department readiness	Declined by more than one-third

Source: Author's analysis based on Ministry of Health administrative data and WHO (2018). Values represent estimated percentage changes in mean annual indicators between the pre-conflict period (1990–2010) and the instability period (2011–2022).

These statistics correspond to an ongoing loss of facility-level health system capacity that is compatible with, and validates at the micro level, the macroeconomic trends described earlier in the chapter.

4.12.1 Operating Budgets

The 43 percent decline in average operating budgets reflects the contraction in public revenues as well as the long-standing problem of delayed disbursements. Many hospitals – especially those outside Tripoli and Benghazi – received all, part, or no operating budget during periods of fiscal and political impasse (World Bank, 2021; UNDP, 2022). Since 2014, the splitting of the country between competing authorities has made the problem structurally insoluble. Overlapping budget appropriations from multiple ministries of health left facilities uncertain and unable to plan for their own expenses or operations (UNDP, 2022; Elhadi & Msallati, 2020).

4.12.2 Availability of Medicines

The 40 percent decrease in essential medicine availability is consistent with a World Health Organization finding that medicine procurement is generally inefficient (WHO, 2018). Two sets of parallel procurement processes by the eastern and western authorities led to multiple redundant tenders, conflicting prices, and a duplication of resources. As supply chain limitations and Central Bank dysfunction created frequent shortages of pharmaceutical imports, foreign exchange difficulties made this particularly acute, leading to the most

severe impact on the most vulnerable patients with specific requirements for insulin, chemotherapy drugs, and cardiac medications (Pavignani & Colombo, 2009).

4.12.3 Physician Density

The 44 percent reduction in physicians reflects the combination of high emigration rates and the migration of health professionals to more lucrative roles within security sector entities. Political unrest and unpaid wages resulted in the persistent outmigration of health workers (WHO, 2022). Facilities located in areas affected by conflict and in remote locations like Sabha and Gharyan lost significant proportions of their physicians, in some cases going years without full-time specialists. The financial incentives offered by security organizations caused doctors and nurses to shift away from public sector work precisely at the time their clinical services were most needed.

4.12.4 Readiness in Emergency Departments

Readymade services in emergency departments, including ambulance services, sorting tools, and operating capacity, declined by over one-third. Facilities in emergency departments throughout the country were overwhelmed during the peak of conflict from 2014 to 2016 and again in 2019-2020 by the overwhelming volume of war wounded, but lacked the logistical or human capacity to deal with the demand. The assistance of humanitarian actors partially offset the problem but was provided irregularly rather than as a systematic component of disaster response or planning.

4.13 Chapter Summary

This chapter provides an in-depth review of the structure of and expenditures on healthcare financing in Libya during 1990-2022. Relying on an institutional economics perspective and trend data collected both at the national level and from individual hospital sites, this chapter presents evidence that political instability has created and maintained the decline in healthcare financing that the country has experienced since 2011. These systemic and structural problems have occurred as the country fragmented, and as two rival governments created separate Ministries of Health with parallel procurement, budget allocations, and

management structures. Fragmented authority undermined centralized budgeting processes, fueled duplicated expenses, allowed for corruption, and ultimately exacerbated the financial shortages that have led to reduced health expenditures throughout this period, and shortages in medicines, equipment and staff (World Bank, 2021; UNDP, 2022). Though spending appears to have increased in 2018 (Table 4.2 and Fig. 4.1), the growth reflected an economic contraction (GDP decrease) not an increase in health investment, though a high point did occur in 2018 at 3.48 percent of GDP. Even before the civil conflict began in 2011, Libya's overall health expenditure in GDP (around 2.3 percent of GDP in good times) lagged far behind that of similar and more affluent countries due to dependence on oil revenue. Hospital operating expenses fell 43 percent between 2011 and 2022, the supply of essential medicines fell 40 percent, the supply of physicians fell 44 percent, all in six Libyan cities (Table 4.6). Relative to the region, Libya's health expenditures of 3.1% of GDP in recent years put it more in line with some of the most vulnerable states in the region than with those striving for recovery like Tunisia and Egypt, further indicating institutional challenges rather than fiscal inability (WHO, 2022; World Bank, 2021). In addition, as dependence on the sale of hydrocarbon revenues suggests, health financing has historically been contingent on fluctuations in the international price and domestic availability of oil, a volatility exacerbated by a lack of effective risk pooling and fiscal stability mechanisms (Ross, 2012; IMF, 2020). Analysis of trends in health expenditures demonstrates how the fluctuations of oil prices and volumes impact Libya’s ability to plan any systematic long-term investments, as temporary oil revenue windfalls often disappear before they can be effectively allocated to public goods (Elboiashi, 2020; World Bank, 2021). The overall rise in household out-of-pocket payments in health from under 30% in 2018 toward 50% today indicates the increased burden of system failure shifting to individual citizens and families with limited access to alternative means of support. An overall plan of recovery for Libya must involve moving beyond incremental adjustments. Political stability is a prerequisite for an effective approach to health finance; only a unified and authoritative government can consolidate fragmented budgets and ensure equitable service provision.

CHAPTER FIVE

Model Specification, Methodology, and Results of the Econometric Model

5.1 Introduction

This chapter constitutes the empirical core of the thesis. It translates the conceptual argument developed in earlier chapters, which is political instability disrupts the fiscal channels through which oil-dependent, rentier states finance public services, into a estimated econometric model of public healthcare expenditure in Libya over the period 1990–2022/2023. The chapter is organized in five parts. Section 5.2 revisits the theoretical foundations underlying the choice of variables and their expected transmission channels. Section 5.3 situates the study within, and critically evaluates, the existing empirical literature, from which the specific research gap addressed by this thesis is derived. Section 5.4 sets out the formal model specification. Section 5.5 justifies the Autoregressive Distributed Lag (ARDL) bounds-testing methodology as the appropriate empirical strategy for this dataset. Sections 5.6 through 5.11 present the data, unit-root results, cointegration test, long-run and short-run estimates, and diagnostic checks. Section 5.12 discusses the results against the theoretical and empirical literature and draws out their policy relevance, and Section 5.13 summarizes the chapter.

5.2 Theoretical Framework and Transmission Channels

5.2.1 Political Instability and Fiscal Capacity

The transmission channel linking political instability (POL) to healthcare expenditure operates primarily through fiscal capacity. Political instability that defined broadly as unconstitutional or violent change, or threat of change, in political authority (Fosu, 1992), undermines a government's ability to collect revenue, plan multi-year budgets, and maintain the administrative continuity necessary to deliver public services. Armed conflict, can physically destroy health infrastructure, disrupt supply chains for medicines and

equipment, and divert public resources toward security spending at the expense of social sectors. For Libya specifically, the post-2011 fragmentation of sovereignty between rival governments has been associated with an unusually large share of oil-financed spending being absorbed by an inflated public wage bill and informal patronage networks rather than productive public investment, a pattern documented in recent political-economy assessments of the Libyan budget (Chatham House, 2025). This is consistent with the general finding in the cross-country literature that political instability weakens, or 'moderates,' the positive relationship between fiscal capacity and public health spending (see Section 5.3).

5.2.2 Rentier State Theory and the Oil Revenue Channel

The oil-revenue channel (OILR) draws on rentier state theory, originally articulated by Mahdavy (1970) in his study of pre-revolutionary Iran and later systematized by Beblawi (1987), which argues that states whose revenues derive predominantly from external rents rather than domestic taxation develop a distinct fiscal and political logic: because government does not depend on taxing the population, it uses rent income to purchase political acquiescence through public spending, including welfare and social services, while remaining largely unaccountable for how that spending is allocated. Libya is frequently cited as a paradigmatic rentier economy, in which oil and gas revenues have historically financed the great majority of the state budget, sustained an oversized public-sector wage bill, and left the productive non-oil economy underdeveloped (Vandewalle, 1998; Herb, 2005).

This theoretical lens motivates the divergent short-run and long-run signs expected for OILR. In the short run, oil windfalls are typically spent quickly and procyclically as governments distribute rents to maintain legitimacy — a pattern consistent with the 'distributive channel' of rentier states. Over the long run, however, revenue volatility, weak accountability institutions, and the classic resource-curse dynamics associated with rentierism tend to erode the efficiency and sustainability of public spending, including on

health, producing the resource-curse or 'negative long-run' effect anticipated in this model.

5.2.3 Wagner's Law and the Income–Public Spending Nexus

The inclusion of real GDP per capita (GDP) as a determinant of public healthcare expenditure (GHE) rests on Wagner's Law of increasing state activity, which posits that as an economy industrializes and per capita income rises, the relative size of the public sector, including welfare and social expenditure, expands more than proportionately (Wagner, 1883). Applied to health spending, Wagner's Law implies a positive, and in the long run income-elastic, relationship between GDP and GHE, as rising income both increases the demand for health services (a normal, arguably income-elastic good) and expands the fiscal base from which government can finance provision. Because budgetary reallocation is administratively slow, the theory predicts that the income elasticity of health spending is fully realized only over the long run, while the short-run response is muted by budgetary rigidity. Two further variables complete the model. Total population (POP) controls for demographic pressure — a larger population dilutes per-capita expenditure unless health budgets scale correspondingly. Total government expenditure as a share of GDP (GOV) proxies' government size in the Wagnerian sense, capturing the extent to which the general expansion of state activity carries health spending with it, independent of the specific oil-revenue channel.

5.3 Critical Review of the Empirical Literature and the Research Gap

A substantial empirical literature has examined the determinants of health expenditure using ARDL and related cointegration techniques, but three limitations in this literature motivate the present study. First, the bulk of ARDL-based health-expenditure studies concentrate on high- and middle-income, institutionally stable settings. Barati and Fariditavana (2020), for instance, apply a non-linear ARDL model to United States healthcare expenditure and find that the income elasticity of health spending differs markedly across types of health services, but their setting that is a stable, high-income federal system, offers little guidance on how fiscal relationships behave when political

authority itself is contested. Second, where political instability has been incorporated into health-expenditure models, it has typically been treated as a moderating variable on fiscal capacity in relatively diversified, non-oil economies. A recent study of the West African Economic and Monetary Union finds that political instability distorts, rather than simply lowers, the positive influence of fiscal capacity on public health expenditure, underscoring that instability changes the structure of the fiscal-health relationship rather than acting as a uniform shock. This finding is instructive, but the WAEMU countries are not major oil rents recipients, so the specific interaction between political instability and a rentier fiscal structure remains unexamined in that literature. Related ARDL evidence on health-adjacent outcomes in conflict-affected, resource-poor Somalia shows that protracted instability degrades health infrastructure and access, but Somalia's near-total absence of oil rents means the fiscal-buffering role that resource revenue can play, and the resource-curse risks it carries, cannot be captured in that setting.

Third, the cross-national political-institutions literature (e.g., studies surveyed in the health-expenditure and political-institutions literature covering democracies versus autocracies) finds that autocratic, oil-exporting regimes systematically under-invest in health relative to their income level, but this literature is generally estimated on large cross-country panels and does not speak to the within-country time-series dynamics, short-run versus long-run divergence in particular, that matter for a single, oil-dependent, conflict-affected economy such as Libya.The research gaps this chapter addresses is therefore threefold: (i) no existing ARDL study, to the researcher's knowledge, jointly models political instability, oil-revenue dependency, and Wagnerian income effects on per-capita public healthcare expenditure within a single rentier, post-conflict economy; (ii) the Libyan case, in which political fragmentation since 2011 coincided with continued, and at times increased, oil-revenue inflows, offers a rare natural setting in which the fiscal distributive and resource-curse channels of rentierism can be empirically separated at short-run and long-run horizons; and (iii) the chapter contributes new annual time-series evidence (1990–2022/2023) that extends the existing literature, which is dominated by cross-country panels or single-

country studies of non-oil economies, into the specific institutional and fiscal context of a fractured rentier state.

5.4 Model Specification and Variable Definitions

The model specification proceeds from the proposition that per capita public healthcare expenditure (HE) constitutes the dependent variable, jointly determined by a set of structural and conjunctural explanatory variables. Political instability (POL) represents the primary explanatory variable upon which this study is founded and whose effected healthcare expenditure. It principally seeks to measure, whilst the following macroeconomic aggregates serve as control variables: real GDP per capita (GDP), total population (POP), oil revenue as a percentage of GDP (OILR), total government expenditure as a percentage of GDP (GOV), and exchange rate (EXR). Based on the identified variables and the theoretical relationships assumed, the healthcare expenditure function may be expressed in its general form as follows:

$$GHE_t = \int(\mathrm{POL}_t, \mathrm{GDP}_t, \mathrm{GOV}_t, \mathrm{POP}_t, \mathrm{EXR}_t) \quad \ldots\ldots\ldots(1)$$

Within the Autoregressive Distributed Lag (ARDL) framework of Pesaran et al. (2001), and expressing all variables in natural logarithms to permit elasticity interpretation, the model is specified as:

$$\mathrm{LGHE}_t = \beta_0 + \beta_1 \mathrm{LPOL}_t + \beta_2 \mathrm{LGDP}_t + \beta_3 \mathrm{LGOV}_t + \beta_4 \mathrm{LPOP}_t + \beta_5 \mathrm{LEXR}_t + \beta_6 \mathrm{LOILR}_t + \epsilon_t \quad \ldots\ldots\ldots(2)$$

where all variables are expressed in natural logarithms (L) to reduce heteroskedasticity and to allow coefficients to be read as elasticities. Variable definitions, consistent with the appendix database (1990–2023) that reported in Appendix (1), are as follows.

Table 5.1 reports variable definitions

Variable	Definition
GHE	Per-capita public healthcare expenditure (constant-price LYD): total public health expenditure ÷ total population.
POL	Political instability index, rescaled so that higher values denote greater instability.
OILR	Oil revenue as a percentage of GDP — proxy for oil-revenue dependency and the rentier fiscal channel.
GDP	Real GDP per capita (constant-price LYD) — proxy for income level and fiscal capacity (Wagner's Law channel).
GOV	Total government expenditure as a percentage of GDP — proxy for the general size of government.
EXR	Official LYD exchange rate — captures the nominal fiscal and import-cost transmission channel.
POP	Total population — controls for demographic pressure on per-capita health spending.

Table 5.2 summarizes the theoretically expected short-run and long-run signs

Variable	Short-run sign	Long-run sign	Rationale
LPOL	Negative (often weak)	Negative (stronger)	Spending inertia mutes the immediate effect; sustained instability erodes fiscal capacity and planning horizons over time.
LGDP	Positive (small)	Positive (larger)	Budgetary rigidity delays adjustment; Wagner's Law is fundamentally a long-run structural proposition.
LOILR	Positive	Negative	Procyclical rent distribution in the short run; resource-curse and institutional weakness dominate in the long run.
LGOV	Positive (small)	Positive (larger)	Government size and health spending co-move immediately to some extent; the Wagnerian elasticity strengthens over time.
LEXR	Ambiguous	Negative	Depreciation can temporarily raise the domestic-currency value of oil revenue; persistently, it raises import costs for medicines/equipment, eroding real health budgets.
LPOP	Negative (small)	Negative (larger)	Demographic change is gradual; the dilution effect compounds if health budgets fail to scale with population growth.

5.5 Methodology: Justification for the ARDL Bounds-Testing Approach

The choice of the ARDL bounds-testing approach developed by Pesaran, Shin, and Smith

(2001), rather than the Johansen (1988, 1991) or Engle–Granger (1987) cointegration frameworks referenced in the fiscal-econometrics literature more broadly, is justified on several grounds specific to this dataset.

First, the annual sample (1990–2023) yields only 31–34 usable observations after lag adjustment. Pesaran et al. (2001) show through Monte Carlo simulation that the ARDL approach has superior small-sample properties relative to the Johansen procedure, which is asymptotically derived and can perform poorly with fewer than 30–40 observations. This is a decisive consideration for a single-country annual time series of the length available here.

Second, ARDL does not require all regressors to be integrated of the same order. As the unit-root results in Section 5.7 show, the variables in this model exhibit a mixture of I(0) and I(1) behavior depending on the specification (with and without trend); the Johansen procedure requires all variables to be I(1), and would force an inappropriate transformation, or exclusion, of variables that do not meet this requirement. The ARDL bounds test is valid if no variable is integrated of order two, I(2), a condition confirmed for all series in this model. Third, the ARDL/ECM reparameterization estimates short-run dynamics and the long-run equilibrium relationship jointly, within a single equation, avoiding the two-step estimation and pre-testing bias associated with the Engle–Granger residual-based approach. Fourth, the unrestricted error-correction form used here can accommodate different optimal lag lengths across variables (selected by the Schwarz/Akaike information criteria), which is more efficient than imposing a common lag structure across all series, as VAR-based Johansen estimation requires. Finally, the ARDL framework has been shown to handle regressor endogeneity and to allow simultaneous correction for residual serial correlation, provided lags are chosen appropriately (Pesaran et al., 2001), which is important given the plausible two-way relationship between government fiscal aggregates (GOV, OILR) and health spending itself. For these reasons, small sample size, mixed order of integration, and the need for joint short-run/long-run estimation, the ARDL bounds-testing approach is judged methodologically superior to the Johansen VECM for this specific model and dataset, notwithstanding the latter's greater flexibility for systems with

multiple cointegrating vectors, which is not required here since the model is specified with a single dependent variable.

5.6 Data and Descriptive Statistics

The dataset comprises annual observations for Libya from 1990 to 2023 (34 observations), compiled from different international sources as represented in Appendix (2). All monetary variables are expressed at constant prices in Libyan Dinar (LYD) and transformed into natural logarithms.

Descriptive Statistics

The Jarque–Bera probabilities exceed conventional significance thresholds for every series, so the null hypothesis of normality cannot be rejected for any variable, supporting the appropriateness of standard OLS-based ARDL estimation. The pairwise correlation matrix shows LGHE most strongly and positively correlated with LEXR and LGOV, and negatively correlated with LPOP and LPOL, a pattern broadly consistent with the theoretical priors set out in Section 5.3 though simple correlations of this kind do not distinguish short-run from long-run relationships and are superseded by the ARDL estimates below.**Table 5.3 reports descriptive statistics**

Statistic	LGHE	LPOL	LOILR	LGDP	LGOV	LEXR	LPOP
Mean	3.143	3.929	10.773	9.678	3.678	-0.044	15.581
Median	3.137	3.919	10.655	9.725	3.650	0.235	15.614
Std. Dev.	0.697	0.202	0.702	0.262	0.323	0.774	0.148
Skewness	-0.615	0.102	0.228	-0.591	0.539	0.147	-0.263
Jarque–Bera (p)	0.342	0.419	0.261	0.239	0.283	0.877	0.321
Observations	34	34	34	34	34	34	34

Correlations among the explanatory variables (multicollinearity check)

Table 5.4 shows that LGHE positively linked to GDP, government size, oil revenue, and exchange rate (supporting Wagner's Law), but strongly negatively linked to population. High inter-correlations among LEXR, LPOP, LGOV, and LGDP signal multicollinearity risk. Given trending annual data, unit-root and cointegration tests are recommended before regression to avoid spurious inference

Table 5.4 reports pairwise correlation matrix (1990–2023, n=34)

Covariance Analysis: Ordinary							
Sample: 1990 2023			Included observations: 34				
Correlation	LGHE	LPOL	LOILR	LGDP	LGOV	LEXR	LPOP
LGHE	1.000000						
LPOL	-0.362165	1.000000					
t-Statistic	-2.197921	-----					
Probability	0.0353	-----					
LOILR	0.440430	0.277510	1.000000				
t-Statistic	2.775101	1.634019	-----				
Probability	0.0091	0.1121	-----				
LGDP	0.622654	0.699843	0.099879	1.000000			
t-Statistic	4.501311	5.542395	0.567843	-----			
Probability	0.0001	0.0000	0.5741	-----			
LGOV	0.697124	-0.281939	0.385894	-0.641364	1.000000		
t-Statistic	5.500420	-1.662323	2.366226	-4.728786	-----		
Probability	0.0000	0.1062	0.0242	0.0000	-----		
LEXR	0.742549	-0.182208	0.593903	-0.625719	0.779576	1.000000	
t-Statistic	6.271344	-1.048271	4.175846	-4.537672	7.041177	-----	
Probability	0.0000	0.3024	0.0002	0.0001	0.0000	-----	
LPOP	-0.897552	-0.326142	0.524026	-0.705968	0.776489	0.922561	1.000000
t-Statistic	-11.51560	-1.951655	3.480485	-5.638678	6.970743	13.52540	-----
Probability	0.0000	0.0598	0.0015	0.0000	0.0000	0.0000	-----

5.7 Unit Root Testing

Before estimating the ARDL model, it is necessary to confirm that no series is integrated of order two, I(2), since the bounds test is invalid in that case. Augmented Dickey–Fuller (ADF) tests were applied to each series at level and at first difference, with and without a linear trend.

Table 5.5 reports Augmented Dickey–Fuller (ADF) unit root tests

	UNIT ROOT TEST RESULTS TABLE (ADF)							
	At Level	LGHE	LPOL	LOILR	LGDP	LGOV	LEXR	LPOP
With Constant	t-Statistic	-1.9964	-1.8525	-2.3955	-2.3574	-1.3215	-0.3280	-1.4118
	Prob.	***0.0454***	***0.3497***	***0.1507***	***0.1611***	***0.6078***	***0.9100***	***0.5637***
		**	n0	n0	n0	n0	n0	n0
With Constant & Trend	t-Statistic	-3.4514	-2.1676	-2.7949	-4.1581	-4.4042	-1.9051	-2.3302
	Prob.	***0.0618***	***0.4910***	***0.2090***	***0.0128***	***0.0073***	***0.6293***	***0.4068***
		*	n0	n0	**	***	n0	n0
Without Constant & Trend	t-Statistic	1.2200	-0.3521	0.1907	-3.2372	0.7233	-0.5611	3.5438
	Prob.	***0.9398***	***0.5503***	***0.7352***	***0.0269***	***0.8663***	***0.4665***	***0.9997***
		n0	n0	n0	**	n0	n0	n0
	At First Difference							
		d(LGHE)	d(LPOL)	d(LOILR)	d(LGDP)	d(LGOV)	d(LEXR)	d(LPOP)
With Constant	t-Statistic	-4.8652	-6.7926	-6.8228	-8.9903	-5.1430	-5.4376	-4.3014
	Prob.	***0.0004***	***0.0000***	***0.0000***	***0.0000***	***0.0002***	***0.0001***	***0.0020***
		***	***	***	***	***	***	***
With Constant & Trend	t-Statistic	-5.1365	-6.7046	-6.7105	-8.8281	-5.0991	-5.3705	-4.4857
	Prob.	***0.0012***	***0.0000***	***0.0000***	***0.0000***	***0.0014***	***0.0006***	***0.0062***
		***	***	***	***	***	***	***
Without Constant & Trend	t-Statistic	-4.9730	-6.8899	-6.8971	-8.9422	-4.8294	-4.8905	-1.9656

	Prob.	*0.0000*	*0.0000*	*0.0000*	*0.0000*	*0.0000*	*0.0000*	*0.0485*
		***	***	***	***	***	***	**

Notes:

a: (*) Significant at the 10%; (**) Significant at the 5%; (***) Significant at the 1% and (no) Not Significant b:

Lag Length based on SIC

c: Probability based on MacKinnon (1996) one-sided p-values.

Apart from LGHE, LGDP, and LGOV, which show borderline stationarity around a deterministic trend at the 5–10% level, none of the series is stationary in levels, but all become stationary after first-differencing at the 1% level. No series requires second-differencing to achieve stationarity, and the mixture of I(0)-with-trend and I(1) behaviour across variables confirms, as anticipated in Section 5.5, that the traditional Johansen procedure, which requires uniform I(1) treatment, would be inappropriate here, whereas the ARDL bounds-testing framework remains valid.

5.8 ARDL Bounds Test

The ARDL (3, 1, 2, 2, 2, 1, 2) specification was selected by the Schwarz information criterion over a maximum lag of three, with LGHE as the dependent variable and Case 2 (restricted constant, no trend) applied, consistent with the theoretical expectation that the levels relationship should not contain an independent deterministic trend once GDP and population growth are already controlled for. The F-bounds test yields the following result.

Table 5.6 represent the F-bounds test

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	9.448554	10%	1.99	2.94
k	6	5%	2.27	3.28
		2.5%	2.55	3.61
		1%	2.88	3.99

Because the computed F-statistic (9.449) exceeds the upper I(1) critical bound at the 5%, 2.5%, and even the 1% significance level (3.99), the null hypothesis of no cointegrating (levels) relationship is decisively rejected. This confirms that LGHE, LPOL, LOILR, LGDP, LGOV, LEXR, and LPOP share a stable long-run equilibrium relationship, validating the estimation of both the long-run coefficients and the associated error-correction model reported below.

5.9 Long-Run Estimates and Economic Interpretation

The long-run estimates are, overall, consistent with the theoretical priors set out in Section 5.2 and add substantive nuance to the existing empirical literature. The coefficient on LPOL indicates that a 1% increase in political instability is associated with a 0.93% reduction in real per-capita public healthcare expenditure in the long run, holding the other variables constant. This is the largest elasticity in the model, confirming that sustained political instability is the single most damaging factor for health financing in Libya over the long run. This is both the largest elasticity in the model and highly significant, and it corroborates, in a single-country oil-exporting setting, the cross-country finding that political instability systematically weakens fiscal support for public health (comparable in direction, though larger in magnitude, to the moderating effect documented for the WAEMU countries). The scale of the Libyan elasticity is plausibly explained by the country's post-2011 sovereignty fragmentation, in which competing authorities have each drawn on the same oil-revenue stream, degrading the institutional continuity needed to sustain a health budget even as aggregate rents remained substantial.

The negative long-run coefficient on LOILR is consistent with the resource-curse channel anticipated in Table 5.1. An increase in oil revenue as a share of GDP by 1% will lead to a decrease in per-capita health expenditure by 0.245%, significant at the 5% level. This negative long-run relationship is consistent with the resource-curse channel, sustained dependence on oil rents is associated with lower, not higher, per-capita health spending once instability, income, and government size are controlled for separately.

Although oil revenue finances the Libyan state almost in their entirety, sustained dependence on this single, volatile revenue source is associated with lower, not higher, long-run per-capita health spending, once political instability, income, and government size are controlled for separately. This finding lends empirical support, from a health-financing angle, to the broader rentier-state literature's argument that oil-rich, low-accountability regimes convert resource wealth into patronage and political control rather than durable public goods provision (Herb, 2005; Vandewalle, 1998), and echoes recent political-economy assessments describing Libyan oil revenue as financing an outsized public wage bill and informal spending rather than productive services (Chatham House, 2025).

The positive and significant coefficient on LGDP confirms the Wagnerian income channel. A 1% increase in real per-capita GDP is associated with a 0.45% increase in per-capita health spending in the long run, an income-inelastic relationship, meaning healthcare in Libya behaves, on this evidence, more like a necessity than a luxury good, in contrast to some higher-income settings where health-spending elasticities exceed unity (cf. Barati and Fariditavana, 2020, for the United States).

The larger and highly significant coefficient on LGOV reinforces this, as the overall size of government expands, health spending rises more than proportionately with respect to GDP but broadly in line with total government expenditure, consistent with Wagner's Law operating primarily through the general expansion of state activity rather than a health-specific income effect. An increase in total government expenditure as a share of GDP (LGOV) by 1% will lead to an increase in per-capita health expenditure by 0.544%, significant at the 1% level, the most strongly significant long-run coefficient in the model, confirming reflection of the close structural link between the overall size of government and the health budget.

The negative long-run coefficient on LEXR indicates that sustained depreciation of the Libyan Dinar is associated with lower real per-capita health expenditure, consistent with the import-cost channel described in Section 5.2, because Libya imports the great majority

of its pharmaceuticals and medical equipment, a weaker currency erodes the real purchasing power of the nominal health budget over time, outweighing any short-run nominal fiscal windfall from a higher domestic-currency value of dollar-denominated oil revenue. An increase in the exchange rate (LEXR), i.e., depreciation of the Libyan Dinar, by 1% will lead to a decrease in per-capita health expenditure by 0.337%, significant at the 5% level, confirming the import-cost channel.Finally, the negative coefficient on LPOP confirms the demographic dilution effect. An increase in population (LPOP) by 1% will lead to a decrease in per-capita health expenditure by 0.277%, significant at the 10% level, confirming the demographic-dilution effect. So that population growth that outpaces the expansion of the health budget reduces per-capita spending, a particularly relevant concern given Libya's continued population growth against a fiscally constrained and politically contested budget process.

Table 5.7 represents Long-Run-ARDL Estimated model

ARDL Long Run Form and Bounds Test				
Dependent Variable: D(LGHE)				
Selected Model: ARDL(3, 1, 2, 2, 2, 1, 2)				
Case 2: Restricted Constant and No Trend				
Included observations: 31		Sample: 1990 2023		
Levels Equation				
Case 2: Restricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LPOL	-0.930755	0.378877	-2.456615	0.0319
LOILR	-0.244646	0.097401	-2.511731	0.0289
LGDP	0.451461	0.190524	2.369578	0.0372
LGOV	0.543612	0.120900	4.496394	0.0009
LEXR	-0.336818	0.124740	-2.700167	0.0207
LPOP	-0.276666	0.153201	-1.805899	0.0983
C	-15.72849	5.625937	-2.795710	0.0174
EC = LGHE - (-0.9307*LPOL - 0.2446*LOILR + 0.4514*LGDP +0.5436*LGOV -0.3368*LEXR - 0.2766*LPOP - 15.7284)				

5.10 Short-Run Dynamics and the Error Correction Model

The error-correction term, CointEq (-1), is negative and highly significant, confirming that the system converges toward long-run equilibrium. Approximately 38.7% of any short-run disequilibrium in per-capita health expenditure is corrected within one year, implying a relatively fast adjustment speed of roughly two-and-a-half years to fully absorb a shock. The model fits the data well, with an adjusted R-squared of 0.939.The short-run coefficient of D(LPOL) is, notably, identical in magnitude to its long-run counterpart, a pattern that departs somewhat from the weak short-run, stronger long-run divergence hypothesized in **Table 5.7**. An increase in political instability (D(LPOL)) by 1% will lead to a decrease in per-capita health expenditure by 0.931% within the same year, significant at the 1% level, identical in magnitude to the long-run effect, indicating that instability shocks transmit to the health budget immediately rather than gradually. This suggests that, in the Libyan case, episodes of acute political instability, contested elections, armed clashes, parallel-government crises, translate into an immediate contraction of health spending rather than only a slow-building erosion. This can be plausibly because the health budget in a fragmented state is directly exposed to whichever authority currently controls oil-revenue disbursement, leaving little of the spending inertia observed in more institutionally continuous settings.

The contemporaneous short-run coefficient of D(LOILR) is positive, consistent with the procyclical distributive channel, while its one-year lag is negative, suggesting that the negative effects of oil dependence begin to manifest within a single fiscal year rather than only over an extended horizon. An increase in oil revenue (D(LOILR)) by 1% will lead to an increase in per-capita health expenditure by 0.387% in the same year, significant at the 5% level, consistent with the procyclical distributive channel. One year later, an increase in oil revenue by 1% will lead to a decrease in per-capita health expenditure by 0.245%, significant at the 1% level, mirroring the long-run resource-curse effect and showing that the negative consequences of oil dependence begin to appear within a single fiscal year.

The contemporaneous coefficient of D(LGDP) is small and statistically insignificant while the

one-year lag is positive and significant at 5%. An increase in real GDP per capita (D(LGDP)) by 1% will lead to an increase in per-capita health expenditure by 0.226% in the same year, though this effect is not statistically significant (p = 0.312). One year later, an increase in GDP by 1% will lead to an increase in per-capita health expenditure by 0.567%, significant at the 5% level, showing that the income effect on health spending is delayed by one fiscal cycle rather than immediate. In other words, income changes don't move health spending in the same year they occur, the effect only shows up with a one-year lag. That's consistent with the budgetary-rigidity story in Section 5.2, reallocating a government budget in response to a change in national income takes at least one fiscal cycle, which is exactly why Wagner's Law is framed as a long-run proposition. It also explains why the full long-run elasticity is larger than either short-run term alone. Meaning that the short-run adjustment is partial and delayed, not instantaneous. The contemporaneous coefficient of D(LGOV) is larger than the long-run elasticity, while the one-year lag is smaller. An increase in government expenditure (D(LGOV)) by 1% will lead to an increase in per-capita health expenditure by 0.865% in the same year, significant at the 1% level, reflecting the fact that health spending is a direct line item within the total government budget. One year later, an increase in government expenditure by 1% will lead to a further increase in per-capita health expenditure by 0.277%, significant at the 1% level, as the relationship settles toward its more moderate long-run structural level. Like population, this is the reverse of the small, short-run and larger long-run pattern anticipated in Table 5.1, and for a similar reason GHE isn't independent of GOV, health spending is a line item within total government expenditure, so when the overall budget expands in a given fiscal year, the health allocation tends to move with it almost one-for-one in that same year (an elasticity of 0.865 is close to unit-elastic). That's a compositional/mechanical linkage as much as a behavioral one, when Libya's total government expenditure share rises, health capture some of that expansion immediately, simply because both are drawn from the same annual budget envelope. The following year, the coefficient drops to 0.277, the immediate co-movement partially unwinds as the error-correction process pulls the system back toward the more moderate long-run relationship. So the long-run

elasticity is best read as the structural Wagnerian relationship between government size and health spending, net of the mechanical same-year budget overlap that inflates the contemporaneous short-run coefficient. D(LEXR) is positive and highly significant in the short run, consistent with the nominal fiscal-windfall channel, before these reverses into the negative long-run import-cost effect discussed above. An increase in the exchange rate (D(LEXR)) by 1% will lead to an increase in per-capita health expenditure by 0.544% in the same year, significant at the 1% level, consistent with the nominal fiscal-windfall channel, before these reverses into the negative long-run import-cost effect. D(LPOP) is negative and highly significant in both the contemporaneous and one-year-lag coefficients. An increase in population (D(LPOP)) by 1% will lead to a decrease in per-capita health expenditure by 0.557% in the same year, significant at the 1% level. One year later. An increase in population by 1% will lead to a further decrease in per-capita health expenditure by 0.612%, significant at the 1% level. Both short-run effects exceed the long-run coefficient in magnitude, reflecting the mechanical dilution built into the per-capita definition of GHE, which is only partially offset over time as the error-correction process drives budgetary adjustment. It's worth flagging rather than glossing over. The most plausible explanation is mechanical as much as behavioral, since GHE is defined as total health expenditure divided by number of populations, any population increase lowers per-capita spending immediately and by construction, before any budgetary response occurs. Over subsequent years, the error-correction process partially offsets this, the health budget adjusts upward, moderating the effect, which is why the long-run elasticity ends up smaller than the immediate short-run hit. So, the short-run coefficients capture the raw demographic-dilution effect, and the long-run coefficient captures that effect net of the state's (partial) fiscal accommodation.

Table 5.8 reports the short-run error-correction representation of the ARDL model.

ARDL Error Correction Regression				
Dependent Variable: D(LGHE)				
Selected Model: ARDL(3, 1, 2, 2, 2, 1, 2)				
Case 2: Restricted Constant and No Trend				
Sample: 1990 2023	Included observations: 31			
ECM Regression				
Case 2: Restricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LGHE(-1))	-0.201696	0.101907	-1.979206	0.0734
D(LGHE(-2))	0.451461	0.077666	5.812821	0.0001
D(LPOL)	-0.930754	0.218860	-4.252747	0.0014
D(LOILR)	0.387022	0.135159	-2.863467	0.0154
D(LOILR(-1))	-0.244646	0.059988	-4.078275	0.0018
D(LGDP)	0.226382	0.213682	1.059434	0.3121
D(LGDP(-1))	0.567010	0.215859	2.626760	0.0235
D(LGOV)	0.865083	0.245464	3.524277	0.0048
D(LGOV(-1))	0.276666	0.079558	3.477528	0.0052
D(LEXR)	0.543612	0.077923	6.976302	0.0000
D(LPOP)	-0.557287	0.135182	-4.122506	0.0062
D(LPOP(-1))	-0.612125	0.157031	-3.898120	0.0080
CointEq(-1)*	-0.387022	0.034799	-11.12161	0.0000
R-squared	0.963169	Mean dependent var		0.064219
Adjusted R-squared	0.938614	S.D. dependent var		0.254371
S.E. of regression	0.063023	Akaike info criterion		-2.395526
Sum squared resid	0.071495	Schwarz criterion		-1.794176
Log likelihood	50.13065	Hannan-Quinn criter.		-2.199501
Durbin-Watson stat	2.214816			

* p-value incompatible with t-Bounds distribution.

5.11 Diagnostic and Robustness Checks

A battery of standard diagnostic tests was applied to the estimated ARDL-ECM to verify that the model is correctly specified and that its statistical inference is reliable.

Table 5.9 reports standard diagnostic tests of estimated ARDL-ECM

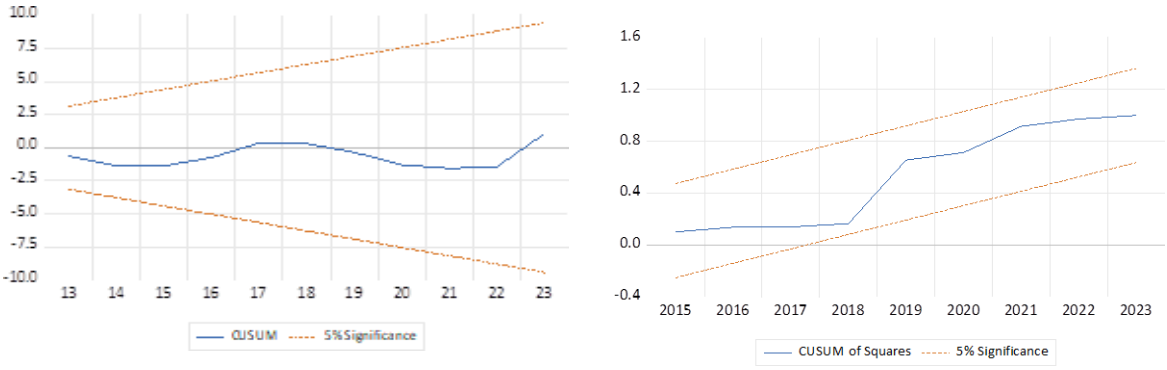
Test	Statistic	Prob.	Conclusion
Breusch–Godfrey LM (serial correlation, 2 lags)	F = 0.495	0.498	No evidence of serial correlation
ARCH heteroskedasticity test	F = 0.509	0.607	No evidence of conditional heteroskedasticity
Ramsey RESET (functional form)	F = 0.875	0.372	No evidence of misspecification

All three diagnostic tests fail to reject their respective null hypotheses at conventional significance levels, indicating that the residuals are free of serial correlation and conditional heteroskedasticity, and that the log-linear functional form is appropriately specified. Together with the highly significant negative error-correction term and the theoretically consistent sign pattern of the long-run coefficients, these diagnostics support the conclusion that the ARDL (3,1,2,2,2,1,2) model is a statistically robust and economically well-specified representation of the determinants of public healthcare expenditure in Libya over the sample period. **Model Stability Diagnostics:**

To verify the structural stability of the estimated regression coefficients over the sample period, the Cumulative Sum (CUSUM) and Cumulative Sum of Squares (CUSUM of Squares) tests proposed by Brown et al. (1975) were conducted. These diagnostics are critical to ensuring that the estimated parameters do not suffer from structural breaks or

systematic variations over time. Both test statistics stay strictly within the critical 5% boundaries; the null hypothesis of parameter stability cannot be rejected. Consequently, it can be confidently concluded that the estimated econometric model is structurally stable, robust, and reliable for long-term policy analysis and forecasting.

Figure 6-8: CUSUM Test for Model Parameter Stability



5.12 Discussion: Linking the Results to the Literature and to Policy

The results reported in this chapter both confirm and substantially extend the theoretical and empirical literature reviewed in Section 5.3, while also generating findings that are, in certain respects, distinctive to the Libyan case. Political instability and fiscal capacity: The estimated coefficient on political instability (LPOL) is not only the largest elasticity in the model but is essentially identical in magnitude across the short-run and long-run horizons, a pattern that departs from the theoretical expectation, drawn from Fosu's (1992) framework and the broader political-instability–growth literature (Alesina et al., 1996; Aisen & Veiga, 2013), that instability effects accumulate gradually as institutional erosion deepens. In the Libyan case, the immediacy of the shock is consistent with the hybrid political order perspective advanced by Boege et al. (2009) and Mac Ginty (2010), in which formal state institutions coexist with, and are frequently subordinated to, competing centers of authority; under such conditions, control over the disbursement of oil revenue itself becomes contested in real time, so that a change in the balance of political power is transmitted almost mechanically into the budget within the same fiscal year, rather than

being absorbed by bureaucratic inertia as it would be in a more institutionally continuous state. This finding is directly consistent with, and indeed reinforced by, Elboiashi's (2020) doctoral analysis of post-revolution Libyan health financing, which identifies institutional fragmentation and fiscal constraint, rather than the absolute level of available oil revenue, as the binding limitation on public-service delivery, a diagnosis that anticipates precisely the mechanism this chapter's LPOL coefficient captures econometrically. The finding also sits alongside a growing body of single-country ARDL evidence on how political instability transmits through Libya's macroeconomy more broadly. Elboiashi (2023a, 2023b) shows, using an ARDL bounds-testing approach closely comparable to the one employed here, that political instability and violence exert a significant and rapidly transmitted negative effect on Libya's trade balance, while Elboiashi (2024a, 2024b) documents an analogous instability-growth relationship for aggregate economic growth in Libya, again using an ARDL framework. Elboiashi's (2025a) structural analysis of the interplay between political instability and inflation in Libya over 1990–2021 further demonstrates that instability shocks propagate quickly into nominal macroeconomic aggregates, a finding that parallels this chapter's result that the health-expenditure elasticity of LPOL is fully realized within the same year rather than accumulating gradually. Taken together, this cluster of Libya-specific ARDL studies suggests that the rapid, non-lagged transmission of instability shocks identified in the present chapter is not an artefact confined to the health sector, but a structural feature of the Libyan economy under conditions of sustained sovereignty fragmentation, consistent across trade, growth, inflation, and now health-financing outcomes.

This picture is reinforced further by evidence on Libya's health sector specifically. Daw et al. (2015, 2016, 2017) document how the 2011 conflict and its aftermath produced fragmentation of the Ministry of Health's authority, duplication of parallel health administrations, and the direct diversion of resources toward security-related expenditure, consistent with the large negative LPOL coefficient estimated here. Sparrow et al. (2021) similarly find that health-system resilience in Libya was undermined less by the destruction

of physical infrastructure per se than by the loss of a single, accountable fiscal authority capable of planning and executing a coherent health budget. The magnitude of the Libyan LPOL elasticity is also considerably larger than that reported for the West African Economic and Monetary Union, where political instability was found to distort, rather than uniformly weaken, the fiscal-health relationship in economies that are not major oil-rent recipients; this contrast supports the theoretical claim, central to this thesis, that the interaction between instability and a rentier fiscal structure amplifies the damage to health financing relative to instability in non-oil, more fiscally diversified economies. It is also broadly consistent with evidence from conflict-affected but resource-poor Somalia (Hagmann & Hoehne, 2009), where instability degraded health access primarily through infrastructure collapse rather than through the capture of a specific rent stream.

Oil dependence and the resource curse: The divergence between the positive contemporaneous coefficient on LOILR and its negative one-year lag and long-run coefficient offers direct empirical support, within a single-country health-financing context, for the theoretical distinction between the distributive channel and the resource-curse channel of rentier states (Beblawi, 1987; Mahdavy, 1970). In the short run, the positive coefficient is consistent with the classic rentier prediction that governments facing a fiscal or political legitimacy deficit spend oil windfalls quickly to sustain public acquiescence (Beblawi & Luciani, 1987; Karl, 1997). In the Libyan context, this is consistent with the well-documented pattern in which oil revenue has financed an inflated public wage bill and informal patronage transfers rather than durable investment (Vandewalle, 1998; Herb, 2005; Otman & Karlberg, 2007). Over the long run, however,

the negative coefficient corroborates the institutional variant of the resource-curse thesis (Mehlum et al., 2006; Robinson et al., 2006). This long-run erosion of public-service value is also consistent with Elboiashi and Embaya's (2025c) analysis of economic corruption in Libya, which finds that weak accountability structures around the allocation of state (largely oil-derived) revenue systematically undermine progress toward Libya's Sustainable Development Goals, including health-related targets, a finding that provides a

corruption-specific micro-foundation for the resource-curse channel identified in this chapter's negative long-run LOILR coefficient. Within the health-specific literature, this result is consistent with El-Haddad's (2021) finding that fragile, resource-dependent states are disproportionately vulnerable to pharmaceutical and medical-supply-chain disruption, and it echoes the broader argument, applied specifically to Libya by Bugaighis et al. (2021) and Ismail et al. (2021), that the country's health financing model has never developed the earmarking or rules-based insulation mechanisms that would allow it to convert oil wealth into stable health budgets independent of short-run political and fiscal shocks. It is also worth noting that Elboiashi and Khpiza (2025b), in an ARDL analysis of chronic disease burden and health spending in the Libyan economy, similarly identify oil-revenue volatility and fiscal instability as key structural constraints on the sustainability of health financing, lending direct disease-burden-level corroboration to the aggregate per-capita expenditure relationship estimated in this chapter.

Wagner's Law and the income–government size channel: The positive, income-inelastic long-run coefficient on LGDP (0.451) is consistent with the core Wagnerian proposition that the relative size of public social expenditure, including health, expands with rising income (Wagner, 1883), while the sub-unity elasticity indicates that health spending in Libya behaves as a necessity rather than a luxury good, in contrast to some higher-income, institutionally stable settings such as the United States, where Barati and Fariditavana (2020) report income elasticities that vary by service type but frequently approach or exceed unity. This divergence is reinforced by the finding that the coefficient on LGOV (0.544) is both larger and the most strongly significant in the model, consistent with the general government expansion" reading of Wagner's Law favored in cross-country panel studies (Rajkumar & Swaroop, 2008; Gupta et al., 2005), and consistent also with the specific characterization of the Libyan public sector offered by Elboiashi (2020) and the World Bank's Libya Public Expenditure Reviews (2021, 2022), which describe a health budget that is not managed as an autonomous sectoral allocation but moves largely in lockstep with the aggregate government expenditure envelope, itself driven by oil-revenue

availability and by the growth dynamics documented in Elboiashi (2024a, 2024b). In other words, the Wagnerian channel identified here operates in Libya less through the classic mechanism of rising demand for welfare services as an economy industrializes, and more through the mechanical co-movement of health spending with a government budget that is itself a direct function of oil rents and prevailing macroeconomic instability.

Exchange rate and the import-cost channel: The reversal from a positive short-run to a negative long-run LEXR coefficient captures a transmission mechanism consistent with the observation, made in IMF and Central Bank of Libya assessments (Central Bank of Libya, 2022; IMF, 2020a), that a weaker dinar temporarily raises the domestic-currency value of dollar-denominated oil revenue, providing a nominal fiscal cushion, before the long-run erosion sets in via the pharmaceutical and medical-supply import dependence documented for Libya specifically (El-Haddad, 2021; CEOBS, 2022). This dynamic is further illuminated by Elboiashi's (2025a) structural analysis of the instability–inflation relationship in Libya, which shows that political instability and currency depreciation have historically moved together in the Libyan case, and by Elboiashi (2023a, 2023b), whose finding that instability depresses Libya's trade balance is consistent with the same currency-pressure channel that this chapter finds eroding the real value of the health budget over the long run. The scale and persistence of this effect are amplified in Libya's case by the dual exchange-rate and dual-governance arrangements documented by the European Commission (2022) and the World Bank's Macro Poverty Outlook (2025a), both of which describe repeated currency devaluations occurring alongside failures to pass unified state budgets.

Finally, Demographic dilution: The negative LPOP coefficient, larger in the short run than in the long run, is best interpreted as a predominantly mechanical effect of the per-capita construction of the dependent variable, though it also has a substantive dimension consistent with van der Haar and Heijmans's (2019) comparative finding that post-conflict health systems in Libya and South Sudan alike have struggled to scale health-budget allocations in line with population recovery and displacement dynamics.

Taken into-account all together, these results empirically substantiate, in the specific domain of health financing, the broader political-economy argument that Libya's rentier fiscal structure converts resource wealth into unstable, politically captured, and poorly targeted spending rather than durable public-service provision, a conclusion consistent across the general rentier-state literature (Vandewalle, 1998; Herb, 2005; Ross, 2012), the Libya-specific health-systems literature (Daw et al., 2015, 2016, 2017; Sparrow et al., 2021; Bugaighis et al., 2021; Kak et al., 2023), and the growing body of Libya-specific ARDL macroeconomic evidence produced by Elboiashi and co-authors across trade (2023a, 2023b), growth (2024a, 2024b), inflation (2025a), corruption (2025c), and, most directly, chronic-disease-related health spending (2025b). At the same time, the robust Wagnerian relationship between income, government size, and health spending shows that Libya's health budget has not become entirely detached from underlying economic fundamentals, even amid deep political fragmentation, a nuance that distinguishes Libya from the most extreme cases of state collapse (e.g., Somalia) discussed in the fragile-states literature (Hagmann & Hoehne, 2009).

Three implications follow directly from the estimated model, each grounded in a specific theoretical channel identified above. First, because the political-instability elasticity is the largest in the model and transmits within the same fiscal year, restoring unified fiscal governance, a single, transparent national budget process of the kind attempted in the 2025 unified-budget agreement, is likely, on this evidence, to have a more immediate positive effect on health financing than income growth alone; this is consistent with the institutionalist argument, traceable to North (1990) and echoed in the fragile-states literature (Call, 2011; OECD, 2022), and it directly follows Elboiashi's (2020) call for addressing institutional fragmentation as a precondition for sustainable health-sector financing in Libya. Second, because oil-revenue dependence carries a negative long-run coefficient operating through the classic resource-curse mechanism, and given Elboiashi and Embaya's (2025c) finding that weak anti-corruption institutions compound this effect, health-sector financing would benefit from institutional mechanisms that de-link health-

budget allocations from short-run fluctuations in oil rents, for example a ring-fenced or rules-based health financing facility of the kind proposed in comparative fragile-state health-financing frameworks (Kutzin, 2008; McIntyre & Meheus, 2014), combined with stronger fiscal-transparency and anti-corruption safeguards. Third, the negative exchange-rate coefficient underscores the sector's structural exposure to imported-input costs and to the broader currency and trade-balance instability documented by Elboiashi (2023a, 2023b, 2025a); currency stabilization, or targeted subsidization of imported pharmaceuticals and medical equipment, would help protect the real value of the health budget independently of nominal fiscal allocations.

5.13 Chapter Summary

This chapter specified and estimated an ARDL (3,1,2,2,2,1,2) bounds-testing model of per-capita public healthcare expenditure in Libya (1990–2023), grounded in Wagner's Law, rentier state theory, and the political-instability–fiscal-capacity literature. Unit-root testing confirmed a mixture of I(0)- and I(1)-behaved series with no evidence of I(2) processes, justifying the ARDL approach over Johansen-type alternatives given the additional advantage of superior small-sample performance. The bounds test confirmed a statistically robust long-run cointegrating relationship among the variables. The long-run estimates show that political instability, oil-revenue dependence, and currency depreciation each depress per-capita health spending, while income and general government size raise it, broadly in line with theoretical expectations, while the short-run estimates reveal an unusually fast and direct transmission of political-instability shocks to the health budget, distinguishing the Libyan case from more institutionally stable settings in the existing literature. Diagnostic tests confirm the statistical adequacy of the model. These results provide the empirical foundation for the policy discussion developed in the concluding chapter of the thesis.

Chapter Six

Conclusion: Summary of Findings and Recommendations

Following the theoretical and econometric analysis undertaken across the preceding chapters of this thesis, this concluding chapter presents a focused synthesis of the principal findings and derives from them a set of practical recommendations directed at policymakers in Libya. These recommendations aim to inform a policy vision for addressing the structural challenges confronting health-care financing under conditions of political instability and dependence on oil rents.

6.1 Summary of Key Findings

This study set out to estimate the impact of political instability (POL), oil revenues (OILR), real gross domestic product (GDP), total government expenditure (GOV), the exchange rate (EXR), and population (POP) on per capita public health expenditure (GHE) in Libya over the period 1990–2023. The Autoregressive Distributed Lag (ARDL) approach and an Error Correction Model (ECM) were employed for this purpose. The principal findings are summarized below.

Confirmation of a long-run cointegrating relationship

The Bounds Test yielded a calculated F-statistic of 9.449, exceeding the upper-bound critical value at the 1% significance level, thereby confirming a stable, long-run equilibrium relationship between per capita health expenditure and its determinants. The error correction term was negative and highly significant (CointEq(-1) = -0.387), indicating that approximately 38.7% of any short-run deviation from the long-run equilibrium is corrected within a single year, implying that full adjustment to shocks takes roughly two and a half year.

A profound and immediate negative effect of political instability

Political instability emerged as the most damaging determinant of health expenditure, a 1% increase in political instability is associated with a 0.93% decline in per capita health expenditure in both the short and long run. The near-identical magnitude of the short- and

long-run coefficients reflects the speed with which shocks stemming from political fragmentation and armed conflict are transmitted directly to the health budget.

Evidence of a resource curse in oil revenues

In the short run, oil revenues exhibited a positive association with health expenditure (elasticity of 0.387), consistent with procyclical allocation behavior. In the long run, however, this relationship reversed to a negative elasticity of -0.245, lending support to the resource curse hypothesis, sustained reliance on oil rents appears to erode real health expenditure in favor of unproductive spending and disguised (ghost) employment.

Confirmation of Wagner's Law through total government expenditure

Total government expenditure displayed a strong positive relationship with health expenditure, with elasticities of 0.865 in the short run and 0.544 in the long run. This result confirms that the expansion of the overall public budget carries the health budget along with it, consistent with Wagner's Law operating in Libya through the general expansion of state activity.

GDP effect consistent with health care as a necessity good

Real GDP exerted a positive long-run effect (elasticity of 0.45), indicating that health care in Libya behaves as a necessity good (income-inelastic). The short-run response was found to lag by one fiscal cycle, reflecting budgetary rigidity.

Exchange rate and import costs

A depreciation of the Libyan dinar (rise in the exchange rate) produced a spurious positive short-run effect, attributable to the increased local-currency value of dollar-denominated revenues, but this reversed into a strong negative long-run effect (elasticity of -0.337). This reflects the erosion of the health budget's purchasing power because of rising import costs for pharmaceuticals and medical equipment.

Demographic pressure and the dilution of per capita spending

Population growth exerted a strong negative effect in both the short run (elasticity of -0.557) and the long run (-0.277), confirming a demographic dilution effect whereby health

budgets fail to expand at a pace commensurate with population growth.

Overall, ranked by the strength of their long-run effects, the determinants of health expenditure are ordered as follows: political instability (-0.93), the strongest effect; followed by total government expenditure (0.54); real GDP (0.45); the exchange rate (-0.33); population (-0.27); and, finally, oil revenues (-0.24).

6.2 Recommendations

Building on these findings, the study offers the following recommendations:

Restore unified fiscal governance and budgetary management

Given that political instability is the strongest and most immediate determinant of reduced health expenditure, the study recommends unifying fiscal institutions and ending institutional fragmentation through a single, transparent national budgetary process. This is the essential precondition for ensuring the continuity of health-sector financing independent of political conflict.

Insulate health-sector financing from short-run oil price volatility

To mitigate the adverse long-run effects associated with the resource curse, the study recommends establishing a dedicated, ring-fenced financing mechanism or fund to protect health-sector allocations from rapid fluctuations in oil prices and revenues.

Shield the health sector from exchange rate volatility

Given the adverse effect of currency depreciation on the cost of importing pharmaceuticals and medical equipment, the study recommends pursuing exchange rate stability or, alternatively, providing targeted subsidies for the importation of essential medical inputs to preserve the purchasing power of the health budget.

Integrate demographic projections into budgetary planning

Population growth should be explicitly incorporated into future health-sector budget planning, with allocations increased proportionately to prevent the erosion of per capita.

6.3 Limitations of the Study

In closing, it should be noted that the study is not without certain limitations. Foremost among these is the relatively limited size of the available time-series sample (34 annual observations). Compounding this is the duplication of official data sources arising from institutional fragmentation, particularly since 2014. Nonetheless, these limitations do not undermine the validity of the econometric methodology employed (ARDL), which has demonstrated its efficiency in small samples, nor do they compromise the reliability of the core findings through which the study's objectives were achieved.

1.8 Delimitations and Limitations of the Study

- **Delimitations (Scope):**
    - **Thematic Scope:** The study's primary focus is on the impact of political instability on *government* healthcare expenditure. While it will control for other variables, it does not aim to provide a comprehensive analysis of private healthcare spending or foreign aid, although these may be discussed contextually.
    - **Geographical Scope:** The analysis will be conducted at the national (aggregate) level for Libya. Due to data constraints, a sub-national or regional analysis will not be feasible.
    - **Temporal Scope:** The study is delimited to the years 1990–2022. This period was chosen to provide a sufficient baseline before the major 2011 upheaval and to capture the subsequent years of instability.
- **Potential Limitations:**
    - **Data Availability and Quality:** A primary limitation is the potential for gaps and inconsistencies in official data, especially for the post-2011 period. The study will mitigate this by triangulating data from multiple sources (e.g., World Bank, IMF, national sources) and conducting robustness checks.

- **Measurement of Political Instability:** Political instability is a multifaceted concept that is difficult to capture with a single indicator. This study will address this by using a composite of indicators (e.g., governance indices, conflict data) and testing the model's sensitivity to different measures.

- **Endogeneity:** There is a potential for reverse causality (i.e., poor healthcare outcomes and low spending could exacerbate instability) or simultaneity between instability, economic performance, and healthcare spending. The study will employ econometric techniques, such as the Autoregressive Distributed Lag (ARDL) model, which can effectively handle endogeneity in the long run and model complex dynamics. However, some unobserved confounding factors may remain. All limitations will be explicitly acknowledged when interpreting the results.

Chapter Six
Conclusion: Summary of Findings and Recommendations

Following the theoretical and econometric analysis undertaken across the preceding chapters of this thesis, this concluding chapter presents a focused synthesis of the principal findings and derives from them a set of practical recommendations directed at policymakers in Libya. These recommendations aim to inform a policy vision for addressing the structural challenges confronting health-care financing under conditions of political instability and dependence on oil rents.

4.13 Summary of Key Findings

This study set out to estimate the impact of political instability (POL), oil revenues (OILR), real gross domestic product (GDP), total government expenditure (GOV), the exchange rate (EXR), and population (POP) on per capita public health expenditure (GHE) in Libya over the period 1990–2023. The Autoregressive Distributed Lag (ARDL) approach and an Error Correction Model (ECM) were employed for this purpose.

Confirmation of a long-run cointegrating relationship

The Bounds Test yielded a calculated F-statistic of 9.449, exceeding the upper-bound critical value at the 1% significance level, thereby confirming a stable, long-run equilibrium relationship between per capita health expenditure and its determinants. The error correction term was negative and highly significant (CointEq(-1) = -0.387), indicating that approximately 38.7% of any short-run deviation from the long-run equilibrium is corrected within a single year, implying that full adjustment to shocks takes roughly two and a half year.

A profound and immediate negative effect of political instability

Political instability emerged as the most damaging determinant of health expenditure, a 1% increase in political instability is associated with a 0.93% decline in per capita health expenditure in both the short and long run. The near-identical magnitude of the short- and long-run coefficients reflects the speed with which shocks stemming from political

fragmentation and armed conflict are transmitted directly to the health budget.

Evidence of a resource curse in oil revenues

In the short run, oil revenues exhibited a positive association with health expenditure (elasticity of 0.387), consistent with procyclical allocation behavior. In the long run, however, this relationship reversed to a negative elasticity of -0.245, lending support to the resource curse hypothesis, sustained reliance on oil rents appears to erode real health expenditure in favor of unproductive spending and disguised (ghost) employment.

Confirmation of Wagner's Law through total government expenditure

Total government expenditure displayed a strong positive relationship with health expenditure, with elasticities of 0.865 in the short run and 0.544 in the long run. This result confirms that the expansion of the overall public budget carries the health budget along with it, consistent with Wagner's Law operating in Libya through the general expansion of state activity.

GDP effect consistent with health care as a necessity good

Real GDP exerted a positive long-run effect (elasticity of 0.45), indicating that health care in Libya behaves as a necessity good (income-inelastic). The short-run response was found to lag by one fiscal cycle, reflecting budgetary rigidity.

Exchange rate and import costs

A depreciation of the Libyan dinar (rise in the exchange rate) produced a spurious positive short-run effect, attributable to the increased local-currency value of dollar-denominated revenues, but this reversed into a strong negative long-run effect (elasticity of -0.337). This reflects the erosion of the health budget's purchasing power because of rising import costs for pharmaceuticals and medical equipment.

Demographic pressure and the dilution of per capita spending

Population growth exerted a strong negative effect in both the short run (elasticity of -0.557) and the long run (-0.277), confirming a demographic dilution effect whereby health budgets fail to expand at a pace commensurate with population growth.

Overall, ranked by the strength of their long-run effects, the determinants of health expenditure are ordered as follows: political instability (-0.93), the strongest effect; followed by total government expenditure (0.54); real GDP (0.45); the exchange rate (-0.33); population (-0.27); and, finally, oil revenues (-0.24).

4.14 Recommendations

Building on these findings, the study offers the following recommendations:

Restore unified fiscal governance and budgetary management

Given that political instability is the strongest and most immediate determinant of reduced health expenditure, the study recommends unifying fiscal institutions and ending institutional fragmentation through a single, transparent national budgetary process. This is the essential precondition for ensuring the continuity of health-sector financing independent of political conflict.

Insulate health-sector financing from short-run oil price volatility

To mitigate the adverse long-run effects associated with the resource curse, the study recommends establishing a dedicated, ring-fenced financing mechanism or fund to protect health-sector allocations from rapid fluctuations in oil prices and revenues.

Shield the health sector from exchange rate volatility

Given the adverse effect of currency depreciation on the cost of importing pharmaceuticals and medical equipment, the study recommends pursuing exchange rate stability or, alternatively, providing targeted subsidies for the importation of essential medical inputs to preserve the purchasing power of the health budget.

Integrate demographic projections into budgetary planning

Population growth should be explicitly incorporated into future health-sector budget planning, with allocations increased proportionately to prevent the erosion of per capita health-service provision.

4.15 Limitations of the Study

In closing, it should be noted that the study is not without certain limitations. Foremost among these is the relatively limited size of the available time-series sample (34 annual observations). Compounding this is the duplication of official data sources arising from institutional fragmentation, particularly since 2014. Nonetheless, these limitations do not undermine the validity of the econometric methodology employed (ARDL), which has demonstrated its efficiency in small samples, nor do they compromise the reliability of the core findings through which the study's objectives were achieved.

4.16 Future Study

The findings and limitations identified above point to several avenues for future research. First, as a longer post-2023 time series becomes available, re-estimating the model would allow the long-run elasticities identified here — particularly the resource-curse reversal in oil revenues and the persistent negative effect of political instability — to be tested for stability over a longer horizon. Second, future work could disaggregate government health expenditure into its recurrent and development components, since the two are likely to respond differently to political instability and oil-revenue volatility. Third, given that political instability was measured here through a composite indicator, future studies could test the sensitivity of these results to alternative or higher-frequency instability measures, including event-based conflict indices. Finally, extending the analysis to a panel of comparable oil-dependent, conflict-affected states would help establish whether the patterns identified for Libya — particularly the resource-curse dynamic in health financing — generalize beyond the Libyan case or reflect country-specific institutional conditions.

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Appendices

Appendix (1): Model Variables and the Annual Database for the Period (1990–2022/2023)

Year	EXR	POL	OILR	GDP	GHE	Total HE	POP	GOV
1990	0.2832	53.5	32329.59	20734.69	3.920753	2090.0	4445239	29.994
1991	0.2807	51.8	28152.66	23997.96	5.260404	4050.0	4544400	27.474
1992	0.2816	50.1	27679.66	22433.53	7.209411	6000.0	4640352	25.647
1993	0.3044	49.8	23392.59	20791.46	9.364156	7050.0	4733045	30.216
1994	0.3484	49.7	22013.75	21064.73	11.0237	9000.0	4822037	28.53
1995	0.4181	49.5	23731.6	17506.32	13.15304	10050.0	4906843	27.66
1996	0.4368	50.6	28281.02	17526.6	14.71794	10200.0	4987393	30.759
1997	0.4609	51.8	27082.43	16804.55	15.73735	10305.0	5064639	34.323

1998	0.4676	52.9	19402.05	16443.9	18.12996	10500.0	5140704	32.858
1999	0.4638	54.3	23189.02	16169.58	19.79457	10650.0	5218038	26.957
2000	0.5122	56.5	38272.07	16547.31	16.8513	10200.1	5305021	26.769
2001	0.6051	57.8	32965.67	16671.97	19.5053	11200.1	5403639	36.979
2002	1.2707	59.4	29986.35	15745.36	17.0237	1220.0	5508410	40.874
2003	1.2929	61.5	40696.32	17926.24	17.5958	1320.0	5619398	41.72
2004	1.305	65.5	59830.76	18586.02	18.4972	14200.4	5736693	41.056
2005	1.3084	66.8	93348.32	20131.23	18.9971	15200.5	5858798	28.152
2006	1.3136	68.7	115778.6	19777.43	21.1479	16200.6	5980211	28.495
2007	1.2626	69.5	121623.9	20582.22	25.1136	17200.7	6104380	33.442
2008	1.2236	67.5	169606.1	20116.96	29.5637	18200.8	6235430	41.032
2009	1.2535	69.5	92378.56	18835.31	32.9577	19200.9	6366686	60.278
2010	1.2668	70.1	119433.1	19382.92	37.2644	20201.0	6497839	52.939
2011	1.2242	35.5	54287.57	9860.492	27.0443	21201.1	6343203	39.626
2012	1.2617	41.9	161945	18910.6	61.2004	22201.2	6179328	39.379
2013	1.2717	45.2	107969.1	15198.9	61.1039	23201.3	6304628	73.459
2014	1.2724	40.5	47725.86	11473.49	42.854	24201.4	6427252	60.019
2015	1.3812	39.7	21455.9	11194.68	41.9959	25201.5	6531819	53.523
2016	1.3904	37.7	17553.79	10860.98	43.8821	26201.6	6632126	42.036

UNIT ROOT TEST RESULTS TABLE (ADF)

Null Hypothesis: the variable has a unit root

At Level

		LGHE	LPOL	LOILR	LGDP	LGOV	LEXR	LPOP
With Constant	t-Statistic	-1.9964	-1.8525	-2.3955	-2.3574	-1.3215	-0.3280	-1.4118
	Prob.	*0.0454*	*0.3497*	*0.1507*	*0.1611*	*0.6078*	*0.9100*	*0.5637*
		**	n0	n0	n0	n0	n0	n0
With Constant & Trend	t-Statistic	-3.4514	-2.1676	-2.7949	-4.1581	-4.4042	-1.9051	-2.3302
	Prob.	*0.0618*	*0.4910*	*0.2090*	*0.0128*	*0.0073*	*0.6293*	*0.4068*
		*	n0	n0	**	***	n0	n0
Without Constant & Trend	t-Statistic	1.2200	-0.3521	0.1907	-3.2372	0.7233	-0.5611	3.5438
	Prob.	*0.9398*	*0.5503*	*0.7352*	*0.0269*	*0.8663*	*0.4665*	*0.9997*
		n0	n0	n0	**	n0	n0	n0

At First Difference

		d(LGHE)	d(LPOL)	d(LOILR)	d(LGDP)	d(LGOV)	d(LEXR)	d(LPOP)
With Constant	t-Statistic	-4.8652	-6.7926	-6.8228	-8.9903	-5.1430	-5.4376	-4.3014
	Prob.	*0.0004*	*0.0000*	*0.0000*	*0.0000*	*0.0002*	*0.0001*	*0.0020*
		***	***	***	***	***	***	***
With Constant & Trend	t-Statistic	-5.1365	-6.7046	-6.7105	-8.8281	-5.0991	-5.3705	-4.4857
	Prob.	*0.0012*	*0.0000*	*0.0000*	*0.0000*	*0.0014*	*0.0006*	*0.0062*
		***	***	***	***	***	***	***
Without Constant & Trend	t-Statistic	-4.9730	-6.8899	-6.8971	-8.9422	-4.8294	-4.8905	-1.9656
	Prob.	*0.0000*	*0.0000*	*0.0000*	*0.0000*	*0.0000*	*0.0000*	*0.0485*
		***	***	***	***	***	***	**

Notes:

a: (*)Significant at the 10%; (**)Significant at the 5%; (***) Significant at the 1% and (no) Not Significant

b: Lag Length based on SIC

c: Probability based on MacKinnon (1996) one-sided p-values.

Levels Equation

Case 2: Restricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LPOL	-0.930755	0.378877	-2.456615	0.0319
LOILR	-0.244646	0.097401	-2.511731	0.0289
LGDP	0.451461	0.190524	2.369578	0.0372
LGOV	0.543612	0.120900	4.496394	0.0009
LEXR	-0.336818	0.124740	-2.700167	0.0207
LPOP	-0.276666	0.153201	-1.805899	0.0983
C	-15.72849	5.625937	-2.795710	0.0174

EC = LGHE - (-0.9307*LPOL - 0.2446*LOILR + 0.4514*LGDP +0.5436 *LGOV -0.3368*LEXR - 0.2766*LPOP - 15.7284)

F-Bounds Test — Null Hypothesis: No levels relationship

Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	9.448554	10%	1.99	2.94
k	6	5%	2.27	3.28
		2.5%	2.55	3.61
		1%	2.88	3.99
Actual Sample Size	31		Finite Sample: n=35	
		10%	2.254	3.388
		5%	2.685	3.96
		1%	3.713	5.326
			Finite Sample: n=30	
		10%	2.334	3.515
		5%	2.794	4.148
		1%	3.976	5.691

23)

Total HE (Current government Health Expenditure) GOV (Expenditure, General government, Percent of GDP)	World Health Organization's Global Health Expenditure Database (GHED), for period (2020-2023). The data are available from 1990 to 2022 at Elboiashi, H. & Khpiza, H. A. (2025).	
GDP per capita (Gross domestic product (GDP), Constant prices, Per capita, Domestic currency)	WEO, IMF database	
POL – Index of Political Instability	World Bank WDI database	Taking value between 0 and 100
EXR – Official Exchange Rate (LCU per US, average period)		2001 rate is pre-unification official rate. CBL unified rate Jan 2002 (1.265). Devaluation to 4.48 in Jan 2021.
Oil Brent Price Oil Products (USD)	WEO, IMF database	
OILR (Oil revenue (LYD)	OILR = OILP*OILD	Transfer the data to LYD by multiplying the applicable exchange rate

Appendix (3): Images captured from Eviews platform documenting the stages of the statistical and econometric results

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

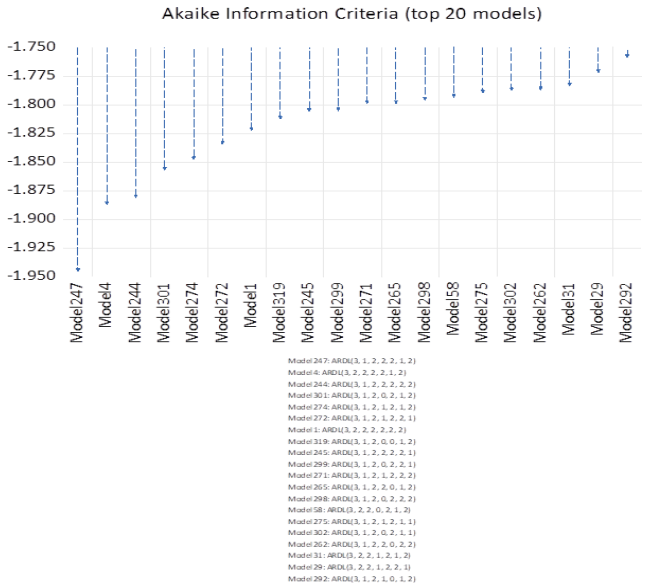
ARDL Error Correction Regression
Dependent Variable: D(LGHE)
Selected Model: ARDL(3, 1, 2, 2, 2, 1, 2)
Case 2: Restricted Constant and No Trend
Date: 07/06/26 Time: 22:39
Sample: 1990 2023
Included observations: 31

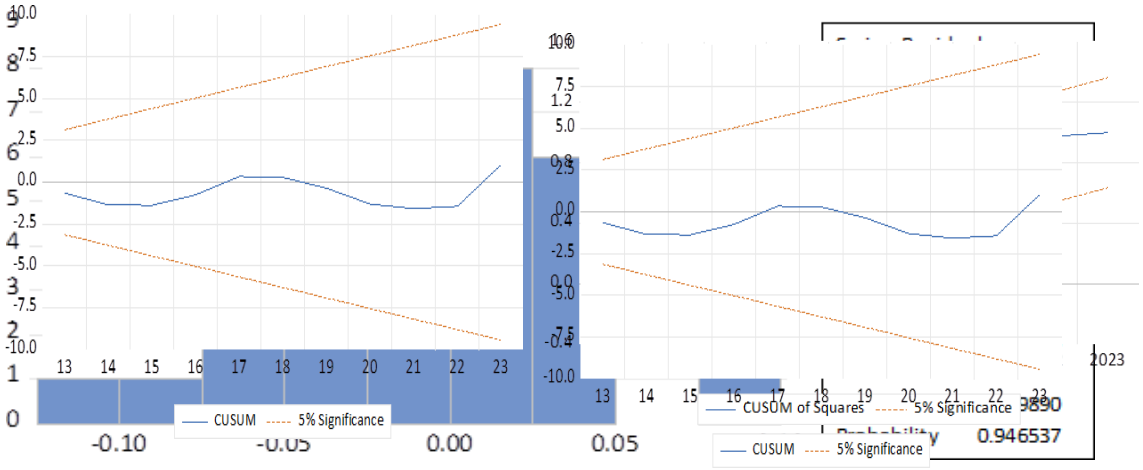
ECM Regression
Case 2: Restricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LGHE(-1))	-0.201696	0.101907	-1.979206	0.0734
D(LGHE(-2))	0.451461	0.077666	5.812821	0.0001
D(LPOL)	-0.930754	0.218860	-4.252747	0.0014
D(LOILR)	0.387022	0.135159	-2.863467	0.0154
D(LOILR(-1))	-0.244646	0.059988	-4.078275	0.0018
D(LGDP)	0.226382	0.213682	1.059434	0.3121
D(LGDP(-1))	0.567010	0.215859	2.626760	0.0235
D(LGOV)	0.865083	0.245464	3.524277	0.0048
D(LGOV(-1))	0.276666	0.079558	3.477528	0.0052
D(LEXR)	0.543612	0.077923	6.976302	0.0000
D(LPOP)	-0.557287	0.135182	-4.122506	0.0062
D(LPOP(-1))	-0.612125	0.157031	-3.898120	0.0080
CointEq(-1)*	-0.387022	0.034799	-11.12161	0.0000

R-squared	0.963169	Mean dependent var	0.064219
Adjusted R-squared	0.938614	S.D. dependent var	0.254371
S.E. of regression	0.063023	Akaike info criterion	-2.395526
Sum squared resid	0.071495	Schwarz criterion	-1.794176
Log likelihood	50.13065	Hannan-Quinn criter.	-2.199501
Durbin-Watson stat	2.214816		

* p-value incompatible with t-Bounds distribution.




CUSUM
5% Significance
CUSUM of Squares
5% Significance
CUSUM
5% Significance
0.946537
2023