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Supporting a Just Energy Transition through Alternative Funding Strategies for African Hydrocarbon Developments

By Baba Freeman

Abstract

Africa contains significant amounts of hydrocarbon reserves that contribute extensively to state revenue and facilitate social and economic development. The growth prospects for these African countries are however under threat as international financial institutions reduce their funding for hydrocarbon developments in response to global warming and its adverse effects. Given that Africa contributes less than 5 percent of global carbon emissions and has widespread energy poverty, the curtailment of funding for hydrocarbon development will create an inequitable burden on African economic development. This commentary aims to reemphasize the importance of hydrocarbon resources to African development and present alternative funding strategies that can minimize disruptions to growth and are consistent with notions of a just energy transition.

Africa is energy poor

Most of Africa is energy poor. The World Bank estimates that electricity consumption in sub-Saharan Africa was about 487kWh per capita. This is much lower than India, Latin America, and China with 805kWh, 2158kWh, and 3905kWh of electricity consumption per capita respectively. Similarly, sub-Saharan Africa consumes 687kg of oil equivalent per capita which is in sharp contrast to other parts of the world such as the OECD, China, and Latin America which consume 4021kg, 2224kg, and 1360kg per capita respectively as shown in Figure 1 below.[1]

[1] The World Bank, https://data.worldbank.org/indicator/EG.USE.ELEC.KH.PC, https://data.worldbank.org/indicator/EG.USE.PCAP.KG.OE.Accessed 10/10/22.

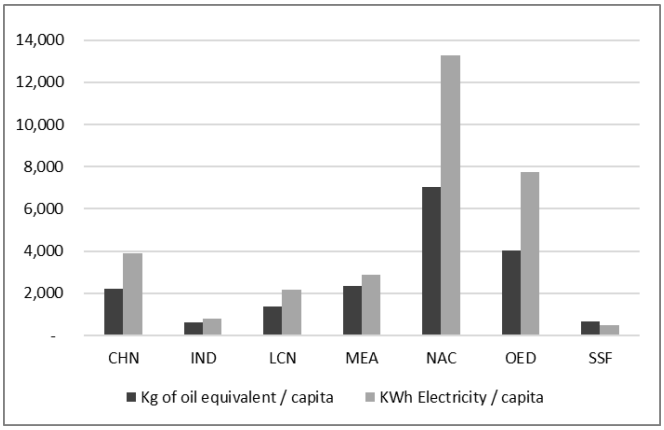

Figure 1: Annual per capita energy consumption by region.[2]

Africa has substantial gas reserves and minimal CO_2 emissions

BP (2022) data presented in figure 2 below show that Nigeria and Libya have the highest gas reserves-to-production (R/P) ratios in Africa with 111 and 107 respectively. R/P ratios are a general proxy for reserve lifespans in years under current market and technical conditions. Egypt (37) and Algeria (28) also have substantial gas reserve lives while Africa has a combined R/P ratio of 56. This suggests that without further discoveries or reserves appreciation, its reserves are sufficient for another 56 years of production.[3]

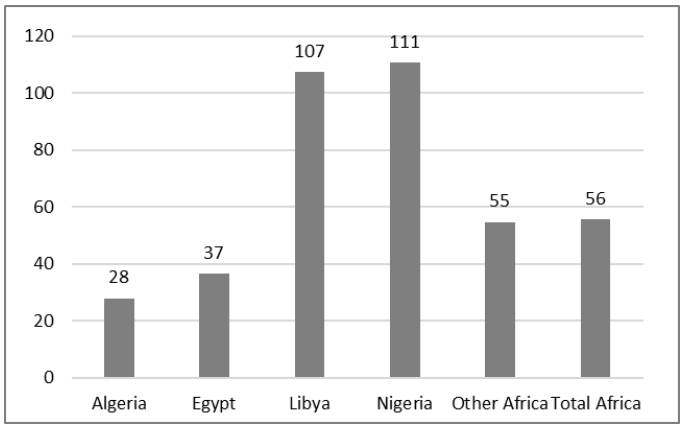

Figure 2: Gas reserves-to-production ratio in Africa's leading gas producers.

It has been noted though, that African countries contribute less than 5 percent to global greenhouse gas emissions (Boden et al., 2017).[4] Table 1 below shows supports the latter assertion and puts Africa's

[2] CHN (China), IND (India), LCN (Latin America and the Caribbeans), MEA (Middle East and North Africa), NAC (North America), OED (OECD), SSF (Sub-Saharan Africa).
[3] BP Statistical Review of World Energy June 2022. https://www.bp.com/en/global/corporate/energy-economics/statistical-review-of-world-energy.html
[4] Tom Boden and Bob Andres (Oak Ridge National Laboratory); Gregg Marland (Appalachian State University). DOI: 10.3334/CDIAC/00001_V2017

contribution in context. Total African emissions amount to about 12 percent of emissions produced by centrally planned Asian economies and less than 25 percent of that produced by north America.[5]

Table 1: CO_2 emissions from fossil fuels and cement production by region.

Region	CO_2 emissions from fossil fuels and cement production (000's metric tons of C)	Percentage of global CO_2 emissions
Africa	353,814	3.8%
Developing America	515,865	5.5%
Centrally Planned Asia	2,868,887	30.8%
Centrally Planned Europe	846,001	9.1%
Far East	1,265,411	13.6%
Germany	196,314	2.1%
Middle East	667,988	7.2%
North America	1,579,349	17.0%
Oceania	442,856	4.8%
Western Europe	563,225	6.1%
Total	**9,299,710**	**100.0%**

Funding shortfalls for African hydrocarbons threaten African economic development

Despite its low levels of carbon emissions in comparison to other regions, African oil and gas-producing countries will be increasingly subject to policies designed to curb global carbon emissions. These policies can impose inequitable burdens on African development by undermining the investment case for a considerable portion of Africa's hydrocarbon reserves and thus deprive impacted countries of revenue needed for economic growth and socio-political stability.

Revenue from fossil fuel extraction contributes extensively to the economy of several countries in Africa. Economic rents are a measure of the difference between the revenue a commodity generates on the open market and its cost of production.[6] Figure 3 below shows the economic rent from oil and gas production as a percentage of GDP in eight countries in North and West Africa that have long production histories. The World Bank (2022) data shows that these countries have an average oil/gas rent-to-GDP ratio of 23 percent ranging from 6 percent (Egypt) to 41 percent (Libya). Thus, a substantial drop in revenue from oil and gas production can have severe adverse effects on these countries' economic growth and political stability.

[5] "Centrally-planned Asian economies" is predominantly The People's Republic of China.

[6] The World Bank defines rent as, "the difference between the value of natural oil and gas production at regional prices and total costs of production."

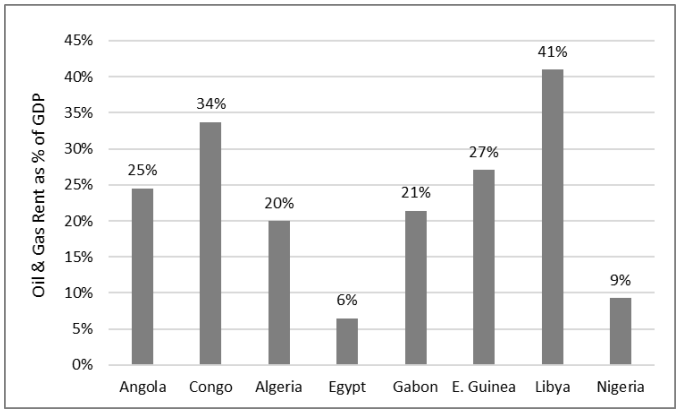

Figure 3: Oil and gas rents as a percentage of GDP in select African oil-producing countries, 2011-2020.

Conversely, revenue from oil and gas is essential to closing the wide development gap between African countries and other regions. Table 2 below highlights the importance of gas development to economic growth in large gas producers in Africa. Global average per capita GDP is between 2 and 6 times that of Africa's major gas producers while the EU's per capita GDP ranges from 6 to 18 times that of major African gas producers. Notably, while economic growth does not depend entirely on oil and gas revenue, it can play a substantial role in facilitating economic development in African countries.

Table 2: Per capita GDP of African gas producers relative to global and EU averages.[7]

	Gas reserves-to-production (R/P) ratio	2021 GDP per capita (US$)	Global per capita GDP / national per capita GDP	EU per capita GDP / national per capita GDP
Algeria	28	3,765	3.3	10.2
Egypt	37	3,876	3.2	9.9
Libya	107	6,018	2.0	6.4
Nigeria	111	2,085	5.9	18.3
Other Africa	55	1,645	7.5	23.2

IEA (2022) data however indicates that capital inflows to African hydrocarbon projects have been declining since 2015. Figure 4 below illustrates the decline in oil investments in Africa from US$64bn in 2015 to US29$bn in 2022, an annual decline of about 9 percent. In the same period, gas-focused investments in Africa also declined from US19$bn in 2015 to US17$bn in 2022, an annual decline rate of about 2 percent.[8]

[7] Per the World Bank (2022), EU GDP per capita is US$38,234 and Global per capita GDP is US$12,296.
[8] IEA (2022), World Energy Investment 2022, IEA, Paris https://www.iea.org/reports/world-energy-investment-2022

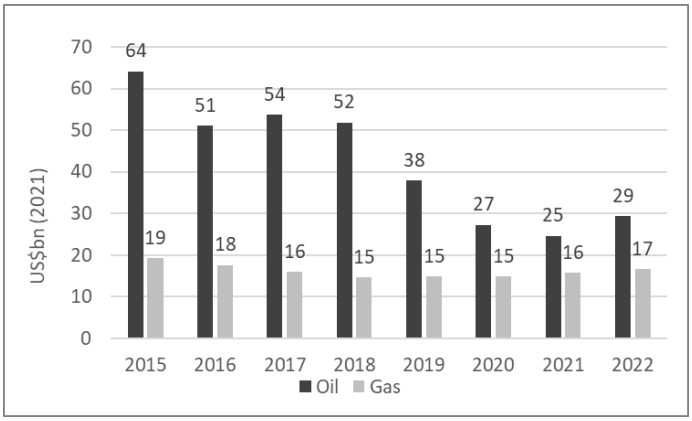

Figure 4: Annual investment in African oil and gas projects by phase.

While the decline in funding for gas developments is substantially lower than for oil, it is notable that a large portion of the gas output is associated with oil production. Furthermore, as illustrated in figure 5 below, IEA (2022) data shows that investment in the upstream sector declined by 12 percent per year between 2015 and 2022 while downstream, midstream, refining, and LNG investments grew by about 7 percent annually over the same period. It is however unlikely that the uptick in the non-upstream sector investments could be sustained without additional upstream investments in the future.

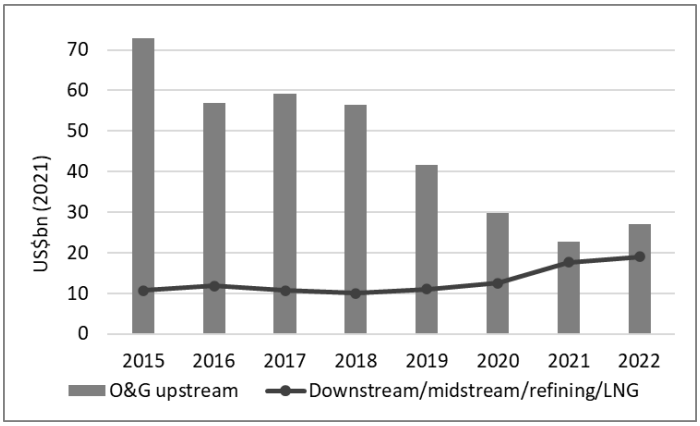

Figure 5: Annual investment in African oil and gas projects by subsector.

It should also be noted that while the decline in investment levels noted above was likely driven in part by the general market cycle, the timing and magnitude of a rebound are uncertain.[9]

[9] The general extent to which the reduction in funding for oil and gas projects in Africa will go is also unknown and the outcome of recent capital-raising efforts has been variable. For example, the Rovuma LNG project in Mozambique successfully secured funding while the proposed East African Crude Oil Pipeline is facing resistance. Another source of uncertainty regarding future financing levels for African oil and gas projects is the ongoing IOC divestments from prominent oil-producing areas such as onshore Nigeria and Angola. The financial and operational capabilities of the successor companies, which can either constrain or boost investments in the sector are also unknown at present.

Alternative approaches to funding African hydrocarbon developments

Hydrocarbon developments in Africa are financed predominantly from outside the region. Data from Geuskens and Butijn (2022), presented in figure 6 below, suggests that about 90 percent of funds for developments in Africa are sourced from outside the continent. North America, Europe, and Australia contribute 55 percent, while Asia accounts for about 32 percent of total project funds.

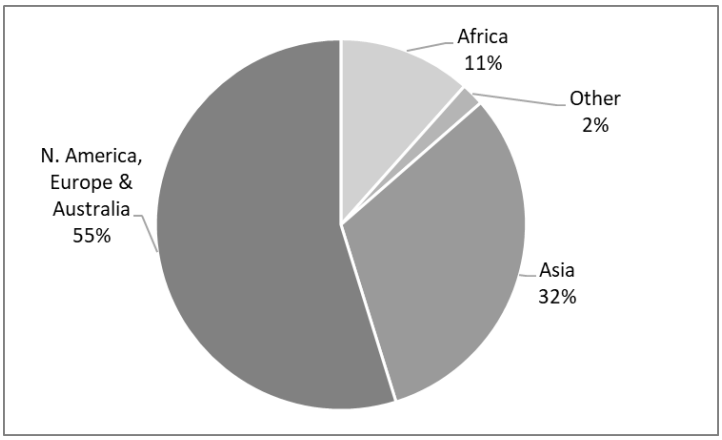

Figure 6: Sources of funding for oil and gas projects in Africa.

This lopsidedness towards non-African sources of finance makes African projects more susceptible to risks of loss of access to financing, especially as Environmental, Social, and Governance (ESG) considerations continue to play a large role in capital allocation and IOCs and independents prioritize opportunities in jurisdictions with lower political risk profiles. Therefore, given the importance of hydrocarbons to the economic development of African producers, alternative funding strategies should be explored. Two potential strategies i.e., overseas funding and domestic funding are discussed below. These strategic approaches are not intended to be mutually exclusive.

Overseas Funding Strategy

Demand for hydrocarbons is expected to grow as developing countries increase oil and gas consumption. Competition for resources may lead net energy importers like China and South Korea to act through their Sovereign Wealth Funds (SWFs) to bolster their energy security by investing in African hydrocarbon assets. Table 3 below shows the assets under management (AUM) of the top energy-importing country SWFs amounting to about US$3,100bn.

Table 3: Top sovereign wealth funds in net oil-importing countries 2021.[10]

	Fund Name	Country	Assets Under Management (US$bn)
1.	China Investment Corporation	China	941
2.	Hong Kong Monetary Auth. Inv. Portfolio	China	522
3.	SAFE Investment Company	China	441
4.	Govt. of Singapore Inv. Corporation	Singapore	390
5.	Temasek Holdings	Singapore	375
6.	National Social Security Fund	China	295
7.	Korea Investment Corporation	South Korea	134

State Street (2022) estimates that SWFs allocated about 36 percent of their AUM to cash and fixed-income investments between 2012 and 2020.[11] At this rate, Asian SWFs probably held about US$1,000bn in cash and fixed income. If 5 percent of this was further allocated to hydrocarbon investments in Africa, it would amount to about US$50bn which is equivalent to the average annual capital inflow into oil and gas projects in Africa between 2017 and 2022. However, National Oil Companies (NOCs) of hydrocarbon exporting countries such as Saudi Arabia and Kuwait, have access to large, low-cost reserves within their national boundaries. Thus, they are likely to bypass investment opportunities in Africa in favor of domestic investments. In contrast, large emerging economies such as China and India on one hand, and even less populous states such as Indonesia, Malaysia, Thailand, Argentina, and Brazil that have limited reserves may be more inclined to invest in African reserves. Figure 7 below shows the reserve lives of the latter countries.

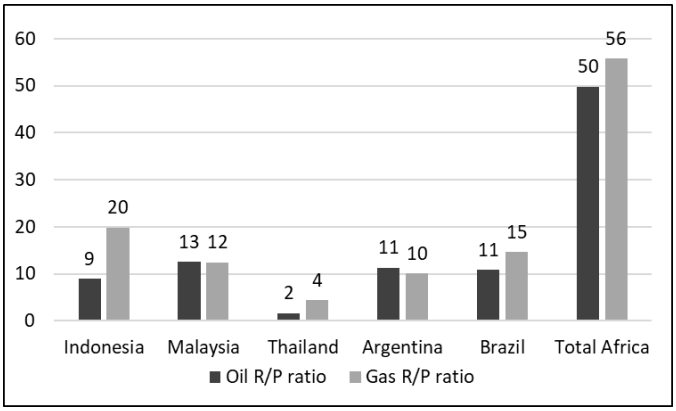

Fig. 7: Oil and gas reserves-to-production (R/P) ratios for Africa and select emerging market economies.[12]

[10] Largest Sovereign Wealth Funds, Reuters, 2022. http://fingfx.thomsonreuters.com/gfx/rngs/GULF-QATAR-QIA/010041PS3P9/index.html.Accessed 10/05/2022

[11] Hentov H., Ale J., *"How do Sovereign Wealth Funds Invest? With Strategic Diversification"*, State Street Global Advisors, 2022.

[12] BP Statistical Review of World Energy June 2022. https://www.bp.com/en/global/corporate/energy-economics/statistical-review-of-world-energy.html

Indonesia, Malaysia, Thailand, Argentina, and Brazil have an average reserve life of 12 years for gas and 11 years for oil.[13] In contrast, Africa has a reserve life of 56 years for gas and 50 years for oil and some African countries have substantially larger reserve lives e.g., Nigeria and Libya have gas reserve lives of 111yrs and 107yrs respectively. The mismatch between the energy endowments of Africa and the relative scarcity of oil and gas reserves in emerging economies creates a potentially lucrative opportunity for interregional partnering. Therefore, African governments should consider pursuing the following course of action.

- **Establish emerging markets energy partnerships:** Governments of African hydrocarbon exporters could initiate partnerships with NOCs such as Pertamina (Indonesia) and Petronas (Malaysia) to attract investments in specific African greenfield or brownfield projects as their domestic reserves decline. Others such as Petrobras (Brazil) may also take interest in African projects to deploy their vast technical prowess in exploration and development to West Africa which is geologically analogous to Brazil's oil-producing regions. It should be noted though, that due to the ongoing curtailment of financing for hydrocarbon projects, this strategic approach may be ineffective if reliant on international banks and multilateral agencies for financing. To bypass this outcome, African governments should be prepared to adopt bespoke commercial arrangements on an asset-by-asset basis if necessary. Where such arrangements may be beyond the specific provisions of current regulatory frameworks, new contractual terms may be required to secure investments on mutually beneficial terms given the declining appetite for investment in African oil and gas projects and the emerging industry paradigm in which the bargaining power of potential partners may have changed.

Domestic Funding Strategy

Domestic stock markets may also have the potential to provide financing for hydrocarbon development in some African countries. At present though, domestic stock and debt markets appear to be relatively immature in Africa, but with room to grow.[14] In most African countries, the combined market value of listed companies is minor in comparison to the GDP. Except for South Africa, stock market capitalization as a percentage of GDP is predominantly below 20 percent. This is in sharp contrast to Australia and North America, which have 109 percent and 161 percent market capitalization-to-GDP ratios respectively (The World Bank, 2022).[15] [16] African domestic debt as a percentage of GDP is also small, typically falling between 8 percent and 20 percent. Figure 7 below illustrates market capitalization and domestic debt levels relative to the size of the economy in some African countries for which data is available.

[13] Thailand which has an oil R/P ratio of 2 was excluded from this calculation so as not to bias the conclusion from the data by exaggerating the region's reserves deficiency.
[14] *African Capital Markets: Challenges and Opportunities*, CFA Institute Research Foundation. 2019.
[15] https://data.worldbank.org/indicator/CM.MKT.LCAP.GD.ZS?end=2020&locations=NG-ZA-NA-MA-GH-KE-TZ-EG&name_desc=true&start=2011
[16] It should be noted that South Africa is an outlier amongst African countries. Its stock market capitalization as percentage of GDP averaged about 283 percent from 2016 to 2020.

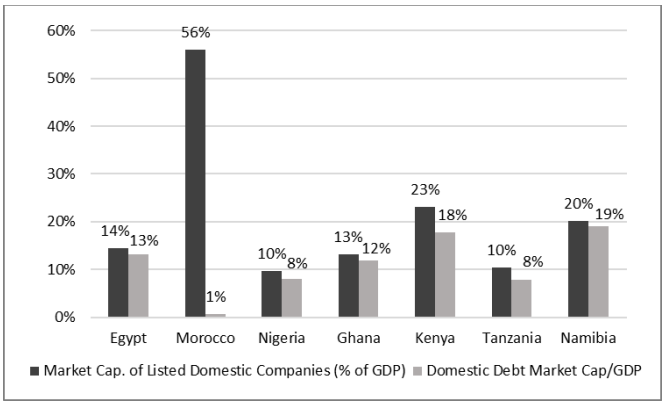

Figure 7: Market capitalization of listed domestic companies as a percentage of GDP.

Domestic pension funds can also play a larger role in providing capital for hydrocarbon developments. Sub-Saharan African pension funds alone had substantial assets under management amounting to about US$350bn.[17] As is the case for debt and equity, growth prospects for African pension funds are also promising because of their large informal economies, rising populations, and low penetration rates of pension funds relative to their economies. For example, Egypt, Nigeria, and Kenya have pension fund AUM-to-GDP ratios of about 2 percent, 7 percent, and 13 percent respectively. On the other hand, pension fund managers also face a scarcity of opportunities to invest in their domestic economies. As a result, in Nigeria, Uganda, and Kenya, fixed income makes up 60 percent to 70 percent of pension fund investment portfolios [18]

The commercial risk of hydrocarbon ventures may have reduced the risk appetite amongst pension managers for investment in the sector given their preference for steady income over different timeframes. However, suitable opportunities may exist for those investment funds with long-term horizons and those focused on utility-like segments of the sector such as pipelines and other midstream assets.

To harness the potential of domestic finance for hydrocarbon development, national strategies should consider several plans of action. First, they should create awareness and promote opportunities in the domestic hydrocarbon sector amongst potential domestic investors. Second, they should facilitate greater asset diversification in managed asset portfolios to include a greater share of oil and gas investments, and third, they should encourage the privatization of lower risk assets on domestic stock markets.

- **Create awareness and promote commercial opportunities in the domestic hydrocarbon sector:** African capital markets are lightly capitalized thus limiting opportunities for capturing and directing savings to oil and gas investment. Yet there is untapped potential to increase funds available for investment capital. For example, despite the labor participation being about 68 percent in sub-Saharan Africa and 50 percent in North Africa, a large share of the workforce is employed in the informal sector which accounts for up to 50 percent of GDP in some countries.

[17] *"African pension funds have grown impressively"*, The Economist, 10/2/2021.
[18] "*Bright Africa 2020 Pension Industry*", RisCura, https://brightafrica.riscura.com/wp-content/uploads/2021/05/Bright_Africa_Pensions_2020_Download.pdf

[19] [20] This indicates a substantial opportunity for mobilizing savings for investment in the economy at large. African counties could thus take steps to facilitate an expansion of savings through awareness and marketing campaigns to capture a greater share of the economy's savings potential. Such promotional activities can also encourage the repatriation of capital back into local economies after years of capital flight.

- **Increase share of oil and gas assets in managed asset portfolios:** African pension funds are concentrated by geography and asset class. Therefore, governments should work towards increasing cross-border investments by reducing regulatory barriers that hinder the matching of available funds with suitable opportunities across national borders. Moreover, asset portfolios are often overconcentrated in fixed-income investments where the lure of high interest rates from government bonds can crowd out investments in oil and gas ventures with their long lead times. Thus, portfolio diversification should be encouraged (using administrative tools if necessary) to ensure that hydrocarbon investments are not excluded from consideration by asset managers.
- **Privatize producing assets via stock market listings:** Another means of transparently unlocking the potential of the domestic debt and financial markets is to float the shares of lower-risk, cash-generating producing assets on domestic stock markets. This may encourage further investment in the sector once the investor community has a "proof of concept" regarding the viability of domestic oil and gas companies. An additional benefit could arise in the form of the likely emergence or growth of a capital-owning interest group of investors that can participate through civil society and other avenues to expand the influence and represent the interests of the oil and gas sector in the political economy. Privatization can also increase the institutional capacity of the sector and its overall contributions to the economy via the influx of highly trained commercial and technical personnel into the sector.

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[19] The World Bank, https://data.worldbank.org/indicator/SL.TLF.ACTI.ZS?locations=ZG-ZQ&name_desc=true. Accessed 10/06/2022.

[20] Elgin, C., M. A. Kose, F. Ohnsorge, and S. Yu. 2021. *"Understanding Informality."* CERP Discussion Paper 16497, Centre for Economic Policy Research, London.

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