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Article

Failing to Use the Balance Sheet to Manage Cycle Shocks: Evidence from Nigeria

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Abstract

Nigeria entered the 2020 COVID-19–related oil price downturn without the fiscal buffers that numerous resource-rich economies had built over time. Despite heavy dependence on petroleum revenues, the country has made limited use of stabilization tools such as structured hedging programs, sovereign savings mechanisms, or strategic reserves, leaving public finances exposed to external shocks. Drawing on political choice theory and the resource governance literature, this study examines how institutional conditions shaped crisis management during the 2020 oil price collapse and the COVID-19 pandemic. The study combines qualitative institutional analysis with stochastic counterfactual simulations, comparing Nigeria's policy approach with those of oil-producing countries including Mexico, Saudi Arabia, the United Arab Emirates, Angola, and Ghana, using data from the IMF, World Bank, Afreximbank, and peer-reviewed sources. The analysis identifies institutional gaps in Nigeria's use of hedging, sovereign savings, and reserve infrastructure. Counterfactual modeling indicates that even a modest oil hedging strategy could have mitigated the 2020 downturn, reducing GDP contraction by an estimated 0.54 percentage points. These findings suggest that governance constraints contributed to fiscal vulnerability. The study proposes a four-pillar framework centered on risk hedging, revenue savings, strategic investment, and institutional reform to strengthen fiscal stability and resilience to external shocks.

Keywords: commodity price risk; sovereign balance sheet; oil hedging; sovereign wealth funds; resource curse

1. Introduction

Oil-exporting countries face recurring cyclical shocks that test fiscal stability and economic resilience, requiring governments to manage their sovereign balance sheets to absorb these shocks and protect public finances. A sovereign balance sheet includes financial assets, natural resource wealth, savings funds, reserves, and public liabilities that governments use to finance operations, manage fiscal risks, stabilize the economy, and ensure long-term sustainability (Affinito et al., 2022). When these instruments are used effectively, governments can manage revenue volatility and reduce crisis risk. When they are neglected, external price shocks translate into fiscal emergencies.

A cyclical shock is a sudden, often sharp rise or fall in commodity prices that disrupts government revenue, public spending, exchange rates, and overall economic activity over a short period (Nguyen et al., 2025). Such shocks are recurrent and largely unavoidable in resource-dependent economies. Anecdotal evidence suggests that downturns in commodity prices occur approximately every five to seven years. Commodity-dependent countries therefore experience repeated cycles of price booms and busts: high prices generate windfalls, whereas price collapses trigger fiscal crises.

The late 2010s and early 2020s vividly illustrate commodity price volatility. In early 2020, a price war among major producers coincided with the collapse of global demand caused by the COVID-19 pandemic, triggering an unprecedented crash in oil prices. By April 2020, benchmark crude prices had fallen to historic lows, and on April 20, 2020, West Texas Intermediate traded at negative prices,

meaning sellers effectively paid buyers to take delivery. This extreme market condition reflected a severe glut of unsold oil and limited storage capacity as lockdowns eliminated approximately 29 million barrels per day of global demand. Consequently, oil-exporting countries faced the twin shocks of sharp revenue losses and severe market disruption.

For Nigeria, Africa's largest oil producer, the 2020 oil shock was devastating. Oil accounts for approximately 65% of government revenue and more than 85% of exports (Extractive Industries Transparency Initiative [EITI], 2021; Nwaogu & Osahon, 2025). This structure creates deep fiscal dependence on a single volatile commodity. When oil prices collapsed, fiscal revenues declined sharply and external balances weakened. This situation was further aggravated by nearly five years of weak growth following Nigeria's 2016 recession. The Excess Crude Account (ECA), Nigeria's main stabilization fund, had declined from \$2.5 billion in December 2015 to only \$72 million by May 2020 (Securities and Exchange Commission, 2017), a level that provided no meaningful buffer against major shocks. Without savings or hedging protection, fiscal pressure quickly intensified. Across several states, budget adjustments reflected this strain; "compared to the Original 2020 Budgets: total expenditures reduced by 35 percent" (Worldbank, 2020 P. 5). The naira faced strong depreciation pressure, and the federal government turned to emergency external financing to stabilize public finances (International Monetary Fund [IMF], 2020a).

This outcome raises a critical question: Why did Nigeria enter the 2020 oil cycle shock with so little preparation? Several oil-producing countries weathered the crash more effectively because they used sovereign balance sheet tools, such as financial hedges, savings funds, and physical reserves, to stabilize revenue. For example, Mexico entered 2020 with an oil hedging program that guaranteed a price of approximately \$49 per barrel, helping cushion its budget (Valencia & Ma, 2018; Johnson, 2022). Major exporters in the Middle East had accumulated substantial foreign assets and drew on sovereign wealth funds (SWFs) or central bank reserves to finance deficits. Large importers, such as the United States, China, and India, maintain strategic petroleum reserves (SPRs) and purchase oil during price declines to stabilize domestic supply.

However, Nigeria followed a different path. The country operated without hedging protection, substantial savings, or meaningful storage capacity. The Nigerian National Petroleum Corporation sold crude oil largely on the spot market, exposing public revenue directly to price volatility. When prices collapsed, fiscal vulnerability became acute. The Nigerian government reached a breaking point, revealing a deeper failure to manage its sovereign balance sheet for resilience.

This study addresses this gap by examining the consequences of Nigeria's failure to use its sovereign balance sheet to manage commodity cycle shocks. It investigates why Nigeria did not deploy key instruments such as financial hedging, SWFs, or SPRs despite its heavy dependence on oil revenue. Drawing on political choice theory and the resource governance literature, the study analyzes how institutional weaknesses, limited accountability structures, and short-term political incentives constrained fiscal preparation before the 2020 oil price collapse and the COVID-19 pandemic. It moves beyond descriptive accounts of oil dependence to provide a structured evaluation of balance sheet management as a stabilization strategy. The study's novelty lies in linking sovereign balance sheet tools to the political and economic constraints faced by a major African oil producer. The findings offer broader lessons for commodity-dependent economies seeking to convert natural resource wealth into long-term fiscal resilience rather than recurrent crises.

1.1. The Sovereign Balance Sheet Approach

A sovereign balance sheet comprises assets (financial funds, foreign reserves, natural resource wealth, and infrastructure) and liabilities (debt and contingent obligations) (Huertas & Meyer Cirkel, 2021). Proactive management of this balance sheet involves saving or hedging during booms and leveraging assets during downturns to stabilize the economy. In theory, resource-rich countries should convert volatile commodity earnings into more stable assets, such as diversified financial savings and productive infrastructure, while avoiding excessive borrowing during booms that can create debt overhang during busts (Bova et al., 2016; Wills et al., 2016). Effective balance sheet

management depends on strong institutions, fiscal rules, transparent governance, and public accountability that support long-term planning over short-term political incentives (Gelb et al., 2014).

In Nigeria, institutional weaknesses have undermined prudent management. Political-economic analyses often describe Nigeria's governance in terms of the "resource curse" and patronage (Ojabor et al., 2018). Ufodike et al. (2023) draw on the "tragedy of the commons" thesis developed by Hardin (1968), which posits that individual rationality and self-interest can lead to the overexploitation of commonly shared resources. Subsequent scholars, such as Berkes (1985), revisited and critiqued this argument, emphasizing the role of institutions and collective governance in preventing resource depletion. Since Nigeria's return to democracy in 1999, the country's elite—comprising former and current politicians and their associates—have often treated oil revenues as a "national cake" to be distributed among patronage networks (Wills et al., 2016). Although formal democratic institutions exist, scholars have noted a deficit in horizontal (O'Donnell, 1999; Schedler, 1999) or network accountability (Ufodike et al., 2022), including checks and balances that hold leaders accountable. This condition has been described as "democracy washing," referring to the presence of elections without effective governance, which enables the mismanagement of oil wealth with limited consequences (Bloom & Rhodes, 2021). For example, legal frameworks for saving oil revenues have frequently been ignored or contested, and instances of high-level corruption have often gone unpunished. These issues are examined extensively in Okonjo-Iweala's (2018) aptly titled book: *Fighting Corruption Is Dangerous*, a firsthand account by Nigeria's former Minister of Finance, who previously served as Managing Director of the World Bank and currently serves as Director-General of the World Trade Organization. Such institutional factors help explain why Nigeria has struggled to adopt the policies used by numerous peer countries to mitigate commodity shocks (O'Donnell, 1999; Schedler, 1999).

This study examines these issues in depth. First, it reviews global examples of commodity risk hedging and stabilization mechanisms, highlighting how countries such as Mexico, Saudi Arabia, and the United Arab Emirates (UAE) manage oil cycles. It then compares Nigeria's approach with those of other OPEC members and emerging oil producers, emphasizing the institutional gaps and policy failures that left Nigeria particularly exposed. To illustrate these differences, the analysis incorporates data on oil dependency, SWF assets, strategic reserves, and fiscal outcomes. The study concludes with policy recommendations and proposes a conceptual framework for sovereign balance sheet resilience tailored to resource-dependent economies, drawing lessons from international best practices and Nigeria's experience.

1.2. Theoretical Background

Political choice theory emerged in the mid-twentieth century through the work of scholars such as Buchanan and Tullock (1965). Buchanan's *"The Calculus of Consent"* provided the foundation for analyzing political decision-making using economic reasoning (Buchanan & Tullock, 2003). The theory rejects the assumption that governments always pursue the public interest. Recognizing the difficulty of defining the "public interest" (Ufodike, 2020), political choice theory argues that political actors respond to incentives and often seek to maximize power, electoral support, and control over resources (Buchanan & Tullock, 2003; Carden et al., 2022). This framework treats fiscal decisions as outcomes of strategic behavior rather than neutral economic planning. It therefore provides a useful lens for analyzing policy choices in resource-dependent economies.

The theory rests on several interconnected concepts that explain how political incentives shape fiscal outcomes in resource-dependent economies. Political choice theory suggests that policy decisions reflect the incentives of powerful interest groups and politicians who may favor the immediate distribution of resource rents to secure support rather than investing for the future (Becker, 1983). Shaw (2002) argues that political actors behave rationally within institutional constraints and pursue policies that strengthen their political positions and electoral survival. Consequently, short-term electoral pressures often favor visible public spending over long-term savings. In resource-rich environments, large and volatile revenue inflows intensify rent-seeking

behavior by creating opportunities for patronage, redistribution, and political bargaining (Mengiste, 2020). Weak accountability structures reduce the political cost of fiscal indiscipline and limit oversight of resource allocation (Theletsane, 2014). These conditions reinforce one another, creating a cycle of short-term fiscal expansion during commodity booms. Governments therefore overspend, underinvest in stabilization mechanisms, and avoid hedging strategies that limit discretionary control over public revenue.

Political choice theory addresses a gap in conventional macroeconomic analysis. In Nigeria, oil revenue has historically served as a tool for political bargaining and distribution. Leaders may deplete stabilization funds or avoid hedging mechanisms because these tools constrain short-term spending flexibility. The theory therefore explains how institutional weaknesses and political incentives undermine prudent sovereign balance sheet management, consistent with the arguments of Okonjo-Iweala (2018). It links Nigeria's fiscal vulnerability during the 2020 oil shock to incentive structures and governance constraints, explaining why the country entered the crisis without adequate savings, hedging arrangements, or strategic reserves despite clear exposure to oil volatility. The theory strengthens the institutional argument in this study and supports the proposed framework for sovereign balance sheet resilience. Effective hedging programs, SWFs, and reserve accumulation require credible institutions, transparency, and political commitment; without these conditions, technical instruments alone cannot prevent recurring fiscal crises in resource-dependent economies.

2. Research Methodology

This study adopts a mixed-methods research approach that integrates qualitative institutional analysis with quantitative macro-fiscal simulation. The qualitative component draws on political choice theory and the resource governance literature to examine how institutional incentives shaped Nigeria's fiscal policy decisions. The quantitative component applies stochastic counterfactual simulation to estimate the macroeconomic implications of alternative policy choices. This combined approach provides both explanatory depth and empirical estimates of policy effects.

The study also employs a comparative policy case-study design, with Nigeria as the primary case. Comparator oil-producing countries, including Mexico, Saudi Arabia, the UAE, Angola, and Ghana, serve as benchmark cases. The design is analytical and retrospective and focuses on the 2020 oil price collapse during the COVID-19 pandemic. The study integrates documentary analysis, institutional assessment, and probabilistic modeling to evaluate Nigeria's fiscal vulnerability and simulate alternative policy outcomes under conditions of oil price volatility.

The population of interest comprises oil-producing economies that rely heavily on hydrocarbon revenues for fiscal stability. The analytical sample includes Nigeria as the focal case and selected oil producers that have implemented oil hedging programs, SWFs, or strategic reserve mechanisms. The temporal scope primarily covers the period from 2015 to 2022, with particular emphasis on fiscal outcomes in 2020.

This study relies exclusively on secondary data. Sources include macroeconomic and fiscal statistics from the IMF, World Bank, Afreximbank, Central Bank of Nigeria, and national budget documents. Policy documentation related to SWFs, oil hedging programs, and fiscal rules was also reviewed. Academic literature and institutional reports were analyzed to identify governance patterns and institutional constraints. Documentary analysis served as the principal data-collection instrument for the qualitative component. For the quantitative component, macro-fiscal data were extracted and calibrated into a stochastic simulation model to generate counterfactual GDP outcomes.

Qualitative data were analyzed using structured comparative analysis. Institutional features—including fiscal rules, savings mechanisms, hedging strategies, and accountability structures—were systematically compared across countries to identify explanatory differences. The study then examines the commodity hedging experiences of OPEC and non-OPEC members and evaluates the potential benefits had Nigeria implemented a hedging program during the COVID-19 downturn.

2.1. Commodity Risk Hedging Mechanisms: International Experiences

One key component of sovereign balance sheet management is the financial hedging of commodity price risk. Hedging involves using financial instruments (such as futures or options) to lock in prices or insure against adverse price movements (Prymostka et al., 2024). While corporations often hedge their exposure, only a few sovereigns have implemented hedging programs for national oil revenues (Batten et al., 2021). A prominent example is Mexico, which operates the world's largest sovereign oil hedge. Since at least 2001, Mexico's Ministry of Finance has annually purchased put options on oil through the Hacienda hedge program, effectively buying an "insurance policy" against oil price crashes (IMF, 2015). This program typically costs Mexico around \$1 billion per year but pays off when prices plunge. For example, Mexico received payouts of \$5.1 billion in 2009, \$6.4 billion in 2015, and \$2.7 billion in 2016 from its hedges (IMF, 2015; Baumeister & Kilian, 2016). During the 2020 collapse, Mexico had hedged at approximately \$49 per barrel, helping to shield fiscal revenues during the global downturn (Kumar & Eschenbacher, 2020). The hedge also gave Mexico greater confidence during OPEC negotiations, as downside risks were already covered (Levi et al., 2022). In effect, Mexico transferred risk to financial markets during favorable periods to maintain budget stability during downturns. Academic analyses of Mexico's oil-hedging program show that it can reduce income volatility and lower sovereign borrowing costs (Ma & Valencia, 2018). More specifically, Ma & Valencia (2018) argues that Mexico's sovereign borrowing costs would be 19 basis points higher without hedging. Nonetheless, Mexico remains "the only country" (Cifuentes, 2016) to operate an oil hedge on this scale, partly because the approach requires significant technical capacity and high upfront costs (van den Bremer & van der Ploeg, 2013).

Most major producers do not employ sovereign-level financial hedging. For instance, Saudi Arabia, where oil accounts for approximately 55% of government revenue, has generally avoided hedging through international financial markets. One reason is that, as the de facto leader of OPEC, Saudi Arabia manages oil prices primarily through supply policy rather than financial instruments (IMF, 2019; Kouleas, 2023). Hedging large volumes could be perceived as undermining OPEC's supply discipline by effectively "betting against" efforts to raise prices. Instead, Saudi Arabia has focused on fiscal reforms and economic diversification to reduce oil dependence (Azad, 2023; Ateba & Enwereji, 2024). Following the 2014–2016 price slump, the country implemented austerity measures and introduced a 5% value-added tax (VAT), which was later increased to 15% in 2020, to strengthen non-oil revenue (Platt, 2020). These measures, part of the Vision 2030 agenda, aim to mitigate oil volatility by expanding the non-oil fiscal base. Nevertheless, Saudi Arabia's national oil company, Saudi Aramco, and the government have occasionally considered hedging certain exposures; for example, during discussions surrounding the 2018 initial public offering (IPO), hedging refined product margins was contemplated (Bakir & Al-Shamari, 2025). In practice, however, the norm has been "too big to hedge." The kingdom relies on its substantial foreign reserves and its role as a swing producer to absorb price shocks rather than relying on derivative contracts (van der Ploeg & Venables, 2011).

The UAE follows a similar pattern. The UAE is a major OPEC producer (particularly the emirate of Abu Dhabi) that has not publicly implemented an oil hedging program (Antwi-Boateng & Jaber, 2022). Instead, the UAE's strategy for managing oil cycles emphasizes investment diversification and savings (El Anshasy & Khalid, 2023). With a population of approximately 10 million, the country maintains several large SWFs, including the Abu Dhabi Investment Authority, whose assets are estimated at approximately \$700 billion (USD) and are invested globally using surplus oil revenues (International Energy Agency, 2020). Income generated from these diversified portfolios provides a fiscal cushion during periods of oil price decline. The UAE's economy is also relatively diversified, for example, through Dubai's tourism and services sectors, which helps reduce exposure to oil price volatility.

Furthermore, as a high-income federation with substantial financial reserves, the UAE can afford to run deficits or stimulate the economy during oil price declines without resorting to hedging (Crupi & Schiliro, 2023). During the 2020 COVID-19 crisis, UAE authorities supported the economy, for

example, through central bank stimulus and the use of state resources, while tolerating a larger deficit, confident that SWF assets and low debt levels would reassure creditors (Berg, 2013; Siddiqui & Afzal, 2022). The strength of the UAE's balance sheet is also evident in its ability to maintain a peg between its currency, the dirham, and the USD. In contrast, Nigeria attempted for many years to peg its currency, the naira, to the USD. However, a weak balance sheet and an inability to meet public demand for USD contributed to the emergence of a thriving black market and significant depreciation of the naira, eventually resulting in "duers", a dual exchange rate system that created substantial arbitrage opportunities linked to political connections.

Other emerging-market oil exporters have shown interest in hedging but face significant barriers. Notably, Nigeria has periodically debated hedging its crude oil sales but has never implemented a sustained program (Adegun & Abiola, 2020). Industry analysts cite several reasons for this. Hedging costs can be "prohibitive" for Nigeria, particularly given its production (approximately 2 million barrels per day before the pandemic), which would require substantial option premiums (Ayodele et al., 2024). Nigeria's oil derivatives market is also underdeveloped, meaning that any hedge would likely be arranged through international banks, potentially at higher cost or perceived risk (Ansari et al., 2020). Importantly, Nigerian policymakers often appear to assume that oil revenues will eventually rebound ("the market will always be there"), reducing the perceived urgency to hedge (Okwueze et al., 2025). Membership in OPEC also plays a role; as one expert noted, it may seem "counterintuitive if you are part of [OPEC]" to hedge against price declines (Azebi & Joseph, 2025). In practice, Nigerian officials have relied on OPEC's collective supply management and ad hoc domestic measures—such as currency devaluation or borrowing—when prices fall rather than on pre-emptive financial insurance (Okwueze et al., 2025).

In summary, sovereign-level commodity hedging remains rare, and Mexico represents the clearest example of its successful application. The trade-off is clear: hedging provides protection during price crashes but requires consistent upfront costs and the political willingness to allocate funds for insurance during favorable periods. Countries such as Nigeria have thus far considered these costs too high or the mechanism too complex, a decision that proved costly in 2020 when unhedged exposure contributed to fiscal stress. As discussed later, establishing a hedging program could significantly strengthen Nigeria's fiscal stability but would require overcoming technical and political constraints, including improving stakeholder understanding of its long-term benefits. Meanwhile, other sovereign balance sheet tools are more widely adopted by oil-producing countries, particularly SWFs and reserve assets.

2.2. Quantitative Model of a Nigerian Hedging Program

The quantitative analysis employed the stochastic simulation framework developed by Berg et al. (2013). The baseline scenario uses Nigeria's observed GDP contraction of -1.8% in 2020. The counterfactual scenario assumes the adoption of an oil hedging mechanism capable of offsetting approximately 20% of oil revenue losses. Hedge effectiveness was modeled as a normally distributed random variable. One thousand iterations were conducted to generate a probability distribution of counterfactual GDP outcomes. Distributional statistics, including mean values and percentile bounds, were computed to assess the potential effects of macroeconomic stabilization. The findings are presented in descriptive tables, comparative institutional matrices, and graphical simulation outputs. The stochastic simulation results are illustrated using probability distribution charts to demonstrate the range of possible GDP outcomes under a hedging regime.

Internal validity was strengthened through triangulation across multiple data sources and institutional reports. The counterfactual model is grounded in established fiscal stress-testing frameworks in the macroeconomic literature. Sensitivity checks were conducted to ensure that simulation outcomes remained stable across repeated runs. Reliability is supported by transparent modeling assumptions and replicable simulation procedures. The use of 1,000 iterations ensures distributional stability and reduces random estimation noise.

This study relied entirely on publicly available secondary data and did not involve human participants; therefore, formal ethical approval was not required. All data sources are acknowledged to ensure academic integrity. The analysis was conducted objectively without political bias, and the findings are presented in a manner that supports evidence-based policy discussions.

2.3. Counterfactual Model Specification

This study employs a counterfactual model (Berg et al., 2013) to quantify the impact of missing fiscal buffers. Counterfactual models use econometric simulations or fiscal stress-testing frameworks to estimate how economic outcomes might differ under alternative policy conditions. In this case, a stochastic simulation was used to estimate Nigeria's potential GDP outcome had it adopted hedging practices similar to those implemented by Mexico.

Counterfactual GDP Impact Model

- Actual (2020): Nigeria's GDP contracted by approximately -1.8%, largely due to the collapse in oil revenues during the COVID-19 crisis.
- Counterfactual: If Nigeria had implemented a hedging policy similar to Mexico's—protecting approximately 20% of the oil revenue shock—GDP contraction might have been reduced to approximately -1.44%.
- Assumption: The model assumes that hedging provides fiscal stabilization, thereby reducing the magnitude of economic contraction.
- Implication: The results illustrate how financial instruments can enhance macroeconomic resilience.

3. Key Findings

The results of the stochastic simulation are presented in Figure 1, which illustrates the distribution of Nigeria's counterfactual GDP growth in 2020 under an oil price hedging strategy. The model is based on 1,000 simulations of hedge effectiveness drawn from a normal distribution. Summary statistics are presented below:

- Mean counterfactual GDP contraction: ~ -1.44%
- 5th percentile (worst-case hedge performance): ~ -1.62%
- 95th percentile (best-case hedge performance): ~ -1.26%

These results indicate that, under a hedging strategy, Nigeria's GDP contraction in 2020 would likely have remained within a relatively narrow range between -1.62% and -1.26%, with an expected outcome of approximately -1.44%.

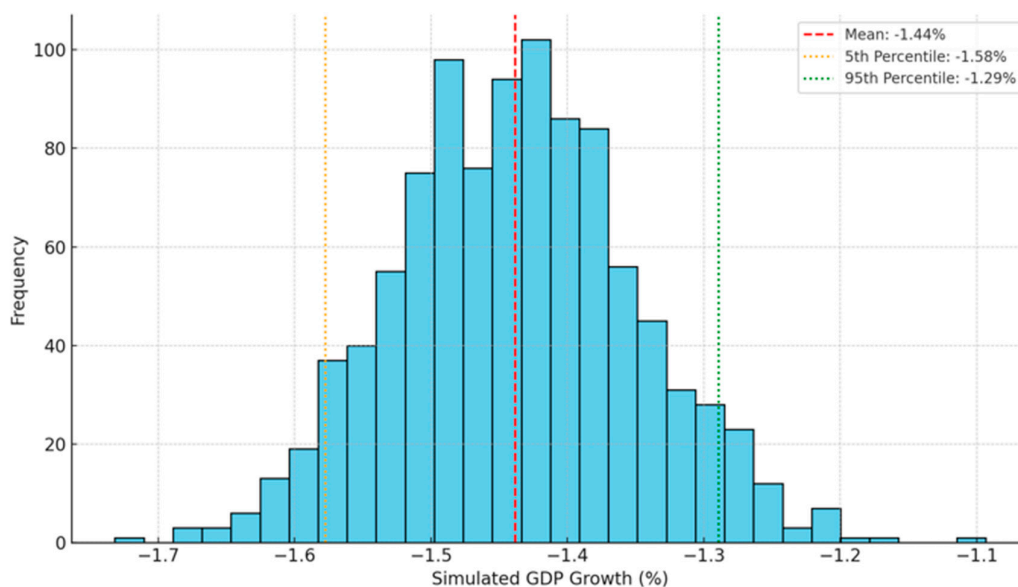


Figure 1. Stochastic simulation: Counterfactual GDP growth with oil hedging (2020).

3.1. Interpretation of Results

The simulation assumes that oil price hedging mitigates between 0% and 40% of external oil shocks, with an average effectiveness of 20%. This range reflects plausible variation in hedge performance under volatile market conditions. Three key insights emerged.

3.1.1. Risk Containment

Even in the lower tail of the distribution (5th percentile), GDP contraction remains moderated relative to the no-hedge scenario. This finding suggests that partial hedging can significantly reduce downside risk.

3.1.2. Stability Effect

The relatively narrow dispersion between the 5th and 95th percentiles indicates that hedging contributes to macroeconomic stability by limiting extreme output fluctuations.

3.1.3. Macroeconomic Cushioning

In favorable scenarios (95th percentile), GDP losses could have been reduced by up to 0.54 percentage points. This magnitude is economically significant, particularly during a recession.

These findings reinforce the argument that even partial oil price hedging can serve as an effective macroeconomic stabilization instrument. By smoothing revenue volatility, hedging reduces the likelihood of emergency borrowing and abrupt fiscal contraction, thereby supporting sustainable fiscal management (Mehlum et al., 2006).

3.2. SWFs and Oil Revenue Savings

The second major mechanism for managing oil cycle shocks is the establishment of SWFs or related sovereign savings instruments (Bouhmidi, 2024). These funds enable governments to save surplus revenue during boom periods and allocate it to long-term investment or macroeconomic stabilization objectives (Garg & Shukla, 2021). In practice, SWFs convert non-renewable and volatile oil revenues into diversified financial assets that generate more stable returns and provide fiscal buffers during economic downturns. Across oil-producing regions—from the Gulf States to emerging African producers—numerous countries have adopted such funds, although their effectiveness varies depending on governance quality, transparency, and policy discipline (Ma & Valencia, 2018).

At one end of the spectrum is Norway, often cited as a model of prudent resource management and therefore not used as a comparator country for Nigeria. Norway is not an OPEC member but is a major oil exporter that allocates virtually all petroleum budget surpluses to the Government Pension Fund Global, now the world's largest SWF (Takle, 2021). In recent years, the fund has exceeded \$1 trillion (922 billion USD in 2017), amounting to nearly \$180,000 per Norwegian citizen on average. Norway earns returns that can finance up to 3% of its budget annually (under a self-imposed fiscal rule) while preserving wealth for future generations through investment in a diversified global portfolio (Norouzi & Ataei, 2022). Norway's strong institutions, including a transparent mandate for the sovereign fund, effective parliamentary oversight, and a well-established culture of rule compliance, have safeguarded the fund's integrity and supported its long-term growth (Øvald et al., 2019). As a result, Norway has largely decoupled fiscal spending from short-term oil price fluctuations; even during the 2020 collapse, the government could comfortably run deficits or withdraw funds as a countercyclical measure with minimal fiscal stress. Norway's experience highlights the value of saving oil revenues in sovereign funds and investing them prudently abroad (Berg et al., 2013).

Gulf Arab states also maintain enormous sovereign funds, although their governance structures differ. Kuwait's fund, established in the 1950s, and Abu Dhabi's ADIA (UAE) are among the largest, each managing assets of approximately \$600–700 billion (Carvalho et al., 2017). These funds have accumulated decades of oil surpluses. For example, by 2020, Kuwait's sovereign net foreign assets had reached nearly 500% of its GDP, providing an extraordinary fiscal buffer. Qatar and Saudi Arabia also maintain sizable funds; the Qatar Investment Authority held around 300 billion USD (Oancea, 2022), while Saudi Arabia's Public Investment Fund had grown rapidly to more than 360 billion USD by 2020, partly boosted by proceeds from the Aramco IPO (Roll, 2019).

These funds serve multiple roles, including stabilization, savings, and economic development, but their sheer size allows countries such as Saudi Arabia and the UAE to access assets or investment income when oil revenue declines. For instance, during the 2020 oil price collapse, Saudi Arabia drew down its central bank's foreign reserves and used the Public Investment Fund (PIF) to support the economy while also issuing debt. The impact of the shock was mitigated by past savings:

Although Saudi Arabia's fiscal deficit widened to 11.3% of GDP in 2020 due to an approximately 30% decline in oil revenue, the kingdom was able to finance it through a combination of reserve drawdowns and borrowing, maintaining both solvency and creditworthiness (Magazzino, 2022).

In contrast, Nigeria's deficit, about 5.6% of GDP in 2020, was smaller as a share of GDP; however, Nigeria faced more severe financing constraints, its reserves were limited, and borrowing options were restricted without multilateral assistance (Odekule, 2024). The difference lies in the accumulated buffers: Saudi Arabia had hundreds of billions in reserves and SWF assets to draw upon, whereas Nigeria's official sovereign funds were nearly depleted.

Nigeria's SWF position is among the weakest globally relative to its oil earnings (IMF, 2016; Ekong et al., 2025). Over the past few decades, Nigeria has implemented several oil-saving mechanisms. The ECA, established in 2004, functioned as a stabilization account designed to save oil revenue exceeding a benchmark budget price (Oleka et al., 2014). In principle, the ECA had the potential to accumulate substantial reserves; at one point in 2008, it held more than \$20 billion (Onyi-Ogelle & Musa, 2020; Mark et al., 2023). In practice, however, the account was repeatedly drawn down or distributed to cover budget shortfalls and political expenditures. Between 2005 and 2015, approximately \$201.2 billion was deposited into the ECA, while \$204.7 billion was withdrawn during the same period (102% of deposits) (NEITI, 2017). This effectively nullified its stabilization function. As oil prices declined in 2014–2015, the ECA balance fell from \$22 billion in 2008 to only \$2.5 billion by the end of 2015 and, as noted earlier, to merely \$72 million by 2020 (NEITI, 2017).

Separately, the Nigeria Sovereign Investment Authority (NSIA) was established in 2011 and is structured into three funds: the Stabilization Fund, the Future Generations Fund, and the Nigeria Infrastructure Fund. The NSIA began with \$1 billion in seed capital and gradually grew to manage about \$3.6 billion by 2020 (including third-party funds) (Nwoke, 2023). This amount remains modest

for a country of Nigeria's size, equivalent to roughly \$18 per capita in sovereign wealth (with a population of approximately 200 million in 2020). By comparison, despite its own governance challenges, Angola (another OPEC member with similar oil dependence) saved about \$5 billion in its SWF, or roughly \$156 per capita (Shaxson, 2021). Saudi Arabia's per capita sovereign assets (PIF plus reserves) are on the order of tens of thousands of dollars, while those of the UAE are even higher (see Figure 2). Nigeria's SWF assets remain relatively small, covering only about 10% of its annual budget. A NEITI report noted that Nigeria's \$1.5 billion SWF (as of a few years earlier) was "one of the lowest in the world, better only than war-torn Iraq and crisis-hit Venezuela" (NEITI, 2017).

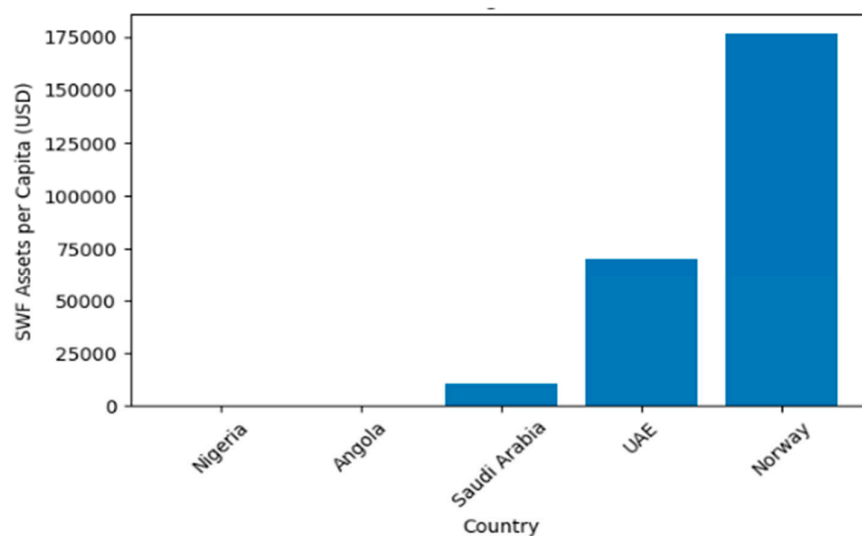


Figure 2. Sovereign oil fund comparison. Source: Nigeria Extractive Industries Transparency Initiative (2017).

Figure 2 shows that Nigeria's savings are minimal compared with those of its OPEC peers and Norway. Illustrative values are as follows: Nigeria ~ \$18, Angola ~ \$156, Saudi Arabia ~ \$10,500, the UAE ~ \$70,000, and Norway ~ \$177,000 per person.

The consequences of Nigeria's weak savings were fully revealed during the 2020 crisis (Ozili, 2021). With almost no fiscal reserves to draw upon, Nigeria resorted to emergency measures. It requested an IMF Rapid Financing Instrument (drawing \$3.4 billion), secured World Bank loans, and borrowed domestically at high interest using its sovereign credit because it lacked sufficient sovereign wealth buffers (Efosa et al., 2020). Meanwhile, countries such as Ghana and Botswana—although much smaller economies—had accumulated modest stabilization funds or savings during favorable periods. While not large, these funds provided some fiscal space when commodity revenues declined (Onyekwena & Edefe, 2024; Honde, 2024). Ghana's Petroleum Stabilization Fund, for example, though only several hundred million dollars, was drawn upon to support the national budget during the 2015–2016 oil price slump (Onyekwena & Edefe, 2024). Because of repeated withdrawals and a constitutional dispute between federal and state governments over oil funds that undermined long-term savings, Nigeria lacked such a cushion by 2020 (Ozili, 2021). Importantly, establishing a fund alone is insufficient; governance and institutional rules determine its effectiveness. In Nigeria, both the ECA and NSIA were weakened by unclear legal status and political interference (Roy et al., 2022). Moreover, the ECA lacked firm legal protection; state governors at times sued the federal government over its accrual (Okonjo-Iweala, 2018). Although the NSIA was legally established, it faced political opposition and received limited funding from successive governments (Chigozie & Alao, 2021). In contrast, countries that have successfully used SWFs, such as Norway, Chile (with a copper stabilization fund), and Botswana (with a diamond fund), typically maintain strict deposit and withdrawal rules alongside high transparency. For example, Chile's Economic and Social Stabilization Fund can be accessed only under structural budget rules tied to

long-term copper prices, insulating it from ad hoc political pressure (Morandé, 2025). Nigeria's experience demonstrates that without political commitment and legal safeguards, oil funds can be treated as discretionary accounts, undermining their stabilization purpose (Roy et al., 2022).

Nigeria fell behind its peers in oil revenue savings. While numerous OPEC and emerging oil-producing states built sovereign wealth portfolios during the 2000s commodity boom, Nigeria largely did not. Figure 2 highlights the stark gap in per capita sovereign assets. Nigeria's total oil savings (ECA and NSIA) were less than \$4 billion in 2017, representing less than 20% of the annual federal budget. In contrast, smaller countries such as Kuwait and the UAE accumulated funds several times larger than their annual budgets, and even an African peer, Angola, maintained higher reserves despite also facing corruption and debt challenges. The absence of a robust fund left Nigeria's balance sheet unprotected, and when oil prices collapsed, there were no substantial financial assets to liquidate. This situation places Nigeria among the most vulnerable "petrostates," which, as noted by a Carbon Tracker analysis, face severe revenue shortfalls during energy transitions because of limited savings and heavy dependence on oil revenues (Gopalakrishnan & Miller, 2023). Thus, building and preserving sovereign wealth remains an urgent priority for strengthening Nigeria's future fiscal resilience.

3.3. Downstream Infrastructure and Strategic Reserves

Beyond financial instruments, sovereign states can also manage commodity cycles through physical assets such as downstream infrastructure (refineries, pipelines, and storage terminals) and SPRs (Jaffe, 2020). According to Ikevuje et al. (2024), these assets enhance flexibility during periods of price volatility. With adequate storage, a producer can withhold crude oil when prices collapse and sell it when markets recover. However, Nigeria has historically underinvested in this area. Despite being a major oil producer, the country operates with severely limited refining capacity and has long relied on imported petroleum products (Itsekor, 2020). State-owned refineries have operated far below capacity for years, creating the paradox of exporting crude oil while importing refined products. Compounding this weakness, Nigeria lacks a functional strategic petroleum reserve, leaving it unable to store crude oil during price collapses, such as the 2020 contango episode, when futures prices exceeded spot prices.

By contrast, several countries treat physical oil stocks as strategic national assets. The United States Department of Energy manages the world's largest strategic reserve. During the 2020 price crash, the United States considered further filling its storage facilities to support producers and energy security and later released barrels in 2022 to stabilize markets (Norouzi, 2021). China aggressively expanded its strategic and commercial storage, reportedly exceeding 300 million barrels by 2020, while India filled its smaller reserves during the downturn (Guo et al., 2020). Among producers, Saudi Arabia maintains extensive storage infrastructure at multiple sites, enabling it to smooth exports and respond to disruptions, as demonstrated after the 2019 Abqaiq attack (Barbary, 2025). The UAE has similarly expanded its storage and pipeline networks, including the Habshan-Fujairah pipeline, positioning itself as a resilient exporter. These investments provide operational flexibility, market leverage, and shock-absorption capacity.

The absence of comparable infrastructure in Nigeria imposed high costs in 2020. Without adequate storage capacity, the country could not defer sales during the glut period and was forced to sell crude oil at extremely low prices (Ikevuje et al., 2024). Limited refining capacity also meant continued reliance on fuel imports, even as foreign exchange earnings from crude exports declined. This created a double vulnerability: falling export revenue and persistent import bills. Countries with substantial refining and storage capacity can partially hedge against such volatility because refining margins may offset weakness in crude prices, while stockpiles can be accumulated during low-price periods. Consequently, Nigeria's structural gaps amplified the fiscal and external shocks triggered by COVID-19.

Recent post-COVID developments, such as the commissioning of the privately owned Dangote refinery, may improve Nigeria's downstream capacity and reduce dependence on refined product

imports (Ahmed & Usman, 2023). However, this development is unlikely to significantly expand domestic storage capacity because the private refinery is expected to contract production primarily for domestic consumption and foreign exports rather than maintain strategic reserves, which typically remain a government responsibility.

Nigeria's sovereign balance sheet lacked an important class of assets, physical reserves and infrastructure, that numerous other countries use to manage oil cycles. The absence of strategic storage left Nigeria highly exposed to market forces in 2020. This situation highlights a broader principle: resilience depends not only on economic diversification but also on diversification of the asset base (both financial and physical) that supports national stability. Ideally, a resilient oil producer should maintain (a) financial savings, (b) hedging contracts, (c) spare capacity and storage, and (d) diversified revenue streams. Nigeria performed poorly across all of these dimensions in 2020, whereas its peers had at least one in place (Mexico: hedging; Saudi Arabia, UAE, Angola, and Ghana: savings and storage). The next section compares Nigeria with specific peer countries to identify the institutional differences that contributed to these outcomes.

3.4. Nigeria vs. Other Oil Producers: Institutional Gaps and Failures

This section compares Nigeria with other oil producers to examine institutional gaps and failures. Nigeria's experience can be better understood by comparing it with both wealthy OPEC members and emerging oil producers. While numerous oil exporters face common challenges—such as price volatility, rent-seeking, and Dutch disease—the degree of preparedness and institutional response varies widely. Several comparator countries are considered below.

3.4.1. Saudi Arabia and the UAE

Saudi Arabia and the UAE built strong fiscal buffers during oil booms and implemented long-term planning through centralized governance. Saudi Arabia accumulated more than \$500 billion in foreign assets in 2014, which helped it absorb major price shocks between 2014 and 2016 and again in 2020 (Moshashai et al., 2020; Young, 2021). Both countries, neither of which are democracies, implemented fiscal reforms, including subsidy reductions and the introduction of new taxes, to lower fiscal break-even oil prices and protect public finances. Their national oil companies, Saudi Aramco and the Abu Dhabi National Oil Company, operate with strong commercial mandates and remain closely aligned with state strategy, including downstream investment and global asset expansion. Centralized authority reduced policy conflicts and ensured consistent savings as well as effective implementation of reforms. In contrast, Nigeria struggled with intergovernmental disputes, weak savings discipline, and low revenue mobilization, leaving it highly exposed during the COVID-19 oil price collapse.

3.4.2. Angola

Angola shares Nigeria's high dependence on oil revenues and similar governance challenges, yet it has introduced modest institutional reforms that improved crisis management. The government established a SWF in 2012, creating a formal savings framework despite ongoing governance concerns (Bolander, 2024). After 2017, Angola pursued IMF-supported reforms, devalued its currency, reduced fuel subsidies, and restructured its public debt to restore macroeconomic stability (Markowitz, 2020). It also restructured its national oil company, Sonangol, to strengthen oversight and transparency (Mouan, 2024). Although Angola faced declining output from maturing fields, it maintained tighter control over production and avoided the scale of oil theft observed in Nigeria. Nigeria, by contrast, delayed structural reforms, relied heavily on central bank financing, and suffered major revenue losses from production leakages, which deepened fiscal vulnerability during downturns.

3.4.3. Mexico

Mexico presents a contrasting model built on fiscal risk management rather than large savings (Levi et al., 2022). Although oil production declined from its earlier peaks, the government maintained macroeconomic discipline after the 1990s crisis and adopted a systematic oil hedging strategy managed by the Finance Ministry. Rather than relying primarily on large precautionary reserves, Mexico has long used annual oil-hedging operations to protect budgeted oil revenues, while also maintaining stabilization and trust funds as secondary buffers (Duclaud, 2012; IMF, 2020b; Cervantes & Rivera, 2021). During the 2020 oil-price collapse, the IMF noted that the government was benefiting from its oil hedge while drawing down its revenue stabilization and trust funds, which helped cushion the fiscal shock and preserve spending capacity.

The stabilization funds themselves were not the sole line of defense. Rather, Mexico's hedging program played a central role in offsetting the revenue impact of sharply lower oil prices, including in 2020, when hedge gains supplemented fiscal buffers. Strong coordination between fiscal authorities and the central bank supported the confidential and strategic execution of the program (Levi et al., 2022). However, Nigeria did not replicate this model. Fragmentation among the Finance Ministry, the national oil company, and subnational governments limited consensus on hedging or benchmark discipline. Mexico's experience demonstrates how technocratic capacity and policy coherence can substitute for large sovereign savings.

3.4.4. Ghana

Ghana adopted a rules-based framework before oil production began in 2010 (Ayanoore & Hickey, 2022). The Petroleum Revenue Management Act of 2011 created a Stabilization Fund and a Heritage Fund and mandated formula-based deposits from oil revenue. In a 2013 Reuters interview, the Central Bank of Ghana governor pointed to Nigeria's experience and stated that the government was wary of Dutch disease and did not want oil to come "at the expense of cocoa or gold" (Reuters, 2013). This mindfulness and early institutional design aimed to prevent procyclical spending and improve intergenerational equity. Savings have remained modest, and political pressures have led to drawdowns; however, the legal framework established clear fiscal rules from the outset (Ayanoore, 2020).

Ghana also strengthened transparency through parliamentary oversight and participation in global accountability initiatives. Nigeria introduced reforms only after decades of oil dependence had entrenched spending expectations and weakened savings discipline. Ghana's approach shows that the early institutionalization of fiscal rules, even in a lower-income context, can promote greater accountability and structured revenue management than a system shaped by ad hoc political bargaining. Table 1 outlines the hedging strategies, sovereign fund presence, and reserve strategies of the selected countries.

Table 1. Comparative use of commodity hedging and reserves.

Country	Hedging Strategy	Sovereign Fund	Strategic Reserves
Nigeria	None	NSIA (\$2B)	None
Mexico	Options hedge	Oil Income Stabilisation Fund	Minimal
Saudi Arabia	Forward sales	Public Investment Fund	Operational SPR
UAE	Fiscal rule-based	ADIA	Yes

Source: Compiled by the authors.

This comparison shows that institutional quality and governance determine how oil exporters manage volatility. Countries that outperformed Nigeria relied on distinct but coherent strategies: long-term, centralized planning in Gulf monarchies; technocratic risk management, such as hedge programs in Mexico, Saudi Arabia, and the UAE; conditional reform and restructuring in Angola; and early fiscal rules and savings laws in Ghana. Nigeria's weakness stemmed not from ignorance of

these tools but from weak political will, fragmented institutions, and limited accountability. Recurrent corruption scandals, subsidy fraud, and opaque oil revenue management undermined savings and reform efforts, while legal and political disputes diluted the implementation of measures such as the SWF and revenue centralization reforms. By contrast, countries that embedded fiscal discipline, enforced accountability, and aligned political incentives with long-term national goals built buffers against oil shocks. Nigeria's experience reflects a systemic governance failure that prevented the effective use of its sovereign balance sheet, despite clear policy alternatives.

4. Discussion of Results

A comparative analysis of Nigeria and other oil-producing countries highlights the critical roles of institutional quality and governance in managing fiscal vulnerability. Nigeria's sovereign balance sheet in 2020 was notably weak, with minimal savings, an absence of hedging programs, and limited strategic reserves (Odekule, 2024; Ozili, 2021). By contrast, Saudi Arabia and the UAE built robust fiscal buffers through centralized governance and long-term planning, enabling them to absorb oil price shocks without major fiscal disruptions (Moshashai et al., 2020; Young, 2021). Angola, while facing governance challenges similar to Nigeria, implemented modest reforms, established an SWF in 2012, and pursued IMF-supported policy measures, which allowed it to manage revenue shocks more effectively (Bolander, 2024; Markowitz, 2020). Mexico relied on technocratic risk management through annual oil hedges that guaranteed minimum budget revenues and reduced exposure to price volatility without accumulating large reserves (Levi et al., 2022; Cervantes & Rivera, 2021). By contrast, Ghana institutionalized fiscal rules and revenue stabilization mechanisms early in its oil development, creating a legal framework for savings and accountability even under political pressure (Ayanoore & Hickey, 2022; Ayanoore, 2020). Nigeria's underperformance relative to its peers demonstrates that fiscal resilience requires more than resource wealth; it depends on credible institutions, policy coordination, and governance capacity.

Political choice theory provides a lens through which to interpret Nigeria's institutional failures and policy choices. The framework asserts that political actors respond primarily to incentives rather than pursuing the public interest (Buchanan & Tullock, 2003; Becker, 1983). In Nigeria, short-term electoral pressures and entrenched patronage networks created strong incentives for immediate resource distribution rather than long-term savings or hedging (Shaw, 2002; Mengiste, 2020). Weak accountability structures and limited enforcement of fiscal rules further reduced the political cost of mismanaging oil revenues, leaving instruments such as the ECA and NSIA underutilized or politically contested (Odekule, 2024; Chigozie & Alao, 2021). By contrast, countries like Mexico and Ghana aligned technocratic capacity and institutional frameworks with long-term fiscal stability, while Gulf monarchies adopted centralized authority to enforce disciplined savings and investment policies (Moshashai et al., 2020). This suggests that the mere existence of fiscal instruments is insufficient, and their effectiveness is contingent on political incentives and the capacity of institutions to enforce strategic policy objectives.

The findings highlight that Nigeria's fiscal vulnerability during the 2020 oil shock resulted from systemic governance failures rather than a lack of awareness of international best practices. While peer countries demonstrated distinct approaches—long-term centralized planning in Saudi Arabia and the UAE, risk-management hedging in Mexico, early institutionalization of fiscal rules in Ghana, and conditional reform in Angola—Nigeria's political fragmentation, intergovernmental disputes, and rent-seeking behavior prevented the effective implementation of sovereign balance sheet tools (Ozili, 2021; Bolander, 2024; Levi et al., 2022). This reinforces the political choice argument that technical instruments, including hedges, SWFs, and strategic reserves require complementary institutional structures and political commitments to achieve fiscal resilience (Buchanan & Tullock, 2003; Mehlum et al., 2006). The study, therefore, highlights the importance of integrating governance reform with financial tools to convert resource wealth into long-term macroeconomic stability, offering lessons for Nigeria and other resource-dependent economies facing recurrent commodity shocks.

4.1. Sovereign Balance Sheet Resilience

Building resilience to commodity cycles requires sound economic tools and institutions to implement them. Based on these discussions, we propose a conceptual framework for the balance sheet management of a resource-dependent sovereign, along with specific recommendations tailored to Nigeria (but applicable to its peers). The conceptual framework of this study aligns with and builds upon the scholarly discourse on the resource curse and the institutional determinants of macroeconomics.

The framework highlights that the proactive management of assets and liabilities is essential for fiscal resilience in resource-dependent economies. Like any resource-rich state, Nigeria should treat its wealth as a corporate balance sheet, in which assets such as natural resources, financial reserves, physical infrastructure, and skilled institutions must be managed to cover liabilities, including public debt, contingent obligations, and decommissioning costs. A resilient balance sheet ensures that assets exceed liabilities and that their characteristics match obligations—for example, holding financial reserves or hedges to meet debt repayments—even if oil prices collapse. The framework also incorporates intergenerational equity, ensuring that the depletion of natural resources is offset by building financial assets or strategic reserves for future citizens, consistent with the Hartwick rule.

Operationalizing this framework requires fiscal discipline and integrated risk management. Nigeria could adopt fiscal rules to limit non-oil deficits; coordinate scenario planning across the Finance Ministry, NNPC, and Central Bank; and institutionalize stress testing of the sovereign balance sheet under different oil price scenarios. International partners, including the IMF, World Bank, and Afreximbank, can provide technical guidance on hedging, SWF governance, and infrastructure financing. Ultimately, sustainable implementation depends on domestic political will, institutional capacity, and societal support to maintain buffers, enforce rules, and make strategic asset and liability decisions that protect the economy from commodity shocks while preserving resources for future generations. This framework (Figure 3) emphasizes that proactive asset management, especially building buffers, is key to weathering fiscal shocks in resource-dependent economies.



Figure 3. Sovereign balanced sheet resilience model (for Nigeria). Source: Compiled by the authors.

The framework can be considered a four-pillar strategy: (1) Risk Hedging, (2) Revenue Savings, (3) Physical Investment, and (4) Governance and Institutions. These findings provide clear policy recommendations for Nigeria to restore and strengthen its sovereign balance sheets. The recommendations are as follows.

4.2. Implement a Pragmatic Oil Price Hedging Policy

Nigeria should adopt a limited and opportunistic oil hedging program to protect its budget from price shocks. The government can hedge a portion of production (e.g., 100,000 barrels per day) using put options to secure a minimum price floor when market conditions are favorable. This approach treats hedging premiums as insurance rather than losses and helps stabilize annual revenue, reduce midyear budget disruptions, and cushion external shocks. A dedicated unit within the Ministry of Finance should manage the program to ensure strong transparency, competitive contracting, and independent audits to prevent abuse. Hedging would complement broader fiscal reforms and provide short-term stability while deeper structural measures take effect.

4.3. Strengthen and Consolidate Sovereign Wealth Funds with Clear Rules

Nigeria should consolidate oil savings into a single legally protected SWF with automatic deposit and withdrawal rules. Oil revenue above a defined benchmark should flow directly into the fund, whereas withdrawals should occur only during certified revenue shortfalls or with strong legislative approval. Clear governance structures, professional management, and representation from federal and state stakeholders can improve trust and compliance. The fund should aim to build a meaningful stabilization buffer and include a component to promote intergenerational equity for future generations. Predictable rules and transparency would help smooth expenditures across cycles and prevent political interference.

4.4. Invest in Downstream Assets and Strategic Storage

Nigeria should prioritize investments in refineries, pipelines, and storage to reduce import dependence and strengthen energy security. Supporting the operational success of the Dangote refinery and rehabilitating domestic refining capacity can retain more value within the economy and reduce foreign exchange pressure. The country should also establish strategic reserves of refined products, targeting at least 30–60 days of supply, and expand crude storage at export terminals. Development partners can support financing for storage infrastructure. Strategic reserves would provide flexibility during supply disruptions or price spikes and prevent forced sales during global gluts.

4.5. Enhance Governance, Transparency, and Accountability

Sovereign balance sheet resilience requires strong governance and credible enforcement. Nigeria should fully implement the Petroleum Industry Act, strengthen its regulatory independence, and act decisively on audit findings from oversight institutions. Legislative scrutiny, independent fiscal councils, and civil society participation can reinforce horizontal accountability. Anti-corruption efforts must focus on oil sector contracts, revenue leakages, and oil theft, with visible prosecution of offenders. Clear public communication about oil revenue management and savings objectives can build citizens' trust in and support for reforms.

4.6. Limitations

This study has several limitations that should be considered when interpreting the findings. First, the analysis relies exclusively on secondary data and documentary sources, which limits the ability to verify institutional practices in real time or to capture informal political bargaining that may have shaped fiscal decisions. Second, the comparative case design is analytically useful but constrained by differences in country size, regime type, production structure, fiscal rules, and access

to financial markets, which means that the experiences of Mexico, Saudi Arabia, the UAE, Angola, and Ghana are not fully comparable to Nigeria in all respects. Third, the stochastic counterfactual simulation is deliberately stylized and is intended to illustrate plausible macroeconomic effects rather than provide a precise ex post estimate of what would have occurred under an actual hedging regime. Its results depend on simplifying assumptions regarding hedge effectiveness, transmission to GDP, and the share of oil-revenue losses that could realistically have been offset. Finally, the study focuses primarily on the 2020 oil shock and therefore does not model the full political economy of repeated boom-bust cycles over a longer historical horizon. These limitations do not negate the study's central argument, but they suggest that the results should be interpreted as indicative rather than definitive.

5. Conclusions

Nigeria's failure to use its sovereign balance sheet effectively during commodity shocks revealed critical weaknesses in fiscal management and institutional capacity. The 2020 oil price collapse and the COVID-19 pandemic demonstrated that the country lacked financial hedges, maintained limited savings, and possessed inadequate physical reserves—conditions that reflected short-sighted policy choices and weak governance. Countries such as Mexico, Norway, and the Gulf states demonstrate that effective tools exist to stabilize revenues, manage risk, and protect public finances, indicating that Nigeria's crises were not inevitable but rather the result of systemic failures.

Strengthening the sovereign balance sheet requires adopting oil price hedging to secure minimum revenue levels, consolidating and professionally managing SWFs under clear fiscal rules, investing in strategic oil infrastructure and storage to improve supply control and domestic value addition, and reforming institutions to enforce accountability and transparency. Political will and active citizen engagement are also essential to safeguard oil revenues, ensure transparent and accountable hedging programs, and guarantee that public investments produce tangible and measurable development outcomes.

Future research could extend this study in several directions. First, scholars could develop more detailed sovereign balance sheet models for Nigeria that incorporate debt dynamics, exchange-rate pressures, reserve adequacy, and alternative hedging structures under different oil-price scenarios. Second, future work could examine the political economy of implementation by analyzing how federal-state relations, electoral incentives, and bureaucratic fragmentation affect the adoption of stabilization mechanisms. Third, comparative longitudinal studies could test whether countries with stronger legal protections for sovereign savings and hedging arrangements experience lower fiscal volatility over time. Fourth, subsequent research could assess the post-2020 implications of the Petroleum Industry Act, the Dangote refinery, and ongoing energy-transition pressures for Nigeria's fiscal resilience. Finally, interview-based or archival research could complement this study by providing deeper evidence on why successive governments failed to institutionalize buffer-building despite repeated exposure to oil shocks.

The urgency of these reforms is heightened by the finite lifespan of Nigeria's oil reserves and the global shift toward decarbonization, which narrows the window for converting oil wealth into sustainable assets. Implementing these measures could stabilize the economy, reduce vulnerability to future shocks, and establish a foundation for diversification into education, industry, and other sectors—transforming the resource curse into a potential driver of long-term development.

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Abbreviations

The following abbreviations are used in this manuscript:

ECA	Excess Crude Account
EITI	Extractive Industries Transparency Initiative
IMF	International Monetary Fund
NEITI	Nigeria Extractive Industries Transparency Initiative
SWF	Sovereign wealth fund
SPR	Strategic petroleum reserves
UAE	United Arab Emirates

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