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Fuel Subsidy Reforms

Lessons from the Literature and Assessing the Price Shock for Different Sectors through an Input-Output Table in the Case of Angola

Bao-We-Wal-Bambe
Chadi Bou Habib
Joaquin Marandino Peregalli

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Abstract

Global oil prices have surged in recent decades, significantly hurting household living standards. In response to rising prices, many governments introduced fuel price subsidy to protect the most vulnerable populations. The literature is almost unanimous that fuel price subsidies are inefficient and generate significant socioeconomic and environmental costs. However, it is also acknowledged that subsidies often represent a significant proportion of poor households' income, so removing them can have devastating effects. Moreover, given that fuel is a key input to economic activity, removing subsidies would alter the cost structure of specific sectors, with impacts on employment, competitiveness, and, ultimately, households' welfare. One important question then is how policy makers can reduce the distorting effects of fuel subsidies while implementing effective measures to curb the adverse effects of price rises on the economy and poor households. This paper reviews the literature on this issue, discusses alternative policies to fuel subsidies, and provides scenarios that simulate cost and price shocks and fiscal savings for fuel subsidy reforms in Angola. Using an input-output table, the analysis estimates that gradual removal of the subsidies until full removal would result in a cumulative price increase of around 5.0 percent. The highest increases would be in fisheries and transportation (20 percent on average). Fully compensating for the price increase in the two sectors would absorb around 30 percent of the savings (around 1.0 percent of gross domestic product), notwithstanding the form and channel this compensation would take. This sector granularity is crucial to anticipate the potential negative effects of subsidy removals for various social and economic groups involved with a given sector as users or as producers.

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Bao-We-Wal-Bambe

Chadi Bou Habib; Joaquin Marandino Peregalli[1]

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[1] Bao-We-Wal-Bambe is consultant at the World Bank, and he also works for the German Development Institute. Chadi Bou Habib is Lead Economist at the World Bank. Joaquin Marandino Peregalli is consultant at the World Bank. The authors are deeply grateful to Nelson Tisso Miezi Eduardo, Senior Economist at the World Bank, for his contribution to the initial thinking about this paper and for his excellent comments and suggestions afterwards. The authors are also grateful for the comments and suggestions received from Benedicte Baduel, Senior Economist at the World Bank, and for the comments and guidance receive from Abha Prasad, Practice Manager at the World Bank, and Juan Carlos Alvarez, World Bank Country Manager for Angola. The views in this paper are those of the author. They do not necessarily represent the views of the World Bank and its affiliated organizations.

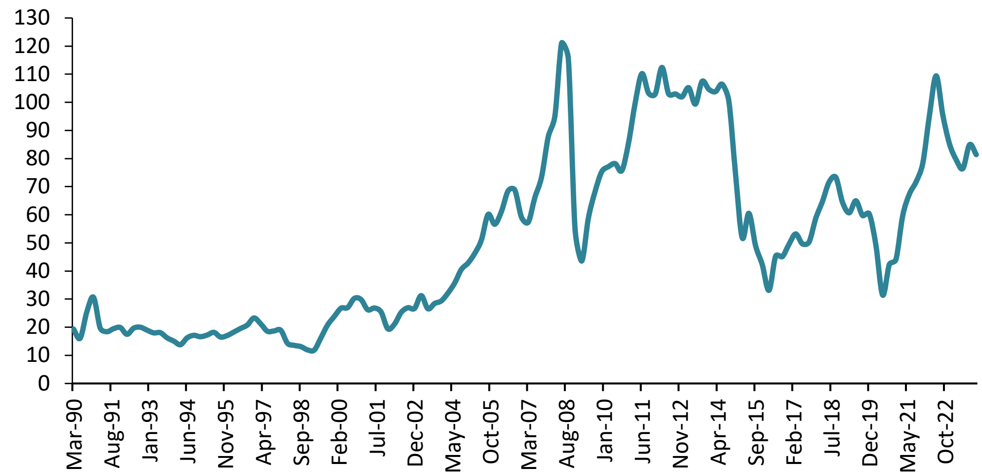
1- Strong fluctuations in world oil prices, with a sharp upward trend in recent decades

World oil prices have experienced highly volatile fluctuations, with a strong upward trend in recent decades. Between September 2003 and June 2008, oil prices soared fourfold, before dropping drastically, followed by a further rise in late 2008. Oil prices fell again drastically between June 2014 and May 2020, from US$105 to US$31 a barrel. The upturn in 2021 was exacerbated in Q1 2022, mainly due to the war in Ukraine, reaching a peak of US$114 a barrel in July 2022. The overall trend was downward in 2023, fluctuating around US$80.5 a barrel. The literature identifies some key determinants of sharp fluctuations in world oil prices. These include strong variations in production levels —often associated with geopolitical events, the discovery of new oilfields, or improvements in extraction and production technologies. They can also be related to demand shocks due to the worldwide economic cycle, as expansion periods in the global economy can be associated with increased oil demand to meet energy needs. Oil price expectations or speculative behavior also plays a key role in shaping the actual price. For instance, if countries anticipate a future rise in price, they may incorporate these expectations into their decisions right now, for example by stockpiling oil for future use, thus creating an imbalance between supply and demand on the world market. Moreover, by fueling expectations of future price rises, the highly volatile fluctuations in the world oil market can drive an inflationary spiral through higher wage demands.

Rising oil prices worsen household living standards and increase production costs, with greater effects on the poorest. The increase in oil prices directly affects households, by raising fuel prices for daily needs such as cooking, lighting, transport, and heating. In addition, indirect effects result from higher production costs for firms, leading them to raise their prices, thus resulting in higher inflation. In the absence of a subsidy program, or if household wages are not indexed to price rises, the latter are subject to a loss in purchasing power. This leads to a drop in consumption, a reduction in savings to maintain their standard of living, or budget reallocation at the expense of human and physical capital accumulation. The latter impact is particularly true for the poorest households, generally with low precautionary savings and the least able to absorb the social cost of price rises, which exacerbates household poverty and vulnerability.

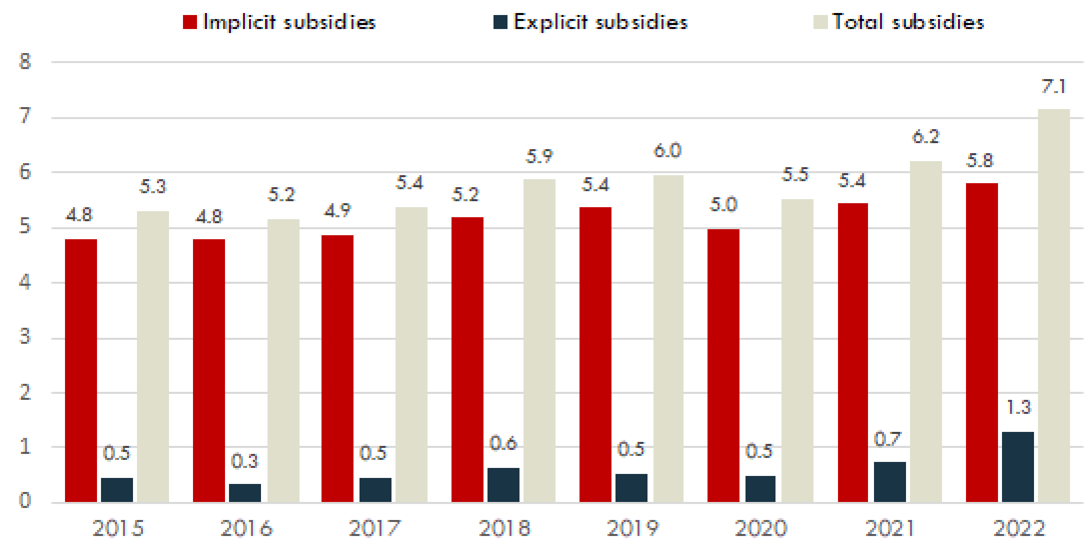
In response to rising oil prices since 2003, many governments introduced fuel subsidies to protect households, especially the most vulnerable. Explicit global fuel subsidies have risen steadily in recent years. According to the an IMF report by Black et al. (2023), total fossil fuel subsidies rose from 5.4 percent of GDP in 2015 to 7.1 percent of GDP in 2022. Implicit subsidies, such as under-invoicing of environmental costs and uncollected consumption taxes, account for 82 percent of the total, while explicit subsidies (under-invoicing of supply costs) account for 18 percent. Fuel subsidies remain high in many countries, with the República Bolivariana de Venezuela topping the list between 2015 and 2022, averaging 38 percent of GDP, followed by Ukraine (30 percent of GDP) and the Kyrgyz Republic (around 25 percent of GDP). The removal of fuel subsidy programs initiated by some governments has been hampered by the COVID-19 pandemic and the war in Ukraine. For instance, since 2018, the Ukrainian government has implemented a series of reforms leading to the removal of many subsidies, while implementing targeted consumer support programs. However, fossil fuel subsidies have recently increased, in response to the COVID-19 crisis, rising from US$37.97 billion in 2020 to US$45.68 billion in 2021, before decreasing to US$32.67 billion in 2022. Fossil fuel subsidies remain high in Ukraine, accounting for 34.83 percent of GDP in 2022, in part due to a denominator effect, since the GDP of Ukraine shrunk in 2022 because of the war.

Figure 1. Trend in the global price of APSP crude (US$/Barrel)



Source: Primary Commodity Price System (IMF)

Figure 2. Recent trends in fuel subsidies (Percent of GDP)



Source: IMF Fossil Fuel Subsidies Data

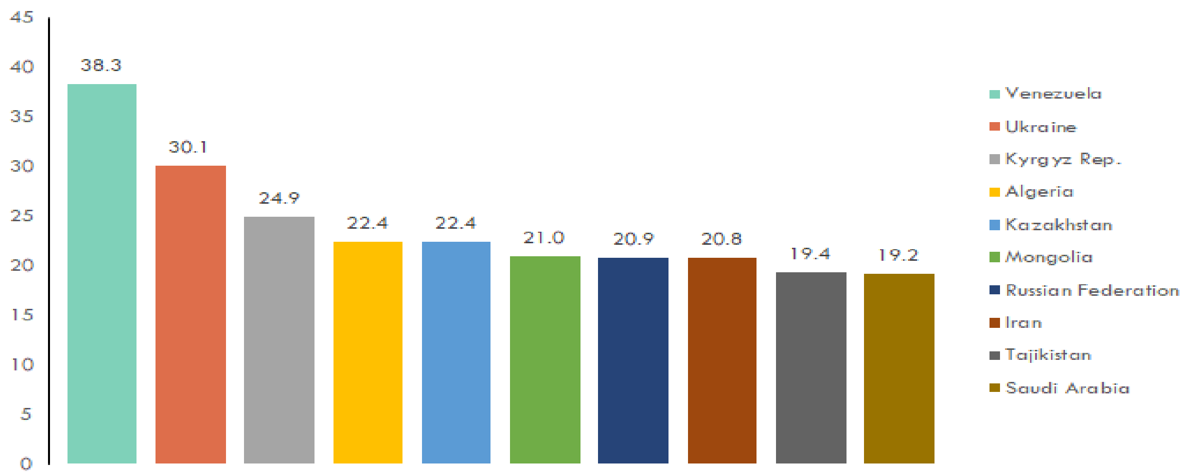
2- Fuel price subsidies are inefficient and costly for the economy

In absolute terms, most fuel price subsidies benefit richer households rather than the poor. In most cases, fuel subsidies are poorly targeted and often regressive**.** Since they lower prices for all —rich or poor— in absolute terms, they benefit the rich more than the poor. This holds for kerosene (for which subsidies are often presented as a means of protecting the poor), as well as for both net oil importers and exporters. For example, studies show that the poorest 20 percent of households gain less than 20 percent of the benefits, or that the richest 20 percent gain on average more than six times the benefits on fuel than the poorest 20 percent (e.g., see Gillingham et al. 2006; Arze del Granado, Coady, and Gillingham 2012; Kpodar and Djiofack 2010; Soile and Mu 2015; Plante 2014).

Fuel subsidies hamper fiscal sustainability and can adversely affect growth-enhancing expenditure. By reducing fiscal space, subsidies compromise the sustainability of public finances and leave little scope for the government to deploy large-scale fiscal stimuli in response to adverse shocks (Dartanto 2013; Coady et al. 2017; Mundaca 2017). In addition, to finance such spending, governments may have incentives to increase taxation and public debt, or reduce public expenditures in other sectors that can foster inclusive and sustainable economic growth, such as investment in infrastructure and human capital. Another aspect is the political economy of subsidy reforms. In many developing countries, fuel subsidy accounting is not transparent, and the subsidy system encourages large-scale corruption from the ruling elite and its cronies, creating a gap between the implementation of fuel price adjustment and fiscal savings (Sambo and Sule, 2024).

Fuel subsidies encourage fossil fuel over-consumption, distort factor allocation, and increase environmental costs. In general, subsidies result in lower prices than the market price, leading to greater consumption of environmentally damaging fuels. Subsidies will favor fuel-intensive sectors and lead to a higher allocation of production factors towards these sectors. Similarly, research points out that they tend to reduce incentives to invest in other cleaner energies such as wind and solar power (OECD 2003; Sovacool 2017). Coady et al. (2017) estimate that eliminating subsidies would have reduced global carbon emissions by 21 percent and air pollution from fossil fuels by 55 percent in 2013, with favorable effects on public finances and social well-being.

Figure 3. Top 10 countries with the highest share of fuel subsidies in GDP over 2015- 2022 (explicit and implicit subsidies)



Source: IMF Fossil Fuel Subsidies Data

3- Which effective strategies to deal with global oil price rises?

Fuel subsidy removal can have significant economic costs and alter the cost structure of other sectors of the economy, such as agriculture and fisheries, with the risk of a nutritional crisis. While the literature shows that fuel price subsidies are inefficient, it is also acknowledged that their removal would lead to a considerable drop in real incomes for poor households, with adverse consequences for poverty and inequality (Arze del Granado, Coady, and Gillingham 2012; Rentschler 2016; Kpodar and Liu 2022). Subsidy removal could also lead to social tensions, particularly among beneficiaries, with important political and socio-economic costs. More importantly, fuels are a key input in the production of goods and services, and removing fuel subsidies could lead to a drastic change in the cost of production with a drop in output or massive inflation for end users. For instance, a significant drop in agricultural production, and therefore a rise in food prices, occurred after episodes of subsidy removal, as was the case in Port Harcourt (Nigeria) from 2001 to 2012 (Ekine and Okidim 2013), or in Malaysia in the mid-2000s (Razak, Ismail, and Hakim 2014).

Eliminating fuel price subsidies progressively, while implementing alternative social programs could help mitigate the negative side effects of fuel subsidy removal. Awareness-raising campaigns are key to informing the public about the inefficiency of subsidies and the adverse effects they generate (Arze del Granado, Coady, and Gillingham 2012; FAD, AFR, and FAD 2013). In addition, such campaigns should be coupled with increased priority public spending, such as measures to expand universal social services that primarily benefit the poor, or targeted cash transfer programs, as was the case in Gabon, Ghana, and Indonesia. A gradual approach could be eliminating the politically more difficult ones last, as was the case for fuels used for transport and by industry, in Brazil. To limit the impact of removal on other sectors of the economy, such as agriculture and fisheries, complementary policies could be implemented to mitigate the effects of subsidy removal on agricultural production and food security, for instance by targeting transfers to producers for them to improve their productivity.

Many studies present cash transfers targeting poor households as an effective alternative to fuel subsidies. These programs can be financed by the gains from the removal of subsidies and target low-income households or the populations most affected by the rise in energy prices. Programs can be made conditional, for example by requiring children to be enrolled and attend school regularly. However, Kpodar and Djiofack(2010) point out that as such measures may require time, it is recommended to extend and strengthen already existing social protection mechanisms. Simulating the situation in Mali — assuming that 60 percent of the savings from subsidy removal are transferred to the poor under the cash transfer program, and 40 percent is used to cover administrative costs — Kpodar and Djiofack (2010) find that the cash transfer program would reduce the negative effects of higher fuel prices by around 86 percent, with a more favorable effect for the poorest.

Yet, targeted cash transfer programs can be hampered by a range of economic, institutional, and cultural factors. Experience in developing countries (e.g., see Rinehart and McGuire 2017) shows that some poor households are not usually aware of the existence of such programs. Sometimes, even when they do have the information, they may not know if they are eligible. In addition, the cost of participating in the program can be a major disincentive for some households living in isolated and inaccessible areas, or for elderly, disabled, or less mobile people, who must travel to register. Similarly, the lack of an appropriate financial infrastructure can be a further constraint. Psychological costs can also play an important role. Indeed, beneficiaries are likely to be stigmatized for benefiting from the program, which may dissuade them from participating. Finally, targeting poor households requires reliable information on their economic conditions (income, poverty level, etc.), which can be difficult to obtain in developing countries.

4- Fuel subsidy reforms: Case studies

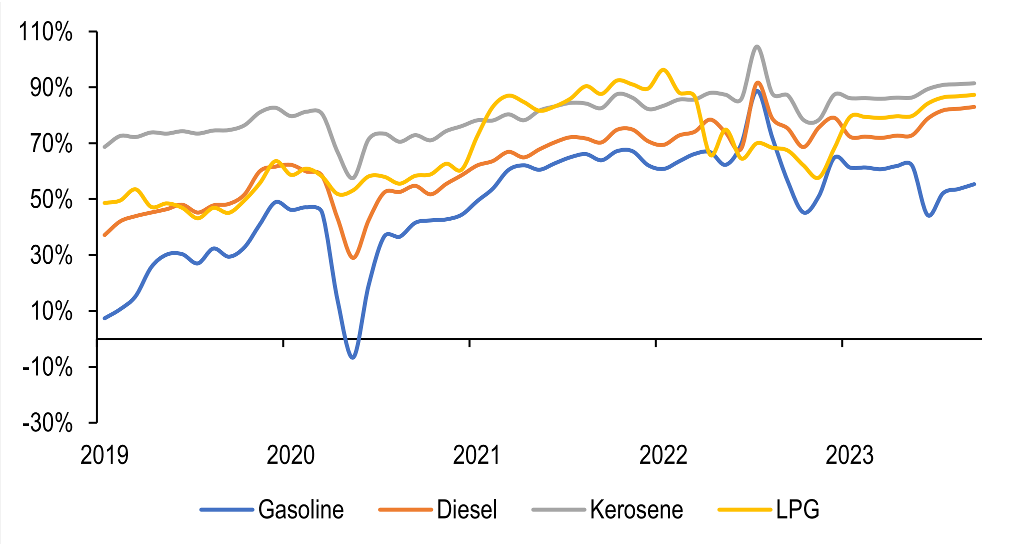
Several fuel subsidy reforms implemented in recent decades have been successful or partially successful. FAD, AFR, and FAD (2013) present some case studies of energy price subsidy reforms over the recent decades. The analysis considers 28 reform episodes, distinguishing between those deemed successful (having achieved a lasting reduction in subsidies) and unsuccessful (the reform was canceled shortly after being initiated). An intermediate case refers to partially successful reforms, i.e., those that reduced subsidies for at least a year, but where subsidies have reappeared or remain a major problem. Out of the 28 episodes, 12 were classified as successful and 11 as partially successful. Successful fuel reforms include, among others, South Africa in the 1950s, Brazil in 1990-2001, and the Philippines in 1996. Partially successful fuel reforms include, among others, Namibia in 1997, Indonesia in 2005 and

2008, Peru in 2010, Mauritania in 2011, Ghana and 2005, Niger in 2011, and Nigeria between 2011 and 2012, while in Indonesia between 1997 and 2003, and Mauritania in 2008, subsidy cuts generated opposition to the reform.

Most successful fuel subsidy reforms have been complemented by social measures to mitigate the effect of rising prices on households. In a recent article, Moayed, Guggenheim, and von Chamier (2021) examine 31 cases of energy subsidy reforms in developing countries over two decades (1991-2012). The authors find that all the subsidy reduction reforms that failed occurred when there was significant protest and no parallel offsetting transfers, while all the reforms that were complemented by cash compensation measures were successful or, at least, partially successful. In Indonesia, for instance, unlike other attempts to increase energy prices in 1998, 2000, and 2002, which led to large-scale, violent protests, the 2005 subsidy reform was successful as the government used part of the fiscal savings to offset the rising cost of living for poor households, through social assistance programs. Similarly, the energy subsidy reforms implemented in Iran in 2010 did not generate significant negative reactions, due in large part to the cash transfer program, unlike the 2019 reform, during which the government did not communicate in advance about the reform, nor compensate households for price increases. In addition, the 2010 measures also led to a significant reduction in national poverty. The two Bonogas programs in the Dominican Republic have also considerably reduced the cost of subsidies for the government, by ensuring the support of the public and the powerful unions in the transport sector.

5- Prices and fiscal Impact of fuel subsidy reform: Angola case study

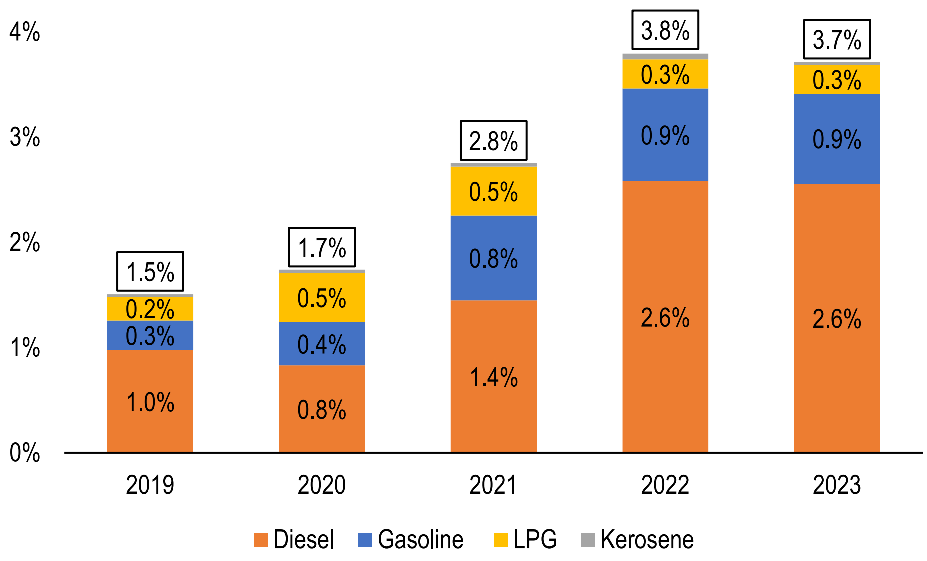
Figure 4. Unit subsidy as a share of market wholesale price in Angola, Jan 2019 to December 2023



Source: authors' estimations based on IGAPE

As in many oil-producing countries, Angola's government provides substantial subsidies for fuel consumption. In 2011, fuel prices in Angola were 67 percent lower than the average price in Sub-Saharan Africa, and among the lowest in the world, due to tax and duty exemptions on petroleum products. With the decline in oil revenues from 2015 onward, the government started a strong fiscal consolidation that left fuel subsidies as the only de-facto social spending, while spending on health education, social protection, and water infrastructure declined. In end-2015, the government removed gasoline and diesel subsidies by increasing retail prices, but subsidies reemerged as soon as market prices and costs increased.[2] As oil prices increased on average from US$43/bbl in 2016 to US$100/bbl in 2022, subsidies covered an increasing share of the market price. Relative to the size of the economy, the total subsidy expenditure also increased consistently from 1.5 percent of GDP in 2019 to 3.7 percent in 2023.

Figure 5. Subsidy expenditure as a share of GDP in Angola, 2019-2023



Source: authors' estimations based on IGAPE and INE

In June 2023, the Government of Angola raised gasoline prices, and in April 2024, it increased diesel prices. These price increases removed around 40 percent and 9 percent of the subsidy per liter, respectively. On June 1, 2023, a government decree laid out a multiphase approach to fuel subsidy reform, for the first time since 2016. Retail prices remained constant until May 2023, when the retail gasoline price stood at about US$0.31 per liter, the fourth lowest price in the world. Then, the government decided to implement an adjustment in the price of gasoline of 87.5 percent from 160 to 300 kwanzas per liter. Gasoline subsidies are being prioritized in the short term as they are the most regressive and their removal has relatively limited direct and indirect impact on the poor. The second phase of the reform in April 2024 targeted diesel, increasing its retail price from 135 to 200 kwanzas. The statement from the Petroleum Derivatives Regulatory Institute said this price change is part of "the gradual adjustment until 2025 (…) towards market levels" initiated on June 1, 2023.

The sharp depreciation of the kwanza in May and June 2023 led to a further increase in subsidies, including those on petrol. Lower oil prices and production in early 2023, coupled with substantial debt service, reduced the supply of foreign currency, and triggered a 40-percent depreciation of the kwanza in May-June 2023. As a result, subsidies on diesel, kerosene, and LPG rose from 69, 84 and 82 percent of market prices in May to 86, 92 and 88 percent by October, respectively. Although the June price adjustment reduced the gasoline subsidy from 63 percent of the market price in May to 39 percent in June, the currency depreciation increased it to 65 percent by October. When measured in nominal

[2] The subsidy is calculated as the difference between the logistic market price and the fixed market price. The former fluctuates with international oil prices, the exchange rate, and transport and storage costs. The latter is set by the government. The subsidy is normally transferred from the central government to Sonangol, Angola's national oil company.

kwanzas, the estimated unit subsidy also increased, despite the adjustment in June, rising from 155 kwanzas in June to 307 kwanzas in July. Therefore, as in 2016, when the government removed gasoline and diesel subsidies, gasoline subsidies re-emerged after an increase in costs (this time due to currency depreciation).

We consider three scenarios for the next phases of the fuel subsidy reform. These scenarios should be treated as illustrative, as the authorities are still holding internal consultations to discuss the best approach and strengthen political ownership. In the first scenario, all fixed wholesale prices remain as of June 2024. In the second scenario, fixed wholesale prices for gasoline and diesel are adjusted to market levels by end-2025. In the third scenario, a more progressive one, fixed wholesale prices for gasoline and diesel are adjusted to market levels by end-2026. For the second and third scenarios, we assume that the price adjustments will occur twice a year in April and October, starting in October 2024. Additionally, the percentage change in price will remain the same for each fuel in each scenario.

Table 1. Next phases of the fuel subsidy reform in Angola

		Fixed wholesale prices in nominal kwanzas						**Percentage change**			
		Scenario 1		*Scenario 2*		*Scenario 3*		*Scenario 2*		*Scenario 3*	
		Gasoline	Diesel	Gasoline	Diesel	Gasoline	Diesel	Gasoline	Diesel	Gasoline	Diesel
Phase 3	Oct-24	176	138	247	228	217	188	40%	66%	23%	36%
Phase 4	Apr-25	176	138	346	377	268	256	40%	66%	23%	36%
Phase 5	Oct-25	176	138	484	625	330	348	40%	66%	23%	36%
Phase 6	Apr-26	176	138			406	474			23%	36%
Phase 7	Oct-26	176	138			500	646			23%	36%

Source: authors' estimations.
Note: these estimations are based on data available as of May 2024 and are subject to changes in volatile variables. For example, changes in the foreign exchange rate and global oil prices will undoubtedly have an impact on these estimations.

These subsidy removals would generate significant additional fiscal savings. If prices remain unchanged, total subsidy spending is projected to reach 3, 2.7 and 2.4 percent of GDP in 2024, 2025 and 2026, respectively. The decline in oil prices and the smooth nominal depreciation expected in the medium term would reduce subsidy spending as a share of GDP. In the second scenario, subsidy spending is expected to reach 3, 1.3 and 0.3 percent of GDP in 2024, 2025 and 2026, saving 0.05, 1.3 and 2.2 percent of GDP, respectively. In the third scenario, subsidy spending is expected to reach 3, 2 and 0.9 percent of GDP in 2024, 2025 and 2026, saving 0.03, 0.7 and 1.5 percent of GDP, respectively.

Table 2. Gasoline and diesel subsidy spending as a share of GDP by reform scenario

	Scenario 1			**Scenario 2**			**Scenario 3**		
	Gasoline	Diesel	Total	Gasoline	Diesel	Total	Gasoline	Diesel	Total
2024	0.7%	2.1%	3.0%	0.6%	2.0%	3.0%	0.7%	2.0%	3.0%
2025	0.6%	1.8%	2.7%	0.2%	0.8%	1.3%	0.4%	1.3%	2.0%
2026	0.6%	1.6%	2.4%	0.0%	0.0%	0.3%	0.1%	0.5%	0.9%

Source: authors' estimations

In a country like Angola, fuel subsidy removal will massively affect the cost structure of specific sectors. For example, the fishing sector absorbs a relatively small share of overall subsidies but will be massively impacted by a removal of subsidy on diesel. If the impact is totally transferred to consumers, there could be a nutritional problem with long-term health consequences. Indeed, fish accounts for 47 percent of animal protein consumption in Angola (including cheese and eggs), 67 percent for the bottom decile, and 44 percent for the top decile. Ignoring these granularities means overlooking the potential for a social crisis originating in a specific social and economic category (fishermen), and a public health crisis that can hardly be alleviated by cash transfers.

Using the 2015 Input-Output (IO)[3] table for Angola, we simulated the impact of the fuel subsidy removal on the cost structure, and in which sectors the impact will be concentrated. We simulate an increase in oil input prices using the IO table (see Annex 1 for the Methodology) with 124 sectors and simulate the past increases from June 2023 and April 2024 and the full impact of the subsidy removal starting from the first price increase in June 2023. We further provide an estimation of the size of the needed mitigation.

The June 2023 increase in gasoline prices by 87.5 percent generated a price increase of 0.6 percent in total, including 2.4 percent for fishing and 2.0 percent for transportation (Annex 2). Fully compensating for the increase in fishing would have absorbed 10.9 percent of the savings the government generates, and fully compensating for road transportation would have absorbed 16.5 percent. Hence, with 27.4 percent of the savings, the government could have fully compensated for the increase in fishing and road transportation costs.

April 2024 increase in diesel by 48 percent generates a price increase of 1.0 percent in total, including 3.5 percent for fishing and 3.9 percent for transportation (Annex 3). Fully compensating for the increase in fishing would absorb 10.3 percent of the savings the government generates, and fully compensating for road transportation would absorb 20.8 percent. Hence, with 31.1 percent of the savings, the government can fully compensate for the increase in fishing and road transportation costs.

The combined increases of June 2023 and April 2024 generate a price increase of 1.6 percent in total, including 5.9 percent for both fishing and transportation (Annex 4). Fully compensating for the increase in fishing would absorb 10.5 percent of the savings the government generates, and fully compensating for road transportation would absorb 19.1 percent. Hence, with 29.6 percent of the savings, the government could have fully compensated for the increase in fishing and road transportation costs.

In line with the above, and if the government intended to pass on the increases on consumers, the increase in taxi fares should have been around 5.9 percent. Yet, the taxi drivers, after an agreement with the government, have increased the fare by 33 percent, which may suggest the ability to accommodate the impact of potential future additional fuel price hikes. Yet, based on the fuel price hikes scenarios discussed in this paper, the 33 percent increase would still overcompensate taxi drivers at the expense of consumers.

The full removal of subsidies, including the 87.5 percent increase in gasoline, and the 48 percent increase in diesel, raises prices by 5.2 percent (Annex 5). Prices in fishing increased by 19.4-23.4 percent and in transportation by 20 percent. Fully compensating for the increase in fishing and transportation absorbs respectively 10.4 and 19.7 of savings, hence 30.2 percent in total.

[3] The use of the IO table from 2015 implied a tradeoff between relevance of the analysis and data accuracy. Without the IO, it is impossible to estimate some of the most relevant impacts, such as the increase in costs across sectors, and the change in the cost structure in the economy. However, the 2015 IO is the last available for Angola, and given the dynamic nature of economies, particularly in an oil-dependent country like Angola, the availability of recent data is important for the accuracy of the estimates. Usually, IOs are updated every 5 years, but unfortunately this is not the case in Angola, despite it being a middle-income country. Hence, we hope the relevance of the impacts we are estimating would motivate the authorities to update the IO more frequently for more accurate understanding of the economy and of the implications of reforms.

Looking at the impact of the full removal of subsidies across sectors, we find that:

- Of the 5.2 percent increase in prices, 2.9 percentage points are due to an 11.1 percent indirect increase in the costs of inputs and 2.3 percentage points to the direct increase of 122.4 percent in oil prices.
- Of the 124 sectors, 16 sectors would see a 16 percent increase in their sales prices driven by a 53.2 percent increase in the cost of inputs. The highest increases are in fishing and transportation. The fishing sector absorbs 8.4 percent of oil demand, but oil is 57 percent of the sector's input, hence the significant rise in prices in this sector. The road transportation sector absorbs 17.1 percent of oil demand and oil is 41.6 percent of the sector's inputs.
- Once these 16 sectors and the direct increase in oil prices are accounted for, the increases experienced by the rest of the economy are 1.8 percent and 7 percent, for sales prices and input costs, respectively.
- The 16 sectors represent 8.7 percent of GDP, 7.9 percent of uses, and absorb 9 percent of all inputs. However, oil products amount to 34.8 percent of their inputs, and 11 percent of their sales against 2.4 percent and 0.7 percent for other sectors.
- Of the oil products sold domestically, 89.7 percent are used as inputs, while the rest is used for household final consumption. Of the 89.7 percent, 53.1 percent are absorbed by the abovementioned 16 sectors, hence representing 59.3 percent of all oil inputs.

From the above, the pain points of fuel subsidy removal for Angola are in the fishing and transport sectors, and government intervention should be designed accordingly. In the fishing sector, a transfer of the price shock to consumers can have heavy nutritional and public health consequences given the reliance of the population, especially the poor, on fish as a key source of animal protein. Indeed, fish represents 47 percent of animal protein intake in Angola, 67 percent for the lower decile and 44 percent for the higher decile. The fishing sector has few forward linkages to the economy, only 2 percent of its supply is used as input and for 10 sectors out of 124. Hence, while cash transfers would help mitigate some of the impact, direct producer subsidy might be more efficient, provided it is well designed, given the strong and clear direct impact and the limited number of employers and workers in the sector (1.2 percent of the working force). In the transportation sector, the situation is different given the strong forward links the sector has with the rest of the economy, with 24 percent of sector's supply used as inputs in 121 sectors out of 124. Here, given the importance of indirect channels, cash transfers are crucial to help households alleviate the impact of subsidy removal. Whether the cash transfer will be universal or targeted depends on the quality of censuses, surveys, and social registries. Still, simulations show that with 30 percent of the savings generated from subsidy removal (around 1 to 1.5 percent of GDP), the government could fully compensate for the increase in fishing and road transportation costs. This can be considered the upper boundary of the compensation package, regardless of the form and channels of this compensation.

6- Summary and policy implications

In response to the sharp rise in world oil prices in recent decades, many governments have introduced fuel subsidies to protect poor households. These subsidies are generally inefficient and generate significant socio-economic costs. In absolute terms, fuel subsidies benefit the rich more than the poor. In addition, they burden public finances, encourage over-consumption of polluting energies, and distort the allocation of production factors towards sectors benefiting from cheap fuel.

Fuel subsidy removal may generate significant fiscal savings but needs to be properly implemented given the economic, social, and political implications it may trigger. Measures aimed at reducing or eliminating fuel subsidies must be properly managed. This implies, among other things, fully understanding the social and economic consequences of subsidy removal on various categories of households and various sectors in the economy. Sequencing is key, with a progressive elimination of subsidies, starting by removing the most politically acceptable ones, while implementing parallel measures. The compensation packages and the information campaign need to be synchronized with subsidy removal to ensure the success of the reform. Success stories have in common a compensation package, such as increased social spending or cash transfer programs targeting the poorest or most affected households, activated before the subsidy removal, or at least in parallel to it. It is also crucial to implement measures to support specific sectors. A second factor of success is a large coverage of the compensation package, that goes beyond the lower decile and covers the lower-middle-income categories and near-poor of the second, third, and fourth deciles. A third factor of success is informing the public beforehand about the detrimental effects of subsidies and the objective of alternative reforms, which, for example, can be done through large-scale information campaigns.

The experience of Angola's subsidy removal is quite telling on the importance of the timing and sequencing of reform and of the coverage and synchronization of compensation measures. The turmoil that followed the decision to increase gasoline prices in June 2023 highlighted the potential for political resistance and social unrest that may stand in the way of subsidy reform. This underlines the importance of clear and timely communication in policy implementation. It also underscores the importance of synchronizing reform and compensation. The second round of removal in April 2024 proved less chaotic since partial subsidy removal on diesel was accompanied by an increase in transportation tariffs. This measure diffused potential tension from actors from the sector but shifted the burden to the society as a whole. The examples of successful reforms in other countries mentioned in the study could provide a useful benchmark for Angola.

Yet, as highlighted in the analysis, compensation and cash transfer programs require several preconditions, including well-established administrative capacity. Lessons learned from several successful experiments suggest that such programs are likely to succeed if they are well prepared, well deployed, and well monitored. In the case of Angola, although the Kwenda program has provided support to a sizeable segment of the population, it has faced several obstacles. Many households in need are in remote areas, making them difficult to reach due to poor transport infrastructure. Added to this is the low literacy rate among beneficiaries and the lack of national identity cards in many households. Furthermore, markets and payment systems are absent in many rural areas, requiring innovative tools to overcome such obstacles.

Our analysis shows that Angola will have the fiscal space for compensation measures, provided that administrative capacity is in place and information and compensation are available and timely. Our simulation of the price shock through the IO for Angola shows that the pain points are concentrated in a handful of sectors that represent less than 10 percent of GDP but consume 53 percent of oil products. Chief among these sectors are fisheries, a key source of animal protein for the poor, and road transportation, with important and strong forward linkages to the rest of the economy. For the former, producer subsidy seems to be more appropriate. For the latter, cash transfers to households seem more adapted. Our simulations show that fully alleviating the price impact on fishing and transportation absorbs 30 percent of the savings generated from subsidy removal (around 1 - 1.5 percent of GDP). This can be considered the upper bound of any compensation package, regardless of the design of this package.

Finally, our analysis did not examine the important issue of the relationship between the business cycle and the pace of fuel subsidy reform. Here again, timing seems essential, not only to exploit low fossil fuel prices, but also to take advantage of economic conditions, given the close link between fiscal factors and the business cycle. We believe this is a promising avenue for future research.

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Annex 1 – The Input-Output Methodology to Assess the Impact of a Price Increase

Using the Input-Output table, we first calculate Matrix D, of the coefficients of destination (or distribution). The coefficients D show the distribution of the use of each product. They show for each product how much is used as inputs for the production of other products. Hence, they are suitable to assess how a price shock in a specific sector affects prices in other sectors. In a closed economy, the change in prices is simulated as a change in Value Added since there is no change in quantities. In an open economy, the change in prices is simulated as both change in Value Added and Value of Imports. These coefficients D are different from technical coefficients that show for each branch B the ratio of Inputs from other branches used to produce the output of B.

The calculation formula is: $(I - {}^{t}D)^{-1}(V + M)$

where I is the identity ${}^{t}D$ matrix is the transpose of D, V value added, and M imports.

Since there is no increase in quantities, the price increase scenarios translate it into increase in Value Added and Imports of fuel products which then feeds into the cost structure of various sectors that in turn interact with each other through iterations until a new cost structure emerges.

Based on V+M with increased prices of Gasoil and Gasoline, a new Value of Production calculated with $(I - {}^{t}D)^{-1}(V + M)$ appears.

We obtain the new value of Inputs, namely new costs, by subtracting the new V+M with oil price increase from the new Value of Production.

Since this is a Leontief calculation, there are no elasticities and no changes in production or demand with the change in prices. All that we get is the price increase fueled directly by the increase in oil prices and indirectly through increases in the prices of inputs with feedback effects. There are no distributional impacts since the assessment is at the primary level.

Annex 2 - IO Simulation of the June 2023 87.5 Percent Increase in Gasoline

	VA	Previous Value of Production	Previous Value of Inputs	Change in Sales Price	Change in input costs	Share of oil products in Inputs	Oil Inputs Ratio to Production	Sector's Oil Input Share in Total Oil Input	Sector's Oil Input Share in Total Oil Domestic Uses
Total 16 Sectors	1,376,059	2,116,540	635,324	1.6%	5.3%	34.8%	11.0%	59.3%	53.1%
o/w Fishing	*208,974*	*327,092*	*61,338*	*2.4%*	*12.9%*	*57.0%*	*12.9%*	*9.4%*	*8.4%*
o/w Road Transportation	*430,718*	*601,252*	*170,535*	*2.0%*	*7.1%*	*41.6%*	*11.8%*	*19.1%*	*17.1%*
Total Oil Sectors	56,978	501,569	149,361	14.6%	0.2%	0.0%	0.0%	0.0%	0.0%
Total All Sectors	15,884,062	26,886,323	7,036,514	0.6%	1.2%	5.3%	1.6%	100%	89.7%
Total Other Sectors	14,451,025	24,268,214	6,251,829	0.2%	0.8%	2.4%	0.7%	40.7%	36.5%
Share 16 Sectors in Total	8.7%	7.9%	9.0%						
Share Oil Sectors in Total	0.4%	1.9%	2.1%						
Share Other Sectors in Total	91.0%	90.3%	88.8%						

Memo Items	
Total Cost Increase	**0.6%**
Direct Contribution of Oil Price Increase to Overall Increase in Sales Prices	0.3%
Indirect Contribution of Input Cost Increase to Overall Increase in Sales Prices	0.3%
o/w 16 sectors, including:	*0.1%*
Fisheries	*0.0%*
Road Transportation	*0.0%*
o/w other sectors	*0.2%*
Share of Full Compensation of Fisheries in Total Savings	10.9%
Share of Full Compensation of Road Transportation in Total Savings	16.5%
Total Share of Compensation Package in Savings	**27.4%**

Annex 3 – IO Simulation of the April 2024 48 Percent Increase in Gasoil

	VA	Previous Value of Production	Previous Value of Inputs	Change in Sales Price	Change in input costs	Share of oil products in Inputs	Oil Inputs Ratio to Production	Sector's Oil Input Share in Total Oil Input	Sector's Oil Input Share in Total Oil Domestic Uses
Total 16 Sectors	1,376,059	2,116,540	635,324	3.1%	10.3%	34.8%	11.0%	59.3%	53.1%
o/w Fishing	*208,974*	*327,092*	*61,338*	*3.5%*	*18.8%*	*57.0%*	*12.9%*	*9.4%*	*8.4%*
o/w Road Transportation	*430,718*	*601,252*	*170,535*	*3.9%*	*13.6%*	*41.6%*	*11.8%*	*19.1%*	*17.1%*
Total Oil Sectors	56,978	501,569	149,361	22.4%	0.5%	0.0%	0.0%	0.0%	0.0%
Total All Sectors	15,884,062	26,886,323	7,036,514	1.0%	2.1%	5.3%	1.6%	100%	89.7%
Total Other Sectors	14,451,025	24,268,214	6,251,829	0.3%	1.3%	2.4%	0.7%	40.7%	36.5%
Share 16 Sectors in Total	8.7%	7.9%	9.0%						
Share Oil Sectors in Total	0.4%	1.9%	2.1%						
Share Other Sectors in Total	91.0%	90.3%	88.8%						

Memo Items	
Total Cost Increase	**1.0%**
Direct Contribution of Oil Price Increase to Overall Increase in Sales Prices	0.4%
Indirect Contribution of Input Cost Increase to Overall Increase in Sales Prices	0.5%
o/w 16 sectors, including:	*0.2%*
Fisheries	*0.0%*
Road Transportation	*0.1%*
o/w other sectors	*0.3%*
Share of Full Compensation of Fisheries in Total Savings	10.3%
Share of Full Compensation of Road Transportation in Total Savings	20.8%
Total Share of Compensation Package in Savings	**31.1%**

Annex 4 – IO Simulation of the June 2023 87.5 percent Increase in Gasoline and the April 2024 48 percent Increase in Gasoil

	VA	Previous Value of Production	Previous Value of Inputs	Change in Sales Price	Change in input costs	Share of oil products in Inputs	Oil Inputs Ratio to Production	Sector's Oil Input Share in Total Oil Input	Sector's Oil Input Share in Total Oil Domestic Uses
Total 16 Sectors	1,376,059	2,116,540	635,324	4.7%	15.6%	34.8%	11.0%	59.3%	53.1%
o/w Fishing	*208,974*	*327,092*	*61,338*	*6.0%*	*31.7%*	*57.0%*	*12.9%*	*9.4%*	*8.4%*
o/w Road Transportation	*430,718*	*601,252*	*170,535*	*5.9%*	*20.7%*	*41.6%*	*11.8%*	*19.1%*	*17.1%*
Total Oil Sectors	56,978	501,569	149,361	37.0%	0.7%	0.0%	0.0%	0.0%	0.0%
Total All Sectors	15,884,062	26,886,323	7,036,514	1.6%	3.3%	5.3%	1.6%	100%	89.7%
Total Other Sectors	14,451,025	24,268,214	6,251,829	0.5%	2.1%	2.4%	0.7%	40.7%	36.5%
Share 16 Sectors in Total	8.7%	7.9%	9.0%						
Share Oil Sectors in Total	0.4%	1.9%	2.1%						
Share Other Sectors in Total	91.0%	90.3%	88.8%						

Memo Items	
Total Cost Increase	**1.6%**
Direct Contribution of Oil Price Increase to Overall Increase in Sales Prices	0.7%
Indirect Contribution of Input Cost Increase to Overall Increase in Sales Prices	0.9%
o/w 16 sectors, including:	*0.4%*
Fisheries	*0.1%*
Road Transportation	*0.1%*
o/w other sectors	*0.5%*
Share of Full Compensation of Fisheries in Total Savings	10.5%
Share of Full Compensation of Road Transportation in Total Savings	19.1%
Total Share of Compensation Package in Savings	**29.6%**

Annex 5 – IO Simulation of a Total Removal of Subsidy on Gasoline and Gasoil

	VA	Previous Value of Production	Previous Value of Inputs	Change in Sales Price	Change in input costs	Share of oil products in Inputs	Oil Inputs Ratio to Production	Sector's Oil Input Share in Total Oil Input	Sector's Oil Input Share in Total Oil Domestic Uses
Total 16 Sectors	1,376,059	2,116,540	635,324	16.0%	53.2%	34.8%	11.0%	59.3%	53.1%
o/w Fishing	*208,974*	*327,092*	*61,338*	*19.5%*	*104.0%*	*57.0%*	*12.9%*	*9.4%*	*8.4%*
o/w Road Transportation	*430,718*	*601,252*	*170,535*	*20.0%*	*70.6%*	*41.6%*	*11.8%*	*19.1%*	*17.1%*
Total Oil Sectors	56,978	501,569	149,361	122.4%	2.4%	0.0%	0.0%	0.0%	0.0%
Total All Sectors	15,884,062	26,886,323	7,036,514	5.2%	11.1%	5.3%	1.6%	100%	89.7%
Total Other Sectors	14,451,025	24,268,214	6,251,829	1.8%	7.0%	2.4%	0.7%	40.7%	36.5%
Share 16 Sectors in Total	8.7%	7.9%	9.0%						
Share Oil Sectors in Total	0.4%	1.9%	2.1%						
Share Other Sectors in Total	91.0%	90.3%	88.8%						

Memo Items	
Total Cost Increase	**5.2%**
Direct Contribution of Oil Price Increase to Overall Increase in Sales Prices	2.3%
Indirect Contribution of Input Cost Increase to Overall Increase in Sales Prices	2.9%
o/w 16 sectors, including:	*1.3%*
Fisheries	*0.2%*
Road Transportation	*0.4%*
o/w other sectors	*1.6%*
Share of Full Compensation of Fisheries in Total Savings	10.4%
Share of Full Compensation of Road Transportation in Total Savings	19.7%
Total Share of Compensation Package in Savings	**30.2%**