AFRICAN DEVELOPMENT BANK GROUP

Sources of Inflationary Pressures in Sudan

Analysis of the External, Structural, and Policy Factors

Policy Brief[1]

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EXECUTIVE SUMMARY

Inflation in Sudan has averaged 46 percent over the past decade, reaching 359 percent in 2021. Sudan's history of high inflation suggests that strong inflationary pressures remain an important macroeconomic challenge for the country. Building on the African Development Bank's (AfDB) 2023 background analysis on the Sources of Inflationary Pressures in Sudan, this Policy Brief identifies and quantifies these pressures over the period 1992-2022, and proposes policy measures to reduce inflation. Results from the structural vector autoregressive (SVAR) analysis showed that policy variables were the main drivers of inflation in Sudan. Over the medium run, money supply shocks explained more than 20 percent of the variation in inflation, fiscal spending more than 12 percent and the exchange rate around 9 percent, altogether adding up to 41 percent for domestic policy variables. External factors accounted for only 9 percent of the variation. The findings of the error correction (EC) model confirmed these results and allowed for the contrasting of the short and long run dynamics of inflation. Both models underscore the role that both fiscal and monetary policies play in overly stimulating aggregate demand via large budget deficits and debt monetization, resulting in high inflation.

These findings have critical policy implications for the country. On the demand side, public expenditure should be aligned with the new reality of permanently lower tax receipts from the oil sector, while maintaining sufficient fiscal space to support essential social needs for the most vulnerable. A full audit of public expenses and revenues should be conducted in order to identify sources of savings and incomes and ways to restore a sustainable balanced budget. Also, among other policy actions, the phasing out of the monetization of fiscal deficits should be sustained. On the supply side, there is need to boost both production and productivity in Sudan's economy. A comprehensive investigation into the factors hampering productivity growth should be conducted, especially in the agricultural sector. Productivity boosting measures targeting capital and investment in technology should be accelerated and upscaled with a view to lifting labor productivity in the long run. In the meantime, in the face of geopolitical risks and high food prices, Sudan should secure short-term supply contracts for key staples with reliable partners, especially wheat, in order to alleviate pressure on prices and the risk of famine. Imported inflation could be reduced by removing the remaining foreign exchange market distortions, increasing foreign exchange reserves, and reducing trade barriers to increase supply and lower import prices.

1. Introduction

Sudan's Gross Domestic Product (GDP) grew by an estimated 0.3 percent in 2022, down from 0.7 percent in 2021, with a remarkable recovery from a contraction of 3.6 percent in 2020. The rebound follows several years of economic contraction stemming from macroeconomic imbalances, structural deficiencies, and political instability (AfDB, 2022). In parallel to this recovery, inflation in Sudan suddenly accelerated from 163.3 percent in 2020 to reach 359 percent in 2021 (Figure 1, panel A).

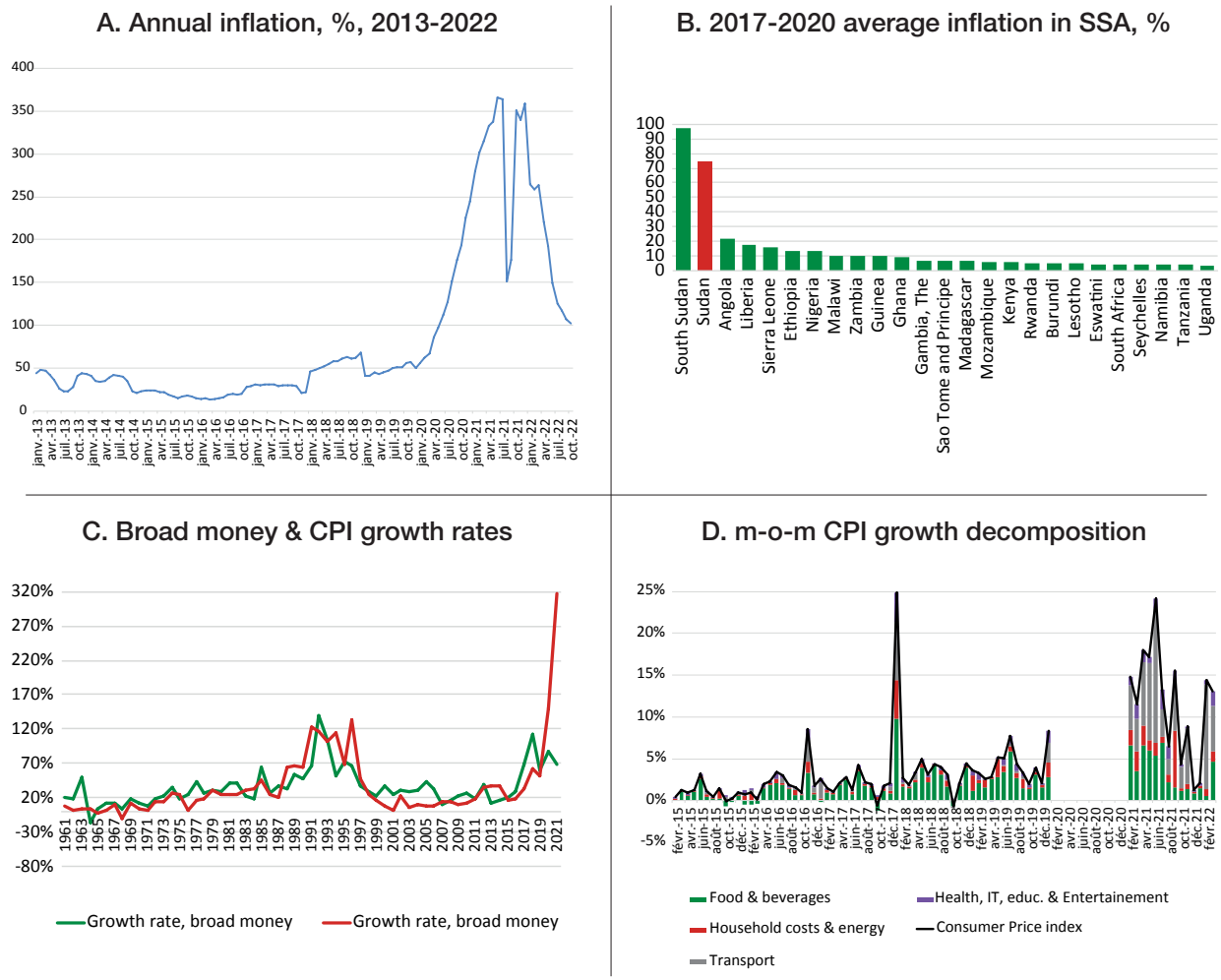
While inflation fell back to an estimated 100.9 percent in 2022, it should be noted that high inflation in Sudan dates back to the 1980s and 1990s. The country experienced triple-digit inflation in the 1990s, peaking at 140 percent in 1992, due to monetary and fiscal expansion, extensive price and wage controls, and constraints on the private sector. Building on the progress made in deregulating the economy during 1992-1996, Sudan embarked on a comprehensive and sustained structural reform program to which the economy responded positively with inflation dropping to 8 percent in 2000, and further rising to an average of 35 percent in the period 2013-2019, before rising to new highs from 2020. Such high inflation is harmful for a poor country like Sudan where an estimated 66 percent of the population live below or close to the poverty line, since it reduces purchasing power and real incomes. Inflation also reduces the incentive to save, which discourages capital accumulation, thereby hindering the growth of productivity and long-term growth prospects. It also comes with a series of indirect effects, such as real price distortions and currency depreciation which further hampers growth and economic development.

This Policy Brief offers an overview of Sudan's inflation landscape, drivers of inflation, past policy responses, and proposes additional policy options for government consideration. The Policy Brief builds on the AfDB's background analysis of the external, structural, and policy factors behind Sudan's runaway inflation (AfDB, 2023). The sources of inflation in Sudan were investigated by building a structural vector autoregressive (SVAR) model using monthly data over 2007-2022, and an error-correction (EC) model using annual data from 1992 to 2020 (Annex 1).

2. Sudan's macroeconomic landscape

While short term factors such as the removal of fuel subsidies and the COVID-19 outbreak contributed to inflation, it is believed that some policies could also be responsible, given Sudan's history of inflation. In particular, years of large oil revenues created a "ratchet effect" whereby public expenditure has remained consistently above fiscal revenues, encouraging the monetization of the resulting public deficit. Sudan began exporting large volumes of crude oil in the early 2000s, peaking at US$ 11.1 billion in 2008 (95.1 percent of its exports). As a result, the economy went through a decade of rapid expansion, with GDP increasing from US$ 10 billion in 1998 to above US$ 60 billion in 2008. When South Sudan seceded in 2011, it took with it 75% of Sudan's oil reserves, thus inflicting a large permanent fiscal and external shock to an economy whose spending habits were modelled by a 10-year oil boom. Revenues as a share of GDP fell from 16 percent in 2011 to 5 percent in 2020. While public expenditure followed a similar downtrend between 2011 and 2015, it moved back up to pre-secession level in 2019, pushing the fiscal deficit to 11 percent of GDP in 2019 (Figure 1, panel B). A significant part of this deficit was driven by fuel subsidies, which represented 8.5 percent of GDP in 2020. The fiscal deficit was largely financed through monetization (International Monetary Fund [IMF], 2020). Thus, broad money rose sharply on the back of fast rising claims by the banking sector on government, with inflation closely following the growth rate of the money supply (Figure 1, panel C).

Figure 4: Inflation and monetary aggregates



On the external side, a second ratchet effect is at play with imports holding on to pre-secession levels while exports declined sharply (Figure 1, panel D). While oil exports and revenues declined following the secession of South Sudan, other factors also contributed to Sudan's deteriorating trade. The agriculture sector, for example, faced low productivity due to years of neglect, and output was adversely impacted by drought and some of the world's highest tariffs on imported goods. Politically instigated protests added to supply disruptions. As a result, Sudan has become highly dependent on food imports, especially wheat, whose imports account for 80 percent of its annual consumption. With other key import prices (e.g., oil) being set by the government in foreign currencies, the depreciation of the Sudanese Pound (SDG) automatically increased the size of food and fuel subsidies. These supply constraints, combined with rising demand due to rapid population growth (2.7 percent annually) and Russia's invasion of Ukraine[2], further fueled inflation. In addition, limited foreign exchange reserves led to rationing, persistent shortages, and disruptions to electricity and food supplies, which also led to higher prices.

[2] Agreed wording at the African Development Bank Annual Meetings 2022 in Ghana. Algeria, China, Egypt, Eswatini, Namibia, Nigeria, and South Africa entered a reservation and proposed "Russia-Ukraine Conflict".

3. Drivers of inflation in Sudan and past policy responses

Using the forecast error variance decomposition, the SVAR analysis showed that policy variables were the main drivers of inflation in Sudan over the medium run. In particular, money supply shocks explained more than 20 percent of the variation in inflation, fiscal spending more than 12 percent and the exchange rate depreciation of around 9 percent, adding up to 41percent for the domestic policy variables. External factors in the form of oil and wheat price shocks cumulatively explained 9 percent of the variation. Past realizations of inflation which may be interpreted as inflation inertia, also played a significant role, especially in the short run, highlighting the importance of not letting expectations of high inflation set in. The impulse-response analysis confirmed the significance of inflation responses to a contemporaneous rise in oil prices and to currency devaluation. For instance, a one percentage point increase in oil prices has a contemporaneous positive impact of a 0.31 percentage point on Sudan's inflation. Forecasts conducted with the model under a no-COVID scenario seemed to align with the recent fall in inflation. However, by disrupting supply chains in key areas such as food and energy, the Russian invasion of Ukraine may have had a similar effect as COVID-19 had on Sudan's inflation, implying that inflation may not fall further.

Findings from the EC model (annual data from 1992 to 2020) confirmed these results and allowed the contrasting of the short run and long run dynamics of inflation in Sudan. In the long run, a one percent depreciation of the SDG is followed by a 0.56 percent increase in the Consumer Price Index (CPI), which confirms the exchange rate pass-through identified in the SVAR model. Similarly, a one percent increase in the money supply translates into a 0.20 percent increase in the CPI, a one percent increase in crude oil price leads to a 0.32 percent increase in the CPI, and a one percent increase in the wheat price leads to a 1.7 percent increase in the CPI. Productivity expansion plays a mitigating role in Sudan's inflationary pressures - a one percent increase leads to a 3.9 percent decrease in the CPI. Consistent with the SVAR model, while past inflation plays a role in the short run, exchange rate and money supply shocks combined explain more than 50 percent of variation of inflation as the horizon lengthens. However, other shocks such as wheat prices, oil prices and productivity growth play a more limited role. This confirms the earlier results that policy shocks play an important role in the dynamics of inflation in Sudan. Unless strong policy actions are taken, the model points to inflation remaining high in the future if the currency continues to depreciate, oil prices rebound, and the money supply remains on its high growth trajectory.

While providing new insights, these findings corroborate some of the existing literature. Darbo and Nakumuryango (2019) found that money supply, credit to the private sector, and the nominal effective exchange rate were the key drivers of inflation in Sudan over the period 2011-2017. Moriyama (2008) found that more than 80 percent of CPI fluctuations in inflation between 1995 and 2007 could be explained by money supply (about 25 percent) and nominal exchange rate variations (about 55 percent), while Abdoun (2012) found that the exchange rate, reserve money, fiscal monetization, and wages were the key determinants for inflation between 1998 and 2011.

Sudanese authorities have recently taken steps to address some of the channels fueling inflation. To limit reserve money growth, the authorities have identified the need to pursue fiscal consolidation while maintaining sufficient fiscal space to support essential social needs for the most vulnerable.

On the monetary side, banks have been stress tested and steps taken to implement a reserve money targeting regime and a liquid market for government securities. Importantly, the Central Bank Act is being revised to strengthen the independence of the Central Bank of Sudan (CBoS) with the new Act focusing on price stability. As a matter of fact, the current objective of the CBoS lists as one of its responsibilities "to act as Government banker, an advisor and agent thereof, in the monetary and financial affairs", which opens the door to the harmful debt monetization. On the external side, exchange rates have been progressively unified since 2021.

4. Conclusion and Policy options

A **key finding of the analysis is that monetization of the fiscal deficit is a major driver of inflation in Sudan.** It is therefore important that policies aimed at addressing inflation prioritize measures to gradually reduce the budget deficit. The sequencing of reforms matter and the ordering of the reforms below account for this prioritization.

4.1 Reducing the budget deficit and eliminating deficit monetization

Progressively align public expenditure with revenues in the short to medium term. By raising aggregate demand without a corresponding increase in supply, public expenditure is feeding into inflation. A full audit of 1) public expenses, 2) government revenues, and 3) the 'rachet effect' at play in Sudan since secession, should be conducted in order to identify sources of savings and incomes, and ways to restore a sustainable balanced budget. In the meantime, fiscal consolidation should be pursued while maintaining sufficient fiscal space to support essential social needs for the most vulnerable in times of external shocks. Combined with on-going debt relief, fiscal adjustment would bring back Sudan's fiscal position onto a sustainable path, boosting confidence for investors and donors, and removing the incentive to monetize fiscal spending.

Restrict the monetization of fiscal deficit. The growth of money supply was identified as a key driver of inflation. The channel of debt monetization can be prevented by restricting the CBoS from directly crediting the various bank accounts of government bodies. This requires amending the Central Bank of Sudan Act of 2002, which currently expects the Central Bank of Sudan to 'act as Government's Bank' (cf. Central Bank of Sudan's "Vision, Mission, and Core Value"), in order to focus on price stability and reserve management.

4.2 Entrenching central bank independence and setting up a new operational framework for monetary policy

Strengthen the Central Bank of Sudan's independence. In the long run, phasing out of the monetization of fiscal deficits should be sustained by severing the ties between the Central Bank of Sudan and the fiscal authority. Indeed, strong cross-country negative relationships between central bank independence and inflation have long been documented (e.g., Brumm, 2006). In addition to amending the Central Bank of Sudan Act, the Sudanese authorities should study the example of central banks in Africa that successfully became independent, such as the National Bank of Rwanda, in order to learn from their experience and progressively strengthen the independence of monetary authorities from the fiscal authority.

Clarify the CBoS' strategic and operational framework and set a clear commitment to price stability through monetary targeting. With long periods of triple-digit inflation, there is a risk that expectations of high inflation become entrenched fueling a spiral of currency depreciation and higher inflation. To realize its price stability objective the CBoS should design a policy formulation framework setting the level of operating primary and secondary targets. A monetary targeting regime may be warranted as was implemented in Kenya, Mozambique, Rwanda, and Tanzania. The operational framework comprising the monetary instruments the CBoS has control over should be specified such as annual, possibly revisable, broad money targets. In the medium-term, a credible and reasonable inflation goal could additionally help anchor inflation expectations.

Pursue reserve targeting and build a government securities market compatible with Islamic law. Ad-hoc fiscal monetization

should be gradually replaced with a reserve money targeting regime thereby allowing the CBoS to restore its control over the money supply. This should be done in conjunction with the implementation of an open and sizeable government securities market covering a range of maturities that fits the need of commercial banks and the government. Successful experiences of Muslim countries such as Malaysia in doing so while operating under Islamic banking could be followed.

4.3 Fighting imported inflation

Remove forex distortions and consolidate the unified market-clearing exchange rate. Both models have identified the role played by the exchange rate pass-through in driving inflation. While the authorities have unified exchange rates since 2021, a discrepancy between the official and black-market rate remains. Non-aligned exchange rates subdue exports and distort trade decisions. Commercial banks and exchange-rate bureaux should be allowed to set exchange rates in line with market conditions subject to an adjustable band around the daily official exchange rate set by the CBoS and based on the market average exchange rate. A progressive alignment of the exchange rate to its market value should be pursued. While the resulting depreciation could bear the costs in the short run, in the long run it would boost competitiveness, reduce the current account deficit, and increase confidence in the country's ability to commit to a market-based economy. The recent slowdown in inflation may offer an opportunity to accelerate such a transition.

Increase foreign exchange reserves through international donors, acceleration of reforms and expansion of exports. Partly as a result of economic sanctions and international isolation, the shortage of foreign exchange contributed to the depreciation of the exchange rate on the parallel market, pushing up inflation. At about 2.3 months of import cover, current foreign exchange reserves have significantly increased over the last two years but remain well below the three months of import cover rule of thumb, leading to shortages of key imports, including oil, and preventing the CBoS from conducting meaningful forex interventions. Combined with triple-digit inflation, this also undermines confidence in the SDG, fuelling a cycle of currency depreciation, rising fiscal deficit, debt monetization and further depreciation. Combined with a unified exchange rate, a minimum reserve worth three months of imports would help solidify the managed float system and facilitate the stabilization of the SDG around its equilibrium value. Increased access to the support of international donors, acceleration of monetary and exchange rate reforms, and expansion of exports could help reach this target.

Reduce trade barriers in order to increase supply and lower import prices. Sudan ranks in the bottom five of the World Bank's "Trade across borders" Index and charges the highest and second highest tariffs on non-agricultural and agricultural goods respectively in Sub-Saharan Africa. High tariffs are pushing up import prices and preventing the import of productive capital and key intrants. Sudan should set up a program to progressively phase out trade barriers and tariffs. The corresponding increase in the supply of foreign goods would increase supply, lower prices, and facilitate the imports of intrants in agriculture and industry as opportunities to improve domestic productive capacity in both sectors remains substantial.

4.4 Boosting supply in the long term, securing key commodities for the short term

Raise labor productivity in agriculture and secure short-term supply in the face of growing demand and higher import prices. As identified by the EC model, rising labor productivity significantly reduces long-term inflation. An in-depth study should be conducted to identify the main hurdles and enablers to productivity growth in Sudan, especially in agriculture. The ongoing initiatives to enhance agricultural production and productivity should be accelerated and upscaled. This could be complemented by securing contracts for key staples with reliable partners in order to alleviate short run pressures on prices and the risk of famine. Other short-term measures such as fiscally deductible capital and technology investment should be encouraged to grow Sudan's stock of productive capital.

Encourage FDI in the oil sector and other natural resources. Both models found higher oil prices to drive inflation higher, yet Sudan's natural resources remain underdeveloped. foreign direct investment can bring much needed capital and help make the most of Sudan's natural resources, both mineral and agricultural, by accumulating the primary surplus needed for building an industrial base. Recent increased cooperation with the oil producer Zarubezhneft[3] should be used as a model. Long term benefits range from reduced imports, currency appreciation, and boosted fiscal intake.

[3] In August 2022, the Sudanese authorities offered more oil blocks to Russia's Zarubezhneft oil producer with the aim of expanding cooperation in the oil sector beyond just production, to oil recovery technologies, associated gas utilization, oil refining, petrochemicals, and training.

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Annex 1: Summary of models

The SVAR model allows for the explicit statistical modeling of contemporaneous interdependence between macroeconomic data, with some restrictions based on economic theory. An EC model helps identify both long and short-term relationships in the data, which is particularly relevant in a country like Sudan where inflation has a long history.

SVAR model

The following SVAR model is built using monthly data over 2007-2022:

$$A_0 z_t = a + \sum_{k=1}^{K} A_k z_{t-k} + \epsilon_t$$

where z_t = (Δo_t, Δw_t, Δg_t, Δm_t, Δe_t, Δp_t), Δo_t is the percentage change in global oil prices, Δw_t is the percentage change in wheat prices, Δg_t is the percentage change in government expenditure, Δm_t is the percentage growth in money supply, Δe_t is the percentage change in the exchange rate, and Δp_t is the inflation rate. This framework allows for the identification of two external shocks (oil and wheat prices), three policy shocks (fiscal policy, money supply and exchange rate), and inflation's own shock. For variable ordering and identification, the Loungani and Swagel 2001 analysis of the sources of inflation in developing countries was followed. First, it is assumed that movements in global oil and wheat prices are driven by exogenous factors that are not affected by domestic variables. As for the other variables, contemporaneous correlation between them reflects causation from public expenditure to money growth to exchange rate and finally to inflation. Dummy variables related to the secession of South Sudan and COVID-19 are also considered to capture possible structural changes in the economy.

EC model

The following error correction model is estimated using annual data from 1992 to 2020 to define the short-run relationship between macro variables and inflation:

$$\Delta CPI_t = \alpha ECT_{t-1} + \sum_{i=1}^{n} (\beta_{1i}\Delta CPI_{t-i} + \beta_{2i}\Delta E_{t-i} + \beta_{3i}\Delta M_{t-i} + \beta_{4i}\Delta W_{t-i} + \beta_{5i}\Delta P^X_{t-i} + \beta_{6i}\Delta P^M_{t-i}) + \epsilon_t$$

where CPI_t is the log of consumer price index, E_t is the log of exchange rate, M_t is log of money supply, W_t is the log of real wage, P_t^X is the log of export prices, and P_t^M is the log of import prices. ECT_{t-1} is the error correction term defined by,

$$ECT_{t-1} = CPI_{t-1} - (\Phi_0 E_{t-1} + \Phi_1 M_{t-1} + \Phi_2 W_{t-1} + \Phi_3 P^X_{t-1} + \Phi_4 P^M_{t-1})$$

and ϵ_t is the residual. Also introduced are two dummy variables: D2011 takes a value of 0 before 2011 and 1 since 2011 and captures the secession of South Sudan. To capture COVID-related effects on the Sudanese economy, a second dummy, D2020, is introduced which takes a value of 1 for in 2020 and 0 before.


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