THE IMPACT OF MONETARY AND FISCAL REGULATORY POLICIES ON THE BALANCE OF PAYMENTS: A CASE STUDY FROM THE EMERGING MARKET

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Abstract

This study investigates the impact of monetary and fiscal policies on the balance of payments (BoP) in Jordan. Through a robust econometric model, it explores the influence of key independent variables such as domestic credit, money supply, consumer price index, government expenditure, and tax revenue. Unit root test and co-integration (bound) test are employed to ensure methodological credibility. The analysis reveals significant relationships between these variables and the BoP-to-GDP (gross domestic product) ratio. Notably, domestic credit to GDP exhibits a significant positive relationship, while money supply to GDP has a substantial negative impact. Government expenditure to GDP shows a positive influence, whereas tax revenue to GDP lacks statistical significance. The consumer price index demonstrates a significant negative influence. Dummy variables representing the financial crisis and Arab Spring exhibit significant negative impacts. The model explains 65.26% of the variation in the BoP/GDP relationship. Additional diagnostic tests confirm the model's robustness. This research offers valuable insights for policymakers aiming to enhance Jordan's external sector stability and resilience.

Keywords: Balance of Payments, Auto-Regressive Distributed Lags (ARDL), Jordan, Monetary Policy, Fiscal Policy

Authors' individual contribution: Conceptualization — A.I.A. and T.A.W.; Methodology — A.I.A. and T.A.W.; Formal Analysis — A.I.A. and T.A.W.; Investigation — A.I.A.; Writing — Original Draft — A.I.A.; Writing — Review & Editing —T.A.W.; Visualization — A.I.A.; Supervision — T.A.W.; Project Administration — A.I.A.

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1. INTRODUCTION

This study undertakes an examination of the multifaceted objectives inherent in any economy, with a specific focus on Jordan. The objectives of any economy include stabilizing prices, reducing unemployment, maintaining the balance of payments (BoP) at equilibrium levels, and promoting economic growth and welfare (Khan, 2023). In most developing countries, the BoP disequilibrium, particularly a deficit, represents a significant problem (Mushendami et al., 2017). Deficits in the current account of the BoP are also problematic for Jordan, a small, open economy heavily dependent on international trade, foreign investment, and financial flows, which makes it vulnerable to external shocks (Alawin & Oqaily, 2017). Jordan faces various macroeconomic challenges, including high unemployment, inflation, and external imbalances. Its BoP has been a major concern for policymakers, as it has experienced persistent deficits over the past decade. Therefore, understanding

the factors that drive the BoP dynamics in Jordan is crucial for designing effective monetary and fiscal policies that can promote economic stability and growth.

As noted by Al-Masaeed and Tsaregorodtsev (2018), the economy of Jordan has also been affected by United Nations (UN) sanctions and embargoes on Iraq, as well as external public debt issues, which have had negative consequences on the BoP, general budget, and economic activity. As a result, a new program was established for the period 1999–2001 after reassessing the 1989–1998 economic program. Despite the significance of the BoP for Jordan's economy, there is a limited body of empirical research that examines the impact of monetary and fiscal policies on the country's external accounts. Most of the existing studies have focused on specific aspects of the BoP, such as trade or capital flows, and have used different methodologies and data sources, making it difficult to compare their findings and draw robust conclusions. Therefore, a comprehensive and systematic analysis is necessary to investigate the effects of both monetary and fiscal policies on the BoP in Jordan.

Monetary and fiscal policies are the primary tools that governments use to manage their economies, aiming to achieve macroeconomic goals such as reducing national debt, promoting economic growth, reducing poverty levels, combating unemployment, and maintaining stable inflation rates. The potential for Jordan to attain macroeconomic goals has not yet been fully realized (Mugableh, 2019). The effectiveness of these policies in achieving macroeconomic goals, including equilibrium in the BoP, has been widely studied in the literature (Blanchard, 2019; Obstfeld & Rogoff, 1996). However, their effectiveness in the Jordanian context remains a subject of debate.

By undertaking a comprehensive analysis of the short- and long-term relationships between key macroeconomic variables and the BoP, this study seeks to provide a nuanced understanding of the dynamics at play in Jordan's economic landscape. This investigation encompasses several key objectives, including the dissection of Jordan's BoP components, the evaluation of policy effectiveness spanning the period from 2000 to 2022, and the identification of critical variables impacting the BoP. It is pertinent to note that Jordan's enduring deficits are primarily attributed to factors such as weak exports, high imports, and oil price volatility. While extant literature has explored the influence of policies on macroeconomic variables, their specific impact on the BoP remains inadequately understood. Consequently, this study endeavours to fill this gap by posing pertinent research questions concerning policy contributions, exchange rate regimes, and implementation challenges.

The significance of this research is underscored by its potential to provide valuable insights into managing Jordan's external sector, which is vital for economic stability and growth. Persistent BoP deficits impede economic expansion, underscoring the imperative to identify contributing factors and enact effective policy measures. Furthermore, this research contributes to a deeper understanding of the effectiveness of monetary and fiscal policies in managing the BoP, an area that has been relatively underexplored in existing literature. Additionally, the policy recommendations emanating from this study aim to enhance Jordan's external sector, with potential benefits extending to countries sharing similar economic characteristics.

The structure of this paper is as follows. Section 2 reviews relevant literature and develops hypotheses based on existing research gaps and theoretical frameworks. Section 3 outlines the methodology employed to conduct empirical research, detailing the analytical approach and data sources. Section 4 presents the main findings derived from the empirical analysis conducted in the study. Section 5 interprets and discusses the results, examining their implications and relevance within the context of the research objectives. Finally, Section 6 concludes the paper by summarizing the key findings, discussing their implications, and suggesting avenues for future research.

2. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

The BoP, a cornerstone in international economics, encapsulates a nation's transactions with the global community over a specified period. According to Copeland (2014), comprising the current account and the capital account, it gauges trade in goods and services, net income from abroad, and financial transactions.

Monetary and fiscal policies wielded by governments are pivotal instruments in macroeconomic management. While monetary policy, executed by a central bank, influences money supply and credit to achieve goals like price stability, fiscal policy involves government spending, taxation, and borrowing to attain similar objectives. Both policies, if not carefully managed, can impact a nation's BoP, influencing trade dynamics (Khan et al., 2002).

The effectiveness of these policies hinges on diverse factors, as outlined by Khan et al. (2002). Factors such as interest rate flexibility, capital market development, government budget size and composition, exchange rate regime, central bank independence, and capital mobility collectively shape the outcomes. Understanding these intricacies is crucial for analysing their impact on the BoP in Jordan. Different economic theories help us understand how changes in government policies interact with a country's BoP. A prominent framework is the Mundell-Fleming model, which merges the classic Keynesian model with the dynamics of open economies (Mundell, 1968; Fleming, 1962). It offers valuable insights into policy impacts on the BoP. Additionally, approaches like elasticity analysis and absorption analysis shed further light on these complex relationships. By using these diverse frameworks, we gain a more nuanced understanding of how policy decisions can influence the flow of money in and out of a nation.

The elasticity approach, built on Keynesian ideas, dives deep into the factors influencing a country's current account balance, which tracks international trade and financial flows. This approach focuses on how changes in the exchange rate affect exports and imports. It introduces the key concept of total absolute demand elasticity, which helps us understand how adjustments in the BoP occur. However, critics argue that this approach has limitations. Because it only considers a "snapshot"

of a specific market situation (partial equilibrium), it overlooks broader economic effects, thus limiting its explanatory power for complex scenarios.

Developed by Alexander (1959), the Absorption Approach takes a different angle on understanding the BoP. Instead of solely focusing on trade (like the elasticity approach), it highlights the interplay between currency devaluation, spending, and production. In simpler terms, this approach explores how devaluing a currency impacts the relationship between a country's total output and its spending habits. While critics point out that it doesn't consider the role of foreign investment (capital account), this approach complements the elasticity approach by bringing in factors like domestic spending and production, offering a more complete picture of the forces at play.

Several prominent economists, including Jacob A. Frenkel, Robert A. Mundell, Harry G. Johnson, and Rudiger Dornbusch, championed the monetary theory of international trade, which highlights the crucial role of money in balancing a nation's international transactions. This theory emphasizes how fluctuations in the supply and demand for money, particularly through adjustments in domestic credit, directly impact a country's BoP. Essentially, it argues that under a fixed exchange rate system, prudent management of the money supply can achieve equilibrium in the BoP, preventing deficits or surpluses.

The potency of monetary and fiscal tools in shaping domestic activity, production, and international transactions hinges critically on the level of exchange rate flexibility. The Mundell-Fleming framework, a cornerstone analysis conceived by Mundell (1968) and Fleming (1962), builds upon the classic Keynesian investment-saving and liquidity preference-money supply (IS-LM) model by integrating the external sector dynamics relevant to open economies.

Understanding the different approaches that researchers have taken to measure BoP can help to identify gaps in the literature and provide a basis for future research. This literature review aims to group previous studies based on the dependent variable used to measure the BoP, providing an overview of the different methods and findings across the literature.

Monamodi (2024) conducted a study that investigated the impact of South Africa's current account balance on its economic growth from Q1 2015 to Q4 2022, employing the auto-regressive distributed lags (ARDL) technique. The findings suggested that the South African current account deficit had a significant impact on economic growth in both the long and short run. The study recommended implementing strategies to enhance export competitiveness and promote import substitution through investments in domestic productivity. Additionally, it advocated for expedited COVID-19 recovery initiatives, emphasizing the importance of collaboration between the government and the private sector in driving economic resilience and growth.

By examining the complexities of Jordan's current account deficit from 1995 to 2018, Daoud et al. (2023) employed a multifaceted approach, combining qualitative analysis, econometrics, and advanced statistical techniques. Their findings paint a clear picture: factors like low savings, high budget deficits, and increased trade exposure widened the deficit, while higher investments, a stronger real exchange rate, and robust economic growth helped narrow it. Ultimately, the study pinpoints the budget deficit and a negative trade balance as the key culprits behind Jordan's current account woes, providing valuable insights for crafting effective policies to address this crucial economic challenge.

Expanding on past research, Khan (2023) investigated how economic growth, interest rates, inflation, and domestic credit impacted the net foreign assets (NFA) of 17 developing countries from 1982 to 2019. The study revealed a positive link between robust economic growth and increasing NFA, suggesting growing economies attract foreign assets. Higher real interest rates, enticing foreign investment, also boosted NFA, while domestic rates exceeding global norms had the opposite effect. Rising inflation, and eroding domestic currency value, put downward pressure on NFA due to reduced investor appeal and potentially higher import costs. Finally, expanding domestic credit, while stimulating the economy, could crowd out foreign investment, further impacting NFA negatively. Overall, this study highlights the complex interplay between various macroeconomic factors and a nation's NFA.

Ghilous and Ziat (2023) conducted a study investigating the BoP position in Algeria, aiming to address concerns regarding the country's BoP deficit. The researchers explored the long-run relationship between domestic credit, inflation, interest rate, gross domestic product (GDP), and NFA within the context of the monetary approach to the BoP (MABP) from 1980 to 2019. Methodologically, they employed the ARDL bounds test. The study's findings indicated a significant long-run relationship among the variables, with domestic credit exerting a negative and statistically significant influence on NFA. These results suggested that Algeria's BoP is indeed a monetary phenomenon, with excess money supply playing a crucial role in the country's BoP disequilibrium.

Under the microscope of Abu-Murad's (2021) study, Jordan's current account, a key indicator of external financial health, reveals its secrets. Through an intricate analysis of data spanning 1994–2020, the study exposes several key drivers: rising government deficits, increasing trade openness, volatile oil prices, and adjustments in foreign reserves. Interestingly, short-term impacts also emerge — high investments initially strain the account, while global economic growth and central bank reserve changes offer a helping hand. This comprehensive understanding of Jordan's current account dynamics empowers policymakers to craft targeted strategies for a more stable and prosperous future.

Abu Rokbeh and Al Khasheh (2021) delved into the mysteries of Jordan's current account balance (1995–2017) using advanced statistical techniques. Their investigation exposed three key players: domestic credit, real exchange rate, and interest rates. The results were intriguing: raising interest rates, despite seeming counterintuitive, actually improved the current account, while expanding domestic credit had the opposite effect. Surprisingly, a stronger Jordanian currency also contributed to

a healthier balance. This study unravels the intricate relationships influencing Jordan's financial well-being, offering valuable insights for policymakers navigating the path towards stability.

Unravelling the long-term link between domestic credit and NFA across five MENA countries (Jordan, Egypt, Algeria, Morocco, and Tunisia), Ghilous and Ziat (2021) dug deep using the MABP framework for the 1980–2019 period. Their advanced analysis revealed a clear pattern: in Jordan, Morocco, Egypt, and, to a lesser extent, Algeria, expanding domestic credit significantly depleted NFA over time, aligning with MABP predictions. Tunisia, however, showed a different story. This suggests that while increased domestic credit might lead to declining foreign assets in most MENA countries, further investigation is needed to understand the unique dynamics at play in Tunisia.

Showing the secrets of current account balances, Altayligil and Çetrez (2020) analysed 97 developed and developing nations from 1986 to 2013. Their deep dive revealed a complex interplay of factors. Widening fiscal deficits and rapid economic growth can strain the account, while increased trade openness plays a double-edged sword. Stronger currencies and reliance on oil exports tend to shrink deficits, while advanced financial markets and emerging economies lean towards wider gaps. Interestingly, strong institutions and moderate inflation, hinting at stability, can help narrow the imbalance. Overall, this study paints a multifaceted picture of the forces shaping a nation's current account health.

Researching the impact of global currency crises on Jordan's BoP from 2000 to 2017, Rawashdeh et al. (2020) analyzed the effects of Euro and Yen's fluctuations using an advanced statistical tool. Their findings revealed a contrasting picture: while a stronger Euro (relative to the Jordanian Dinar) had a positive and significant impact on the BoP in both the short and long term, potentially boosting exports, a stronger Yen had the opposite effect, potentially due to rising import costs or reduced competitiveness. This highlights the nuanced ways exchange rate fluctuations can impact a nation's external balance, emphasizing the need for careful consideration of diverse currency dynamics.

Exploring data from 17 countries across nearly 150 years (1870–2013), Karras (2019) discovered a fascinating link: every 1% shift in the budget deficit triggered a movement in the opposite direction for the current account balance, up to a quarter of a per cent of GDP. This impact, though temporary, aligns with the "twin deficits" theory. Interestingly, the study found symmetry throughout the period, meaning fiscal expansions and contractions had statistically similar effects on the current account. While positive current account changes were not statistically significant, negative budget deficit shocks were linked to substantial post-war improvements in the current account. This suggests that fiscal policy, while impactful, has a limited influence on the current account.

Showing the secrets of Pakistan's BoP from 1981 to 2016, Khan et al. (2018) employed the MABP framework. Their analysis revealed that a robust economy (higher GDP) and careful money supply management significantly improved the BoP in the long term. Interestingly, domestic credit and exchange rates didn't show a statistically significant impact, suggesting a more complex relationship needing further exploration. Notably, the study recommends prioritizing effective monetary policy to address BoP imbalances, highlighting its crucial role in maintaining external stability. This insightful analysis underscores the multifaceted nature of the BoP and the importance of considering various factors, alongside further research, for crafting effective policies.

Revealing Namibia's alignment with the MABP, Mushendami et al. (2017) utilized a powerful tool — vector error-correction model (VECM) — to analyse factors like NFA, economic indicators, and financial policies from 1991 to 2015. Interestingly, a healthier government budget boosted foreign assets in the short term, showcasing the positive impact of fiscal responsibility. However, expanding domestic credit, as predicted by MABP, had a detrimental effect, highlighting the need for cautious credit management. While factors like interest rates and exchange rates didn't show significant short-term influence, the study emphasizes that Namibia's path to a stronger BoP requires not just monetary policy adjustments but also a focus on fiscal consolidation and responsible credit management. This insightful analysis underscores the intricate interplay between various factors and the importance of a holistic approach to managing a nation's external balance.

Resolving the threads behind Jordan's current account deficit from 1975 to 2010, Al-Sawai and Al-Azzam (2015) revealed a complex interplay of factors. Their analysis, using an advanced statistical model, confirmed Keynesian theory's link between wider government spending and larger trade gaps. Interestingly, they established a causal link, suggesting government spending directly drives trade deficits. While trade openness generally benefits economies, Jordan's case showed it was associated with wider current account deficits, highlighting a potential trade-off. A looser monetary policy, characterized by lower interest rates, was found to exacerbate the deficit, emphasizing the need for careful consideration of its impact on external balances. A stronger Jordanian currency (appreciation) played a positive role in reducing the deficit, aligning with an economic theory where cheaper imports and more competitive exports improve the balance. Surprisingly, genuine economic growth had no statistically significant impact, suggesting growth alone might not automatically correct external imbalances. This study paints a nuanced picture of Jordan's current account, highlighting the importance of considering various factors when designing policies for a healthy external balance.

Exploring the effectiveness of monetary policy in managing Nigeria's BoP from 1980 to 2010, Imoisi et al. (2013) found intriguing results. Their analysis, using advanced statistical techniques, suggested that while increasing money supply and interest rates correlated positively with the BoP, these traditional tools might not guarantee the desired stability. Notably, the exchange rate lacked a statistically significant impact, highlighting the need for further exploration of its complex dynamics in the Nigerian

context. This study underscores the importance of carefully examining the specific nuances of a nation's economic landscape when crafting monetary policies for a healthy BoP.

Kitano (2004) developed a model to analyse BoP disequilibrium that caused external effects. The study aims to identify if the external shock causes a BoP crisis depending on the order of the monetary and fiscal policy sequence. The researcher found that if policies start with fiscal actions that endorse limitations on the monetary policy, this might lead to a crisis in the BoP. However, if it starts with monetary actions that endorse limitations on fiscal policy, it will not cause a BoP crisis.

According to the literature, a nation's BoP is influenced by a variety of variables, including the supply of money, government spending, tax revenue, and GDP. Although many economists find it admirable, the MABP is criticized because it ignores other elements impacting the BoP and solely takes into account monetary variables. In a similar vein, in contrast to MABP, Keynesian approaches consider income level and exchange rate to be essential elements in establishing the BoP of every country.

In contributing to the model, adjustments have been made to the methodology based on the findings of previous studies and the specific context of this research. For instance, variables such as domestic credit, money supply, consumer price index, government expenditure, and tax revenue have been considered in the model, considering their long-term relationship and their impact on the BoP, beyond just the current account or NFA. Statistical time series data has been employed to analyse the relationship between monetary policy and the BoP in Jordan.

In summary, the literature review highlights various approaches to understanding the BoP and emphasizes the need to consider multiple variables beyond monetary factors. The study aims to systematically investigate and analyse the impact of monetary and fiscal policies on Jordan's BoP, with a specific focus on understanding the sources of the BoP deficit, evaluating policy effectiveness from 2000 to 2022, and identifying key variables influencing the dynamics of the BoP.

Building upon the insights garnered from previous literature and aligning with the research objectives outlined above, this study formulates several hypotheses to guide the empirical investigation. These hypotheses are crafted to explore the relationships between key macroeconomic variables and the BoP in Jordan, shedding light on the effectiveness of monetary and fiscal policies in managing external imbalances. Through rigorous analysis, the study aims to validate or refute these hypotheses, thereby contributing to a deeper understanding of the dynamics shaping Jordan's external sector.

H1: Domestic credit has no significant impact on BoP in Jordan.

H2: Money supply has no significant impact on BoP in Jordan.

H3: The consumer price index has no significant impact on BoP in Jordan.

H4: Government expenditure has no significant impact on BoP in Jordan.

H5: Tax revenue has no significant impact on BoP in Jordan.

3. RESEARCH METHODOLOGY

This study delves into the complex interplay between Jordan's economic policies and its external financial health. It aims to unveil how adjustments in money supply (*MS*), domestic credit (*DC*), government expenditure (*GE*), and tax revenue (*TR*) influence the country's overall *BoP*. By building an economic model that considers these diverse factors, the study sheds light on the effectiveness of different policy levers in achieving a stable *BoP*.

These insights are particularly valuable for Jordanian policymakers, as they can utilize the study's findings to design and implement targeted policies that bolster Jordan's external financial position. Ultimately, a healthy *BoP* fosters economic stability and growth, benefiting both government and its citizens. The study employs multiple regression equations to analyze the impact of monetary and fiscal policies on the BoP in Jordan. The specified equation is presented below. Equation (1) adopts *BoP* as the dependent variable, which aligns with the approach taken in previous studies conducted by Khan et al. (2018), Imoisi et al. (2013), and Kitano (2004), as well as the framework proposed by the Mundell-Fleming model.

$$BOP/GDP = \beta_0 + \beta_1 DC/GDP + \beta_2 MS/GDP + \beta_3 CPI + \beta_4 GE/GDP + \beta_5 TR/GDP + \varepsilon \quad (1)$$

where,

- *BoP* = balance of payments;
- *GDP* = gross domestic product;
- *DC* = domestic credit;
- *MS* = supply of broad money (M2);
- *CPI* = consumer price index (inflation);
- *GE* = government expenditure;
- *TR* = tax revenue.

Table 1 provides definitions and sources for the variables used in the study.

Table 1. The definitions of the model variables

No.	*Variable*	*Operational definition*	*References*	*Source of data*
1	Balance of payments (*BoP*)	Calculated using: $BoP = (X - M) + (CI - CO) + (FI - FO) + FXB$, where X is exports, M is imports, CI is cash inflows, CO is cash outflows, FI is financial inflows, FO is financial outflows, and FXB is official monetary reserves.	Rawashdeh et al. (2020), Güneş (2013), Khan et al. (2018), Imoisi et al. (2013), Kitano (2004)	Central Bank of Jordan (CBJ)
2	Domestic credit (*DC*)	The total amount of credit or lending extended by financial institutions, such as banks and other lending institutions, to residents of a particular country during a specified period. It includes credit provided to both the public and private sectors, including individuals, businesses, and the government, for various purposes such as consumption, investment, and other financial activities.	Khan (2023), Abu Rokbeh and Al Khasheh (2021), Ghilous and Ziat (2021), Khan et al. (2018), Mushendami et al. (2017)	CBJ, World Bank
3	Money supply (*MS*)	M2 is a key measure of the MS and captures various financial assets readily available for spending or investment. These include cash, checking accounts, savings accounts, and small-denomination time deposits held by individuals and businesses, as well as balances in retail money market mutual funds.	Rawashdeh et al. (2020), Khan et al. (2018), Imoisi et al. (2013)	CBJ
4	Consumer price index (inflation) (*CPI*)	CPI, with a base year of 2010 set at 100, is a measure that tracks changes in the overall price level of a specific basket of goods and services that are typically purchased by consumers.	Khan (2023), Altayligil and Çetrez (2020), Mushendami et al. (2017)	CBJ, World Bank
5	Government expenditure (*GE*)	Is a fiscal policy tool that refers to the total amount of money spent by the government on goods and services. This includes spending on things like public infrastructure, education, healthcare, defense, social welfare programs, and other government services.	Khan et al. (2002)	CBJ
6	Tax revenue (*TR*)	Is the total amount of money collected by a government through taxes imposed on individuals and businesses. It is one of the main sources of government revenue and is used to fund public services and programs such as education, healthcare, and infrastructure development.	Khan et al. (2002)	CBJ
7	Current gross domestic product (*GDP*)	Final value of goods and services produced within a country.	Abu-Murad (2021), Ghilous and Ziat (2021), Altayligil and Çetrez (2020), Hadili et al. (2020), Mugableh (2019), Karras (2019), Al-Masaeed and Tsaregorodtsev (2018), Khan et al. (2018), Darku (2018), Mushendami et al. (2017), Sarangi et al. (2015)	World Bank

Source: Authors' elaboration.

Exploring the interplay between economic policies and Jordan's external financial health, this study spans 2000–2022 and analyzed data from the CBJ and the World Bank. By constructing an economic model and examining factors like *GDP, DC, MS, CPI*, and *GE*, the study aimed to reveal how monetary and fiscal policies impact Jordan's *BoP*. Understanding this relationship is crucial for policymakers crafting strategies to stabilize and improve Jordan's *BoP*, ultimately fostering economic growth and prosperity.

Before conducting the analysis, the study ensured data stability using the augmented Dickey-Fuller test, then employed the powerful bounds-testing approach to unearth long-term relationships between variables. This advanced framework allowed for estimating both short- and long-term impacts simultaneously. Finally, rigorous diagnostic tests were conducted to guarantee the model's validity and reliability by checking for potential issues like autocorrelation, heteroskedasticity, and multicollinearity. All analyses were carried out with robust statistical software. This approach sets the stage for reliable and insightful findings presented in the following sections.

4. RESEARCH RESULTS

The results from the unit root test using the augmented Dickey-Fuller (ADF) test are presented in Table 2. The ADF test is employed to assess the stationarity of the variables, determining whether they possess a unit root or are integrated of order one ($I(1)$).

Table 2. Unit root test using augmented Dickey-Fuller test

Variable	Level			First difference			Order of integration
	ADF test statistics	Test critical values	p-value	Statistics value	Test critical values	p-value	
BoP / GDP	-10.99228	-2.894716*	0.0001	-10.99228	-2.894716*	0.0001	*I*(0)
CPI	-0.570913	-2.893956	0.8708	-6.214955	-2.893956*	0.0000	*I*(1)
DC / GDP	-2.410955	-2.895109	0.1417	-5.509204	-2.897678*	0.0000	*I*(1)
MS / GDP	-1.905048	-2.896779	0.3286	-2.827212	-2.896779**	0.0588	*I*(1)
TR / GDP	-1.319897	-2.894716	0.6173	-17.81140	-2.894716*	0.0000	*I*(1)
GE / GDP	-1.459244	-2.894716	0.5496	-14.79795	-2.894716*	0.0001	*I*(1)

*Note: * denotes rejection of the hypothesis at the 0.05 level and ** denotes rejection of the hypothesis at the 0.10 level.*
Source: Authors' elaboration using E-views software package.

The *BoP* to *GDP* (*BoP / GDP*) ratio exhibits a highly significant ADF test statistic of -10.99228, well below the critical value at the 0.05 significance level. This implies that *BoP / GDP* is stationary and integrated of order zero (*I*(0)), providing a stable foundation for further analysis.

In contrast, *CPI* indicates a test statistic of -0.570913, exceeding the critical value at the 0.05 significance level. However, the first difference renders the variable stationary (*I*(1)), suggesting that *CPI* is integrated into order one. Similar patterns are observed for *DC* to *GDP* (*DC / GDP*), *MS* to *GDP* (*MS / GDP*), *TR* to *GDP* (*TR / GDP*), and *GE* to *GDP* (*GE / GDP*). These variables exhibit stationarity in their first differences, indicating they are integrated of order one (*I*(1)).

It is essential to note that the unit root test results lay the groundwork for time series analysis, ensuring the data's suitability for modelling. The rejection of the null hypothesis of a unit root at the 0.05 significance level implies that the variables are stationary, contributing to the reliability of subsequent econometric analyses.

Table 3 showcases the results of finding the ideal lag length for our time series models. We used the Akaike information criterion (AIC), a popular metric that considers both how well the model fits the data and its overall complexity. By analyzing the AIC values, we were able to pinpoint the optimal lag length for each variable, ensuring our model is both accurate and efficient.

The AIC values decrease as the lag length increases, reaching a minimum at lag 9, indicating that this is the maximum lag length that can be used.

Table 3. Lag length selection results

Lag	AIC results
0	-0.056644
1	-10.87570
2	-11.55647
3	-12.08148
4	-12.21562
5	-12.96756
6	-13.22500
7	-14.13607
8	-16.55623
9	-21.80769*

Source: Authors' elaboration using E-views software package.

Table 4 reveals the long-term relationships between our variables. This step, called cointegration analysis, is crucial for understanding how these factors influence each other in the long run. To detect these connections, we employed the F-statistic, a powerful tool that weighs the evidence for cointegration against pure chance. By comparing the calculated F-statistic to established critical values, we can confidently determine whether long-term relationships exist between the variables under study.

Table 4. The results of applying the bound cointegration test

	F cal.	1%		5%		10%		K = 7*
		I(0)	I(1)	I(0)	I(1)	I(0)	I(1)	Decision
Results	11.55199	2.73	3.9	2.17	3.21	1.92	2.89	Co-integration

*Note: * Number of independent variables or regressors in the model excluding the constant term.*
Source: Authors' elaboration using E-views software package.

The calculated F-statistic of 11.55 comfortably eclipses the critical values for both stationary and non-stationary variables, regardless of the level of significance (1%, 5%, or 10%), the null hypothesis of "no cointegration" gets thrown out based on the calculated F-statistics and critical values. This resounding outcome provides compelling evidence of cointegration, meaning the variables we examined exhibit a stable and meaningful long-term relationship.

Table 5 reveals the long-term relationships between variables and how they impact Jordan's *BoP*. These vital coefficients, estimated using the ARDL approach, unlock the secrets of how changes in various factors like *GDP* influence the *BoP* over extended periods (2000–2022). Understanding these connections is crucial for building effective strategies to manage Jordan's external financial health.

Results from the regression analysis reveal important insights into the long-term relationships between key economic factors and *BoP* in Jordan. Notably, a one-unit increase in *DC* to *GDP* is associated with a 0.067452 unit increase in the *BoP* to *GDP*. The coefficient is statistically significant, suggesting a positive impact.

Conversely, a one-unit increase in *MS* to *GDP* (*MS / GDP*) is linked to a 0.476957 unit decrease in the *BoP* to *GDP*. The negative coefficient and low p-value indicate that *MS* has a statistically significant and negative impact on the *BoP*. *GDP* (*GE / GDP*) demonstrates a noteworthy association, with a one-unit increase leading to a 1.719748 unit increase in the *BoP* to *GDP*. The positive coefficient is statistically significant, highlighting the positive influence of higher *GE* on the *BoP*.

TR to *GDP* (*TR / GDP*) shows a positive relationship, indicating that a one-unit increase is associated with a 0.641275 unit increase in the *BoP* to *GDP*. However, the t-statistic suggests potential insignificance, warranting caution in concluding its impact on the *BoP*. The *CPI* exhibits a negative impact, with a one-unit increase associated

with a 0.004429 unit decrease in the *BoP* to *GDP*. The statistically significant negative coefficient emphasizes the influence of the *CPI* on the BoP.

Dummy Variable 1 (*Financial crisis*) and Dummy Variable 2 (*Arab Spring*) both have negative coefficients, suggesting their association with decreases in the *BoP* to *GDP*. These dummy variables are statistically significant, indicating their impact on the *BoP* during relevant periods. The R-squared value of 0.652618 and adjusted R-squared of 0.613043 demonstrate the model's robustness, explaining approximately 65.26% of the variation in the *BoP / GDP* model.

In conclusion, the estimated coefficients contribute valuable insights into the nuanced relationships between economic variables and the *BoP* in Jordan. The significance of these coefficients, supported by t-statistics and associated probabilities, aids in comprehending the specific impact of each variable on the *BoP* in the Jordanian context.

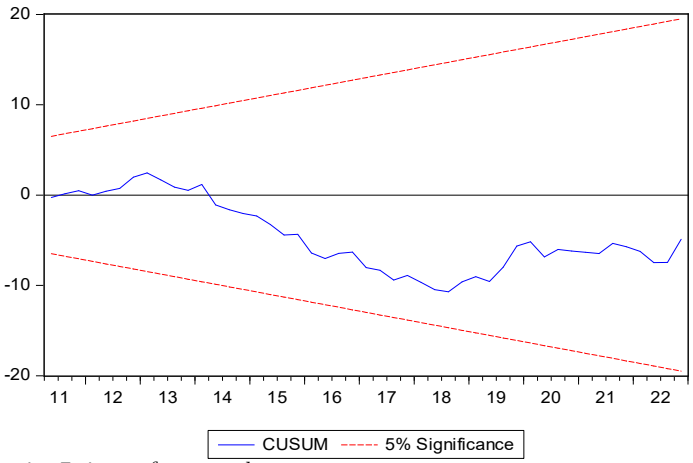
Table 5. Estimated long-run coefficients using ARDL, 2000–2022 (*BoP / GDP* model)

Variable	*Coefficient*	*Std. error*	*t-statistic*	*Prob.*
DC / GDP	0.067452**	0.036553	1.845354	0.0692
MS / GDP	-0.476957*	0.085792	-5.559440	0.0000
GE / GDP	1.719748*	0.486856	3.532358	0.0007
TR / GDP	0.641275	0.421705	1.520671	0.1328
CPI	-0.004429*	0.001398	-3.168529	0.0023
DUM1	-0.106373*	0.040275	-2.641194	0.0102
DUM2	-0.064192*	0.029835	-2.151607	0.0348
C	1.688154*	0.382365	4.415028	0.0000
R-squared		0.652618	Mean dependent var.	0.001220
Adjusted R-squared		0.613043	Std. dev. dependent var.	0.105357
Std. error of regression		0.065538	AIC	-2.506839
Sum squared resid		0.339324	Schwarz criterion	-2.227217
Log-likelihood		121.5543	Hannan-Quinn criteria.	-2.394131
Durbin-Watson stat.		1.909907	CointEq(-1)*	-0.962187

*Note: * denotes significance at the 0.05 level and ** denotes significance at the 0.10 level.*
Source: Authors' elaboration using E-views software package.

The cumulative sum (CUSUM) of squares test is a diagnostic tool used to detect structural instability in a model over time. The CUSUM test assesses whether there are significant changes in the coefficients of the model's variables. The blue line in the CUSUM chart represents the CUSUM of the differences between the estimated coefficients and their means. The red lines, representing critical bounds, indicate the regions where the CUSUM of the differences is statistically significant.

Figure 1. CUSUM results



Source: Authors' elaboration using E-views software package.

The blue line consistently stays between the red lines. This suggests that the coefficients in the model are stable over the study period. The absence of significant departures beyond the critical bounds indicates that the model provides a reliable and consistent representation of the relationship between the variables in the long run.

To ascertain the robustness against common issues such as autocorrelation and heteroscedasticity, relevant diagnostic tests were performed.

The F-statistic for the serial correlation test is 2.037485, with a probability of 0.1381. A p-value above the conventional significance level of 0.05 suggests that there is no evidence of serial correlation in the residuals. This indicates that the model's residuals do not exhibit systematic patterns over time.

The F-statistic for the heteroskedasticity test is 0.642352, with a probability of 0.8462. The high p-value suggests that there is no significant evidence of heteroskedasticity in the residuals. This implies that the variance of the residuals is constant across observations.

Table 6. Econometric diagnostic test results

Test	*Test statistic*	*p-value*
Serial correlation test	F = 2.037485	0.1381
Heteroskedasticity test	F = 0.642352	0.8462

Source: Authors' elaboration using E-views software package.

5. DISCUSSION

The regression analysis conducted in this study illuminates the intricate connections between various economic factors and Jordan's *BoP*. Understanding these relationships is crucial for policymakers and researchers seeking to enhance the stability and resilience of Jordan's external sector.

The positive correlation between *DC* to *GDP* (*DC / GDP*) and *BoP* to *GDP* (*BoP / GDP*) suggests that utilizing *DC* could effectively improve the *BoP*. Policymakers might consider leveraging this relationship to strengthen Jordan's external sector. Conversely, the negative impact of *MS* to *GDP* (*MS / GDP*) on *BoP* to *GDP* implies that managing *MS* is critical. Policymakers should exercise caution to prevent adverse effects on the *BoP* when making decisions about *MS*.

The positive influence of *GE* to *GDP* (*GE / GDP*) on *BoP* to *GDP* (*BoP / GDP*) emphasizes the role of government spending in supporting the *BoP*. Higher *GE* appears to have a favourable impact on the external sector, presenting a potential avenue for policymakers to address *BoP* challenges.

While *TR* to *GDP* (*TR/GDP*) shows a positive association with *BoP* to *GDP* (*BoP / GDP*), further investigation is needed to ascertain its significance. Policymakers should carefully examine the impact of *TR* on the *BoP* before implementing strategies based on this variable. The negative influence of the *CPI* on *BoP* underscores the importance of maintaining price stability. Policymakers need to manage inflationary pressures to prevent adverse effects on the external sector.

The presence of dummy variables related to financial crises and the Arab Spring highlights the external sector's vulnerability to extraordinary events. Adaptive policy measures are essential during such times to mitigate negative impacts on the *BoP*. The robustness of the overall model is supported by a statistically significant intercept, a high R-squared value of 65.26%, and an adjusted R-squared of 61.30%. These metrics affirm the model's capacity to explain a substantial portion of the variation in the *BoP / GDP* relationship.

6. CONCLUSION

In conclusion, the findings from this study shed light on the intricate relationships among economic variables that shape Jordan's BoP dynamics, providing actionable insights for policymakers and researchers. The positive correlation observed between domestic credit to GDP and BoP to GDP underscores the potential effectiveness of utilizing domestic credit to bolster the BoP, offering a promising avenue for policymakers to explore enhancing Jordan's external sector resilience.

Conversely, the negative impact of the money supply to GDP on BoP to GDP highlights the critical importance of prudent management of the money supply to mitigate adverse effects on the BoP. Policymakers must exercise caution and implement measures to ensure the stability of monetary aggregates to safeguard Jordan's external sector stability. Furthermore, the positive influence of government expenditure to GDP on BoP to GDP underscores the pivotal role of government spending in supporting the BoP, suggesting that increased government expenditure could serve as an effective strategy to address BoP challenges.

While tax revenue to GDP shows a positive association with BoP to GDP, further investigation is warranted to ascertain its significance, urging policymakers to conduct thorough assessments before implementing tax-related strategies to impact the BoP positively. Additionally, the negative influence of the consumer price index on BoP emphasizes the importance of maintaining price stability to safeguard the external sector's health, highlighting the need for policymakers to adopt measures to manage inflationary pressures effectively.

The robustness of the model, supported by statistically significant metrics, reinforces the reliability of the findings and underscores their potential utility in informing evidence-based policymaking aimed at enhancing Jordan's external sector stability and resilience in the face of dynamic economic conditions. Overall, this study equips stakeholders with invaluable knowledge to formulate targeted policies, fostering long-term economic prosperity and stability in Jordan.

The findings underscore the importance of prudent monetary and fiscal policies in managing Jordan's BoP and highlight specific areas where policy interventions may be particularly effective. The study's reliance on certain assumptions and data limitations may have implications for the generalizability of the findings. Additionally, the exclusion of certain variables or factors from the analysis may have influenced the results. Future research could explore the impact of additional variables or consider alternative methodologies to further enhance understanding of Jordan's BoP dynamics. Additionally, longitudinal studies could provide insights into the effectiveness of policy interventions over time.

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