

AMERICAN UNIVERSITY OF BEIRUT

THE ROLE OF REMITTANCES IN HAMPERING  
ECONOMIC GROWTH IN LEBANON

by  
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In loving memory of my father, Ghassan, whose wisdom continues to inspire me. Heartfelt thanks to my mother, Diana, for her love and support. Special appreciation goes to my brother, Imad, for his invaluable guidance and encouragement throughout my studies.

# ABSTRACT OF THE THESIS OF

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Remittances from migrants not only represent one of the most stable sources of foreign exchange earnings but have also been the primary capital inflow for Lebanon throughout much of the post-war period. Despite their significant role, limited empirical studies exist on the impact of these remittances on economic growth in Lebanon. This study aimed to address this gap by investigating the effects of remittances on Lebanon's public debt in foreign currency between 2002 and 2022. The ARDL estimation technique was employed to explore the long-term relationships among the chosen variables. The findings revealed a significant positive long-term association, indicating that remittances substantially influenced Lebanon's public debt dynamics. The analysis also identified important short-term effects of central bank foreign currency reserves on public debt. Furthermore, the study highlighted a noticeable misallocation of remittances into unproductive sectors, suggesting a crowding out effect where remittances failed to enhance productive investment and economic capacity, thereby undermining long-term economic development and compromising the growth benefits of these foreign inflows.

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# CHAPTER I

## INTRODUCTION

International migration involves people moving from their country of birth or origin to another country. As part of this migration, migrants regularly send money to their relatives at the place of origin, a practice known as remittances. The examination of international migration and remittances is not a recent development; its origins can be traced back to the 1990s (Borjas, 1995). Since the latter part of the 1990s, remittances have evolved into a driving force fostering development and alleviating poverty (Kunz, Maisenbacher, & Paudel, 2022). Families benefiting from remittances experience income stabilization, creating a layer of financial security that enables better planning and resilience amid economic uncertainties.

Numerous discussions and debates have centered around the impact of sending money back home from abroad on the growth and development of economies in the recipient countries. Glytsos (2005) emphasizes that due to the intricate factors tied to the nature and purpose of migration, the evolving patterns of migrant flows give rise to intricate and multidimensional effects of remittances. This complexity poses challenges in accurately detecting and evaluating their role. While there is an increasing focus in scholarly literature on exploring the potential growth effects of remittances, there is a division among academics and policymakers regarding the long-term consequences of remittances on economic growth (Kristina & Mindaugas, 2016).

Surpassing foreign direct investment, export revenues, and foreign aid, remittances constitute a considerable component of international capital flows for many developing countries (Giuliano & Ruiz-Arranz, 2009). In the year 2022, it was

projected that the cumulative global remittances would reach \$794 billion. (Ratha et al., 2022). As depicted in the graph and as reported by the World Bank in 2022, Lebanon stood among the leading nations in terms of receiving remittances relative to its GDP, securing the third position with remittances accounting for 37.8% of its GDP and having the highest percentage in the MENA region.

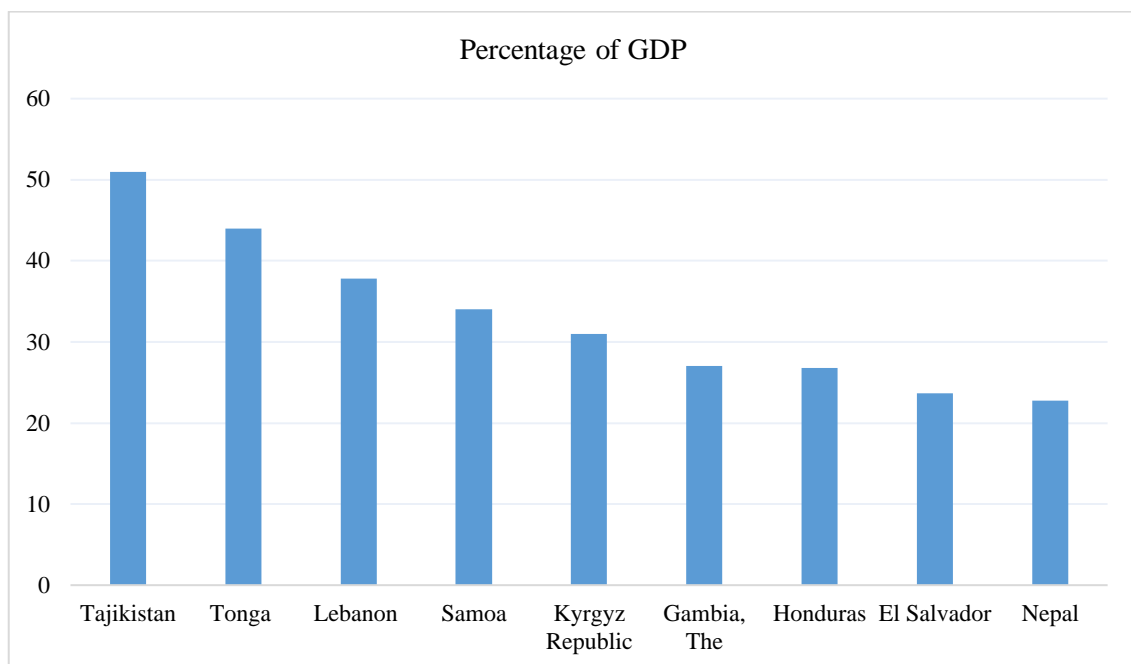


Figure 1. Low- and middle-income countries with the highest inflows of remittances  
Source: World Bank, 2023

According to the World Bank, remittances to Lebanon reached \$6.4 billion in 2023, positioning it as the third-highest recipient in the MENA region in terms of value, trailing behind Egypt with \$24.2 billion and Morocco with \$12.1 billion. Remittance receipts constituted 27.5% of the Lebanese GDP and comprised over 80% of the combined external resource flows in 2023. Following Lebanon, the West Bank and Gaza recorded remittances equivalent to 19.9% of GDP, while Jordan recorded 9.9%.

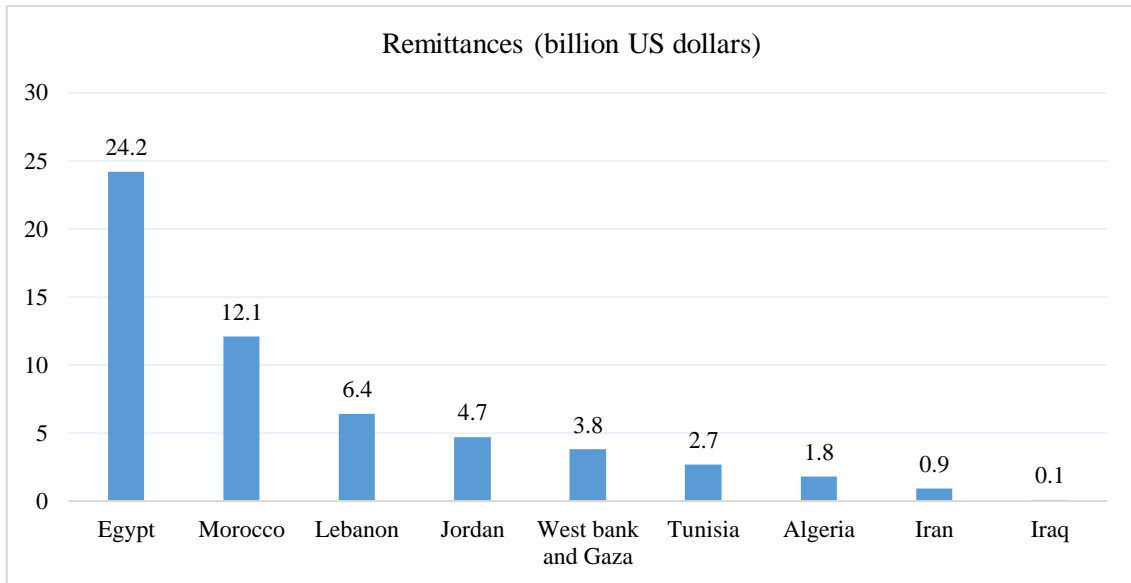


Figure 2. Remittance inflows to the MENA region in absolute terms by country in 2023. Source: World Bank, 2023 .

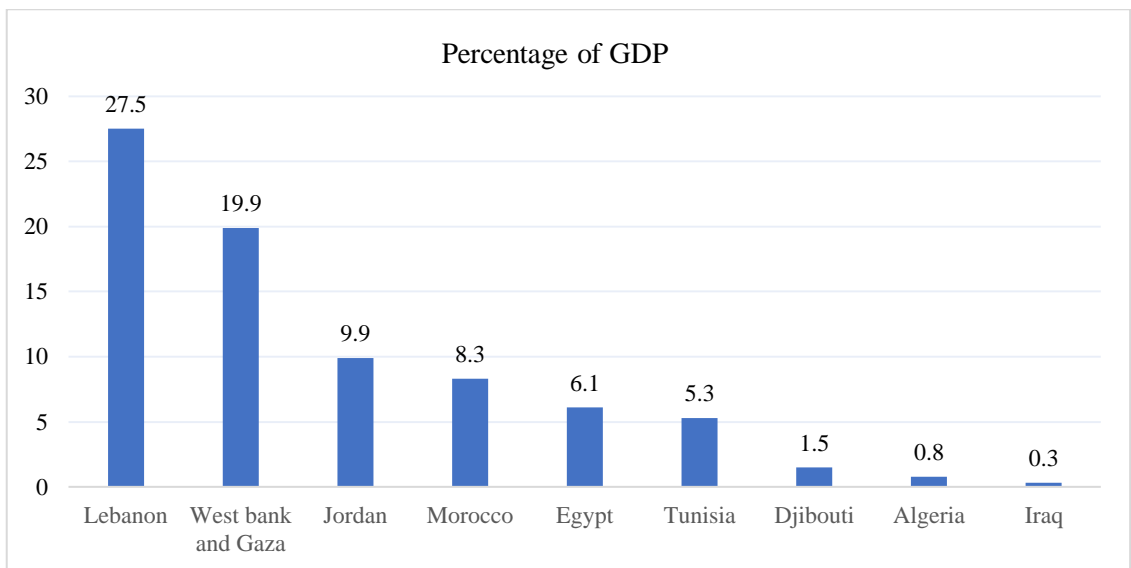


Figure 3. Remittance inflows to the MENA region as a share of GDP by country in 2023. Source: World Bank, 2023.

Lebanon's remittance inflows have exhibited a relatively consistent trend in absolute nominal terms throughout the past decade. These inflows have consistently fluctuated between \$6 billion and \$7 billion annually from 2011 to 2021, with an average of approximately \$6.5 billion per year. Notably, neither the financial crisis nor

the impact of the COVID-19 pandemic seemed to significantly affect the remittance inflows, as their levels remained relatively steady since 2019. The increasing significance of remittances in the Lebanese economy is not only discernible in their size relative to the GDP but also in their share of the total current account inflows to the country (UNDP, 2023).

Generally, developing countries often value remittances as they serve to promote spending and investment, thereby fostering economic growth. However, it's essential to note that remittances can also pose challenges, such as heightened inflationary pressures and the potential for Dutch disease effects (Acosta, Lartey, & Mandelman, 2009). While remittances are viewed as a means of aiding households rather than a tool directly manipulated by governments or central banks to shape monetary or fiscal policy, the absence of a clear empirical consensus of its macroeconomic impacts opens up opportunities to explore new perspectives and gain deeper insights into their effect on monetary policy and central banking decisions. A considerable body of scholarly research examines the intersection between remittances and financial markets. Upon their arrival in the recipient country, remittances typically flow into the central bank, serving as a vital source of foreign reserves. This initial point of entry into the formal financial system signifies the beginning of remittances' integration into the economy. The process of remittances entering the central bank highlights their role in shaping and influencing economic dynamics within the recipient countries.

Lebanon's post-war economy was heavily supported by foreign currency sources crucial for sustaining its fixed exchange rate. The country relied on income from sectors like tourism and real estate investment, along with remittances sent by the Lebanese

diaspora. Furthermore, its banking sector drew deposits by offering high interest rates and confidentiality. These financial streams were indispensable, enabling Lebanon to manage a trade deficit and escalating public debt by providing the necessary foreign funds to maintain economic stability and support the national currency's value.

Limited literature has been found regarding the relationship between economic growth and remittance inflows for Lebanon. In their 2017 study, Abosedra and Fakhri investigated the interconnection among remittances, financial deepening, and the economic growth of Lebanon, analyzing quarterly data from 1993 to 2011. Their findings revealed compelling evidence supporting a durable, long-term correlation between remittances, financial development, and growth in Lebanon. Furthermore, they noted that while financial development exhibited negligible short-term effects on growth volatility, remittances notably influenced short-term volatility. These findings imply that remittances could potentially play a more substantial role than financial development in mitigating growth volatility in Lebanon. Giuliano et al. (2009) also included Lebanon in their study, which investigated the relationship between remittances and economic growth across a sample of 73 countries.

Despite the steady flow of remittances, Lebanon grapples with economic challenges that raise critical questions. High levels of public debt, persistent political instability, and governance issues spark concerns about the long-term sustainability of an economic model heavily reliant on remittances. This predicament prompts an exploration into the impact of these transfers on crucial macroeconomic indicators. This study aims to look into the impact of remittances on Lebanon's public debt in foreign currency between 2002 and 2022. The objective of the paper is to empirically investigate the role of remittances in hampering economic growth in Lebanon,

hypothesizing that central bank foreign reserves may serve as a transmission channel through which remittance inflows impact public debt.

This chapter has set the foundation for examining the impact of remittances on Lebanon's economy, focusing on their role in the nation's public debt dynamics from 2002 to 2022. Recognizing the role of remittances as a primary source of foreign exchange earnings in post-war Lebanon, it addresses the scarcity of empirical research on how these funds affect economic growth. This introduction paves the way for an in-depth analysis of their dual role as both a financial stabilizer and a potential impediment to sustainable economic development due to the misallocation of funds into unproductive sectors. Chapter two consists of the literature review, that reviews extensive scholarly literature on remittances with a focus on three areas. The first part examines various studies that explore how remittances contribute to or hinder economic growth in recipient countries. The second part discusses theories and empirical evidence on the potential for remittances to lead to the Dutch Disease phenomenon. The third part analyzes the relationship between remittance inflows and external debt levels, investigating how these funds might influence debt management strategies and economic stability. Chapter three provides a comprehensive macroeconomic overview of the Lebanese economy. It discusses historical trends, fluctuations, and the resilience of remittance flows during economic crises. Chapter four outlines the empirical approach and methodology used to analyze the impact of remittances on Lebanon's public debt dynamics, detailing the ARDL model, the selection of variables, and the rationale behind the econometric techniques chosen for the study. This chapter also discusses the testing for structural breaks within the time series data to ensure the robustness of the model results. A dummy variable was incorporated to account for

significant external shocks or policy changes that could have altered the dynamics between remittances and public debt. The inclusion of this dummy variable helps to isolate the effects of such events and better understand their impact on the financial variables under study. The findings from these analyses, including the implications of structural breaks and the effects captured by the dummy variable, are subsequently presented and discussed in detail in chapter five. Concluding the study, chapter six synthesizes the findings, offering an assessment of the role of remittances in Lebanon's economic strategy. It provides policy recommendations aimed at maximizing the benefits of remittances while mitigating potential adverse effects and suggests areas for further research to continue exploring the complex relationships between remittances, fiscal policy, and economic growth in Lebanon.

## CHAPTER II

### LITERATURE REVIEW

#### **A. Remittances and Economic Growth**

Numerous studies offer diverse perspectives on the correlation between remittance inflows and the economic growth of recipient countries, with a growing body of literature highlighting distinct approaches. One strain of studies acknowledges that the remittances sent by international migrants have a positive impact on the growth and development of the receiving countries. Barajas, Chami, Fullenkamp, Gapen, and Montiel (2009) suggest that remittances can impact economic growth through three primary avenues: direct contribution to capital accumulation, support to labor inputs and workforce contributions, and influence on total factor productivity growth. Mim and Ali (2012) identify a favorable influence of remittances on consumption, investment, and overall economic growth. Similarly, Cooray (2012) observes that remittances contribute to economic growth by promoting education and the development of the financial sector.

Desilver (2018) highlights the significant economic impact of remittances on smaller nations with sizable diasporas. Catrinescu, Leon-Ledesma, Piracha, and Quillin (2009) find that country characteristics play a crucial role in determining the relationship between remittances and growth, suggesting that remittances positively affect growth in countries with strong political and economic institutions. Giuliano et al. (2009) investigate the relationship between economic growth and remittances, concluding that in less economically developed countries, remittances promote economic growth. Their study, involving 100 developing countries and analyzing



annual data from 1975 to 2002 using both Ordinary Least Squares (OLS) and System Generalized Method of Moments (SGMM) regressions, indicates that remittances significantly contribute to economic growth. They suggest that financial development is vital in fostering growth, particularly in countries with underdeveloped financial systems. However, in nations with more advanced financial sectors, remittances are associated with a negative impact on economic growth. Eggoh, Bangake, and Semedo (2019) find that remittances significantly and positively support economic growth in developing countries, whereas the impact of aid and foreign direct investments is insignificant. Vargas-Silva, Jha, and Sugiyarto (2009) show that a 10% increase in remittances as a share of GDP correlates with an annual growth increase of approximately 0.9–1.2%.

Kandil and Mirzaie (2009) compare the impact of migrants' remittances and FDI inflows on domestic resources across seven Middle Eastern countries. Their research suggests that remittance flows are more significant in driving output growth in Jordan compared to FDI flows, which have a less pronounced effect. Mundaca (2009) examines the influence of remittances on growth across 25 Latin American and Caribbean (LAC) countries, revealing that remittances are positively correlated with economic growth, particularly when the financial sector is accounted for in the model. Ramirez and Sharma (2008) establish a lasting association between per capita GDP growth and the remittance to GDP ratio across 23 LAC countries from 1990 to 2005, emphasizing that this impact is particularly significant in nations with limited access to private credit. Similarly, Nsiah and Fayissa (2013) demonstrate a positive long-term relationship between per capita remittances and per capita income in a sample of 21 LAC countries. Pradhan, Upadhyay, and Upadhyay (2008) investigate the impact of

workers' remittances on economic growth through panel data analysis encompassing 39 developing countries from 1980 to 2004. Their findings indicate a positive effect of remittances on economic growth. Fajnzylber and López (2007, 2008) find that remittances contribute to increased growth rates and reduced poverty levels in Latin America, focusing on the impact of remittances on financial sector development, savings, and investment as potential channels. Bugamelli and Paternò (2005) delve into the question of whether the growing volume of workers' remittances could serve as a mitigating factor, reducing the likelihood of current account reversals. The findings suggest that when remittances constitute a significant share of GDP, the probability of severe current account deficits diminishes, potentially acting as a preventive measure against financial crises. León-Ledesma and Piracha (2004) identify that remittances had a constructive influence on economic growth following their analysis of data from eleven Central and Eastern European (CEE) nations. Additional research confirming a positive correlation between remittances and economic growth is reported in the works of Faini (2007) and Zieseemer (2006).

Several studies find a negative or no relationship between remittances and economic growth. Matuzeviciute and Butkus (2016) conclude that, overall, remittances positively affect long-term economic growth, although they note that the impact varies depending on the economic development level of the country and the extent of remittances in the economy. Rao and Hassan (2012) conduct a study on 40 countries that receive high amounts of remittances and conclude that remittances do not directly contribute to growth. Instead, they suggest that remittances have a minor and indirect influence on economic growth. El-Sakka and McNabb (1999) discover through their

analysis of Egyptian data that an inverse relationship exists between remittances and economic growth.

When individuals receive remittances, it may result in a reduction in their willingness to work and participate in the labor force. This effect occurs as the increase in wealth from remittances might reduce recipients' need to engage actively in economic activities, potentially hindering overall economic growth. The concern arises from the possibility that the financial support provided by remittances could diminish the work ethic of recipients. According to the findings of Rodriguez and Tiongson (2001), Filipino households with members engaged in temporary overseas migration tend to decrease their involvement in the workforce. This reduction includes both a decline in labor participation, indicating fewer individuals actively seeking or holding employment, and a decrease in the number of hours worked by those who remain in the labor market. Some studies argue that, despite microeconomic discussions suggesting that remittances benefit the receiving economy, particularly when spent on consumption, there is a lack of macroeconomic evidence supporting the impact of remittance inflows on long-term growth.

Chami, Fullenkamp, and Jahjah (2005) indicate that remittances may have a detrimental effect on growth, arguing that they are compensatory transfers and hence are countercyclical. Their research employs a dataset comprising 113 countries over a span of 29 years, asserting that remittances are primarily directed toward consumption and do not function as a capital source for economic development. The observation that remittances are initially utilized for consumption, housing, and land, rather than for direct productive investment, is frequently regarded as a missed opportunity for fostering sustained long-term growth and development. The researchers observe a

significant and negative association between the growth of remittances and GDP growth. To rationalize these findings, they suggest that remittances serve not only as compensation for recipients facing unfavorable economic circumstances but also contribute to a moral hazard issue, arising from the potential disincentive for labor supply and the encouragement of risky investments, posing a risk of declining economic activity. However, Docquier and Rapoport (2005) argue against Chami et al.'s (2005) study, stating that it overlooked the potential impact of remittances on investments and human capital accumulation due to liquidity constraints, and claim that considering these constraints, remittance inflows could have an overall positive effect on long-term economic activity. Additional research indicates that an increase in remittance levels may negatively impact the long-term growth of recipient economies by leading to an appreciation of the real exchange rate. Chami, Barajas, Cosimano, Fullenkamp, Gapen, and Montiel (2008) assert that remittances have the potential to impede economic growth due to the Dutch disease phenomenon, where remittances contribute to real exchange rate appreciation, making the receiving country less competitive.

## **B. Remittances and the Dutch Disease**

The Dutch Disease phenomenon outlines the negative repercussions of significant inflows of natural resources on the exchange rate of the receiving nation, ultimately influencing its internal manufacturing, trade equilibrium, and borrowing expenses. Although remittances serve as crucial income for recipient countries, they also possess the potential to trigger Dutch Disease-like repercussions if not handled with caution. Because the appreciation of the local currency diminishes the competitiveness of exports not related to natural resources, this leads to a contraction

within these industries, which underscores the serious ramifications of large foreign currency inflows on key segments of the country's economy (Frankel, 2012).

The initial systematic exploration of the Dutch disease phenomenon is articulated in the foundational study by Corden and Neary (1982). Their theoretical framework delineates the Dutch disease hypothesis within the context of a vibrant export sector in a small open economy. The two main effects of the Dutch diseases are the spending effect and the resource movement effect. When a country earns more revenue from exporting natural resources, it often invests or spends that revenue domestically. This increased spending can lead to higher demand for goods and services, which can further contribute to inflationary pressures and the appreciation of the exchange rate. This appreciation of the real exchange rate makes the country's exports less competitive, resulting in a decrease in export levels. This effect is referred to as the "spending effect" of the Dutch disease, named after a situation, where one sector's prosperity negatively impacts other sectors of the economy (Basnet, Donou-Adonsou, & Upadhyaya, 2019). Remittances often lead to increased domestic spending in the recipient country, similar to the spending effect observed with revenue from natural resource exports. However, if not properly managed, this surge in domestic spending can fuel inflationary pressures and contribute to the appreciation of the local currency. Consequently, the competitiveness of exports unrelated to natural resources may diminish, leading to a contraction in these industries. Remittances can also trigger a redistribution of resources within the economy, known as the resource movement effect. For instance, if remittances are predominantly channeled towards consumption rather than investment in productive sectors, it may result in the neglect of other areas of the economy. Additionally, if recipients opt out of the labor force or forego

educational opportunities due to the steady inflow of remittances, it can lead to a misallocation of labor and impede long-term economic development efforts.

Recent empirical studies examining the impact of workers' remittances on real exchange rates in recipient countries offer varying conclusions. However, the majority of these analyses support the notion of the Dutch disease phenomenon occurring due to significant remittance inflows. Obstfeld and Rogoff (1996) demonstrate that remittance transfers have a dual effect: they not only diminish a country's competitiveness by causing the real exchange rate (RER) to appreciate but also decrease the variety of exported goods. Wahba (1998), in a study examining how natural resource prices and remittances influence exchange rate appreciation in the Gulf States, finds that the Dutch disease phenomenon can arise not just from significant resource discoveries but also from capital inflows like remittances. Based on their analysis of a panel study involving 13 Latin American and Caribbean nations, Amuedo-Dorantes and Pozo (2004) show that a twofold increase in workers' remittances led to a 22% appreciation of the real exchange rates, consequently diminishing competitiveness in global markets.

Bourdet and Falck (2006) discover that the appreciation of the real exchange rate and its impact on trade competitiveness diminish over time, as the long-term mechanism operates in contrast to the spending effect. Barajas et al. (2009), in their extensive panel study encompassing numerous countries, assert that the strength of the real exchange rate appreciation diminishes with heightened counter-cyclical effects of remittances, domestic factor mobility, and trade regime openness. Lartey, Mandelman, and Acosta (2012) demonstrate that increased remittance inflows result in the appreciation of the real exchange rate. This shift in resources, observed across a selection of 109 developing and transition nations, was illustrated by a movement away

from the production of tradable goods towards the non-tradable sector. Hassan and Holmes (2013) present compelling evidence indicating that in less-developed countries, remittances exert a noteworthy influence on real exchange rates over an extended period. Their research strongly suggests a phenomenon similar to the Dutch disease. Additionally, they highlight how remittances have a distinct, one-way impact on exchange rates in the short term. Chowdhury and Rabbi (2014) examine how remittances affect the external trade competitiveness of Bangladesh. They utilize a model that integrates Johansen Cointegration and Vector Error Correction spanning from 1971 to 2008. Their results indicate a significant appreciation of the real exchange rate due to remittance flows, along with a decline in external competitiveness.

Prakash and Mala (2016) examine the correlation between remittances and the real effective exchange rate in Fiji using the VECM technique. However, they do not detect any impact of remittances on the RER in the long term and consequently refute the presence of the 'Dutch disease' effect associated with remittances. Özcan (2011) investigates the associations between workers' remittances and the real effective exchange rate in 10 developing nations, utilizing a panel cointegration test, but the study does not uncover any evidence supporting the occurrence of the Dutch disease effect within this group of countries.

### **C. Remittances and External Debt**

The research efforts exploring external debt in developing economies encompass studies examining the drivers of external debt across countries and investigations into the impacts of political factors on external debt. Lane (2004) reveals a notable escalation in external debt corresponding to the initial output level when

examining the determinants of external debt in a sample of low- and middle-income nations. The study finds that economies with greater openness tend to harbor elevated levels of debt. Bittencourt (2015) examines the primary factors influencing government and external debt in emerging democracies across South America from 1970 to 2007, focusing on political and economic variables. Utilizing dynamic panel time-series analysis, the study indicates that economic growth reduces debt levels in the region. Nonetheless, factors such as inflation, inequality, and executive constraints, as suggested by existing literature, do not exhibit significant impacts on debt dynamics. Abdullahi, Bakar, and Hassan (2015) investigate the primary determinants of foreign debt accumulation in Nigeria through the analysis of time series data. Their findings indicate that Nigeria's external debt is significantly influenced by factors such as interest rates, national savings, exchange rates, and fiscal deficits both in the short and long term. Colombo and Longoni (2009) explore the determinants of long-term external debt in 61 developing countries from 1970 to 2000. Their analysis reveals that external debt levels in these countries are positively influenced by various factors, including economic development, openness, exchange rate flexibility, financial depth, and inflation rates.

External funding options are utilized to close the disparity between a country's overall domestic savings and domestic investment, which constitutes the need for foreign capital. This necessity is exacerbated by unfavorable trade and current account balances, alongside other macroeconomic convergence measures (Spratt, 2009). Remittances are one of the principal sources of external funding for the recipient country's economy. They contribute to the overall financial inflows from abroad, along with other forms of external financing including aid provided by governments and



international organizations and foreign direct investment. The potential impact of these different sources of external funding, particularly personal remittances, on economic growth has generated considerable interest among academics and researchers, who study their effects on various aspects of the recipient countries' economies.

In theory, it is suggested that when external debt and remittance inflows are used effectively, they can provide the necessary capital to support development efforts and stabilize economic activities across the entire economy. Specifically, the involvement of debt and remittance inflows is associated with the Dutch disease. Consequently, the relationship between these factors and economic growth yields diverse outcomes. Empirical research has focused on examining the effects of certain external funding sources, either individually or in combination, on the economic growth of developing nations (Kapingura, 2017). Paudel, Kharel, and Alharthi (2022) explore the impact of external debt, remittances, exports, and the labor force on Nepal's economic growth, finding that both external debt and remittances have adverse effects, indicating the manifestation of the Dutch disease. Mijiyawa and Oloufode (2023) examine the impact of remittance inflows on external debt in developing countries, highlighting international reserves as a "self-insurance mechanism" against financial risks. Their findings reveal a positive relationship between remittances and the external debt-to-GDP ratio and demonstrate the presence of the Dutch disease effect.

## CHAPTER III

### OVERVIEW OF THE LEBANESE ECONOMY AND OVERALL TRENDS OF REMITTANCES

#### **A. Macroeconomic Overview**

##### *Economic Growth*

Lebanon's Gross Domestic Product (GDP) has demonstrated a diverse range of growth rates since the 1990s. After the end of the Lebanese Civil War in 1990, the country entered a phase of post-war reconstruction, marked by international aid and investments directed towards rebuilding infrastructure and institutions. During this period, Lebanon witnessed a vigorous economic expansion, with the GDP growth rate reaching 16.4% in 1992 and remaining positive in subsequent years. Lebanon later experienced relatively robust economic growth with the GDP reaching \$20 billion during the early 2000s, driven by increased confidence in the tourism sector, banking, and real estate.

The 2008 global financial crisis left a lasting impact on Lebanon's economy, manifesting in a slowdown in global economic activity. This, coupled with reduced remittances and capital inflows, had far-reaching effects across multiple sectors. Lebanon faced a dual challenge from regional instability, notably stemming from the Syrian Civil War that commenced in 2011, and political instability characterized by periods of governance challenges and deadlock. These challenges, encompassing an influx of refugees, disruptions in trade routes, and security issues, collectively led to economic hurdles, affecting investor confidence and overall stability. The years after saw moderate rates of growth, with the GDP increasing to a peak of \$55 billion in 2018.

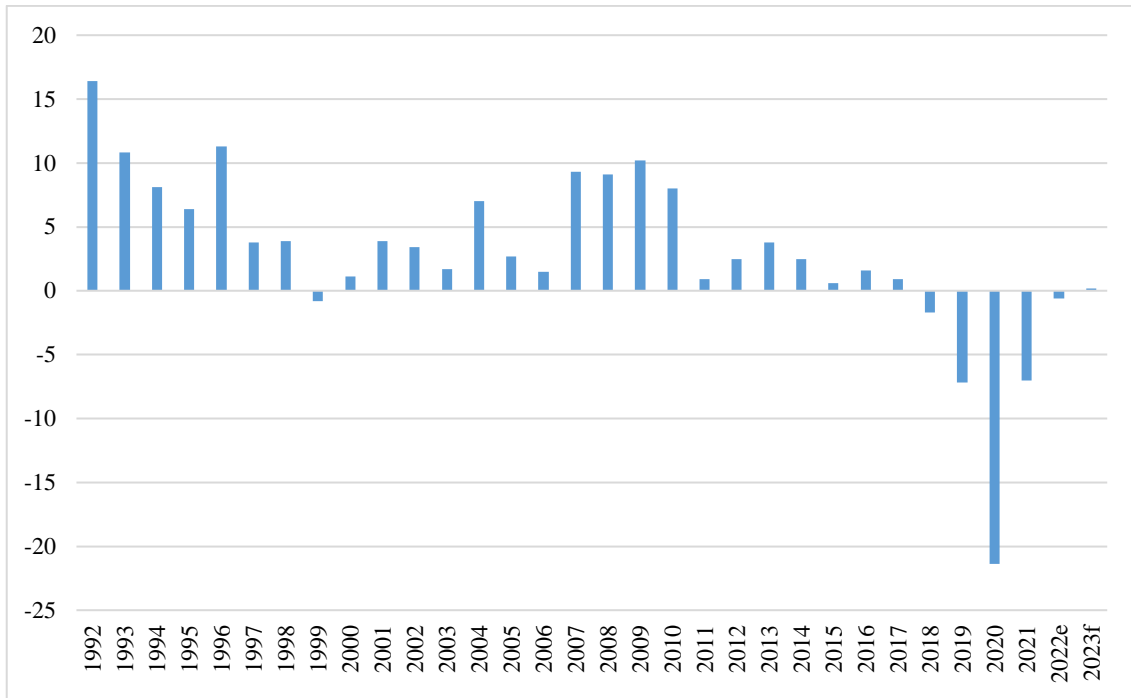


Figure 4. Real GDP growth (%).  
Source: World Bank, 2023.

The GDP per capita mirrors the pattern observed in the overall GDP and experiences a setback. The predominant trend, as depicted in the graph below, shows predominantly positive growth until 2018, with intermittent periods of stability rather than growth. However, the economic challenges in 2020 and 2021 led to contractions, showcasing the economic difficulties during this period with GDP decreasing to \$18.5 billion in 2021. The COVID-19 pandemic, followed by the default on the \$1.2 billion Eurobond debt service in March 2020 and the unfortunate explosion on August 4th, further exacerbated the situation in Lebanon, crippling any potential for growth. The Russian war on Ukraine also added an additional challenge to Lebanon's vulnerabilities. Between 2019 and 2021, the World Bank reported a 36.5% decline in GDP per capita, leading to Lebanon's reclassification from upper-middle-income status to lower-middle-

income status in summer 2022.<sup>1</sup>According to the World Bank (2023), before the escalation of the present conflict on the southern borders, Lebanon's economy was anticipated to experience modest growth, marking the first positive trajectory since 2018.<sup>2</sup>

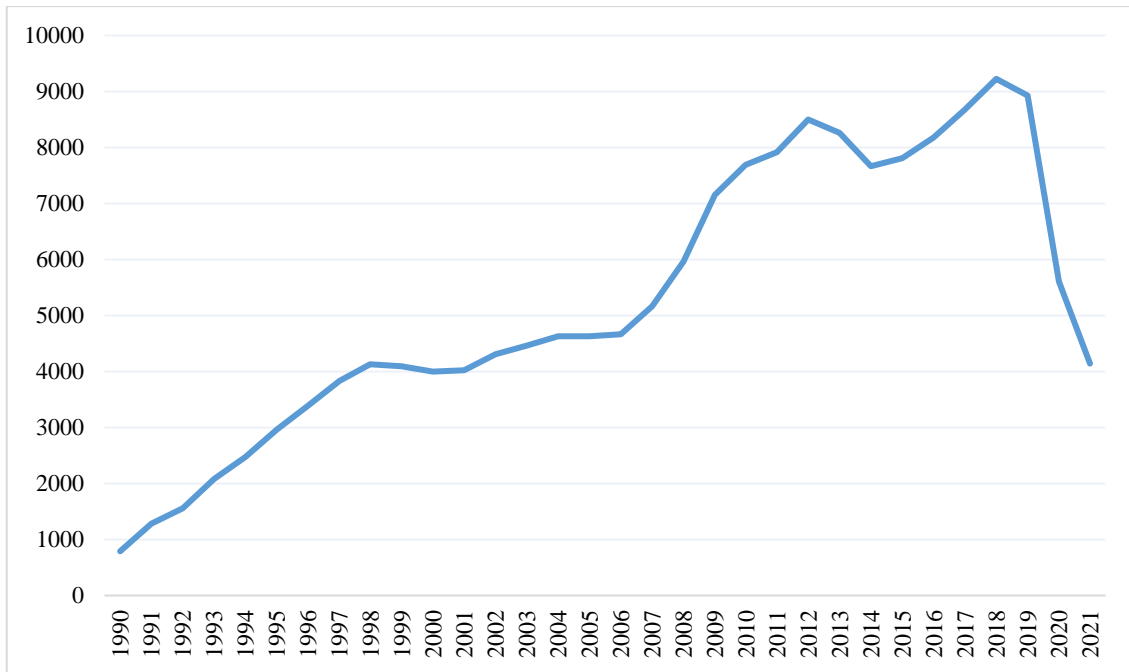


Figure 5. GDP per capita (current USD).  
Source: World Bank, 2023.

<sup>1</sup> World Bank. (n.d.). *Lebanon overview*. Retrieved from <https://www.worldbank.org/en/country/lebanon/overview>

<sup>2</sup> World Bank Group. (2023, December 21). *Lebanon's fragile economy pulled back into recession*. Retrieved from <https://www.worldbank.org/en/news/press-release/2023/12/21/lebanon-s-fragile-economy-pulled-back-into-recession#:~:text=With%20the%20onset%20of%20the,of%2012.8%20percent%20of%20GDP>.

## *Inflation*

Lebanon witnessed a mix of stable to moderate inflation rates from 2009 to 2018, averaging less than 5% and reaching a record low of -4.67% in September 2015. However, the years 2020 and 2021 marked a severe economic downturn, resulting in triple digit inflation, reaching an all-time high of 268.78% in April 2023.<sup>3</sup> The existing fragile Lebanese financial system, which has followed a fixed exchange rate for decades, and the absence of proper reforms have led to the evolution of a parallel market with both an official rate and a black-market rate. The devaluation of the Lebanese lira has had a staggering impact on people's lives and livelihoods, severely eroding their purchasing power. While average food inflation stood at 76.48% from 2009 to 2023, it hit its peak at an all-time high of 483.15% in January 2022.<sup>4</sup> According to the World Bank, for the period from August 2022 to August 2023, Lebanon recorded the highest annual real change in food inflation globally, with a 44% annual change in the food Consumer Price Index (CPI).

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<sup>3</sup>Central Administration of Statistics (CAS). (2023). *Annual Inflation Rate 2013-2023*. <http://www.cas.gov.lb>

<sup>4</sup> Credit Libanais Economic Unit (2023). *Real Food Price Inflation in Lebanon the Highest Globally According to the World Bank*. <https://economics.creditlibanais.com/Article/211838#en>

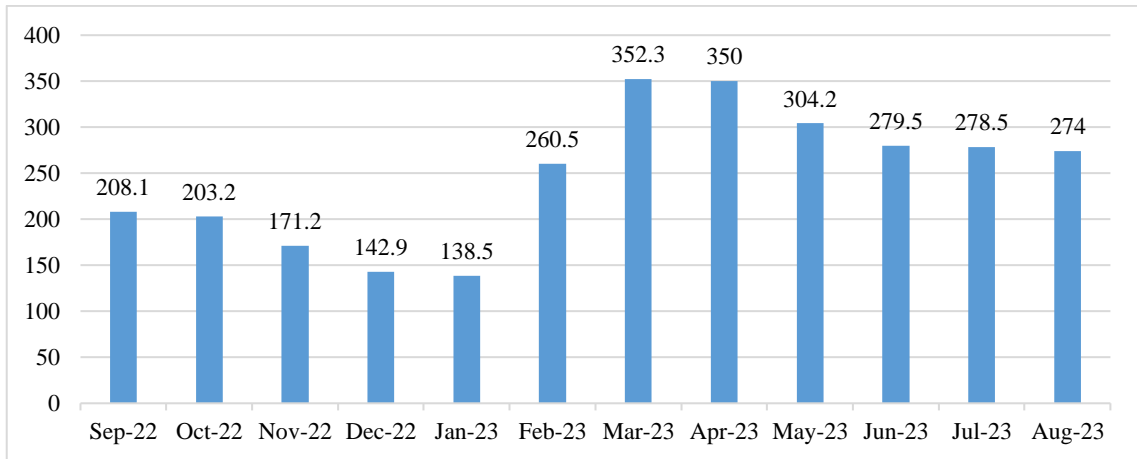


Figure 6. Nominal food inflation in Lebanon (% change, Y-O-Y).  
Source: World Bank and Credit Libanais Economic Unit.

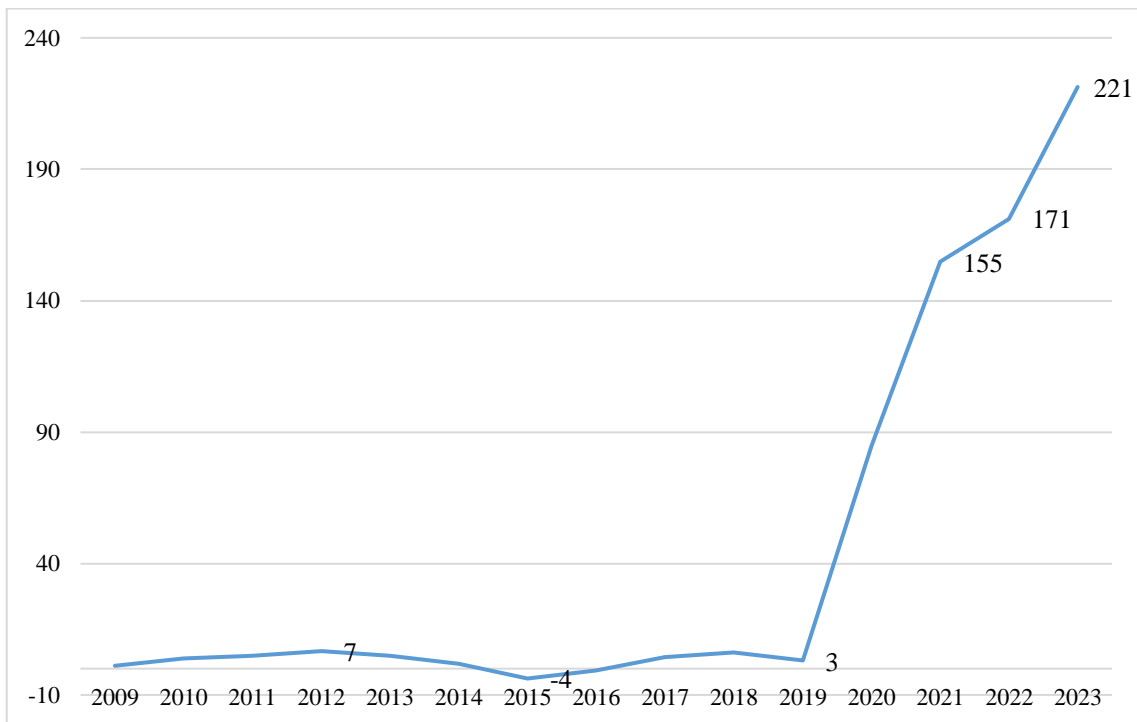


Figure 7. Inflation, consumer prices (annual %).  
Source: Central Administration of Statistics (CAS)-Lebanon and World Bank.

## *Unemployment*

The escalating unemployment crisis in Lebanon is a critical aspect of the country's economic turbulence. From 1991 to 2022, the average unemployment rate has been 8.92%, with a record low of 6.4% in 2009.<sup>5</sup> According to the World Bank, approximately one in five Lebanese residents has experienced job loss since late 2019. Moreover, 61% of companies in Lebanon have downsized their permanent staff, with an average reduction of 43%.<sup>6</sup> A survey conducted by the International Labor Organization (ILO) and Central Administration of Statistics (CAS) in January 2022 reveals an alarming surge in unemployment, soaring from 11.4% in 2018-19 to an unsettling 29.6%. This indicates that nearly one-third of the active labor force was unemployed at the beginning of 2022. Notably, the unemployment burden is disproportionately borne by specific demographics, with more women than men facing unemployment (32.7% for females compared to 28.4% for males). Additionally, the youth unemployment rate stands at a staggering 47.8%, almost twice the adult rate of 25.6%.<sup>7</sup> The persistent drive for emigration among the majority of Lebanese youth does not come at any surprise, given the continuous deterioration in national job prospects, further aggravated by inadequate compensation for available positions. This prevailing trend has led to a significant migration of specialists and professionals in several sectors including the educational and health sectors, especially after the Beirut port explosion in August 2020.<sup>8</sup>

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<sup>5</sup> The World Bank

<sup>6</sup> Elzir, A. (2021). *What the mega-crises have done to Lebanese firms and workers*. The World Bank. <https://blogs.worldbank.org/arabvoices/what-mega-crises-have-done-lebanese-firms-and-workers>

<sup>7</sup> International Labour Organization. (2022). *Lebanon and the ILO release up-to-date data on national labour market*. [https://www.ilo.org/beirut/media-centre/news/WCMS\\_844831/lang--en/index.htm](https://www.ilo.org/beirut/media-centre/news/WCMS_844831/lang--en/index.htm)

<sup>8</sup> In 2020 and 2021, more than 1,500 faculty and staff, including the school's medical center, departed from the American University of Beirut, according to reporting by the Institute of Current World Affairs.

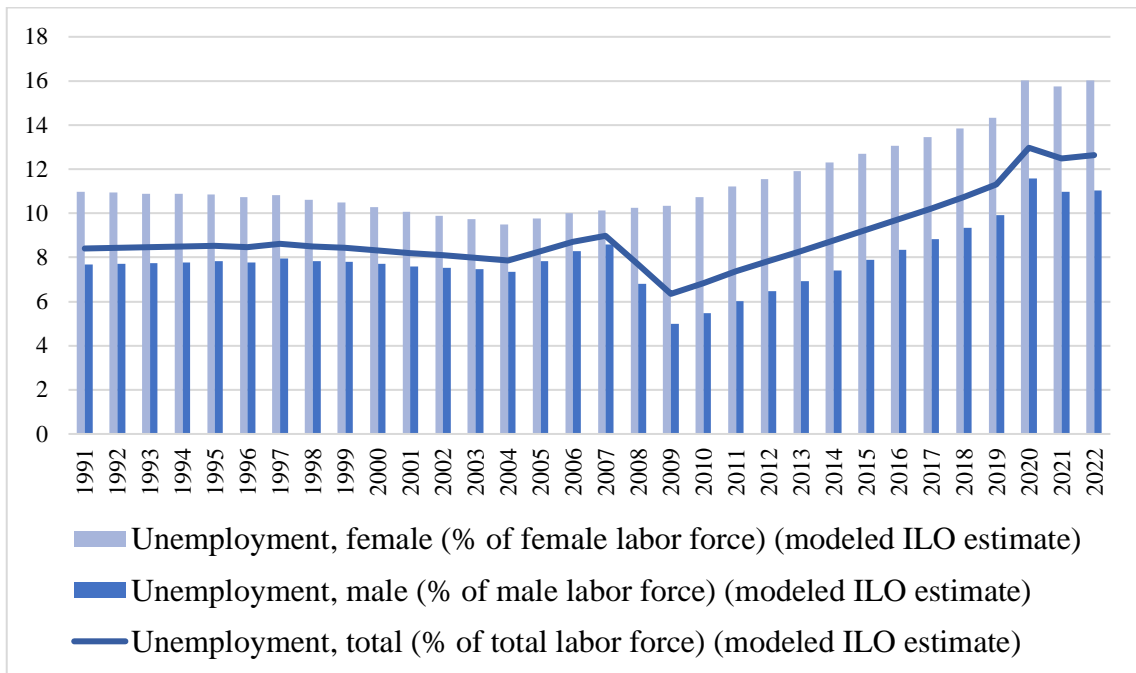


Figure 8. Unemployment percentage of labor force.  
Source: World Bank, 2023.

### ***Debt***

Since the early 1990s, recurring fiscal deficits and rising debt levels have been the outcome of post-war reconstruction along with governance failures and external disruptions. Lebanon's budget has grappled with the weight of interest payments, both from domestic and foreign sources. Notably, Lebanon has consistently maintained higher levels of domestic debt compared to foreign debt over the years. There was an exponential growth in domestic debt from \$1.2 billion in 1990 to \$23 billion in 2003. Foreign debt also experienced exponential growth, particularly after 1995, reaching an unprecedented peak of \$30 billion in 2019. The ratio of debt service to GDP has grown exponentially over the years, mirroring the trend of other indicators, as interest payments accumulated while experiencing minimal GDP growth.



Lebanon's Government Debt to GDP, standing at 150.6 % in 2020, has displayed a varying pattern over the years. The ratio, as depicted in the figure below, experienced fluctuations, reaching 183% in 2006, dropping to 131% in 2012, and later ascending to 171% in 2019.<sup>9</sup> This continuous and exponential increase in public debt is not unexpected and could be attributed to the prolonged rule of the same political class for over thirty years, characterized by an absence of a viable strategy for fostering economic development.

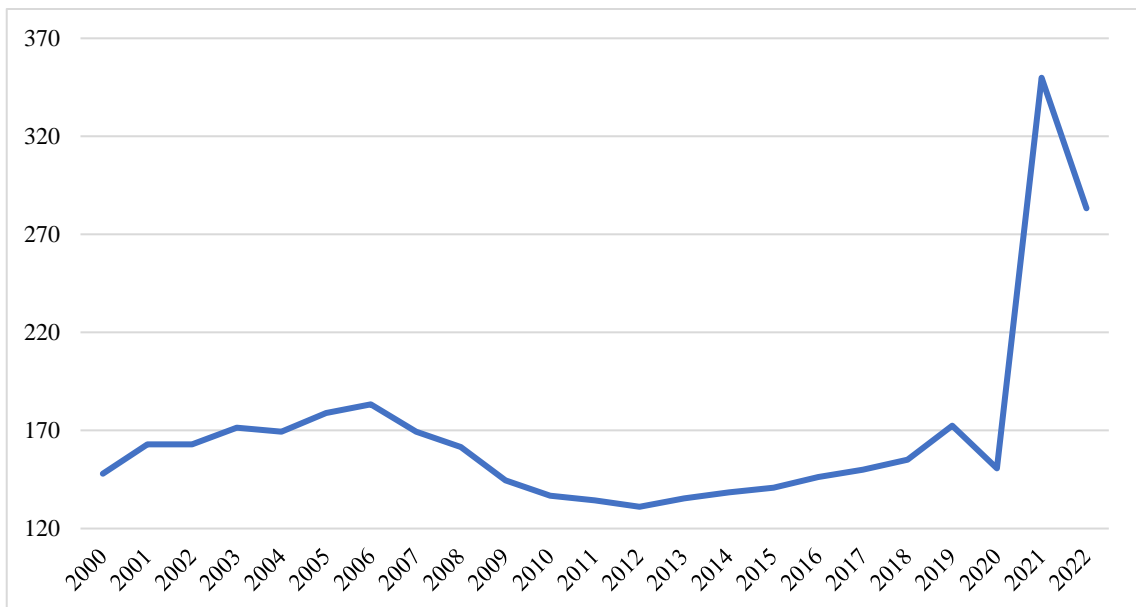


Figure 9. General government gross debt (percent of GDP).  
Source: International Monetary Fund, 2023.

<sup>9</sup> International Monetary Fund

Table 1. Evolution of public debt as a percentage of GDP in Lebanon (1970-2000).  
Source: BdL and World Bank.

Years	Domestic Public Debt (% of GDP)	External Public Debt (% of GDP)	Gross Public Debt
1970	2.6	4.3	6.9
1971	2.1	3.9	6
1972	2.6	2.9	5.5
1973	3.3	1.9	5.2
1974	3.9	1.4	5.3
1975	2	1.5	3.5
1976	19.8	2.8	22.6
1977	18.4	1.4	19.8
1978	21.7	1.6	23.3
1979	23.8	2.8	26.6
1980	32.1	5.1	37.2
1981	41.8	6.8	48.6
1982	111.9	6.4	118.3
1983	131.2	6.6	137.8
1984	111.4	4.2	115.6
1985	91.7	4.9	96.6
1986	75.7	7.3	83
1987	26.1	16.8	42.9
1988	38.5	13.6	52.1
1989	72.8	19	91.8
1990	80.6	19.2	99.8
1991	63.9	12.9	76.8
1992	53.4	4.6	58
1993	44.2	4.3	48.5
1994	61.1	8.5	69.6
1995	66.5	12.1	78.6
1996	84.4	14.6	99
1997	86.5	16.4	102.9
1998	88.5	25.9	114.4
1999	102.3	33.6	135.9
2000	109.5	42.3	151.8

The civil war in Lebanon, spanning over fifteen years from 1975 to 1990, incurred significant damages as the prolonged and intense conflict took a toll on the

country's infrastructure and human resources. The signing of the Taef Accord in 1989 marked a pivotal moment in Lebanon's history, signifying a crucial step towards political stability and the resolution of conflicts. Following this milestone, endeavors were initiated to reconstruct and rebuild Lebanon. However, these initiatives came at a considerable financial cost, marked by a major devaluation of the Lebanese pound in 1992 and a significant accumulation of debt from 1992 to 2004. From 1993 to 1997, government revenues were severely constrained by limited economic activity, while expenditures surged due to postwar reconstruction programs and high debt service costs. Between 2000 and 2004, economic growth accelerated due to significant infrastructure programs funded by the Paris I and II conferences, resulting in increased public spending and interest costs. Additionally, the introduction of Value Added Tax (VAT) in 2002 brought in new revenue streams to the Treasury. During 2005-2006, political upheaval following the assassination of Prime Minister Rafic Hariri in 2005 and the July War in 2006 halted reforms, leading to a reduction in capital spending. Despite this, interest payments on outstanding debt continued to keep overall expenditures elevated. Between 2007 and 2010, Lebanon experienced strong economic growth and capital inflows driven by tourism, real estate, and relatively high interest rates compared to the global economy during the 2008 financial crisis. This boosted revenues, but expenditures remained high, partly due to rising oil prices, increasing the burden on the Treasury's subsidy to EDL. However, from 2011 to 2018, the Syrian crisis caused economic losses, exacerbating debt accumulation and expenditures. Since October 17th, 2019, Lebanon has encountered challenges that have exacerbated the strain on its already fragile public finances.

Lebanon adopts a distinctive approach to funding its public debt and this unique financing model is highlighted by several key components. The financial sector, particularly commercial banks, plays a central role in supporting Lebanon's public debt financing. The sheer magnitude of bank deposits, reaching three times the country's GDP in 2010, underscores the sector's contribution. Lebanese commercial banks emerge as major stakeholders in the country's public debt, with 50% of the debt prominently featured on their balance sheets. This highlights a significant level of engagement and exposure of the banking sector to the government's debt dynamics. The funding landscape is further shaped by capital inflows, primarily sourced from the Lebanese diaspora and Arab investors. This external capital reliance has been a consistent trend since the 1990s, with a 65% of total capital inflows originating from Arab countries, particularly Lebanese expatriates and Arab investors between 1995 and 2015.

To address budget deficits, Lebanon has faced the challenge of managing notably high-interest rates to secure funds. The increased demand for funds, driven by expanded government spending, has contributed to the upward pressure on interest rates. Treasury bills, sold at a discount, have shown interest rates ranging between 14% and 23.8% from 1992 to 2010. Another noteworthy aspect is the reliance on short-term Treasury bills, which constitute 30% of the public debt and are issued by Banque du Liban. This dependence on short-term financial instruments, coupled with rising interest rates, has placed additional strain on debt servicing, affecting the government's repayment capabilities to both the central bank and commercial banks.

### ***Current Account Balance***

After experiencing a sharp improvement in 2020-21, the current account deficit is estimated to have significantly widened to over 25% of GDP in 2022. This expansion is primarily attributed to elevated oil and food prices, as well as accelerated imports preceding an anticipated exchange rate adjustment for tax purposes (IMF, 2023). Lebanon's current account continued to grapple with a significant deficit in 2023, recording a deficit of \$81.20 million in October 2023 and amounting to 12.8% of GDP.<sup>10</sup> Throughout the period spanning from 1993 to 2023, Lebanon's current account averaged -\$15.62 million.<sup>11</sup>

The persistent current account deficit presents a significant obstacle to potential economic growth, as it is mainly funded by the central bank's foreign currency reserves, indicating heavy reliance on these reserves to offset the shortfall in international transactions caused by increasing imports and decreasing exports (World Bank, 2023). Despite the central bank's efforts to stabilize the exchange rate of the Lebanese pound, the currency has continued to depreciate rapidly compared to other currencies.

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<sup>10</sup> World Bank

<sup>11</sup> BdL

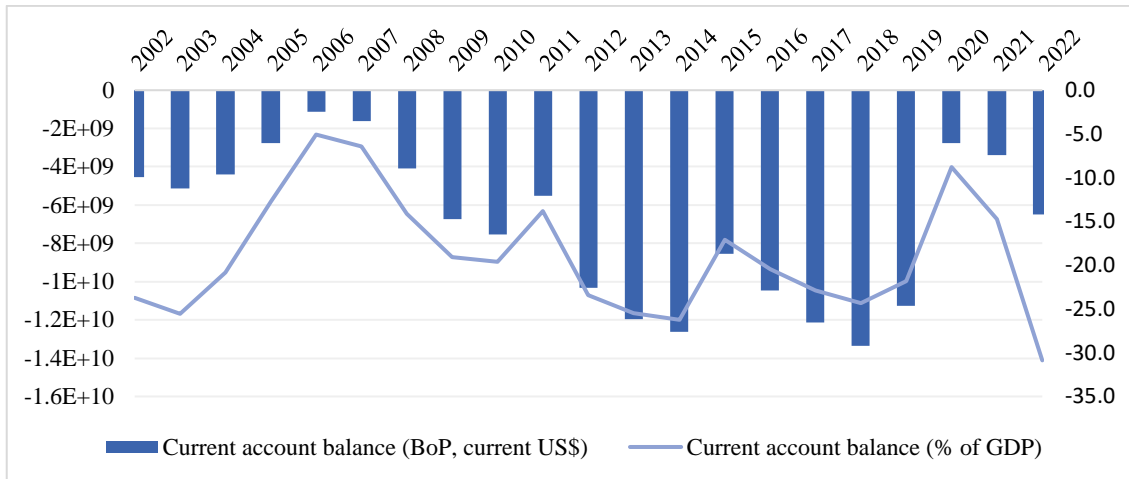


Figure 10. Current account balance.  
Source: World Bank, 2023.

### ***Trade Balance***

Lebanon consistently faces a trade deficit, highlighting its dependence on imported goods and its comparatively weak productive sectors. IMF (2019) suggests that the overvaluation of the Lebanese pound by more than 50%, enabled access to imports but adversely affected the competitiveness of Lebanon's export sector. This trade imbalance is a longstanding defining feature of Lebanon's economy, with imports consistently surpassing exports. From 1993 to 2023, the trade balance has maintained an average of -\$889.43 million, and the average monthly export value was \$198.53 million. The highest recorded export value occurred in December 2021, reaching \$615.89 million, while the lowest point was observed in January 1993 at \$26.69 million.<sup>12</sup>

The percentage contribution of manufacturing value added to GDP declined from 13% in 1997 to 11% in 2000, further dropping to 7% in 2004, and reaching 3% in 2020 and 1% in 2021. In addition, agriculture represented 6.8% of GDP in 1995,

<sup>12</sup> BdL

maintaining an average of 6.4% until 2000. However, it experienced a decline to 3.6% in 2005, a modest increase to 4.9% in 2007, followed by a subsequent decrease to 2.7% in 2016, reaching a minimal share of 1.4% in 2021.<sup>13</sup>

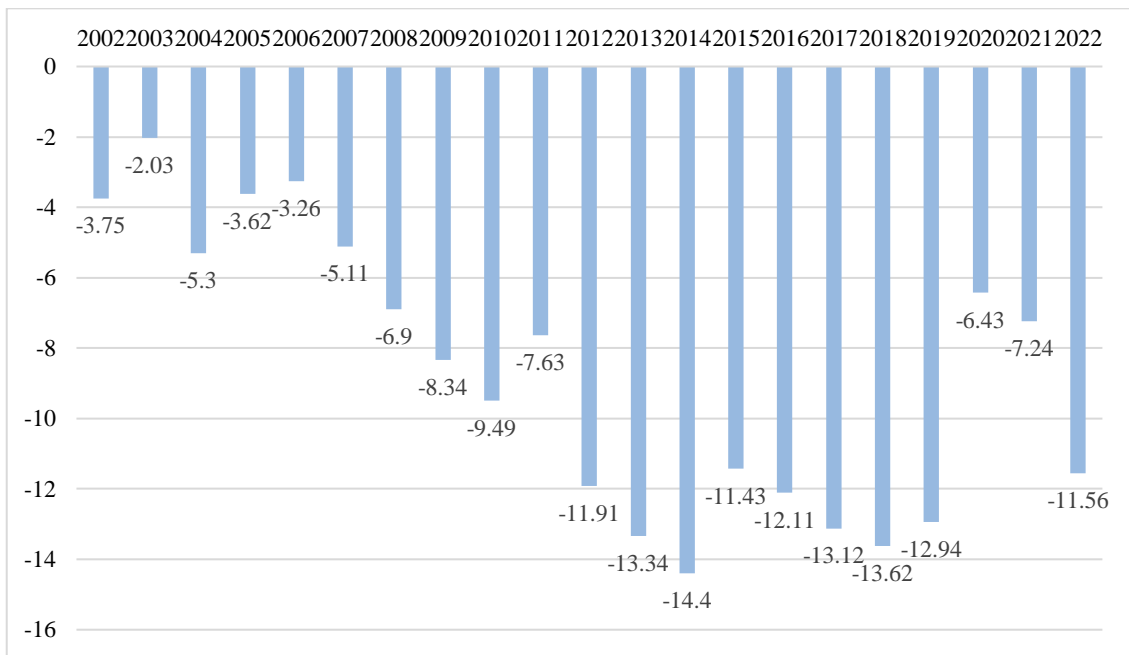


Figure 11. Net trade in goods and services (BoP, current USD in billions)  
Source: World Bank, 2023

<sup>13</sup> World Bank

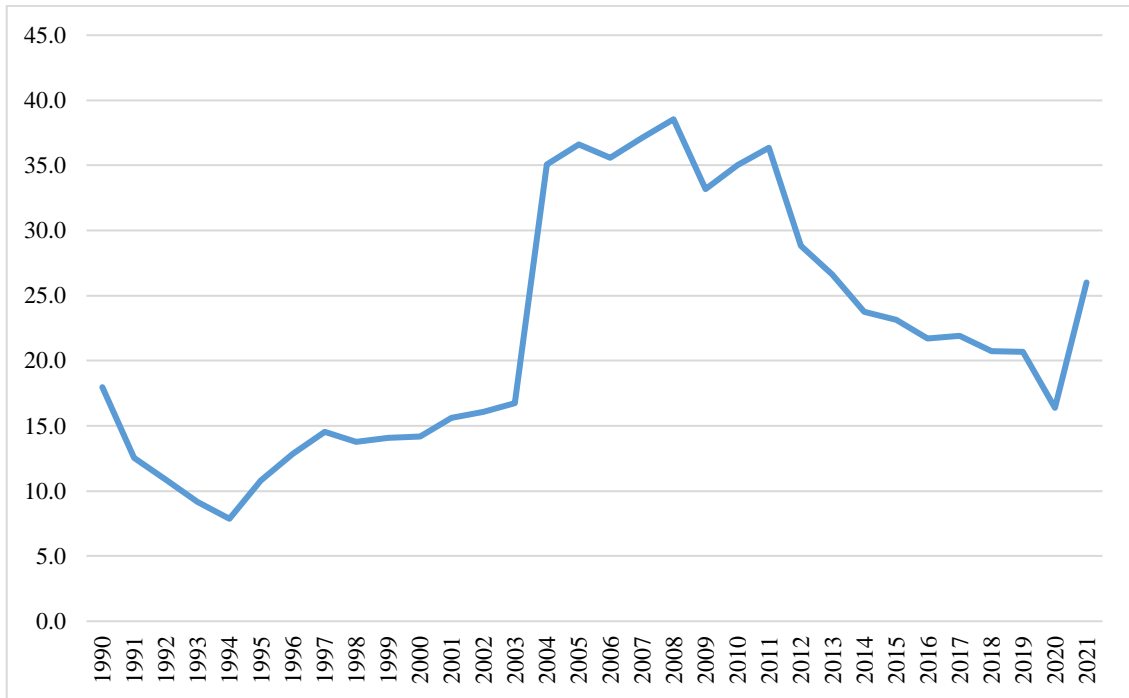


Figure 12. Exports of goods and services (% of GDP)  
Source: World Bank, 2023

### ***Foreign Direct Investment***

According to UNCTAD (2023), global foreign direct investment (FDI) faced a 12% decline in 2022, dropping to \$1.3 trillion. This downturn was influenced by various crises, including the conflict in Ukraine, rising food and energy prices, and increased public debt. The average FDI in Lebanon from 2002 to 2022 was \$217.93 million, with a peak of \$872.50 million in December 2009. In December 2022, FDI in Lebanon rose by \$35.34 million.



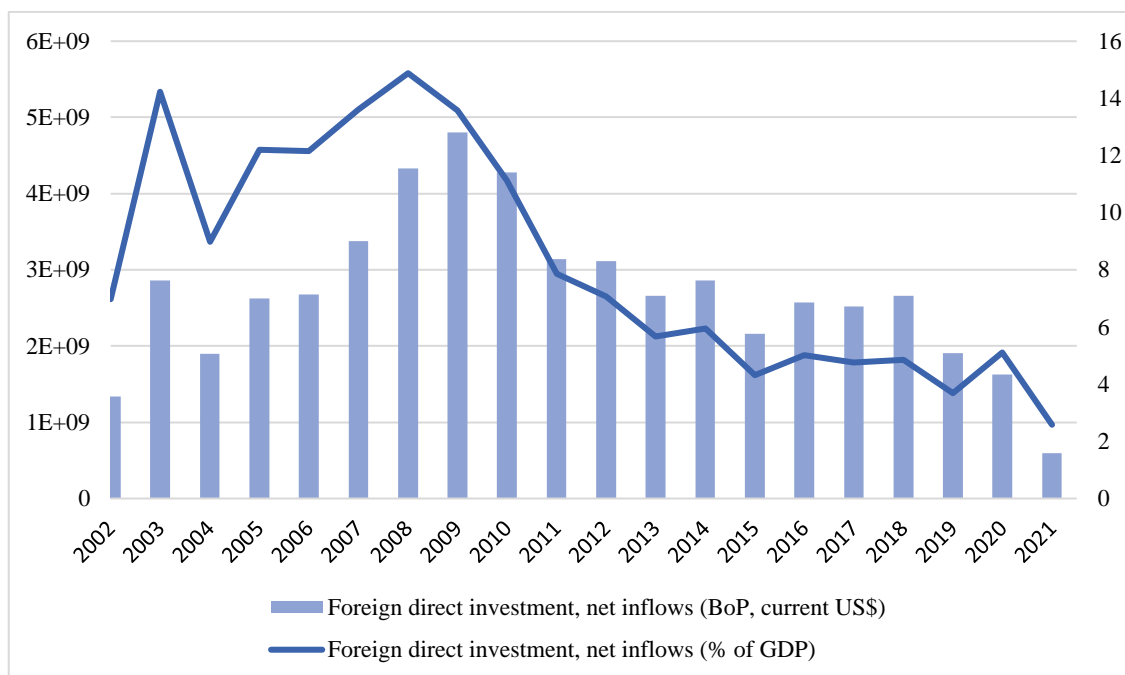


Figure 13. Foreign direct investment, net inflows.  
Source: World Bank, 2023 .

## B. Migration and Remittances Inflows

### 1. Historical Perspective on Remittances in Lebanon

The roots of remittances in Lebanon extend back to the mid-20th century when Lebanese individuals began to migrate in search of economic opportunities abroad. Driven by factors such as economic instability and political unrest, these early pioneers laid the groundwork for a phenomenon that would shape the Lebanese economy for years to come. In initial years, remittances showed how determined and resourceful people were in finding better opportunities abroad.

As the Lebanese diaspora grew and established itself in various corners of the world, remittances emerged as a stabilizing force for families back home. These financial contributions, originating from various locations, differ in volume. In 2021, the Gulf Cooperation Countries stood out as the primary contributors, with 48% of the

remittances having their origins in these countries. Additionally, North America contributed 16%, Western Europe 14%, and Africa 14% to the overall remittance flow.<sup>14</sup>

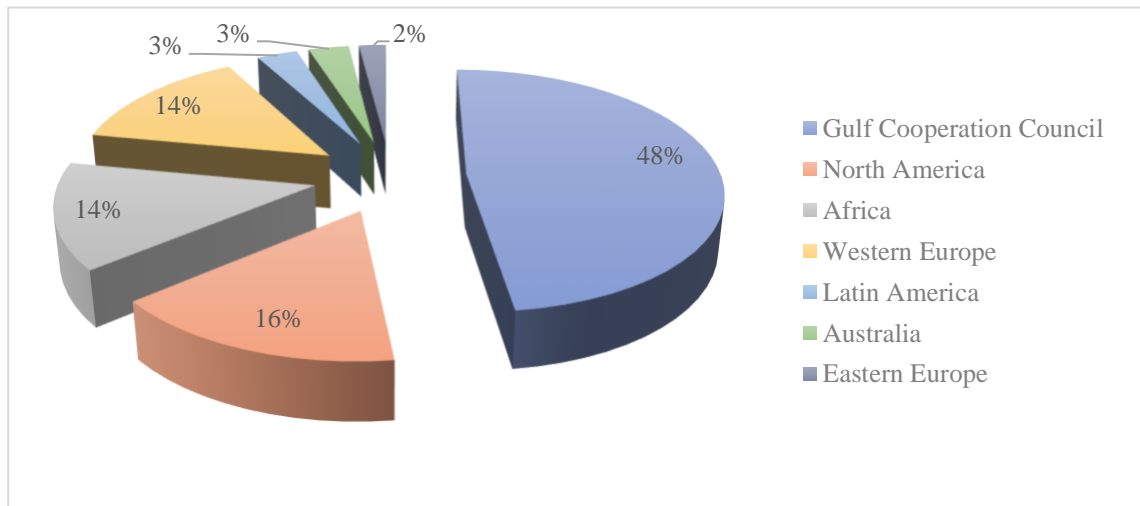


Figure 14. Sources of remittance inflows to Lebanon by regions, 2021.

Source: UNDP Report, 2023.

Based on official data relying on Banque du Liban estimates, the United States, the United Arab Emirates, Saudi Arabia, Australia, and Kuwait collectively accounted for 64% of the total inflows reaching Lebanon in 2020.<sup>15</sup>

<sup>14</sup> United Nations Development Programme [UNDP]. (2023). *The Increasing Role and Importance of Remittances in Lebanon*.

<sup>15</sup> Data sources include Lebanon's Central Bank, Ministry of Foreign Affairs, IDAL, Order of Engineers, and IDAL and Central Bank data.

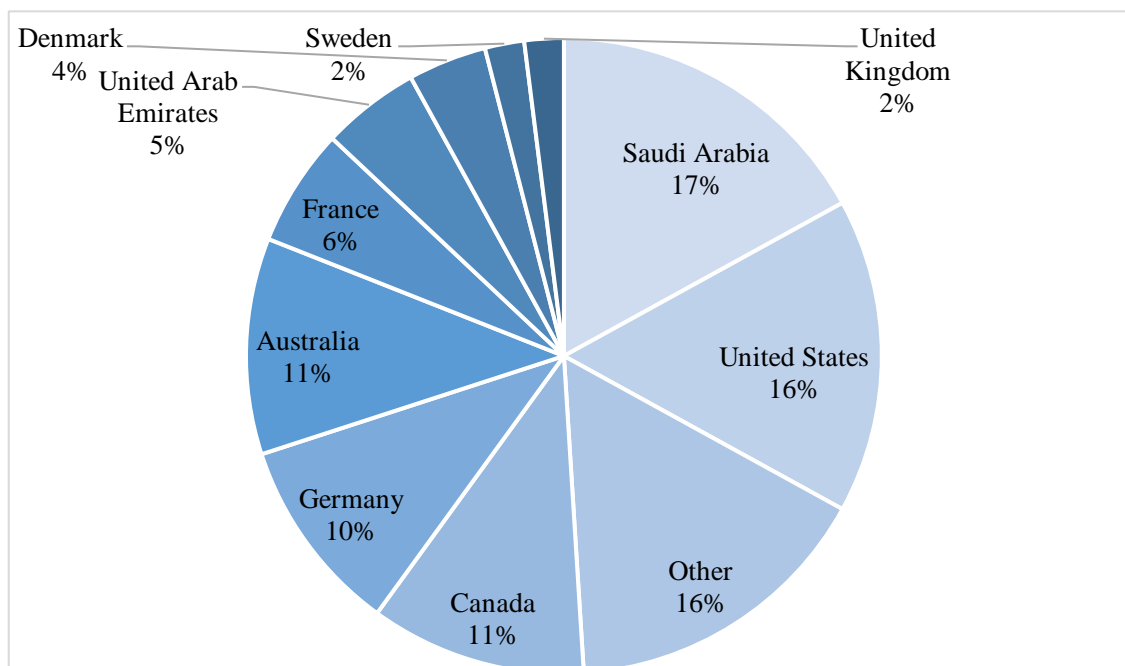


Figure 15. Sources of remittances inflows to Lebanon by countries, 2021.  
Source: World Bank Report, 2023

During tough times of conflict and challenges in Lebanon's recent history, remittances played a vital role in supporting the financial stability of families and communities. This era witnessed a significant transformation in the role of remittances, evolving from individual acts of support to becoming a structural pillar of the Lebanese economy. Beyond the economic implications, the historical perspective on remittances in Lebanon also sheds light on their influence on household dynamics. Remittances became not only a source of financial support but also a bridge connecting families across continents. In 2022, between 15% and 30% of households relied on remittances as a source of income, marking a notable rise compared to the 10% observed in 2018 and 2019.<sup>16</sup> The intercontinental flow of resources became an integral part of the

<sup>16</sup> Central Administration of Statistics & International Labour Organization. (2022). *Labour Force Survey: Lebanon*. [http://www.cas.gov.lb/images/Publications/LFS\\_2022/Presentation%20-%20Follow%20Up%20LFS%20Lebanon%202022.pdf](http://www.cas.gov.lb/images/Publications/LFS_2022/Presentation%20-%20Follow%20Up%20LFS%20Lebanon%202022.pdf)

Lebanese narrative, fostering a sense of interconnectedness that transcended geographical boundaries.

### ***Trends in Remittance Inflows to Lebanon***

Understanding how remittance patterns adapted to economic trends provides valuable insights into the resilience of the Lebanese diaspora and the adaptability of remittance practices. Between 1992 and 2007, around 45% of Lebanese households experienced the departure of at least one family member during that period. During the years of political unrest in Lebanon, remittance inflows either sustained growth or remained steady. After 2002, there was a remarkable surge in emigration from Lebanon, with 46% of individuals leaving the country between 2002 and 2007. Additionally, the percentage of emigrants departing for work-related purposes steadily increased over this timeframe.

The Middle East and North Africa region witnessed a remarkable surge in capital inflows before the 2008 financial crisis. A repercussion of the crisis was a decline in total capital inflows, with the growth slowing down to 12% in 2008 compared to 21.5% in 2007 and contracting by 6.3% in 2009, only to slightly recover and grow by 5.3% in 2010.<sup>17</sup> Similarly, remittance inflows to Lebanon experienced growth, reaching \$5.2 billion in 2006, followed by an 11% increase to \$5.8 billion in 2007, and a significant jump to \$7.18 billion in 2008. In the initial phase of the financial crisis, remittances to Lebanon remained resilient and continued to grow, albeit at a slower pace compared to previous years. Inflows to Lebanon accounted for 21.35% of GDP in 2009, surpassing the regional average of 3.5% of GDP among MENA

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<sup>17</sup> Byblos Bank Economic Research and Analysis Department

countries, making Lebanon the top recipient of remittances in the region. In contrast to Lebanon's positive annual growth, other countries in the region experienced decreases in remittance inflows during the same period, including Egypt, Morocco, Jordan, Syria, and Tunisia. A closer quarterly analysis reveals a different dimension to Lebanon's experience. Remittance inflows to the country experienced a sharp 20% drop in the third quarter of 2008, immediately after the crisis erupted, marking the highest decline among remittance-dependent economies in the region at that time. This period of vulnerability was relatively brief, however, primarily impacting the third quarter of 2008 and the second quarter of 2009. While Lebanon grappled with these fluctuations, the reaction in other remittance-receiving Arab countries was more gradual. The impact on their inflows became noticeable in the fourth quarter of 2008 and intensified in the first quarter of 2009, persisting throughout the year. In 2009, remittance inflows relative to GDP declined in six Arab countries and increased in three, with Lebanon experiencing one of the region's most significant drops. The country's remittance inflows decreased from 24% of GDP in 2008 to 21.35% in 2009. This was the most prominent decrease alongside Jordan, driven by a combination of a mild economic slowdown and a more pronounced deceleration of remittance inflows.

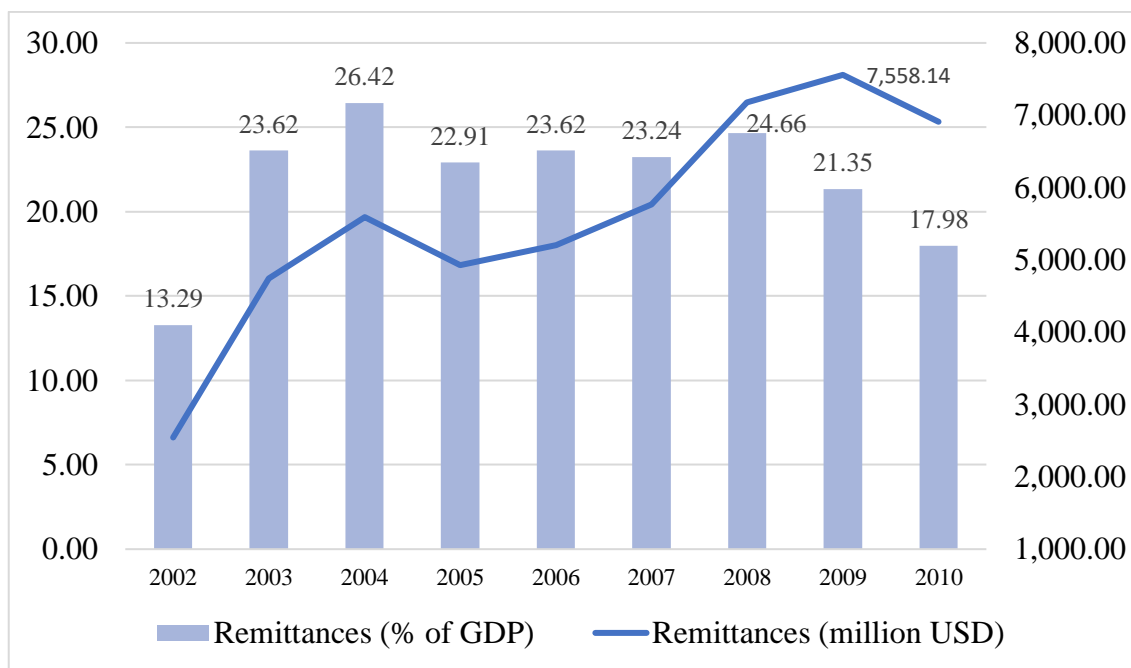


Figure 16. Remittances in Lebanon, 2002- 2010 (USD).  
Source: World Bank, 2023.

Lebanon has experienced a consistent pattern of remittance inflows in absolute nominal terms from 2011 to 2021, fluctuating annually between \$6 billion and \$7 billion. Over this period, the average yearly remittance inflow has been approximately \$6.5 billion. In the early part of the decade, remittances to Lebanon continued to show growth. This period was marked by political instability both within Lebanon and in neighboring countries, notably the Syrian Civil War starting in 2011. From 2016 onwards, Lebanon encountered a significant downturn, marked by increasing public debt, political paralysis, and declining investor confidence. These issues were compounded by the Lebanese central bank's financial engineering operations, which raised concerns about the stability of the country's financial system. Despite these growing economic challenges, remittance inflows remained a critical lifeline for many Lebanese households. However, the growth rate of remittances may have seen fluctuations due to the economic uncertainties and the tightening of global financial

conditions. Both the financial crisis and the repercussions of the COVID-19 pandemic appeared to have minimal impact on remittance inflows, as their levels remained relatively stable since 2019. Surprisingly, remittances inflows in 2020 witnessed an outstanding increase, as the Lebanese diaspora abroad mobilized support in response to the multiple crises facing the country. This spike in remittances was seen as a direct response to the immediate needs following the Beirut explosion and the deteriorating economic conditions, highlighting the diaspora's role in crisis response.

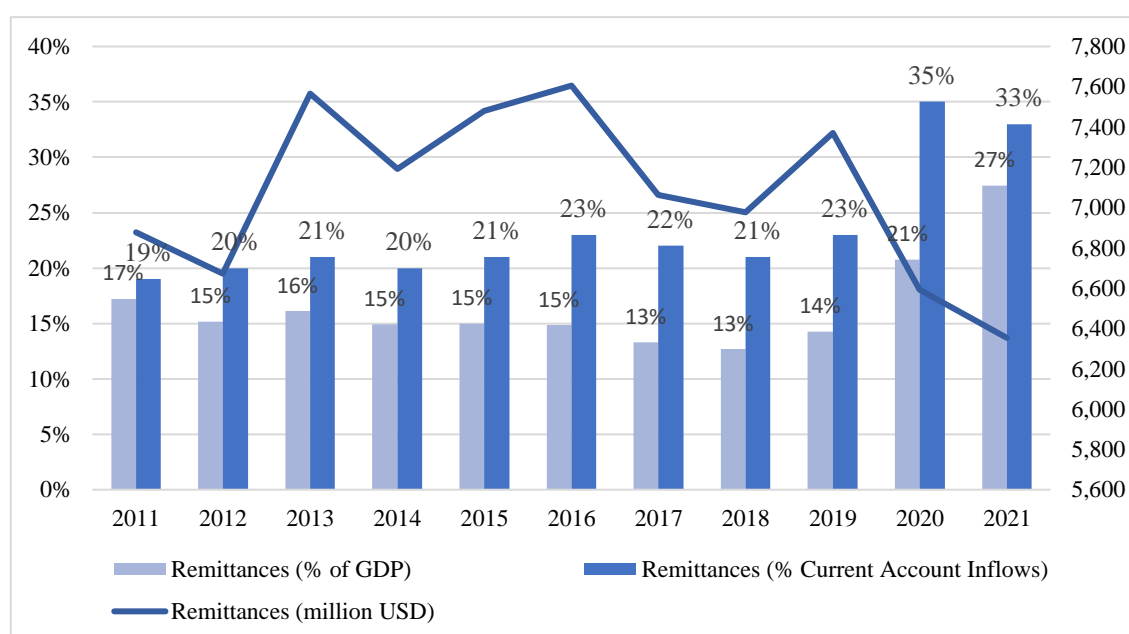


Figure 17. Remittances in Lebanon, 2011- 2021 (USD).  
Source: Calculations based on World Bank and BdL data.

In 2021, as Lebanon faced severe economic challenges including hyperinflation, a banking crisis, and a collapse in public services, remittances not only served as a crucial source of foreign currency but also constituted an essential lifeline for households, remarkably accounting for 21% of the country's GDP. The growing importance of remittances within the Lebanese economy is evident not just in their proportion of the GDP but also in their significant share of total current account inflows

into the nation. This significance is highlighted by their contribution, which constituted 35% of current account inflows in 2020 and adjusted slightly to 33% in 2021. In 2022, remittance flows to Lebanon were estimated at \$6.4 billion, with the country holding the third position regionally in remittance inflows relative to its GDP. Remittances constituted 37.8% of Lebanon's GDP in 2022, marking the highest percentage in the MENA region. Global remittances to Lebanon reached \$6.4 billion in 2023 accounting for 27.5% of its GDP.



## CHAPTER IV

### DATA AND METHODOLOGY

#### **A. Data**

This study utilized monthly data spanning from January 2002 to August 2022, sourced from Banque du Liban. The dependent variable, public debt in foreign currency, represents Lebanon's total public debt denominated in foreign currencies. It reflects the government's borrowing activities over time, critical for understanding fiscal sustainability and external dependency.

The primary independent variable, remittances in foreign currencies, was measured by the net inflows of workers' remittances, as reported by Banque du Liban on a monthly interval. These figures capture the financial contributions from expatriates to Lebanon. The significant impact of diaspora remittances on the Lebanese economy suggests a potential influence on public debt, either through supporting government spending or affecting the balance of foreign exchange reserves. The foreign currency reserves of the central bank, indicated as FC, represent Lebanon's capacity to support its currency and meet external obligations. Changes in these foreign reserves can reflect underlying economic conditions and policy actions, influencing public debt sustainability.

In literature, GDP growth per capita is frequently utilized as a proxy for overall economic growth. For instance, Fakih (2017) resorted to annual data and employed geometric interpolation to translate it into quarterly figures, compensating for the absence of quarterly data for Lebanon. In this study, the Coincident Indicator serves as a proxy for economic activity or growth. This indicator reflects economic activity by

aggregating various data points such as tourist arrivals and construction permits, which are determinants of economic activity. A higher index value indicates a growing economy, while a lower index value suggests economic contraction. The 3-Month Treasury Bill rates, serving as an indicator of the government's short-term borrowing costs, are crucial for understanding debt dynamics; higher rates imply increased debt servicing costs and potentially lead to higher levels of public debt.

The data from the time series were converted into a natural logarithm to reduce potential distortions in the data's dynamic characteristics. Specifically, the series for public debt, remittances, and central bank foreign currencies were converted to their natural logarithms.

Table 2. Summary of variable definition.  
Source: Author's construct, 2024.

<b>Variable</b>	<b>Definition</b>	<b>Source</b>
Debt	Public Debt - Foreign Currency Debt in Million USD	Ministry of Finance
Rem	Workers' Remittances in Million USD	1-Ministry of Labor; 2-General Security; 3-Banking Sector; 4-Banque du Liban
FC	Central Bank Foreign Currencies in Million USD	Banque du Liban
CI	Coincident Indicator	Banque du Liban
TB	3-Month Treasury Bills	Banque du Liban

Table 3. Summary of variable statistics.  
Source: Author's construct, 2024.

Variable	Observations	Descriptive statistics			
		Mean	Standard Deviation	Min	Max
ln(Debt)	248	10.071	0.305	9.165	10.607
ln(Rem)	248	5.800	0.556	0.039	7.238
ln(FC)	248	9.828	0.629	8.019	10.189
CI	248	222.343	59.823	112.000	326.000
TB	248	4.902	1.485	3.470	10.880

## B. Methodology

The Augmented Dickey-Fuller (ADF) (1981) was conducted initially to identify non-stationarity by incorporating lagged increments of the series. Complementing this, the Phillips-Perron (PP) (1988) was employed, focusing on a non-parametric correction for serial correlation and heteroscedasticity in the error terms. To further reinforce the robustness of the stationarity analysis, the KPSS test, suggested by Kwiatkowski et al. (1992), was implemented. This test hypothesizes the stationarity of the series as its null and is particularly reliable in identifying the subtle nature of non-stationarity that other tests may overlook. The deployment of these three distinct yet complementary unit root tests allowed for a comprehensive examination of the stationarity within the dataset. Upon encountering non-stationarity, differencing the data was performed to stabilize the mean, effectively removing any underlying trends and cyclical variations to address the unit root problem and achieve stationarity.

In time series, structural breaks refer to significant shifts in the statistical properties of the series, often triggered by major economic events, policy changes, or technological innovations. These breaks can dramatically alter the behavior of the series and, if not properly accounted for, may lead to misleading conclusions in econometric

analysis. The Quandt-Andrews unknown breakpoint test was employed to ensure the accuracy of the model in reflecting such dynamics. This test is adept at detecting multiple structural breaks at unknown points within the sample, thereby allowing for effective identification and adjustment of these changes. To verify if there was a structural break in the data specified in May 2016 by the Quandt-Andrews breakpoint test, the Chow breakpoint test was conducted. This period particularly coincided with critical financial operations conducted by Banque du Liban. To address the structural shift in May 2016, a dummy variable was introduced. To further ensure robustness, the unit root breakpoint test was conducted to detect any potential changes in unit roots after confirming the presence of a structural break in that year.

Cointegration is a method used to model time series while preserving their long-term information. The concept of cointegration was first formally introduced by Granger (1981) and later by Engle and Granger (1987). They developed tests and estimation procedures to determine the presence of long-term relationships among a set of variables within a dynamic specification framework. Establishing cointegration is crucial for identifying significant long-term relationships within a model. According to Nkoro and Uko (2016), without confirming cointegration among the variables, the analysis would shift towards examining the variables in their differenced form to explore their dynamics. To enhance understanding of the long-term relationships among the variables, the Autoregressive Distributed Lag (ARDL) bounds test for cointegration was applied. This model was selected for its capability to manage various integration levels, demonstrating superiority to conventional cointegration models by offering simultaneous short and long-term estimations (Isik, 2013). The ARDL method not only identifies the presence of cointegration but also specifies the cointegrating relationship.

This method involves testing the null hypothesis of no cointegration against the alternative of existing cointegration, using the computed F-statistic. If this F-statistic exceeds the upper bound critical value, the null hypothesis is rejected, indicating a cointegration relationship. Upon identifying a cointegrating relationship, the ARDL model is reparametrized into an Error Correction Model (ECM), facilitating the investigation of both short-term dynamics and long-term equilibrium without losing long-run information. The model specification for the ARDL that was estimated is as follows:

$$\begin{aligned}
\Delta \ln(Debt)_t = & c + \delta_1 \ln(Debt)_{t-1} + \theta_1 \ln(Rem)_{t-1} + \lambda_1 \ln(FC)_{t-1} + \varphi CI_{t-1} \\
& + \eta_1 TB_{t-1} + \mu_1 D_{t-1} + \mu_2 (DUM \cdot \ln(Rem))_{t-1} \\
& + \mu_3 (DUM \cdot \ln(FC))_{t-1} + \mu_4 (DUM \cdot CI)_{t-1} + \mu_5 (DUM \cdot TB)_{t-1} \\
& + \sum_{i=1}^{p-1} \gamma_i \Delta \ln(Debt)_{t-i} + \sum_{i=1}^q \beta_{1i} \Delta \ln(Rem)_{t-i} + \sum_{i=1}^q \beta_{2i} \Delta \ln(FC)_{t-i} \\
& + \sum_{i=1}^q \beta_{3i} \Delta CI_{t-i} + \sum_{i=1}^q \beta_{4i} \Delta TB_{t-i} + \varepsilon_t
\end{aligned}$$

Where  $\Delta$  represents the difference operator, indicating the change from one period to the next. The coefficients  $\delta_1, \theta_1, \lambda_1, \varphi_1, \eta_1$  correspond to the lagged level of public debt, remittances, foreign currency reserves, Coincident Indicator, and Treasury Bills respectively. These coefficients are designed to capture the long-run impact of each variable on public debt within the ARDL.

$D_{t-1}$  and all  $\mu$  coefficients represent the dummy variable and its interactions, allowing for the impact of the structural break to be separately identified. The term  $\mu_1$  is the coefficient of the lagged dummy variable representing the structural break. The terms  $\mu_2$  through  $\mu_5$  specifically measure the interactive effects of the dummy variable with each of the independent variables, reflecting changes in these relationships due to the structural break. The term  $\gamma_i$  represents the short-run dynamic coefficients for the lagged

differences in public debt. The terms  $\beta_{1i}, \beta_{2i}, \beta_{3i}, \beta_{4i}$  are the short-run dynamic coefficients for the lagged differences of remittances, FC, CI, and TB respectively. The error term in the ARDL model is  $\varepsilon_t$ . The ECM equation was therefore specified as follows:

$$\begin{aligned} \Delta \ln(Debt)_t = & \pi_0 + \sum_{i=1}^{p-1} \pi_i \Delta \ln(Debt)_{t-i} + \sum_{i=1}^q \xi_{1i} \Delta \ln(Rem)_{t-i} \\ & + \sum_{i=1}^q \xi_{2i} \Delta \ln(FC)_{t-i} + \sum_{i=1}^q \xi_{3i} \Delta CI_{t-i} + \sum_{i=1}^q \xi_{4i} \Delta TB_{t-i} + \varphi ECM_{t-1} \\ & + v_t \end{aligned}$$

Where  $\varphi$  is the coefficient of the error correction term (ECT), representing the speed at which deviations from the long-run equilibrium are corrected.  $ECM_{t-1}$  represents the lagged value of the error correction term, calculated from the residuals of the long-term cointegrating relationship estimated in the ARDL model. The coefficient  $\varphi$  should ideally be negative, signifying a correction towards the long-term equilibrium. The constant term in the ECM is  $\pi_0$ . The term  $\pi_i$  represents the short run coefficients for the lagged differences in public debt within the ECM. The lagged differences in remittances, FC, CI, and TB respectively within the ECM are  $\xi_{1i}, \xi_{2i}, \xi_{3i}, \xi_{4i}$ . The stochastic error term in the ECM is  $v_t$ .

After establishing a long-run equilibrium relationship between the variables of interest and running the ECM, the analysis proceeded to investigate further short-run dynamics. This was done through Granger causality tests, which were pivotal for understanding the directional influences and predictive power of the variables over each other in the short term. Following the determination of the short-term and long-term coefficients, a series of diagnostic and stability examinations were performed to confirm

the model's robustness. These checks were essential to verify the absence of serial correlation and heteroskedasticity, and to ascertain the model's stability over time.

## CHAPTER V

### RESULTS

#### A. Stationarity Tests

Emeka and Aham (2016) assert that conducting regression analysis on non-stationary series leads to unreliable outcomes, rendering them ineffective for analysis, forecasting, or the development of policies. The selection of the optimal lag for the ADF test followed the Schwarz Information Criterion (SIC), and the PP test employed the Newey-West estimator, which utilized the Bartlett kernel function (Newey & West, 1994). The lag selection criterion for the KPSS test was automatically determined using the Newey-West estimator, ensuring precise adjustments for autocorrelation and enhancing the test's accuracy.

The transformed series of public debt and remittances demonstrated stationarity at the level when a trend was accounted for, thus not requiring differencing and indicating an integration order of zero,  $I(0)$ . Central bank foreign currencies (FC) and the Coincident Indicator (CI) required first differencing to achieve stationarity, classifying as  $I(1)$ . The 3-Month Treasury Bills (TB) displayed stationarity at the level, indicating that it was  $I(0)$ , and no differencing was necessary for this particular series. This showed that there were no  $I(2)$  series among the variables, only  $I(0)$  and  $I(1)$  series were present, making the use of the ARDL approach more suitable. Results from the unit root test are displayed in the table.



Table 4. Unit root test (ADF).  
Source: Author's construct, 2024.

	<b>Constant, no trend</b>		<b>Constant, trend</b>	
	Intercept	Prob	Intercept	Prob
<b>Levels</b>				
ln(Debt)	-3.430276	0.0108	-5.137229	0.0002
ln(Rem)	-3.265811	0.0013	-5.21788	0.0001
ln(FC)	-3.252518	0.0183	1.057668	0.9999
TB	-4.380136	0.0004	-3.947080	0.0116
<b>First Difference</b>				
dln(FC)	-4.834631	0.0001	-12.70287	0.0000
d(CI)	-13.13595	0.0000	-13.41033	0.0000

## B. Structural Breaks and the Breakpoint Unit Root Test

The Quandt-Andrews test results showed significant values for the maximum LR and Wald F-statistics, indicating that there are structural breaks within the sample period from January 2002 to August 2022. The test pointed out the presence of a structural break specifically around May 2016. The significance of the test statistics suggested that the structural stability of the regression model is violated around this breakpoint. This means that the relationship between the variables might have changed at this point in time.

Table 5. Quandt-Andrews unknown breakpoint test.  
Source: Author's construct, 2024.

<b>H<sub>0</sub>: No breakpoints within 15% trimmed data</b>		
<b>Statistic</b>	<b>Value</b>	<b>Prob</b>
<b>Maximum LR F-statistic (2016M05)</b>	200.525	0.000
Maximum Wald F-statistic (2016M05)	1002.629	0.000
<b>Exp LR F-statistic</b>	96.157	0.000
Exp Wald F-statistic	496.231	0.000
<b>Ave LR F-statistic</b>	110.243	0.000
Ave Wald F-statistic	551.217	0.000

To confirm the presence of a structural break in May 2016, the Chow breakpoint test was used. The results indicated very strong statistical evidence for a structural break in the data in May 2016. The F-statistic, log-likelihood ratio, and Wald Statistic were all significant, further rejecting the null hypothesis of no breaks at specified breakpoints.

Table 6. Chow breakpoint test 2016M05.  
Source: Author's construct, 2024.

<b>H<sub>0</sub>: No breaks at specified breakpoints</b>			
<b>F-statistic</b>	200.526	Prob. F(5,238)	0.000
Log likelihood ratio	409.474	Prob. Ch-Square(5)	0.000
Wald Statistic	1002.629	Prob. Chi-Square(5)	0.000

This confirmation of a structural break corresponded with notable events in Lebanon. During the first half of 2016, Lebanon witnessed a decline in foreign exchange inflows, leading to a decline in official international reserves. In response, between May and October, the Central Bank of Lebanon implemented unconventional financial operations aimed at restoring reserves. These measures not only replenished the reserves but also significantly increased Lebanese pound liquidity and heightened

the commercial banks' financial exposure to the government. These changes potentially affected debt dynamics, remittance flows, foreign currency reserves, and yields on short-term government securities. This is why a dummy variable was created to mark these structural changes, providing a clear distinction in the analysis to assess the impacts of these interventions accurately.

After performing the unit root breakpoint test, the series for public debt and remittances achieved stationarity without the need for differencing. The series for central bank foreign currencies and the Coincident Indicator, however, appeared non-stationary at the level but attained stationarity upon first differencing. The series for the 3-month Treasury Bill rates was found to be stationary at level. The Zivot-Andrews was also performed to test for stationarity in the presence of a structural break. The results also indicated the same outcome.

Table 7. Unit root breakpoint test.  
Source: Author's construct, 2024.

	<b>Constant, no trend</b>		<b>Constant, trend</b>	
	t-statistic	Prob	t-statistic	Prob
<b>Levels</b>				
ln(Debt)	-5.475702	< 0.01	-5.937657	< 0.01
ln(Rem)	-12.93235	< 0.01	-12.9998	< 0.01
TB	-8.40458	< 0.01	-9.436552	< 0.01
<b>First Difference</b>				
dln(FC)	-12.74467	< 0.01	-14.34289	< 0.01
d(CI)	-15.62526	< 0.01	-15.84297	< 0.01

### C. Bounds Test for Cointegration

The stationarity of the series was verified before carrying out the bound test for cointegration, which is a necessary step when applying the ARDL model. The outcomes of this cointegration bound test are detailed in Table.

Table 8. Bound test results.  
Source: Author's construct, 2024.

<b>F-bounds Test</b>				
<b>H<sub>0</sub>: No levels relationship</b>				
	Value	Sig	I(0)	I(1)
<b>F-Stat</b>	3.831641	10%	1.88	2.99
<b>K</b>	9	5%	2.14	3.3
		2.50%	2.37	3.6
		1%	2.65	3.7

The computed F-statistic, as indicated in the preceding table, is 3.831641, which exceeds both the upper I(0) and lower I(1) bound critical values for all conventional significance levels (10%, 5%, 2.5%, and 1%). Since the F-statistic is above the critical value threshold, there is evidence to reject the null hypothesis of no long-run relationship between the variables at a 1% significance level, which is very strong evidence. This suggests that there is a cointegrating relationship among the variables, meaning they move together in the long run. Following the confirmation of a long-term relationship between debt and the variables, the Autoregressive Distributed Lag model was applied to estimate the long-term coefficients. The results from the model showed that not all variables significantly influence the dependent variable.

Table 9. Long-run effects.  
Source: Author's construct.

Levels Equation				
Model: ARDL(2,1,1,2,1,0,0,1,0,1)				
Case 3: No trend with unrestricted Constant				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
ln(Rem)	0.065604	0.049558	1.323784	0.0498
ln(FC)	-0.292318	0.217066	-1.346679	0.1794
CI	0.005811	0.00246	2.361972	0.019
TB	0.001692	0.043158	0.039209	0.9688
DUM	7.888229	4.537348	1.738511	0.0535
DUM*ln(Rem)	-0.752417	0.459384	-1.637803	0.1028
DUM*ln(FC)	-0.112073	0.367626	-0.304856	0.7608
DUM*CI	-0.00575	0.002933	-1.960347	0.0512
DUM*TB	-0.086519	0.138413	-0.62508	0.5325

The positive and statistically significant coefficient for remittances indicated that in the long term, higher remittance inflows were associated with an increase in public debt. In theoretical terms, two distinct scenarios could result in a country increasing its debt. The first involves a positive impact on reserves leading to heightened debt: here, a surge in remittance inflows could amplify a country's international reserves by contributing additional foreign exchange earnings. The expanded reserves would then enhance the nation's borrowing capabilities, acting as collateral that could potentially give rise to increased levels of external debt. The second scenario is a more paradoxical one, where remittances inadvertently lead to an increase in debt through the mechanism known as Dutch disease. In this scenario, remittances swell household income, which can escalate consumption and appreciation of the local currency, eroding the competitiveness of the country's exports. The ensuing decrease in international reserves, intended to function as a buffer against external economic shocks, may actually impair the country's resilience. As the cushion of reserves deflates, the country might find itself obliged to increase its borrowing, aiming to compensate for

the diminished self-insurance capability and maintain economic stability. Therefore, the findings suggested that funds sent home by the diaspora could have been indirectly financing public borrowing, possibly through increased deposits in local banks which were then lent to the government. If there was corruption, these funds might have been misallocated or not used efficiently, leading to a need for increased borrowing. This aligned with the first scenario, where remittances are improving the country's foreign exchange earnings effect, which in turn could have been increasing external debt through the collateral effect.

The positive and statistically significant coefficient at the 5% level for the Coincident Indicator highlighted that better economic conditions, as reflected by this variable, were associated with an increase in public debt in foreign currency. This might have reflected counter-cyclical borrowing patterns where the government was more inclined to issue debt during periods of economic prosperity, or it might have suggested greater access to international debt markets under favorable economic conditions. However, a deeper examination of Lebanon's economic structure revealed underlying complexities. In the case of Lebanon, remittances from migrants predominantly served as a means of supplementing household income, primarily being used to offset expenses for essential services such as education, healthcare, housing, and utilities due to the inadequate provision of these public goods. This spending behavior largely supported the consumer economy rather than productive investment. The excess funds from remittances often ended up deposited in local banks, which in turn fueled growth in the services sector. This expansion in services led to increased wage demands across the economy, making tradable sectors like manufacturing less competitive due to rising labor costs. From 1992 to 2017, the proportion of Lebanon's GDP attributed to the

services sector grew from 66.8% to 81.2%. Conversely, the percentage representing tradable sectors such as agriculture and manufacturing decreased from 33.22% to 18.76% over the same timeframe (Talhouk, 2019). Additionally, from December 1989 to 2021, GDP per capita growth in Lebanon averaged 3.584%, suggesting that the shift towards a service-dominated economy might not have translated into widespread economic prosperity or improved living standards. This structural transformation had significant implications for economic growth and public debt. The move towards a service-dominated economy may have contributed to lower overall productivity and economic growth, which could have impacted the government's ability to generate sustainable revenue. Consequently, even if economic indicators like the CI showed improvements, they might not have fully captured the potential long-term economic challenges stemming from this sectoral shift. The reliance on services, which are generally less capital intensive and lower in productivity compared to manufacturing, might have limited the growth potential and exacerbated public debt burdens, as the government may have continued to borrow to support or stimulate the waning high-productivity sectors. This transformation, indicative of the Dutch disease, highlights how reliance on remittances and the resultant growth of the service sector could be displacing more productive sectors.

It's also worth noting that the significant positive coefficient for the Coincident Indicator could have been suggestive of scenario one as well, where economic stability or improvement, reflected by the CI, increased the ability to attract or service external debt. This might have also indicated that during stable times, the government anticipated future downturns and borrowed preemptively, which could have been related to the precautionary aspect of the reserves.

Central bank foreign currency holdings and Treasury Bill rates showed no significant long-run effects at conventional levels, indicating that within the model's scope, these factors did not have a discernible impact on public debt's long-term behavior, possibly because they are more relevant for short-term financial conditions rather than sustained economic trends. The dummy variable captured the specific period during which the foreign exchange inflows declined and Banque du Liban implemented unconventional financial operations to manage reserves and liquidity. While not significant at the 5% level, it was close enough to suggest that such events may have had a subtle impact on the public debt level, potentially through indirect channels such as the cost of new debt issuance or the refinancing of existing debt. The nonsignificant interaction terms suggested that the financial operation period marked by the dummy variable did not significantly alter the long-term debt relationship with remittances, foreign currency reserves, the Coincident Indicator, or Treasury Bill rates. However, there was a hint of a nuanced interaction with the Coincident Indicator, which warranted a closer look to understand how Banque du Liban's operations might have influenced public debt through these economic variables. This economic growth indicator might have shown mixed responses. While financial operations were aimed at stabilizing the economy and could bolster short-term growth or confidence, the increased exposure of banks to sovereign risk and the significant liquidity could lead to long-term economic pressures.

#### **D. Short Run Dynamics**

The coefficient of the error correction term has a negative sign and is statistically significant even at a 1% significance level. The negative sign of the ECM coefficient is consistent with the theory and indicates that public debt will adjust in the



opposite direction of any deviation from the long-term equilibrium. If public debt is above its equilibrium level, it will decrease in the next period; if it is below equilibrium, it will increase. With monthly data, a 5.74% adjustment back to long-run equilibrium each month indicates a fairly responsive correction mechanism. In the context of public finance and debt management, this could be considered a relatively rapid adjustment, given that government fiscal policies and interventions typically take time to implement and manifest their effects. This degree of responsiveness in monthly data could imply that fiscal or monetary policies are adjusted frequently to address imbalances. Overall, this significant and negative ECT coefficient confirms that the model is well-specified in that it captures the dynamic process where public debt responds to deviations from its long-run path and suggests that the mechanisms to correct such deviations are effective and active.

Table 10. ARDL Error Correction Regression.  
Source: Author's construct, 2024.

<b>Model: ARDL(2,1,1,2,1,0,0,1,0,1)</b>				
Case 3: Unrestricted Constant and No Trend				
Variable	Coefficient	Std.Error	t-Statistic	Prob
C	0.644876	0.101291	6.36564	0.0000
D(lnDebt(-1))	-0.23877	0.058057	-4.1127	0.0001
D(lnRem)	0.000599	0.021737	1.344967	0.0496
D(lnFC)	0.037843	0.029082	1.301255	0.04605
D(CI)	-2.1E-05	0.000123	-0.17435	0.8617
D(CI(-1))	-0.00028	0.000123	-2.30936	0.0218
D(TB)	-0.02135	0.006594	-3.23822	0.0014
D(DUM*lnFC)	-0.01613	0.005844	-2.760612	0.0062
D(DUM*TB)	0.026083	0.012983	2.009054	0.0457
CointEq(-1)*	-0.05738	0.009092	-6.31154	0.0000

The coefficient for the lagged public debt is negative and statistically significant at the 1% level, indicating a counterbalancing mechanism in public debt management. When debt increased in one period, there seemed to be an effort to reduce it in the following period, possibly through fiscal tightening or repayments. This indicates a reactive fiscal policy stance where increases in debt are followed by measures to curtail it. However, the positive coefficient for remittances suggested that in the short term, as remittances increased, there was a corresponding increase in public debt. This could imply that remittances were facilitating or funding government borrowing. This relationship could be due to various factors, including increased deposits from remittances into the banking system that were then lent to the government, or remittances increasing overall economic activity and government revenues, which then led to increased fiscal capacity for borrowing.

A significant positive coefficient for FC suggested that, in the short run, increases in foreign currency reserves were associated with increases in public debt, which could be interpreted in several ways. First, the government might have been more inclined to borrow when reserves were high, as it could signal to lenders that the country had a buffer to meet external obligations, potentially obtaining better terms for new debt or rolling over existing debt. Second, higher reserves might have boosted confidence in the government's fiscal capacity, leading to increased spending or investment financed through additional borrowing. A third case could be operational linkages in financial management practices where increases in reserves, for example through issuance of debt securities to international investors, were directly reflected in higher public debt. Markets could have also interpreted high reserves as a sign of strength, which could temporarily allow the government to incur more debt due to

improved market conditions or lowered risk perceptions. Another possibility is that foreign currency reserves could act as lagging indicators. In this scenario, the increase in reserves might have resulted from previous borrowing activities, such as the proceeds from issued sovereign bonds that subsequently boosted the reserves, which explains the simultaneous increase in both reserves and debt. Another scenario involves the government adopting a counter-cyclical fiscal strategy where it increased spending to stimulate the economy during periods of favorable reserve levels. This approach helps maintain economic stability and buffers against short-term external shocks when the reserves are sufficiently robust. Hence, in the short run, the positive association between FC and public debt could have been indicative of scenario one, where higher reserves encouraged more borrowing due to increased confidence from lenders or better market conditions. This aligns with the idea that reserves can act as collateral, enhancing a country's borrowing capacity.

The negative and significant coefficient for the lagged change in the Coincident Indicator implied that if the CI increased in the previous period, it was associated with a decrease in public debt in the subsequent period. This suggested that an improving economy may have allowed for better fiscal management or increased revenue, leading to a reduction in public debt levels. Additionally, economic growth typically led to increased tax revenues and a reduced need for certain types of public spending, both of which could contribute to a lower fiscal deficit. A smaller deficit means the government needed to borrow less money to finance its operations, ultimately leading to less debt accumulation.

As for the 3-Month Treasury Bill rates, the negative and significant coefficient indicated that an increase in Treasury Bill rates from the previous period was associated

with a decrease in public debt in the subsequent period. This could imply that higher Treasury Bill rates discouraged government borrowing or reflected tighter monetary policy conditions. Specifically, this may have been due to the government's response to rising Treasury Bill rates, possibly by decreasing borrowing to avoid higher interest costs, or it could have reflected a tightening of liquidity, leading to a reduction in debt issuance. These results suggest that Treasury Bills played different roles depending on the time horizon being considered. In the short term, they were part of the tactical management of debt levels, but they did not influence the strategic, long-term approach to public debt management as evidenced by their non-significant long-run coefficient.

The interaction terms involving the dummy variable and FC and the dummy variable with Treasury Bill rates were observed to be significant. The negative coefficient for the dummy with FC suggested that during the period marked by the dummy variable, which represents the structural break, the expected positive relationship between FC and public debt was altered. It's an indication that the policies implemented by Banque du Liban during the structural break effectively led to a short-run improvement in the public debt situation, contrary to what might have been expected during a period without such significant interventions. By creating significant liquidity and increasing banks' exposure to the sovereign, the operations could have had complex repercussions, including how banks and the government manage foreign currency assets and liabilities, impacting public debt levels as a side effect. While these operations were successful in boosting FC reserves in the short term, they might have done so at the cost of potential long-term economic vulnerabilities. For example, the creation of excess Lebanese pound liquidity could have led to inflationary pressures or future balance of payments issues. By involving commercial banks in the financial

operations, their exposure to sovereign debt increased. While this helped to bolster FC reserves, it also potentially increased the financial system's overall risk.

Typically, higher Treasury Bill rates can increase government borrowing costs, as they raise the interest rates the government must pay on new and existing short-term debt. The interaction term indicated that during the period of financial operations, increases in Treasury Bill rates were associated with increased public debt levels more than usual. The financial operations in 2016 might have included adjustments to monetary policy that affected interest rates, including those on Treasury Bills. For instance, in attempting to stabilize the currency and financial markets, BDL might have influenced the rates to either control inflation, manage liquidity, or support the government's borrowing needs in a strained economic environment. The significant interaction suggests that the financial engineering not only aimed to shore up reserves but also had implications for the government's debt management due to altered fiscal and monetary conditions.

#### **E. Causality Tests**

Upon confirming the long-run relationships between the variables through the ARDL model, causality tests were conducted to look into the short-run interactions. The Wald test was employed to test the null hypothesis that the coefficients of the lagged values of the independent variables are jointly zero. Rejecting this null hypothesis indicates that the independent variables Granger-cause the dependent variable, implying that past values of the independent variables have predictive power for the current value of the dependent variable. The Wald test results, indicated by the exceptionally small p-values, firmly rejected the null hypothesis at any conventional

significance level. This finding confirmed a statistically significant relationship between the independent variables and the dependent variable, signifying the presence of short-run causality. It also implied that the variables in the model are meaningful predictors and contribute to explaining the variance of the dependent variable in both the short-run and the long-run.

Table 11. Wald test.  
Source: Author's construct, 2024.

<b>Test Statistic</b>	<b>Value</b>	<b>df</b>	<b>Probability</b>
<b>F-statistic</b>	2588.134	(18,227)	0.0000
<b>Chi-square</b>	3115.682	18	0.0000

Building on the findings from the Wald test, the analysis proceeded with pairwise Granger causality tests to further investigate the directional influences between variables. The results indicated that remittances Granger-cause debt, suggesting that past values of remittances contain information useful for predicting future values of public debt. Additionally, a bidirectional causality was found between debt and remittances. This bidirectional relationship was robust across all examined lag lengths, from 2 through 7, consistently demonstrating that remittances can be used to predict public debt levels. Moreover, public debt was found to consistently influence foreign currency reserves across lags 2 through 7, which points to the predictive power of debt levels over central bank foreign currency holdings. Conversely, no causality in either direction was detected between the Coincident Indicator and public debt, suggesting a lack of predictive power of CI for debt at multiple lags. Treasury Bills exhibited a varied influence on debt across different lags, with some predictive power noted at lag 2, but this influence was not observed at longer lags. The analysis demonstrated that from lags 2 through 4, a bidirectional causality exists between central bank foreign

currency holdings and Treasury Bill rates. Hence, changes in the central bank's foreign reserves could forecast shifts in Treasury Bill rates, and vice versa, Treasury Bill rates also had forecasting power over the fluctuations in foreign currency holdings. However, this bidirectional causality did not persist throughout all time lags. At lag 7, for instance, the relationship became unidirectional, with central bank foreign currency holdings continuing to Granger-cause Treasury Bill rates, but not the other way around. This suggested that while the central bank's reserve levels could impact government borrowing costs in the longer term, the opposite effect of Treasury Bill rates predicting reserve levels was not observed at this extended lag. The analysis also revealed that remittances Granger-cause Treasury Bill rates from lags 2 through 4, indicating that fluctuations in remittance inflows were predictive of changes in government borrowing costs. Furthermore, the analysis revealed that changes in central bank foreign currency holdings Granger-cause remittances and vice versa. This finding of bidirectional causality between foreign currency holdings and remittances highlights a reciprocal relationship, indicating that fluctuations in one are predictive of changes in the other.

In the ARDL model analysis, the long-run relationship revealed significant effects of the Coincident Indicator and remittances on public debt. Additionally, the Granger causality test uncovered a bidirectional causality between remittances and public foreign currency debt, illustrating that changes in one are predictive of changes in the other. This interlinking suggests that remittances can influence future levels of debt and, conversely, fluctuations in debt levels can also inform future remittance flows. If financial inflows such as remittances were primarily used to stabilize the currency, as indicated by the significant relationship with foreign currency, or to service debt, as

suggested by the causality with debt, they might not have been invested in productive sectors that could stimulate economic growth.

In the short-run analysis, several significant relationships were identified among variables. Firstly, remittances showed a positive relationship with public debt, indicating that increases in remittances were associated with increases in public debt. Similarly, foreign currency reserves showed a positive correlation with public debt, suggesting that higher reserves may have encouraged more government borrowing. This could imply that reserves were not just a buffer but were actively being used for financial obligations, such as financing the import bill and maintaining the fixed exchange rate, which could have been a heavy burden on the country's fiscal resources. The accumulation of reserves to finance imports and stabilize the currency could have limited the government's fiscal space. The funds used for these purposes might not have been available for other productive investments within the country, leading to a crowding out effect where government borrowing or spending displaced private sector investment. The results confirmed the existence of a transmission channel through which remittances affected external debt through central bank foreign currencies in Lebanon, a relationship that remains ambiguously explored in the literature.

The relationship between Treasury Bill rates and public debt was also found to be significant, although the influence varied with different lags, indicating that changes in Treasury Bill rates could impact public debt levels. Additionally, a bidirectional causality was detected between central bank foreign currency holdings and Treasury Bill rates at shorter lags, which transitioned to a unidirectional influence from reserves to Treasury Bill rates at longer lags. The relationship between Treasury Bills and public foreign currency debt suggested that the government's borrowing needs might have



been crowding out private investment. High rates on TBs could attract capital that might otherwise have been invested in business or infrastructure, thus stifling economic growth.

While remittances were found to Granger-cause public debt, the Coincident Indicator was not. This suggested that while the Coincident Indicator and debt levels moved together over the long run, the Coincident Indicator did not provide short-term predictive information for debt levels. The lack of significant causality between CI and these variables might have also pointed to a "leakage" effect, where potential growth stimuli were diverted away from productive use, possibly through corruption or mismanagement of funds, leading to economic stagnation.

#### **F. Residual and Stability Diagnosis**

The study examined normality, serial correlation, and heteroskedasticity employing the Jarque-Bera test, Breusch-Godfrey serial correlation LM test, and Breusch-Pagan residual test in that order. The table shows that there is no heteroskedasticity and the data follows a normal distribution, indicated by the F-statistic probability value exceeding the 5% significance level. Furthermore, parameter stability was verified by the CUSUM of Squares test.

Table 12. Results of residual and stability tests.  
 Source: Author's construct, 2024.

<b>Method</b>	<b>F-Statistic</b>	<b>Prob</b>	
<b>Serial Correlation</b>	1.3838	F (7,220)	0.2116
	1.5619	F (4,223)	0.2008
	1.9993	F (3,224)	0.1854
<b>Heteroscedasticity</b>	1.4644	F (18,227)	0.3094

The Breusch-Godfrey Serial Correlation LM Test results for up to 7 lags indicated an F-statistic of 1.388 with a p-value of 0.2116 and a Prob. Chi-Square of 0.1669. These results showed that the p-values are well above the 0.05 threshold, suggesting that there was no statistically significant evidence of serial correlation up to the seventh lag in the residuals of the ARDL model. The Breusch-Godfrey Serial Correlation LM Test was conducted for lags 2 through 7 and all showed no sign of correlation. A Durbin-Watson statistic close to 2 further supported the absence of serial correlation. The F-statistic for the heteroskedasticity test reported a value of 1.4644 with an associated p-value of 0.3094, which is comfortably above the 5% significance level. This result suggested the absence of heteroskedasticity in the model, indicating that the variance of the residuals does not vary with the level of the explanatory variables and remains constant across all levels of the independent variables. For the normality test, the Jarque-Bera method was used, and the results indicated a probability of 0.5104. Since the p-value is significantly higher than the conventional 5% significance level, there is insufficient evidence to reject the null hypothesis of normality. This suggested that the residuals of the model are normally distributed.

## CHAPTER VI

### CONCLUSION

This study empirically investigated the role of remittances in hindering growth in Lebanon, hypothesizing that central bank foreign reserves may serve as a channel through which remittance inflows impact public debt. The theoretical framework developed arguments illustrating the effects of remittance inflows on growth and external debt. However, the impact of remittance inflows on international reserves remains ambiguously defined in the existing literature. Results from this analysis provided strong support for a positive long-term relationship between remittances and public debt, identifying remittances as significant predictors of public debt levels. The causality analysis from public debt to central bank foreign currency holdings indicated that public debt levels influenced how the central bank managed its reserves, likely due to the bank's involvement in financial operations that affected debt dynamics.

The reliance on remittances to stabilize the Lebanese pound and to manage foreign currency reserves highlighted a dependency that detracts from their potential to catalyze economic growth. Instead of fueling investment in sectors that would generate employment, enhance productivity, and increase export capacity, remittances frequently bolstered the country's financial buffers. This usage limited their efficacy as a tool for development, as the funds were tied up in maintaining economic stability rather than fostering growth. There was a discernible misallocation or inefficient channeling of remittances into unproductive sectors within Lebanon, symptomatic of a crowding out effect where government borrowing competed with or displaced private sector investment. Hence, the results suggested that Dutch disease effects were in play, with

remittances possibly causing a shift in the labor market from productive sectors toward non-tradable sectors.

Given these insights, the significant impact of remittances on public debt highlights the importance of developing strategies to manage these flows to support economic stability and growth. The government should prioritize policies that maximize the benefits of remittances, especially since they are often channeled through informal markets and subject to exchange rate fluctuations and unclear pricing. Efforts should focus on enhancing the understanding and tracking of remittance sources and volumes. Proper oversight and a supportive economic environment can ensure that remittances are channeled into productive investments rather than consumption. This involves fostering conditions that facilitate investment in key sectors and engaging the diaspora in economic activities, ultimately leading to sustainable development and job creation. This could help mitigate the risk of Dutch disease resulting from remittance inflows and serve as one of the potential solutions for lowering debt.

This paper presented certain limitations. Notably, factors influencing Central Bank policies and government actions that were not accounted for in the ARDL model might have impacted the findings but were not captured within the scope of this analysis. Additionally, the paper did not fully encompass the impacts of the business cycle or public policies, which could significantly affect the results. One of the primary limitations of the study stemmed from the availability of specific economic growth data, particularly GDP growth per capita for Lebanon, which is only accessible on an annual basis. This constraint posed challenges for conducting a more detailed analysis of the relationship between economic growth and public debt using higher frequency data. Although the Coincident Indicator was employed as a proxy for economic growth in the

model, providing monthly insights into the economy's performance, it was not a perfect substitute for the more comprehensive GDP growth per capita data. The Coincident Indicator, which aggregates several key economic variables to reflect current economic conditions, does not capture all dimensions of economic growth, such as changes in productivity, the standard of living, or income distribution that GDP per capita would provide. The lack of GDP growth per capita data restricted the ability to fully understand economic growth and its direct impacts on public debt levels throughout the years. This is particularly crucial in a country like Lebanon, where economic conditions can rapidly change due to political instability, policy shifts, and external economic shocks.

To ensure the robustness of the analysis and appropriately fit the model, monthly data with two lags were used in the ARDL model. This decision was driven by the need to strike a balance between capturing the immediate responses of public debt to economic variables and maintaining the statistical integrity of the model. Monthly data allowed for observation of the finer, more immediate fluctuations in public debt and economic indicators, providing a detailed view of the short-term dynamics that might be obscured in lower-frequency data, such as quarterly or annual data. The decision to limit the model to two lags was influenced by considerations of the statistical significance of the lagged variables. Incorporating too many lags can lead to overfitting, where the model becomes overly complex and potentially less generalizable, while too few may underfit and miss important dynamics. Thus, the choice of two lags was a methodological compromise designed to ensure the model remained tractable and relevant while still capturing the most critical temporal dependencies within the available data. Nevertheless, this approach has limitations, as the persistence of debt

might not have been fully evident with only two lags, particularly in a complex economic environment like Lebanon's.

Finally, there is considerable potential for further research into the relationship between remittances, government debt, and economic growth. Future studies in this area should concentrate on exploring the relationship between remittances and macroeconomic stability. Specifically, researchers should investigate how fluctuations in remittance flows affect the fiscal balance, exchange rate stability, and monetary policy. Lebanon faced fiscal challenges when these remittances declined due to external factors. In reaction, the central bank rapidly increased the money supply, attempting to bridge the financial shortfall. This precipitated a hyperinflationary period commencing in 2019, which warrants further investigation to unravel its origins, consequences, and potential countermeasures. Future studies should aim to dissect this period of inflation, examining its triggers, repercussions, and potential remedies. Such research would be invaluable in devising strategies that can mitigate the adverse impacts of volatile remittance flows and ensure exchange rate stability, particularly in the context of Lebanon's transition from a pegged currency system prior to the hyperinflationary spiral. Additionally, it would be valuable to examine the sectoral impacts of remittances, particularly on employment, investment, and productivity across different economic sectors. This could include a focused analysis on whether remittances are predominantly channeled into consumption or if they indeed catalyze investments in key growth-enhancing sectors such as technology, infrastructure, and manufacturing. Understanding these dynamics will provide deeper insights into how remittances could be better leveraged to promote sustainable economic development in Lebanon.

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