Bolivia's Balance of Payments Crisis

From Boom to Bust

Isabella Gutiérrez Ramírez
igutierrer@eafit.edu.co
Author

Thomas Goda
tgoda@eafit.edu.co
Advisor

School of Finance, Economics and Government
EAFIT University
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Abstract

This paper investigates Bolivia's ongoing balance of payments crisis, identifying its principal causes and the broader economic implications. The study focuses on key factors, such as the decline in natural gas exports, elevated government spending, and a fixed exchange rate regime. These factors, alongside sustained current account deficits, have increasingly exposed the Bolivian economy to external vulnerabilities. Utilizing an Autoregressive Distributed Lag (ARDL) model, the research assesses both short- and long-term relationships between Bolivia's balance of payments and macroeconomic variables such as the Real Effective Exchange Rate, the Volume of Natural Gas Exports, Government Spending, and the GDP Growth of Bolivia's Trading Partners. The results indicate that the fixed exchange rate policy has caused imbalances by distorting the Real Effective Exchange Rate. Besides, the government's heavy reliance on hydrocarbons has made fiscal policy less effective in maintaining economic balance. The findings emphasize the need for structural reforms, including revisiting the exchange rate policy, diversifying exports sources, and improving fiscal management to mitigate future vulnerabilities. This research offers valuable insights into Bolivia's economic challenges and provides a framework for understanding the broader consequences of relying heavily on natural resources in a globalized economy.

1 Introduction

According to Krugman et al. (2022), the balance of payments represents a comprehensive account of all financial and current transactions between a country and other nations over a designated period. These transactions are divided into current, financial, and capital accounts. The financial account, which records global sales and purchases of financial assets and liabilities, must balance with other accounts due to double-entry accounting. Maintaining this balance is essential for governments to shape policies supporting industry growth, regulating tariffs, and directing fiscal and monetary strategies (van der Merwe, 2002). Therefore, the balance of payments is imperative for evaluating potential economic growth, guiding trade policies, and ensuring economic stability.

Monitoring the balance of payments becomes even more critical when a country experiences a deficit in its current or financial account, potentially signaling an impending economic crisis (Chantal, 2000). Schoenholtz and Cecchetti (2018) describe a balance of payments crisis occurring when a country cannot meet its international payment obligations, because of a significant imbalance between its foreign exchange earnings (from exports or foreign investments) and expenditures (such as imports or debt repayments). Persistent deficits in the current account and capital flow reversals are critical triggers for such crises (Pattillo et al., 2000). Pierri et al. (2023) emphasize the critical indicators of a Persistent External Deficit Crisis (PEDC), including sustained current account deficits over multiple years, a recession characterized by a substantial decrease in real consumption, and a significant adjustment in the current account. These signals typically suggest an upcoming balance of payments crisis in developing countries.

The second primary cause was addressed by Krugman (1979), who discussed the potential for a speculative attack leading to economic default through sudden stops in capital flows. Balance of payments crises occur when the inflow of capital needed to finance a current account deficit stops abruptly due to capital flight by investors who doubt the government's ability to repay. Another critical factor is how this deficit's impact varies depending on the country's exchange rate regime. A flexible exchange rate regime can adjust the exchange rate to balance payments by appreciating or depreciating the currency, providing a welfare advantage (Cristian and Munteanu, 2013). Conversely, a fixed exchange rate system might impede such correction. Krugman (1979) also pointed out the fragility of fixed exchange rates, which can lead to a balance of payments crisis if the deficit of a current account is not addressed in time.

When we examine the balance of payments and the previously mentioned specifics, Bolivia stands out among the rest of the countries in the Latin American region. Marked by reliance on subsidized loans and frequent defaults, recent years have demonstrated an unusual resistance to macroeconomic worldwide shocks. During the financial crisis of 2008, it was one of the countries with the highest international reserves in the region. However, by 2022, the international economic situation faced accentuated inflationary pressures, but Bolivia was again one of the lowest in the region, with 3.12% within a region average of 14,05% (Banco Central de Bolivia, 2010 & 2023). This has raised suspicions among analysts about the measures taken by the Bolivian government to address these two global crises.

In 2005, Bolivia embarked on a new economic journey, benefiting from the debt relief provided by the Heavily Indebted Poor Countries (HIPC) Initiative. As a result, it entered 2006 with significantly reduced debt(Valencia and Bornhorst, 2010). In the same year, Evo Morales was elected, and his administration focused on nationalizing key industries, particularly hydrocarbons, to boost state revenues for social programs, infrastructure projects, and poverty reduction. Between 2006 and 2015, Bolivia enjoyed stability and economic growth, building up significant international reserves. Notably, gasoline prices have been subsidized since 2005, and a fixed exchange rate system has maintained the currency exchange rate at one US Dollar equals 6.96 Bolivianos (Bs) since 2011 (Kehoe et al., 2018).

However, since 2015, international reserves have declined due to falling commodity prices, increased government spending, and higher import costs. Over the past decade, reserves have decreased from about $15 billion (USD) to approximately $1.7 billion (USD) by the end of 2023 (The Economist, 2023), leading to a balance of payments crisis. The root causes might include declining natural gas production, reduced demand from key trading partners, and ongoing fiscal and current account deficits. Bolivia faces increasing inflation, limited access to foreign currency, and potential social unrest due to economic hardships (COFACE, 2024).

This situation urges us to consider whether Bolivia's experience indicates a broader pattern for nations with similar economic setups, such as fixed exchange rate, subsidized goods, low diversified economies, and hydrocarbons dependency. Kehoe et al. (2018) notes that the unraveling crisis is mainly due to the nation's dependence on resource exports, which has jeopardized long-term economic stability, especially since this was the main reason for the 1970's crisis. Fifty years later, we understand the reasons for the crisis, but the main concern is the world's shift towards renewable energy, a potential crises in hydrocarbon-dependent

countries. This becomes significant as global hydrocarbon demand decreases, leaving developing countries in precarious conditions and highlighting the urgency of understanding Bolivia's current predicament.

Analyzing Bolivia's experience is essential for considering the nation's economic path and identifying global trends that could impact other nations that share economic similarities with Bolivia. This study aims to explain the leading causes of Bolivia's current balance of payments crisis through a review of existing literature and analysis of data models to provide insights into the factors contributing to it. The forthcoming sections of the paper are organized as follows: section 2 offers an overview of the literature on the balance of payments crisis, with a focus on the Bolivian case; section 3 describes the data used for the analysis; section 4 shows the methodology with the econometric approach and empirical strategy; section 5 shows the results and discussions; and section 6 offers the conclusions.

2 Literature review

2.1 Balance of Payments Crises

Current account deficits and capital flow reversals are the primary causes of a balance of payments crisis, according to Schoenholtz and Cecchetti (2018). It is crucial to realize that a current account deficit in one period does not automatically indicate an impending balance of payments crisis. A current account deficit may occur when a nation's total imports of goods, services, and transfers surpass its total exports. According to Edwards (2004), current account deficits are typical but should not last for an extended period. When a current account deficit persists, it is essential to consider additional indicators of a potential crisis carefully. In their work in 2023, Pierri et al. outlined several crucial signs of a Persistent External Deficit Crisis (PEDC) that arise from a prolonged current account deficit. The first sign is the ongoing nature of the deficit over time. The second is a recession characterized by a significant decrease in actual consumption. The third sign is a sharp adjustment in the current account, occurring the year following a period of persistent deficit. Based on econometric analysis, the author notes that these indicators have proven reliable in predicting crises in small to medium-sized economies. Typically, these signs become apparent after a current account deficit has been ongoing for 3 to 5 years.

Krugman also explained the risk of a speculative attack leading to economic default through capital flow reversals, known as sudden stops, as critical factors in the balance of

payments crises. Schoenholtz and Cecchetti (2018) described sudden stops as the opposite side of current account in the balance of payments. In the current account, a deficit must be addressed by increasing exports and reducing domestic spending to prevent a balance of payments crisis. On the other hand, the focus of the capital flow reversals is on the financial account. For example, when a country's domestic savings are insufficient to meet investment demand and domestic resources are inadequate, the country seeks funds abroad, resulting in a capital inflow that balances a current account deficit. This deficit must be adjusted immediately because if isn't, it can lead to a sudden and necessary correction, precipitating a crisis that depresses consumption and investment (Reinhart and Calvo, 2000). Balance of payments crises occur when the inflow of capital needed to finance a current account deficit stops abruptly due to capital flight by investors who doubt the government's ability to repay. This means that current account deficits and sudden stops can be found in a balance of payments crisis.

The International Monetary Fund (Pattillo et al., 2000) provides a guide on how to have an early warning system to foresee these crises. First, they explain two kinds of balance of payment crises. The first-generation kind is the traditional crisis caused by macroeconomic imbalances, "such as a fiscal deficit financed through money creation that at some point becomes incompatible with an exchange rate peg" (Pattillo et al., 2000, p. 5). The second-generation crisis involves modern issues such as speculative attacks, contagion, and weaknesses in domestic financial markets. It is noted that these crises are not mutually exclusive, as the second-generation issues can worsen the first-generation crisis. Secondly, Pattillo et al. (2000) explain the variables deemed significant for monitoring the crisis as part of an early warning system. These variables which must maintain comparability across time are as follows: the exchange rate, fiscal deficits, indicators designed to capture unsustainable external positions such as the size of the current account deficit, issues in domestic financial sectors, market expectations, and financial market contagion variables such as the number of crises in recent months in trading partner countries.

Several interconnected factors can cause large current account deficits and sudden capital flight. One of the main factors is excessive demand for imports, often induced by high government spending, as highlighted by the "Twin Deficit" hypothesis, which states that fiscal deficits intensify current account deficits (Abbas et al., 2011). This link may generate a double crisis, as Kaminsky and Reinhart (1999) show that banking sector issues often precede a currency crisis. This crisis typically arises when the economy falls into a recession after experiencing a prolonged period of economic expansion, fueled by credit and capital inflows,

and also characterized by an overvalued currency. For example, in the 1980s, the U.S. experienced prolonged current account deficits due to the Reagan administration's expansionary fiscal policies. Consequently, about one-third of the U.S. trade deficit was attributed to budget deficits. This situation resulted in a decline in export volumes and a rise in import demand, because the strong dollar rendered U.S. products less attractive in overseas markets (Bernheim, 1988).

Another critical factor is the lack of export competitiveness and falling export prices. According to Rodrik (2008), export competitiveness refers to a country's capacity to compete with other countries in national markets, therefore a low degree of competitiveness leads to a trade deficit. Usually, developing countries struggle with this due to weak institutions, insufficient investment in technology, and lack of diversification in their export base. Also, a country can fall into the "Dutch Disease," that is, when the country relies only on commodities to sustain its economy. Brahmbhatt et al. (2010) explain how this phenomenon changes the structures of production within a favorable shock of commodities export production or prices, generating a current account surplus which emphasizes the lack of export competitiveness and unravels the commodities trap.

The Asian Crisis in 1997-1998 is an example of this kind of balance of payments crisis. This crisis unmasked significant vulnerabilities of these emerging economies, excessive unimpeded cross-border flows of short-term foreign borrowing, and weak financial regulatory frameworks (Schoenholtz and Cecchetti, 2018). Years of rapid growth have led to overheating domestic economies, masked by longstanding currency pegs. This crisis also presented the dangers of high external borrowing and rising global interest rates. This was because many Southern Asia countries had taken on significant debt in foreign currencies, especially in US dollars. When the US increased interest rates, this led to a sharp depreciation of the regional currencies, and made impossible for the countries to pay their debt, leading to a default (Corsetti et al., 1999). High external debt is risky because investors may worry about a country's ability to repay, as mentioned before, leading them to stop rolling over loans and causing a liquidity crisis. Macroeconomic mismanagement, such as policies resulting in high inflation, overvalued exchange rates, or unsustainable fiscal deficits, can also increase vulnerability to a balance of payments crisis. For instance, high inflation can reduce a country's international competitiveness, leading to lower exports and higher imports (Pattillo et al., 2000).

The impact of the current account deficit can also vary depending on the exchange rate

regime. In a situation where there's a predicted current account deficit, having a flexible exchange rate regime allows for adjustments in the exchange rate to help balance the payments by either appreciating or depreciating the currency. This monetary strategy can offer a relative advantage in terms of welfare (Cristian and Munteanu, 2013). On the other hand, when faced with a current account deficit, a fixed exchange rate regime cannot rely on the devaluation or appreciation of their currency in the foreign market. Instead, they rely heavily on international reserves to maintain the exchange rate peg. Initially, in 1979, Krugman defined the balance of payments crisis as "when the government is no longer able to defend a fixed parity because of the constraints on its actions, there is a "crisis" in the balance of payments" (Krugman, 1979, p. 313). Early in the international economy analysis, Krugman expressed concerns about the instability of a fixed exchange rate system and how it started to be the leading cause of the first balance of payments crisis, given its rigid nature.

The 1994 balance of payments crisis in Mexico is an essential example of how the exchange rate policy and capital flows combine to generate financial instability. According to Calvo and Mendoza (1996), this crisis was prompted by poorly controlled capital inflows, excessive short-term borrowing, and inherent fragilities in the banking system. Before the crisis, Mexico moved from a fixed exchange rate system to a pre-announced devaluation system and then to an exchange rate band to stabilize the currency and prevent speculative capital flows. However, according to Edwards (1997), Mexico's rapid capital account liberalization without judicious precaution led to the country's vulnerability to a financial crisis. Two critical symptoms of financial vulnerability were unraveled: increasing divergence between M2 and gross foreign reserves, and the rising private sector shares in total short-term public debt, particularly Tesobonos. The drainage of foreign reserves due to these vulnerabilities then became reinforced at the time of crisis upon reversal of capital inflows. Therefore, this marked the prime necessity for managing exchange rates and surveillance on capital flows in preventing such a crisis.

2.2 Bolivia

Bolivia is experiencing a balance of payments crisis marked by declining international reserves, large fiscal deficits, and decreasing natural gas exports. Over the last decade, the nation has exhausted its $14 billion foreign currency reserves, primarily due to heavy dependence on income from natural gas exports (Banco Central de Bolivia, 2024b). Both production and export volumes have significantly plummeted, leaving Bolivia vulnerable to exogenous shocks. The country's fixed exchange rate regime currently faces significant

challenges, which have kept the Boliviano pegged to the US dollar for an extended period. Without enough reserves to support the currency, a parallel market has emerged where foreign exchange is traded at nearly two times the value of the official exchange rate (Bristow and Mendoza, 2024). This overvaluation of the currency, linked with high levels of public expenditure, has increased the fiscal deficit recorded at 7.3% of GDP in 2022.

Moreover, BMI indicates that Bolivian public debt continues to rise as the country relies on foreign loans to meet its fiscal needs. Additionally, higher interest rates have escalated economic pressure. The country has also seen a downsizing of its credit rating, given its worsening economic outlook, which has scared possible investors. In response to these challenges, the government has tried to expand its energy sector with biofuel production and lithium projects. However, these still need to compensate for the decline in natural gas revenues. Inflation has remained relatively controlled, but shortages of vital goods like fuel and food are becoming more common, and structural reforms are urgently needed to address the crisis (BMI, 2024). Werner and other analysts suggest that Bolivia may require external assistance, such as an IMF program, to stabilize its economy and adjust public spending and exchange rate policies.

Bolivia has faced previous balance of payments crises, especially in the late 1990s and early 2000s. External shocks, including a decline in export prices and a reversal of capital inflows, triggered the crisis during this period. This led to a sharp economic slowdown, characterized by falling international reserves, reduced export profits, and increasing fiscal deficits. This created a social and political conflict climate that diminished the effects of the IMF and World Bank's HIPC Initiative to provide debt relief (Morales, 2014). Regardless of the efforts, Bolivia struggled to recover; political and social uprisings, particularly the unrest in 2003 over a proposed income tax, further deteriorated the economic condition. This unrest eventually forced President Gonzalo Sánchez de Lozada to resign (CountryWatch, 2024). According to Kehoe et al. (2018), at the end of 2003, international economic conditions began to recover. The most important was the increase in natural gas exports to Brazil. This increased the total exports from 265.6 million (USD) in 2002 to 389.5 million (USD) in 2003. However, despite signs of economic recovery, social and political instability persisted. Additionally, the export surge, particularly in the hydrocarbon industry, raised concerns about income distribution. This paved the way for the 2005 election of Evo Morales, Bolivia's first indigenous and socialist president in history, signaling the end of the period of neoliberalism in Bolivia.

Before Evo Morales took office in 2005, Bolivia, as mentioned before, was included in the Heavily Indebted Poor Countries (HIPC) Initiative. This program, led by the International Monetary Fund and the World Bank, aimed to improve debt sustainability and reduce poverty in low-income HIPC countries (Arnone et al., 2008). As part of the program, the country has implemented the Bolivian Strategy for Poverty Reduction to benefit from the initiative. This program aimed to alleviate poverty and enhance human development by focusing on the most vulnerable populations (Government of Bolivia, 2001). This allowed Bolivia to start 2006 with a substantial reduction of its debt after nine years in the program. It was a strange coincidence that Evo Morales, the first left-wing party president, came to power in the same year. For a landlocked country with 12 million inhabitants, it was a unique opportunity to make a fresh start in every sense, and the government began to make significant progress. During the Morales administration, emphasis was placed on the nationalization of important industries, especially in the hydrocarbons sector. Nationalizing the hydrocarbon enterprises increased state revenues allocated to social programs, infrastructure development, and poverty reduction initiatives (Weisbrot et al., 2009). The combination of debt relief and increased state revenues created a favorable economic environment in the first years of government.

Under Evo Morales' leadership, Bolivia implemented a hydrocarbon decree in which private oil companies would transfer their shares to Yacimientos Petrolíferos Fiscales Bolivianos (YPFB), placing them under government control. Consequently, the government secured control, both directly and indirectly, of 81% of the total gas production and 56% of the gas reserves.The decree also designated YPFB as the leading regulatory authority in the sector, overseeing prices, production volumes, exports, and distribution (Valencia and Bornhorst, 2010). The nationalization of the hydrocarbon sector and favorable external conditions, such as the rise in external prices of Bolivian exports, created, for the first time in 30 years, a continuous non-financial public-sector surplus between 2006 and 2013.

The surplus played a vital role in improving the country's overall economic situation, leading to an appreciation in the exchange rate. This marked the beginning of the Central Bank of Bolivia's decision to implement a fixed exchange rate system, in November 2011. As part of the macroeconomic policy, it was determined to maintain a stable selling exchange rate at Bs 6.86, which remains in effect today (Banco Central de Bolivia, 2024b). According to Diaz et al. (2023), the peg helped to keep inflation under control, maintained the Consumer Price Index at stable levels, and resulted in one of the lowest rates in the region. Another factor supporting the currency peg is the foreign reserves, which experienced an

upward trend from 2009 to 2014, year in which these reserves peaked historically at 15.1 billion US dollars, accounting for over 50% of the GDP (Larrazábal, 2021). It is essential to acknowledge that these international reserves were instrumental in facilitating the adoption of the new economic model.

The Productive Social Community Economic Model, as explained by Luis Arce, the Minister of Economy and Public Finance during the Evo Morales period and current President of Bolivia, replaces the country's neoliberal economic model. This represents a transition from capitalism to socialism, built on two main pillars. The first pillar comprises strategic sectors, including hydrocarbons, mining, electricity, and natural resources, which generate economic surpluses. The second pillar encompasses sectors that generate income and employment, such as manufacturing, tourism, and agriculture. The model's goal is to shift Bolivia's economy from being primarily based on exporting raw materials to becoming more industrialized and productive. This will be achieved by using the surpluses from strategic sectors to invest in income and employment-generating sectors. The state will manage the distribution of these resources, aiming to reduce the country's reliance on commodity exports and achieve sustainable economic growth through effective natural resource management (Arce, 2014).

With the fixed exchange rate and fuel subsidizing, this model is unsustainable over time (Gonzalez et al., 2022). It represents a hefty burden for the international reserves and the reliance on non-renewable raw materials such as natural gas. When, in 2015, international reserves began to decline, the model started to weaken. This decline was attributed to various factors, including falling commodity prices, increased government spending, and higher import costs. Over the past decade, the reserves have decreased from about $15 billion to approximately $1.7 billion dollars, as of the end of 2023 (Banco Central de Bolivia, 2023). This reduction has significantly strained Bolivia's fixed exchange rate system, making it challenging for the Central Bank to support the value of the boliviano against the U.S. dollar. In recent years, with the political instability, the pandemic, and the government change in 2020, the country has gone through a series of events that created a balance of payments crisis.

In their paper, Kehoe et al. foresaw this crisis. They pointed out that the circumstances in 2018 were quite similar to those of the 1970s, marked by a fixed exchange rate, shrinking international reserves, and a rising fiscal deficit. It was a call for change, but it was not heard, and the government needed to cut public spending. In the surplus years, there was insufficient investment to diversify the export supply to overcome the instability brought by

the dependence on natural resources, especially natural gas. With Gonzalez et al. (2022) paper, the International Monetary Fund also tried to advise and warn about Bolivia's unsustainable path. It pretends to show a more sustainable transition from a fixed exchange rate to a floating exchange rate to reduce a significant burden on foreign reserves and avoid the need to float the exchange rate in a balance of payments crisis. The dollar shortage became so critical in 2023 that the market started feeling its actual effect. As the international reserves fell further and the fiscal deficit soared upwards, investor confidence weakened, and rating agencies downgraded Bolivia's sovereign credit rating.

Moody's, Standard & Poor's, and Fitch Ratings started to lower the sovereign credit rating. Standard & Poor's on November 22, 2023, lowered from B- to CCC+ because of the decline in exports, limited international reserves, high fiscal deficits, and poor transparency about the central bank assets. Standard & Poor's also revealed the political stalemate and a divided congress caused by Luis Arce, the current President and previous Minister of Economics of Evo Morales, divided the political party of MAS (Movimiento al Socialismo). After all, it was intended that Arce would be a transition president to guarantee the fifth reelection of Evo Morales, whom, Arce turned his back on, as he had his own agenda. This divided Congress because the MAS had more than 50 percent of the seats, so Standard & Poor's shows this as a constraint to the government's ability to manage and pass legislation of new policies to overcome the crisis. According to Luis Arce, in 2024, with information from the Ministry of Planning Development and Banco Central de Bolivia, this stalemate has prevented the entry of almost 1 billion dollars in investment.

Fitch Ratings also lowered Bolivia's sovereign credit rating from B- to CCC+ in February 2024 based on concerns similar to those expressed by the other agencies. A significant factor was the emergence of a parallel exchange rate market, which was caused by limited international reserves and fuel shortages due to delays in authorizing import reserves and restrictions by banks on dollar withdrawals. The fuel shortage is a crucial aspect of the current crisis. With government support, diesel and gasoline have been subsidized and kept within a price umbrella since 2005. Until 2015, national hydrocarbon production was enough and allowed government subsidies; after that, national production started to decline (Medinaceli and Velázquez, 2024). More diesel and gasoline had to be imported to meet demand, raising pressure on public finances. The situation worsened when the war in Ukraine started, accelerating the rise in world prices and reducing the scarce reserves that Bolivia still had, which exacerbated the shortage of fuel and foreign reserves of U.S. dollars. These shortfalls have contributed directly to altering the country's structure of imports and exports.

Nowadays, the government has temporarily resorted to selling its gold reserves to address the dollar shortage. However, these reserves are approaching the lower limit established by Law 1503, which sets a threshold of 22 tons. As of 2024, the reserves stand at 22.45 tons, a significant drop from the 42.25 tons reported in 2015 (Banco Central de Bolivia, 2023). An additional implemented measure is the economic strategy of import substitution, which aims to reduce dependence on petroleum-based fuels by boosting eco-fuel production in response to fuel shortage (Arce, 2024). However, these measures are being taken only to maintain the fixed exchange rate afloat, rather than addressing the root problem. This is because, according to The Economist (2023), the government plans to prevent a decline in popularity to secure re-election in the upcoming 2025 elections. This is influenced by Bolivia's history of social unrest in response to price increases, new taxes or reductions in subsidies, as demonstrated in previous crises, which further complicates the situation.

2.3 Application of Balance of Payments Crisis Theory to Bolivia

Bolivia's balance of payments crisis reflects many of the dynamics described in the aforementioned literature. Extended current account deficits are one of the significant factors contributing to Bolivia's crisis. Pierri et al. (2023) proposed the concept of a Persistent External Deficit Crisis (PEDC), which develops after successive years of continuous current account deficits, eventually leading to economic adjustments and recession; a behaviour that can be observed in the balance of payments deficit spanning from 2015 to 2023, marking the initial sign of such crises. Another indicator of a PEDC is a decline in consumption following continuous deficits; there was a decrease in consumption from 10,868,402 thousand Bolivianos in 2023 to 8,875,655 thousand Bolivianos in 2024 (Trading Economics, 2024). The last indicator is a significant current account correction, evident in 2021 when a surplus emerged after six years of deficits due to the post-pandemic economic outlook, signaling the crisis's onset. Bolivia also displays the typical indicators associated with a swift halt in capital inflows, as Krugman (1979) and Reinhart and Calvo (2000) outlined. Doubtful of the government's ability to stabilize the economy and maintain the fixed exchange rate, foreign investors have pulled out their investments from the country. This reversal of capital inflows has worsened the crisis, leading to an upward spiral in the parallel exchange rate market as the central bank reserves rapidly diminish. Indeed, these sudden stops characterize the balance of payment crises in emerging markets, where a loss of investor confidence can trigger a self-reinforcing cycle of financial instability.

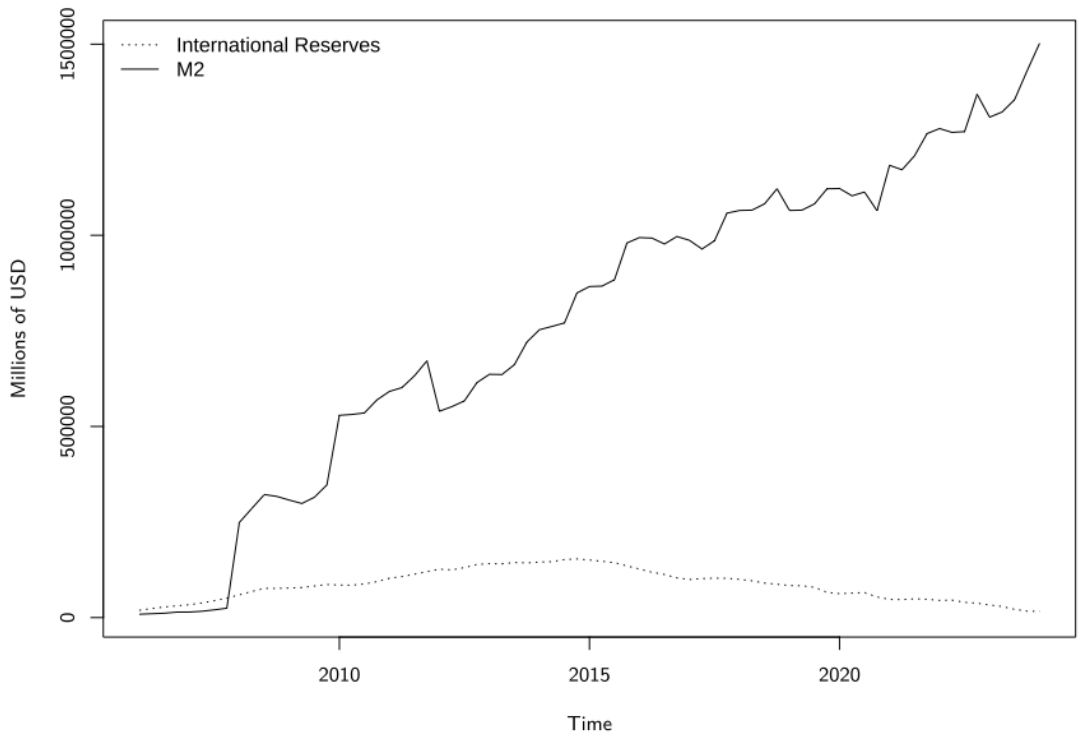
Another layer of the Bolivian crisis is the relationship between fiscal and current account deficits, as the Twin Deficits hypothesis by Abbas et al. (2011) suggested. High levels of government expenditure in Bolivia, especially on social programs, have intensified the challenges presented by its current account. Due to the decline in export earnings, Bolivia struggles to finance these projects without raising its debt, thus eroding fiscal and current account deficits to unsustainable levels. Kaminsky and Reinhart (1999) observed that Twin Deficits often signal more critical financial crises, particularly when compounded by low investor confidence and the corresponding capital outflow. The exchange rate regime is another important aspect detonating this crisis. Krugman (1979) and Pattillo et al. (2000) pointed out that countries with fixed exchange rate regimes during a fiscal imbalance are the most vulnerable to balance of payments crises. The fixed exchange rate Bolivia had instituted for stability has now become a liability, as its government cannot support the peg with rapidly depleting reserves. Without the flexibility to devalue its currency, the pressure on Bolivia to abandon the peg is growing, in a move that would further weaken confidence and worsen capital flight.

The historical examples of the Mexican crisis in 1994 and the Asian financial crisis in 1997-1998 are comparable to the current case of Bolivia. Calvo and Mendoza (1996) argued that such capital inflows could cause a balance of payments crisis once the capital has flown out of the country, if combined with uncontrolled short-term borrowing and a weak banking system structure. Also, the authors propose that the difference between M2 and the foreign reserves as an early warning system. This is shown in Figure 1. Similarly, Bolivia's dependence on foreign financial supplies and its limited financial system's inability to retain currency stability, marks a similar course toward economic uncertainty. The negligible export diversification and high dependency related to Bolivia's natural gas exports have increased the balance of payment problem. As Rodrik said in 2008, one of the determining variables of resilience in an economy is its export competitiveness, and which is an evident challenge for Bolivia. Moreover, as Brahmbhatt et al. (2010) note in their analysis of Dutch Disease, countries that rely too heavily on commodities often need economic distortions that make it very difficult to achieve sustainable growth. In Bolivia, the added reality of decreased gas revenues and a lack of competitiveness in other industries, have made the country vulnerable to exogenous shocks.

3 Data

The analysis of the determinants of the balance of payments crisis in Bolivia takes data from five primary sources. We used data from 2006 Q1 to 2024 Q1, to capture the dynam-

Figure 1: Evolution of Relationship Between International Reserves and M2



Note: This figure provides an overview of the relationship between Bolivia's Foreign Reserves and M2 through the years 2006 to 2024, showing how the International Reserves falls and at the same time M2 grows
Source: Authors own calculations based on data from *Banco Central de Bolivia Quarterly Report*.

ics of the balance of payments deficit in the modern period, when the neoliberal economic model ended with Evo Morales' rise to power. The variables used to create the econometrical model are compliant with Pattillo et al. (2000) suggestions; these are: the Real Effective Exchange Rate, the M2 or a Money Supply Variable, the Terms of Trade Growth Rate, Real GDP Growth, and an import and export variable that portrays the development of the trade balance over time. We also include other variables, such as Government Spending and the weighted average GDP growth of the Trade Partners, with the objective of illustrating Bolivia's economic development separated of the balance of payments.

The first independent variable is the Real Effective Exchange Rate (REER), sourced and

calculated from CEPAL [1]. REER is a crucial indicator for assessing Bolivia's exchange rate competitiveness. By tracking the weighted bilateral real exchange rates with each of Bolivia's trading partners based on their share of total trade, the REER provides insight into the influence of the exchange rates in the export and import prices.

The second independent variable is the Real GDP Growth Rate (RGDPG), which measures an economy's growth or shrinking rate, adjusted for inflation, providing a window into the country's overall economic performance. The data for this variable comes from the Instituto Nacional de Estadística of Bolivia. According to Krugman et al. (2022) the RGDPG directly affects the country's balance of payments, especially in the trade balance, capital inflows, and foreign investment, as it portrays the country's overall economic health.

The third variable is Government Spending, which is measured as a percentage of the GDP (GSP). The data comes from the Banco Central de Bolivia Quarterly Report. It is an essential factor because it represents the percentage of the gross domestic product that the government uses to finance its activities; such as public enterprises and services, infrastructure investment, social programs, and other affairs.

The following variable is Bolivia's trade partners' weighted average GDP growth (TP). We considered the overall GDP growth for 19 of Bolivia's main trading partners, including Argentina, Australia, Belgium, Brazil, Canada, Chile, China, Colombia, Ecuador, Hong Kong, India, Italy, Japan, Netherlands, Peru, South Korea, Turkey, the United Kingdom, and the United States of America. The data is from the Economist Inteligence Unit. Next, we computed the index with 2012 as the reference year. TP provides insight into the external economic environment affecting Bolivia's trade dynamics. For the Terms of Trade Variable, we used The Commodity Terms of Trade (CTOT), measured by the International Monetary Fund. It is a ratio of export prices to import prices. CTOT is crucial for commodity-dependent economies, as price fluctuations can significantly impact national wealth and economic stability.

The import and export variables, which quantify production volume in terms of barrels and cubic meters, serve as indicators of the economy's productive capacity, aside from price volatility. We took the data for the creation of both of the variables from Instituto Nacional de Estadística. Arce discussed about the import variable, the Net Gasoline Pro-

[1]To see more information of the variable visit the CEPAL page https://statistics.cepal.org/portal/cepalstat/technical-sheet.html?lang=es&indicator_id=1901

duction (NGP), in their speech regarding the depletion of dollars in the Bolivian economy; outlining that this is one of the leading causes of the growth of gasoline importation because the country stopped producing commodities. Also, Medinaceli and Velázquez (2024) highlighted, that there has been a subsidy for gasoline since 2005, and this was established at a time when the country had the production capacity to satisfy the national demand. As years passed, this production stagnated. Still, the consumption grew exponentially, representing an essential burden for the government as it has not increased the price of fuel since 2005. Our established variable represents the Net Volume of Gasoline Production (NGP) in barrels. It signifies the disparity between the national production volume and the national consumption volume of gasoline. The export variable is the Net Volume of Exports of Natural Gas (ENG). Diaz et al. (2023) identify this as the primary factor behind Bolivia's economic decline since gas prices began to drop in 2015. The nationalization of hydrocarbon enterprises made this the primary source of dollars for the economy

Lastly, M2, as a percentage of the GDP (M2P), measures the money supply; which includes cash, checking deposits, and easily convertible near money, like savings deposits. We took the data for the creation of the variable from Banco Central de Bolivia. M2 represents one of the two main factors alerting a balance of payments crisis by Calvo and Mendoza (1996). Calvo and Mendoza also explain the danger of the sudden and large shocks to M2 that imply a large drain of foreign reserves.

For the dependent variable, Deficit or Surplus of the Balance of Payments (BoPP), was created using data from the International Monetary Fund and the balance of payments formula shown in Equation (1).

$$\begin{aligned} \text{BoPP} = &\text{ Current Account} + \text{Capital Account} \\ &- (\text{FDI} + \text{FPI} + \text{Derivatives} + \text{Other}) \\ &+ \text{E\&O} \end{aligned} \tag{1}$$

The resulting value displays the amount of millions of USD that the country has to adjust, using it's exchange rate reserves, given the equality of the balance of payments. This amount is also converted into a percentage of the GDP, which gives us a better understanding of the weight of the correction of the balance of payments in the economy.

Table 1: Descriptive Statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
Real Effective Exchange Rate	73	125.06	24.88	85.10	164.43
Government Spending	73	22.74	3.78	18.21	35.13
Trading Partners	73	0.55	0.63	-2.48	3.18
Commodity Terms of Trade	73	97.79	7.39	79.74	122.83
Volumen Exports Natural Gas	73	1037.62	258.52	575.24	1492.41
M2 as % of GDP	73	72.07	28.78	13.45	122.67
Real GDP Growth Rate	73	3.80	3.59	-12.89	10.15
BoP as % of GDP	73	0.22	3.87	-10.89	8.41
Net Gasoline Production	73	-207699.30	203523.80	-761677.40	46771.45

4 Methodology

4.1 Econometric Approach

The econometric literature offers various techniques for analyzing the relationships among macroeconomic variables. This paper employs the Autoregressive Distributed Lag (ARDL) model by Pesaran and Shin (1995), Pesaran et al. (2001) and Pesaran and Smith (1995). The ARDL model is an econometric framework that delineates the connection between a dependent variable and one or more independent variables, incorporating lagged values of both. The OLS-estimated ARDL model is well-suited for small and moderate sample sizes. One of its notable strengths lies in its ability to capture short and long-term relationships effectively. Our dataset comprises 73 observations, falling within the recommended range for applying an ARDL model, typically between 30 and 80 observations (Pesaran and Shin, 1995).

The ARDL model offers the advantage of accommodating both stationary $I(0)$ and non-stationary $I(1)$ values within the same regression framework without the necessity of pre-transforming $I(1)$ variables. This feature allows for handling mixed integration orders by enabling the differencing of $I(1)$ values within the model. The flexibility of the ARDL model permits the estimation of short-run dynamics through differenced variables and long-run equilibrium relationships using variables in levels. The ARDL model is valuable for analyzing the cointegration of variables with differing integration orders (Pesaran et al., 2001).

In the context of time series modeling, the endogeneity problem occurs when one or more explanatory variables are correlated with the error term, resulting in biased and inconsistent

estimates. This issue may arise from omitting relevant variables, reverse causality, or measurement inadequacies. The ARDL model inherently integrates the Error Correction Model, rectifying short-run deviations from long-run equilibrium and addressing endogeneity concerns to a certain extent. In Figure 2, the Correlation Matrix illustrates a notable correlation among our variables, attributed to the presence of both stationary and non-stationary variables. However, the correlation dynamics change in Figure 3 following the differencing of the non-stationary variables. Subsequently, the concern of high correlation becomes restricted to the TP and RGDPG variables, given that these variables stem from the same data which originates from different countries. The model will address this correlation by incorporating lagged variables.

Figure 2: Correlation Matrix

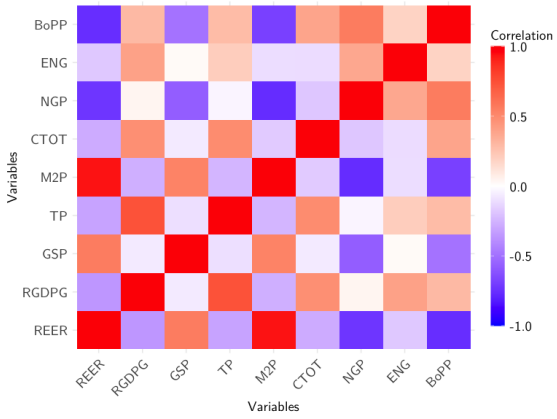
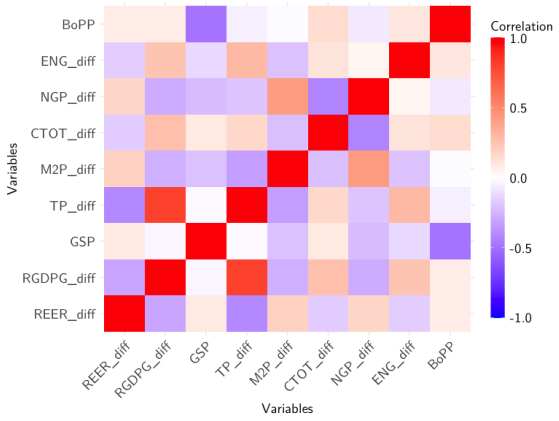


Figure 3: Correlation Matrix with Differentiated Variables



Note: This figure provides a comparative of the Correlation Matrix with $I(0)$ and $I(1)$ variables and with differentiated variables.
Source: Authors own calculations.

4.2 Empirical strategy

The model development process involves identifying a baseline model that serves as the starting line for our analysis. Subsequently, we incorporate additional variables to investigate their interrelationships and impacts. This iterative approach allows for a comprehensive exploration of the interactions between the variables. This method's underlying objective is to continually refine our approach by analyzing the expanded models, and determining the significant variables for this crisis.

The base model (Model 1) in Equation (2) explains how the Balance of Payments ($\Delta BoPP_t$) adjusts over time, influenced by both short-run and long-run factors. The long-run adjustment term incorporates the previous period's Balance of Payments ($BoPP_{t-1}$), the lagged Real Effective Exchange Rate ($REER_{t-1}$), government spending as a percentage of GDP (GSP_{t-1}), Commodity Terms of Trade ($CTOT_{t-1}$), and the Volume of Natural Gas Exports (ENG_{t-1}). Each of these variables has a corresponding coefficient (β_1, β_2, β_3, β_4, β_5) representing their long-run impacts. Additionally, the model captures short-run dynamics through the current changes in $REER_t$, $CTOT_t$, and ENG_t, with coefficients γ_1, γ_2, and γ_3, respectively. The adjustment speed (λ) controls how quickly the balance of payments returns to equilibrium, while ϵ_t accounts for unexplained variation in the model.

$$\begin{aligned} \Delta \text{BoPP}_t = \alpha + \gamma_1 \Delta \text{REER}_t + \gamma_2 \Delta \text{CTOT}_t + \gamma_3 \Delta \text{ENG}_t \\ + \lambda\beta_1 \text{BoPP}_{t-1} - \beta_2 \text{REER}_{t-1} - \beta_3 \text{GSP}_{t-1} - \beta_4 \text{CTOT}_{t-1} \\ - \beta_5 \text{ENG}_{t-1} + \epsilon_t \end{aligned} \tag{2}$$

In Model 1, we incorporate REER, GSP, CTOT, and ENG to examine the effects of the fixed exchange rate on the balance of payments through REER. We anticipate a negative association between REER and BoPP due to the anticipated adverse impact of higher REER values on the balance of payments. The inclusion of the variable GSP allows us to observe its projected negative influence on BoPP, as higher government spending relative to GDP may exacerbate the external balance. Additionally, CTOT is expected to positively impact BoPP, because an enhancement in terms of trade typically strengthens a country's external balance. Lastly, ENG, is expected to positively influence BoPP, as an increased in exports leads to a surplus in the balance of payments, and to portray the efficiency of the production of the YPFB, as a public enterprise.

In Model 2, as highlighted in Equation (3), several key variables are incorporated. The Weight of GDP of Trading Partners (TP) evaluates the impact of the economic performance of Bolivia's trading partners on its balance of payments (BoPP). We also included the Real GDP Growth Rate (RGDPG). This variable can exert a positive influence on the BoPP in both the short and long run, reflecting the direct correlation between Bolivia's economic growth and its balance of payments; it is essential to address the health of the Bolivian economy. Finally, the Net Volume of Gasoline Production (NGP) is a critical variable due to the gasoline subsidy, which has been in effect since 2005. A positive relationship between NGP and BoPP is expected in both the short and long term, as meeting domestic gasoline demand reduces the necessity of imports, thereby contributing to a more favorable balance of payments. A four period lag was used for this variable as it resulted to be the best fit for

our model.

$$\begin{aligned}\Delta BoPP_t = \alpha + \gamma_1 \Delta \text{REER}_t + \gamma_2 \Delta \text{CTOT}_t + \gamma_3 \Delta ENG_t + \gamma_4 \Delta TP_t + \gamma_5 \Delta NGP_t \\ + \gamma_6 \Delta RGDPG_t + \lambda \beta_1 BoPP_{t-1} - \beta_2 REER_{t-1} - \beta_3 GSP_{t-1} - \beta_4 CTOT_{t-1} \\ - \beta_5 ENG_{t-1} - \beta_6 TP_{t-1} - \beta_7 NGP_{t-4} - \beta_8 RGDPG_{t-1} + \epsilon_t\end{aligned} \tag{3}$$

In our research, the final model under consideration is Model 3, denoted by Equation (4). We have incorporated an additional variable, M2, representing a share of GDP (M2P). This inclusion has proven to be crucial in enhancing the model, as it added insights into the behavioral patterns of the population during the crisis. Furthermore, M2 serves as an indicator of the confidence levels of economic agents in the government and the banking system. Diminished confidence levels precipitate a surge in the circulating cash within an economy. Notably, this phenomenon extends to fixed exchange rates, where a government's reluctance to allow exchange fluctuations forces the population to seek more favorable exchange rates for their dollars. Simultaneously, these agents prefer to pay a higher price when exchanging Bolivianos during periods of dollar scarcity in the parallel exchange rate markets.

$$\begin{aligned}\Delta BoPP_t = \alpha + \gamma_1 \Delta REER_t + \gamma_2 \Delta CTOT_t + \gamma_3 \Delta ENG_t + \gamma_4 \Delta TP_t + \gamma_5 \Delta NGP_t \\ + \gamma_6 \Delta RGDPG_t + \gamma_6 \Delta M2P_t + \lambda \beta_1 BoPP_{t-1} - \beta_2 REER_{t-1} - \beta_3 GSP_{t-1} \\ - \beta_4 CTOT_{t-1} - \beta_5 ENG_{t-1} - \beta_6 TP_{t-1} - \beta_7 NGP_{t-4} - \beta_8 RGDPG_{t-1} \\ - \beta_9 M2P_{t-1} + \epsilon_t\end{aligned} \tag{4}$$

5 Results and Discussions

5.1 Primary Results

Table 2 presents a baseline analysis of the determinants of BoPP results across the estimation of the three models. Distinctly, the lagged dependent variable in all three models exhibits a consistently negative relationship with the current BoPP. The coefficients range from -0.9098 in Model 1 to -0.95974 in Model 3, representing that an increment in one unit of the BoPP in the previous period decreases the current BoPP by 0.9% and is statistically significant at the 1 percent level. These results suggest that previous BoPP values exert a negative influence on the current value, indicating a pattern of persistence. For example, a decrease in the balance of payments in one period will likely followed by a further decline in the subsequent period. This pattern may signal inherent structural challenges within the economy, potentially reflecting responses to adverse trade balances and broader macroeconomic conditions.

Table 2: Models Results

Variable	**Model 1**	**Model 2**	**Model 3**
(Intercept)	0.1732	0.17932	-3.28364
l.1.BoP as % of GDP	-0.9098 ***	-0.94681 ***	-0.95974 ***
d.1.Real Effective Exchange Rate	-3.0853	-3.89339	-4.69328 .
d.1.Commodity Terms of Trade	0.6893	0.34100	0.24459
d.1.Volume Natural Gas Exports	-0.2205	-0.30020	-0.36893
d.1.Trading Partners	-	-0.73546	-0.82238
d.1.Net Gasoline Production	-	-0.18005	-0.54935
d.1.Real GDP Growth Rate	-	-0.03133	0.09396
d.1.M2 as % of GDP	-	-	0.06264
l.1.Government Spending as % of GDP	-1.4643 ***	-1.48647 ***	-1.61797 **
l.1.Volume Natural Gas Exports	0.5907 .	0.85979 *	0.71160
l.1.Commodity Terms of Trade	0.7830 *	1.13051 *	1.04207 *
l.1.Real Effective Exchange Rate	-1.7356 ***	-1.80009 **	-2.77401 *
l.1.Real GDP Growth	-	-1.15231 .	-1.07914 .
l.1.Trading Partners	-	0.35375	0.21918
l.4.Net Gasoline Production	-	0.49059	0.84725
l.1.M2 as % of GDP	-	-	0.3732
Model Statistics			
Residual Std. Error	2.261	2.274	2.271
Multiple R-squared	0.5396	0.5953	0.6113
Adjusted R-squared	0.4812	0.4904	0.4917
F-statistic	9.231 ***	5.673 ***	5.112 ***
*Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1*			

Note: This table displays the ARDL Model's results, showing only the Estimated Value, its significance codes, and the respective model statistics.

Source: Authors own calculations.

As our base model, Model 1 offers some interesting results. The short-term variables REER, CTOT, and ENG do not present significant values. However, the long-term variables are all significant. Government Spending as a percentage of the GDP (GSP) is statistically significant at the 1 percent level, demonstrating the expected negative relationship with BoPP. This means that an increase of 1% of the government's spending would decrease 1.46% the BoPP, portraying an important impact on the economic balance of Bolivia. In the long term, ENG shows a positive impact, as expected, but it has weak statistical significance in the model. CTOT also reveals statistical significance and a long-term positive effect, showing the importance of the price of commodities on the well-being of Bolivia's balance of payments. Finally, the REER directly harms BoPP, and is statistically significant at the 1 percent level, representing one of the leading causes of the decrease in the BoPP, showing us that an increase in one unit of the REER would decrease 1.73% of the BoPP.

In the Model 2, we aggregated TP, NGP, and RGDPG. The short-term behavior of the base variables mirrors the same pattern of Model 1. In the long term, the variables of the base model stay statistically significant. They all portrayed a significance level of $\alpha > 0.05$ as ENG increased its significance. The REER decreased slightly when the RGDPG variable was introduced, likely due to its weak significance level. Additionally, RGDPG has a negative impact on the BoPP in the long-term, representing the country's economic growth, which consistently leads to higher imports without a corresponding increase in exports, which could result in a structural trade deficit. In the long-term, TP and NGP demonstrate the expected benefit of increased exports but lack significant statistics in the model.

In Model 3, we concluded our econometric analysis by adding the variable M2 as a percentage of the GDP (M2P). This addition helps us understand how M2P reflects the economy's liquidity and its relationship with the Balance of Payments (BoPP) in both the short and long term. In the short-term, the positive correlation between M2P and BoPP suggests that keeping funds within the banking system instead of spending or transferring them internationally can help reduce capital outflows, thereby improving the BoPP. M2P reflects the current economic conditions, where the population's lack of trust in the financial system and the shortage of dollars prevents them from making international transfers. In the long-term, this positive relationship could make the economy vulnerable to speculative attacks as foreign investors may view the increase in liquidity as inflationary, leading to capital flight.

However, it's crucial to examine how this variable has influenced the other variables, especially in comparison with earlier models. In the short-term variables, we have our first

statistically significant variable; even though it is very weak in significance, it portrays the effect of the REER in the short-run hemisphere. Showing that a one-unit increase in the REER would decrease the BoPP by 4.69% in the short-term, creating immediate pressure on the fixed exchange rate in the BoPP. Also, the RGDPG no longer affects the BoPP in the short-term, which can be attributed to the relationship between M2 and RGDPG. An M2 increase stimulates economic activity, leading to GDP growth. In turn, higher GDP growth positively impacts the BoPP, as it typically boosts exports and reduces the need for external borrowing. In the long-run variables, we can see that the GSP has downgraded its significance because high M2P can dilute the effectiveness of GSP by increasing inflationary expectations, leading to fiscal imbalances and deterioration in the BoPP. Also, ENG is no longer significant, revealing that the crisis is more related to price rather than to the volume of production of exports. Despite the reduced significance of REER in the statistical model, it has a more considerable impact on the BoPP in the long-run, suggesting that the exchange rate plays an increasingly pivotal role in driving the crisis, even though other variables may now overshadow REER in significance. However, the effects of exchange rate fluctuations on the overall economic balance are more pronounced, implying a deeper issue tied to the exchange rate regime. Finally, the last variables, TP, NGP, and M2P, are not statistically significant and present an expected behavior.

The performance of the each model, was assessed based on their residuals and goodness of fit. Table 3 presents the residual standard error metrics along with the mean deviation between the observed and predicted values. A smaller value signifies a more accurate model fit. Model 1 has a residual standard error value of 2.261, Model 2 of 2.274 and Model 3 of 2.271. Therefore, Model 1 provides marginally better accuracy in terms of residual spread. The R-squared value signifies the percentage of the dependent variable's variance accounted for by the independent variables. Model 1 explains 53.96%, Model 2 accounts for 59.53%, and Model 3 explains 61.13%. Thus, Model 3 has the highest explanatory power, capturing more of the variance in the outcome variable. The adjusted R-squared considers the number of predictors within the model to correct its degree of potential overfitting. The adjusted R-square was 48.12% for Model 1, 49.04% for Model 2, and 49.17% for Model 3. Even after accounting for model complexity, Model 3 remains the most robust. The F-statistic shows the overall significance of the model, with a more considerable value indicating a lower p-value, which means that at least one of the predictors is significantly related to the dependent variable. Model 1 has the highest value of the F-statistic at 9.231, suggesting the most significant joint effect of predictors. Models 2 and 3 also had statistically significant F-statistics ($p < 0.001$ in all cases), indicating that all three models are statistically accurate.

We compared the model's performance using the Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC), as shown in Table 4. Model 2 is the best-fitting model based on its lowest AIC value of 325.488. However,is the second highest of BIC value (360.025), which suggests it may be penalized more for the number of parameters in the model. On the other hand, Model 1, despite having the highest AIC (332.186), has the lowest BIC (354.953), indicating a better fit when considering model complexity because the BIC penalizes models with more variables than the AIC. Model 3 demonstrates the lowest performance compared to the other models, as evidenced by its highest BIC (365.702) and second-highest AIC (325.488), implying a relatively inferior fit. However, the non-significant differences between the models indicate that all three models exhibit a comparable range and collectively present a strong overall fit within this econometric framework. Rather than engaging in a comparative analysis to determine a superior model, the emphasis lies on the consistency and validity demonstrated by all models, thereby reinforcing the robustness of the analysis.

Table 3: AIC and BIC values

	Log-Likelihood	AIC	BIC
Model 1	-156.093	332.186	354.953
Model 2	-146.140	324.280	360.025
Model 3	-144.744	325.488	365.702

Note: This table shows the AIC and BIC values for model comparison, indicating a better fit with lower values.
Source: Authors own calculations.

In order to ensure the reliability of the models, diagnostic tests were performed on the residuals. Specifically, the Breusch-Godfrey LM test was utilized to detect autocorrelation, while the Shapiro-Wilk test was employed to evaluate normality, as presented in Table 4. The Breusch-Godfrey LM test examines autocorrelation within the residuals, with a high p-value indicating the absence of significant autocorrelation. Model 1 displayed a p-value of 0.109, approaching the significance threshold, signifying minor concerns regarding autocorrelation. Conversely, Models 2 and 3, with p-values of 0.628 and 0.606, respectively, did not manifest autocorrelation issues, rendering them more dependable in this regard. The Shapiro-Wilk test scrutinizes the normality of the residuals and a p-value exceeding 0.05 indicates normal distribution. Model 1 exhibited a p-value of 0.103, nearly reaching the threshold, while

Models 2 and 3 displayed p-values of 0.329 and 0.503, respectively, indicating normal distribution of the residuals. In summary, the econometric model does not exhibit any significant

Table 4: P-values for the Breusch-Godfrey LM test and Shapiro-Wilk test

	Breusch-Godfrey (p-value)	Shapiro-Wilk (p-value)
Model 1	0.109	0.103
Model 2	0.628	0.329
Model 3	0.606	0.503

Note: This table displays the results of the Breusch-Godfrey LM test for autocorrelation in the residuals and the Shapiro-Wilk test for normally distributed residuals.
Source: Authors own calculations

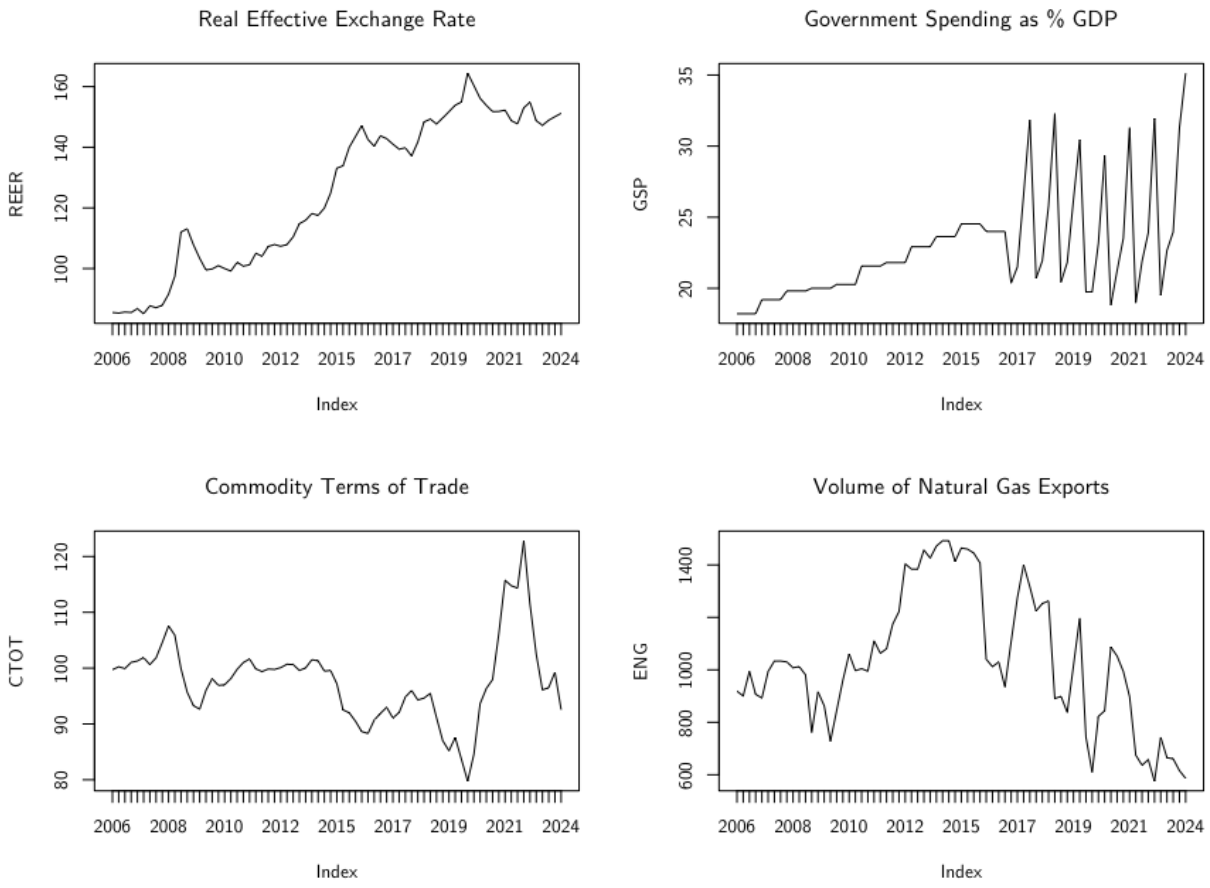
statistical issues. It is robust, well-fitted, and satisfies the required residual independence and normality assumptions. Diagnostic tests validate that the model is free from problems such as autocorrelation and non-normal residuals, ensuring its accuracy and reliability in decoding the relationships between the studied variables.

5.2 Significant Variables Discussion

Analyzing the three models, we identified multiple key variables that are statistically significant in illustrating the fluctuations in Bolivia's balance of payments (BoPP). These variables yield valuable insights into the pivotal macroeconomic factors that created the nation's current balance of payments crisis.

The Real Effective Exchange Rate (REER) is one of the most consistent and significant variables. REER demonstrates a statistically significant and negative relationship with BoPP in all models, with its long-term impact particularly pronounced. In Model 1, a one-unit increase in REER decreases BoPP by 1.73%, and in Model 3, this effect deepens to a 4.69% decrease in the short-term. This negative relationship aligns with theoretical expectations, as an increase in REER reflects a loss of international competitiveness, reducing export demand and worsening the trade balance. The sustained significance of REER highlights the pressures of Bolivia's fixed exchange rate regime and its potential role in driving the country's current account deficits. The enduring impact emerges as the most statistically significant across all three models, indicating that Bolivia's balance of payments crisis stems from a prolonged escalation of the REER, particularly in recent years, as evidenced in Figure 4.

Figure 4: Plots of the Significant Variables



Note: This plot presents the graphs of the significant variables in the model, illustrating their time series behavior. **Source:** Authors own calculations.

Another key significant variable is Government Spending as a percentage of GDP (GSP). This variable shows a negative and significant relationship with BoPP in all models, particularly in the long term. For example, in Model 1, a 1% increase in GSP leads to a 1.46% decrease in BoPP. The findings indicate that government spending in Bolivia's economic system is unsustainable because it significantly burdens the economy, especially since the government plays a dual role as both a spender and the owner of the country's major hydrocarbon enterprises, which are essential to Bolivia's export industry. The reliance on government-controlled hydrocarbon exports translate to a close link between public spending and the export market's performance. When government spending rises, it puts pressure on external balances, particularly in the long-term, leading to higher imports and weaken-

ing in the trade balance due to the strain on Bolivia's international reserves, making the country more vulnerable to external shocks. In particular, since 2015, as shown in Figure 4, government spending has experienced shock-like fluctuations, reflecting an unstable fiscal approach that has had profound consequences for Bolivia's international reserves and export performance. These shocks indicate that the government's fiscal policies have contributed to increased volatility rather than stabilizing the economy, further stressing the sustainability of its economic model. This instability impacts the balance of payments and poses risks to the long-term economic outlook, as reliance on hydrocarbon revenues and large-scale public spending become increasingly challenging to maintain.

The Terms of Trade (CTOT) also emerge as a significant variable in the long-term, positively influencing BoPP in all models. In Model 1, a positive relationship between CTOT and BoPP indicates that improvements in commodity prices enhance Bolivia's trade balance, given its heavy reliance on natural resource exports, underscoring the country's vulnerability to global commodity price fluctuations, which can significantly affect its external balance. However, based on Figure 4, the 2022 increase in hydrocarbon prices would be thought to have helped to increase Bolivia's BoPP in the last few years. However, there is an interconnection between CTOT and the last significant variable, the Volume of Natural Gas Exports (ENG). The decline of natural gas of production, also shown in Figure 4, has prevented an increase in the BoPP. The impact of ENG in the model is not consistent across all models. It has a positive effect on BoPP in the long-term in Model 1 and Model 2, which is in line with Bolivia's heavy reliance on natural gas exports as a crucial part of its export revenues. Regardless, its significance diminishes in Model 3, indicating that production volumes may be less crucial in driving BoPP than initially thought. This could suggest that price fluctuations or broader structural challenges in the natural gas sector have a more significant role.

Finally, the lagged BoPP and RGDPG represent some significance in the model. The BoPP, as noted in the initial findings, exhibits a persistent negative impact on the current balance of payments, increasing the likelihood of a final negative value. Conversely, RGDPG in models 2 and 3 demonstrates weak statistical significance in the long-term. Nevertheless, this cannot go unnoticed, as its negative impact on the BoPP may indicate an over-reliance on imports and a lack of economic diversification in the Bolivian economy. The RGDPG suggests that an overall economic performance improvement would lead to increased imports rather than long-term economic well-being, indicating that the government's economic approach may not be sustainable in the long run, as supported by the literature review.

6 Conclusions

This paper's findings offer valuable insights into the determinants influencing Bolivia's balance of payments over time, leading to the current crisis. The econometric analysis, along with the literature review, uncovered several significant discoveries. Foremost among these is the recognition that this crisis stems from governmental mismanagement. The mismanagement comes from high government spending, a fixed exchange rate, poor decisions regarding YPFB (hydrocarbons sector), and the lack of diversification of the economy; worsening the heavy reliance on commodities, and also leading the economy into de volatility of their price. Importantly, this is not a recent behavior of the government. In 2006, the government decided to concentrate the country's economic resources in the hydrocarbons sector as a strategy to recollect funds to mitigate poverty. However, this was not strong enough to create a heavy diversification of the economy; on the contrary, it increased reliance on commodity production. Additionally, since its implementation in 2011, the fixed exchange rate has exerted a direct influence on foreign reserves, paving the way for an unsustainable trajectory over an extended period. REER portrayed the economic disadvantage that Bolivia had regarding its inability to use the exchange rate as a monetary policy, leading to a depletion of the foreign reserves to fulfill the import base economy. Significantly, the reduction of natural gas reserves and the subsequent decline in commodity prices in 2015 marked the conclusion of the economic boom. Despite evolving circumstances, the government's steadfast dedication to a reliable economic strategy has contributed to the current balance of payments crisis.

Bolivia needs to adopt more sustainable fiscal policies to counteract the adverse effects of government spending on the balance of payments, which could involve consolidating public expenditures, minimizing the budget deficit, and diversifying revenue sources beyond hydrocarbons. Reevaluating the exchange rate policy to boost the competitiveness of exports is also necessary. A more flexible exchange rate system could reduce distortions related to the fixed rate, enhancing Bolivia's trade balance and external position. Diversifying exports away from natural gas into agriculture, manufacturing, and tourism would reduce the economy's vulnerability to global commodity price changes and external shocks, promoting sustainable economic growth. Additionally, carefully adjusting interest rates to attract foreign investment while maintaining inflation control, and effectively managing capital flows, is crucial for ensuring external stability without excessive speculative behavior.

While this paper focused primarily on macroeconomic variables, future research could delve deeper into sector-specific dynamics and political decisions. Also, given Bolivia's re-

liance on hydrocarbons, the global shift toward renewable energy presents significant long-term risks for the country's balance of payments. Future research should assess how the decline in global demand for fossil fuels could reshape Bolivia's economic structure and what measures could be taken to mitigate these risks. Finally, this research highlights the need to consider the balance of payments crises' broader social and environmental impacts. Recent crises in Bolivia have led to a significant rise in gold mining, driven by the government and the population's desperate search for alternative external revenue sources. This has resulted in considerable social and environmental costs often overlooked in macroeconomic discussions. Environmental degradation and social unrest tied to the mining industry, reveal the unintended consequences of economic imbalances. Future research should explore these externalities further to understand how crisis-driven economic policies can have widespread and often damaging effects on society and the environment.

References

Abbas, S. M. A., Bouhga-Hagbe, J., Fatás, A., Mauro, P., and Velloso, R. C. (2011). Fiscal policy and the current account.

Arce, L. (2014). Modelo económico social comunitario productivo.

Arce, L. (2024). El origen y las causas de la falta de dólares en bolivia. https://www.facebook.com/watch/live/?ref=watch_permalink&v=534750439066359.

Arnone, M., Bandiera, L., and Presbitero, A. F. (2008). Debt sustainability framework in hipcs: A critical assessment and suggested improvements.

Banco Central de Bolivia (2010). Reporte de balanza de pagos y posición de inversión internacional 2009.

Banco Central de Bolivia (2023). Reporte de balanza de pagos y posición de inversión internacional 2023.

Banco Central de Bolivia (2024a). Boletín completo estadístico marzo 2024. https://www.bcb.gob.bo/webdocs/publicacionesbcb/2024/07/40/%C3%8Dndice%20Bolet%C3%ADn%20Trimentral.pdf. Accessed: 2024-10-02.

Banco Central de Bolivia (2024b). Reporte de balanza de pagos y posición de inversión internacional 2024.

Bernheim, B. D. (1988). Budget deficits and the balance of trade. *Tax policy and the Economy*, 2:1–31.

BMI (2024). Bolivia's growth outlook weighed down by precarious external accounts. *Fitch Solutions BMI Contry Risk*.

Brahmbhatt, M., Canuto, O., and Vostroknutova, E. (2010). Dealing with dutch disease. *POVERTY THE REDUCTION AND ECONOMIC MANAGEMENT NETWORK*, pages 1–6.

Bristow, M. and Mendoza, S. (2024). Bolivia's boom has turned to bust, fueling an unlikely presidential comeback bid.

Calvo, G. A. and Mendoza, E. G. (1996). Mexico's balance-of-payments crisis: a chronicle of a death foretold'. *Journal of International Economics*, 41:235–264.

CEPAL (2024). Tipo de cambio real efectivo (tcre). https://statistics.cepal.org/portal/cepalstat/dashboard.html?theme=2&lang=es. Accessed: 2024-09-24.

Chantal, T. (2000). Balance-of-payments crises in the developing world: Balancing trade, finance and development in the new economic order. *American University International Law Review*, 15.

COFACE (2024). Estudios económicos bolivia. https://www.coface.com.pe/Estudios-Economicos/Bolivia.

Corsetti, G., Pesenti, P., and Roubini, N. (1999). What caused the asian currency and financial crisis? *Japan and the world economy*, 11(3):305–373.

CountryWatch (2024). Bolivia country review 2024 edition.

Cristian, P. and Munteanu, C. (2013). The monetary approach of the balance of payments: Empirical evidences from emerging markets.

Diaz, C., Dorado, H., and Copali, E. (2023). The fall in gas exports, international reserves and economic growth in bolivia. *International Journal of Economy, Energy and Environment*.

Economist Inteligence Unit (2024). Gdp growth of selected countries 2006 – 2024. https://viewpoint-eiu-com.ezproxy.eafit.edu.co/data/. Accessed: 2024-10-02.

Edwards, S. (1997). The mexican peso crisis how much did we know? when did we know it?

Edwards, S. (2004). Thirty years of current account imbalances, current account reversals and sudden stops. Working Paper 10276, National Bureau of Economic Research.

Fitch Ratings (2024). Fitch downgrades bolivia to 'ccc'.

Gonzalez, A., Jafarov, E., Guzman, D. R., and Walker, C. (2022). Fix vs. float: Evaluating the transition to a sustainable equilibrium in bolivia prepared.

Government of Bolivia (2001). Republic of bolivia poverty reduction strategy paper-prsp estrategia boliviana de reduccion de la pobreza-ebrp.

Instituto Nacional de Estadística (2024a). Bolivia: VariaciÓn acumulada del producto interno bruto a precios constantes por actividad econÓmica segÚn trimestre, 1991 – 2024. https://www.ine.gob.bo/index.php/estadisticas-economicas/pib-y-cuentas-nacionales/producto-interno-bruto-trimestral/producto-interno-bruto-trimestral-intro/#1604584724125-615aec14-e917. Accessed: 2024-10-02.

Instituto Nacional de Estadística (2024b). Hidrocarburos cuadros estadÍsticos. https://www.ine.gob.bo/index.php/estadisticas-economicas/hidrocarburos-mineria/hidrocarburo-cuadros-estadisticos/. Accessed: 2024-10-02.

International Monetary Fund (2024a). Balance of payments and international investment positions. https://data.imf.org/?sk=7a51304b-6426-40c0-83dd-ca473ca1fd52. Accessed: 2024-07-15.

International Monetary Fund (2024b). Commodity terms of trade. https://data.imf.org/?sk=2cddccb8-0b59-43e9-b6a0-59210d5605d2. Accessed: 2024-10-02.

Kaminsky, G. L. and Reinhart, C. M. (1999). The twin crises: The causes of banking and balance-of-payments problems.

Kehoe, T. J., Machicado, C. G., and Cajías, J. P. (2018). The monetary and fiscal history of bolivia: 1960-2015.

Krugman, P. (1979). A Model of Balance-of-Payments Crises. *Journal of Money, Credit and Banking*, 11(3):311–325.

Krugman, P., Obstfeld, M., and Marc, M. (2022). *International Economics: Theory & Policy*. Pearson Education, 12 edition.

Larrazábal, E. (2021). Reserves accumulation, external constraint, and economic growth in bolivia.

Medinaceli, S. M. and Velázquez, M. (2024). Prices and subsidies for gasoline, diesel and natural gas in bolivia.

Morales, J. A. (2014). La economía boliviana de los últimos cincuenta años: reflexiones sobre el desarrollo de largo plazo. *Ciencia y Cultura*, 33:107–135.

Pattillo, C. A., Berg, A., Milesi-Ferretti, G. M., and Borensztein, E. (2000). *Anticipating Balance of Payments Crises–The Role of Early Warning Systems: The Role of Early Warning Systems*. International Monetary Fund, USA.

Pesaran, H. and Shin, Y. (1995). An autoregressive distributed lag modeling approach to co-integration analysis. *Econometncs and Economic Theory in the 20st Century: The Ragnar Frisch Centennial Symposium*, 31.

Pesaran, M. and Smith, R. (1995). Estimating long-run relationships from dynamic heterogeneous panels. *Journal of Econometrics*, 68(1):79–113.

Pesaran, M. H., Shin, Y., and Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of Applied Econometrics*, 16(3):289–326.

Pierri, D., Montes-Rojas, G., and Mira-Llambi, P. (2023). Persistent external deficits and balance of payments crises. *European Economic Review*, pages 1–10.

Reinhart, C. and Calvo, G. (2000). When capital inflows come to a sudden stop: Consequences and policy options.

Rodrik, D. (2008). The real exchange rate and economic growth. *Easterly*, pages 365–412.

Schoenholtz, K. L. and Cecchetti, S. (2018). Sudden stops: A primer on balance-of-payments crises.

Standard & Poor's (2023). Bolivia long-term ratings lowered to 'ccc+' from 'b-' on heightened external vulnerabilities; outlook negative. *S&P Global*.

The Economist (2023). Bolivia is on the brink of an economic crisis.

Trading Economics (2024). Bolivia exports. https://tradingeconomics.com/bolivia/exports.

Valencia, F. and Bornhorst, F. (2010). Bolivia: Selected issues. *IMF Staff Country Reports*, 2010(029):A001.

van der Merwe, E. (2002). The use of balance of payments statistics in the determination of monetary and fiscal policy prepared by the south african reserve bank.

Weisbrot, M., Ray, R., and Johnston, J. (2009). Bolivia: The economy during the morales administration.

Werner, A. M. (2024). Bolivia's economy on the brink. *Americas Quarterly*.