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Commodity exporter's vulnerabilities in times of COVID-19: the case of Ghana

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ABSTRACT

The measures put into place to mitigate the COVID-19 health crisis around the world have disrupted global supply chains and sent commodity prices tumbling. We argue that, while the nature of the COVID-19 crisis is unprecedented, the unfolding consequences for primary commodity export-dependent economies are not. By developing a state-centred adaptive supply chain resilience framework and drawing on past experiences, we identify three impact channels that are specific to commodity exporters: a price, a supply chain and a financial channel. Taking Ghana as a case study, we show how the interplay of these three channels can be particularly damaging.

RÉSUMÉ

Les mesures mises en place afin de mitiger la crise sanitaire causée par la COVID-19 à travers le monde ont déstabilisé les chaînes d'approvisionnement mondiales et fait périlcliter les prix des matières premières. Bien que, de par sa nature, la crise de COVID-19 est sans précédent, nous postulons que les conséquences qui en découlent pour les économies dépendant des exports de matières premières, elles, ne le sont pas. En développant un système de résilience de la chaîne d'approvisionnement adaptatif et centré sur l'État, et en tirant des leçons d'expériences antérieures, nous identifions trois zones d'impact qui affectent spécifiquement les exportateurs de matières premières: celle du prix, celle de la chaîne logistique, et celle de la finance. Notre étude du cas du Ghana nous permet alors de montrer comment l'interaction de ces trois zones d'impact peut être particulièrement nuisible.

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Introduction

The COVID-19 pandemic represents an unprecedented shock to global demand and supply and has caused severe disruptions to globally dispersed supply chains. The recent collapse of oil prices, from an already low level into negative figures, hints at yet another commodity crisis looming. The crisis hits at a time when low- and middle-income countries' debt positions have already reached unprecedented levels after a decade of near zero interest rates and dwindling access to concessional multilateral

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finance (UNCTAD 2019a, 2020). Debt servicing has been particularly challenging for commodity-exporting economies that saw their debt burdens rising with declining oil prices since 2018 (UNCTAD 2020). At the same time, with disruptions to supply chains, transport and storage, commodity producers are faced with difficulties in selling their products, even at lower prices.

The objective of this article is to evaluate how the COVID-19 crisis affects primary commodity-exporting economies differently from other economies. We hypothesise that the commodity-specific effects work through three channels: (1) a price channel, which is the collapse of prices across commodities in the wake of a global recession; (2) a supply chain channel, that is, disruptions of global commodity-based supply chains; and (3) a financial channel, that is, the overlap of financial and commodity price cycles resulting in procyclical capital flows and debt servicing costs.

By adopting a state-centred adaptive supply chain resilience framework, we (1) evaluate how and in what way the COVID-19-induced economic crisis compares to previous episodes of dwindling commodity prices and supply chain disruptions; and (2) by taking Ghana as a case study, show how institutional, global and local economic and policy-contextual factors influence resilience outcomes for Ghana's macroeconomy. Three very different primary commodities—gold, crude oil and cocoa—constituted 37, 31 and 16 per cent, respectively, of Ghana's total 2019 export earnings (Comtrade Data). With more than 80 per cent of its export revenues generated from primary commodities, Ghana belongs to the group of countries referred to as commodity dependent (UNCTAD 2019b).

Following this analytical strategy, we demonstrate how the unfolding crisis threatens to severely undermine commodity-dependent economies' revenue stream and fiscal space at a time when it is needed most. Supply chain resilience is undermined by actors' conflicting interests and power asymmetries that prevent collaborative strategies. For these reasons, unlike manufacturing chains, commodity chains are particularly vulnerable to shocks while commodity-dependent economies are unable to cope with disruptions, as their financial position co-varies with commodity price cycles.

The article is structured as follows: we first review two strands of literature, the commodity price cycle literature and the literature on supply chain resilience. We conclude the review by formulating a state-centred adaptive supply chain resilience framework. We then assess how supply chain actors, in the case of cocoa, oil and gold, are impacted by the COVID-19 crisis by drawing on comparative insights from past commodity crises and supply chain disruptions with the unfolding crisis. We subsequently look at how the resilience strategies of different actors impact the resilience of the Ghanaian macroeconomy. The final section concludes with a policy outlook and suggestions for future research.

Commodity price cycles and resilience

Commodity price cycles

Primary commodity markets are characterised by recurring cycles of booms and busts, high price volatility and an overall declining price trend relative to manufacturing products. These characteristics have had historically devastating consequences for

economies that depend on commodity export revenues for internal and external balances (Nissanke 2017, 2019). Commodity price booms have resulted in exchange rate appreciation and deindustrialisation for economies that were unable to absorb the windfall gain, a dynamic known as “resource curse” (Corden and Neary 1982; Deaton 1999; Collier and Goderis 2007). During commodity price busts, the same economies were faced with heavy import bills and increasing costs of debt servicing as exchange rates depreciated. These challenges are aggravated by a declining price trend underlying boom and bust cycles, relative to manufacturing goods, resulting in deteriorating terms of trade for commodity exporters in the long run (Prebisch 1950).

Unsurprisingly, commodity price collapses and sovereign debt crises have followed in close succession (UNCTAD 2015, 2019c). This has been particularly pronounced for African economies, which were transformed towards primary commodity extraction during colonial times to satisfy Europe’s demands (Geda 2003). During the 1950s and 1960s, many primary commodity exporters that had only recently gained independence from their colonial oppressors, saw their development plans undermined by adverse changes in global commodity prices. Their frustration resulted in the first convention of the United Nations Conference of Trade and Development (UNCTAD) in 1964, which openly questioned the benefits of free trade for primary commodity exporters (Prebisch 1950) and facilitated the negotiation of several International Commodity Agreements (ICAs).

However, the commodity price slump of the early 1980s saw support for many ICAs crumbling (Maizels 1992, 137–138). At the same time, sources of countercyclical funding dwindled. The price slump resulted in a sovereign debt crisis of commodity export-dependent economies, which persisted for over two decades until the Multilateral Debt Relief Initiative was adopted in 2005 (Nissanke 2010b, 2019). The debt crisis was further aggravated by the imposition of structural adjustment programmes (SAPs) by the international financial institutions. SAPs, neglecting the underlying causes of the debt crisis, acted in a pro-cyclical manner to commodity price swings, thereby contributing to deindustrialisation (Nissanke 1993, 2010a, 2019; Geda 2003).

Price volatility, on the rise since the 1990s due to the collapse of the ICAs, drove many commodity chain actors to turn to market-based solutions for price risk management, resulting in a rapid expansion of commodity derivative markets (Nissanke 2017). Leading commodity derivative markets (at the time) were primarily located in the financial centres of Europe and the United States. Their expansion was accelerated by several rounds of market deregulation, which allowed for new instruments and traders to enter (van Huellen 2015). This so-called financialisation of commodity markets, i.e. the increasing presence of financial investors who are not engaged in the physical production, consumption or trading of commodities, in commodity derivative markets has further exacerbated volatilities and undermined these markets’ price discovery function (van Huellen 2018).

The almost explosive liquidity inflow in the build-up of the commodity boom in 2007–08 and the rapid liquidity outflow and subsequent commodity bust in the wake of the global financial crisis (GFC) has demonstrated how commodity derivatives are behaving increasingly like more traditional asset classes (Nissanke 2012; Cheng and Xiong 2013).¹ The tightened link between commodity prices and global liquidity cycles has seen prices recover with the roll-out of expansionary US monetary policies, resulting in another

price boom in 2010–11 and a following slump, with the eventual tightening of monetary policy (Belke, Bordon, and Volz 2013; Kang, Yu, and Yu 2016). Many low- and middle-income countries, which were initially shielded from the impact of the GFC, experienced the immediate consequences of the commodity price boom and bust cycles, as physical trading is benchmarked against futures prices at the international exchanges.² These benchmark prices will, hence, be the primary focus of our price analysis.

The tightened link between commodity price and global liquidity cycles has made macroeconomic management for commodity-dependent economies even more challenging than in previous decades. Further, due to the low availability of concessional loans and deeper financial integration, low- and middle-income countries increasingly rely on private creditors and market-based finance. For instance, external sovereign bond issuance by African economies, mainly denominated in USD, rose roughly tenfold between 2008 and 2014 (UNCTAD 2015). This is particularly worrisome as loan servicing costs are at the mercy of rating agencies, exposing countries to global liquidity cycles and the volatilities of the international financial markets (Bassett 2017). In search for alternative sources of credit and foreign exchange, economies are using their commodity wealth as collateral for external borrowing, further linking availability of credit to commodity price cycles. In addition, sovereign wealth funds, set up by commodity dependent economies (especially the oil-rich economies) to facilitate countercyclical spending, suffer a double blow in times of synchronised commodity and financial slumps, as they are losing money on their financial investments and suffering from reduced funding allocation.

With commodity price and financial liquidity cycles increasingly synchronised and commodity-dependent economies relying increasingly on market-based finance, a commodity price slump does not only squeeze revenues and availability of finance for countercyclical spending, it also redirects remaining revenues towards debt servicing.

Supply chain resilience

A message which has been repeatedly emphasised since the beginning of the COVID-19 pandemic is that supply chains and production networks must be resilient. A supply chain is “the network of organizations that are involved through upstream and downstream linkages, in the different processes and activities that produce value in the form of products and services in the hands of the ultimate consumer” (Christopher and Peck 2004, 2) and may comprise producers, firms or organisations, suppliers, regulatory agencies, insurers, storage and warehousing, marketers and retailers, among others.

Supply chains are vulnerable to risks that cause disruptions. These disruptions may come from internal or external sources, be sudden or gradual shocks, have cyclical or structural impacts and are caused by both man-made and natural events (Christopher and Peck 2004; Tendall et al. 2015). Economic recessions, natural disasters (e.g. flooding, earthquakes, pandemics), labour strikes, equipment failure, power outages and product quality failures are all examples of supply chain disruptions. Also, Just-in-Time sourcing, lean supplies, offshoring and onshoring can increase a chain’s vulnerability to disruptions. Disruptions or shocks can have both short-term and long-term impacts on chain participants and due to the level of interconnectedness of modern supply chains any disruption at one point of the chain will have contagion effects throughout the chain.

There is no consensus on what the concept of resilience, in general, or supply chain resilience (SCRes) specifically means, although it has been extensively studied (Pike, Dawley, and Tomaney 2010; Mensah and Merkurjev 2014; Boschma 2015; Tukamuhabwa et al. 2015; Doherty et al. 2019).³ Resilience is applicable at different levels: households, firms/companies, communities, governments, countries, regions and globally (Boschma 2015; Tendall et al. 2015; Tan et al. 2017; Gong et al. 2020), and the resilience of one level does not imply resilience of the others (Folke et al. 2010). In fact, Armitage and Johnson (2006) noted that it is key to clearly answer the question “resilience of what, for what purpose, and for whom” as the resilience of one actor may mean another actor becomes less resilient.

Increasingly, an adaptive approach to SCRes is adopted, viewing a supply chain as a complex adaptive system (CAS) (Choi, Dooley, and Rungtusanatham 2001; Surana et al. 2005; Pathak et al. 2007). A CAS is a “dynamic network of agents acting in parallel, constantly reacting to what the other agents are doing, which in turn influences behaviour and the network as a whole” (Holland 2006). Disruptions to a system may emanate from within the system or in the environment in which the system is situated and resilience depends on “adaptivity” i.e. the ability of actors or components of the system to continuously through interconnections and interdependence, adjust to disruptions (Nilsson 2003; Surana et al. 2005). Actors in the system interact in a non-linear way, learn from each other, and the system is said to be self-organising, with collective behaviours emerging without centralised control (Surana et al. 2005). Resilience is not necessarily a return to what existed before, but rather the ability to change, adapt and transform. Actors, structures, social and institutional arrangements may undergo changes (Davoudi 2012; Martin and Sunley 2015). See Appendix Table A2 for an explanation of the key elements of a CAS and mechanisms through which resilience is achieved.

In a supply chain, the autonomous entities (actors) are spread over multiple spatial scales (e.g. local, national, regional, international), have different capabilities, assets, resources, competing and complementary goals, all of which mutually interact with each other and the environment to influence outcomes for any actor. Ultimately, a resilient supply chain must continue to benefit its participants by maintaining its prior functions, whether ensuring products get to consumers, workers earn an income, shareholders get profits or states get funds. Operationalising the CAS definition of a supply chain, Tukamuhabwa et al. (2015, 8) emphasise the timeliness and cost efficient manner in which resilience must be achieved and therefore, define SCRes as

the adaptive capability of a supply chain to prepare for and/or respond to disruptions, to make a timely and cost effective recovery, and therefore progress to a post-disruption state of operations – ideally, a better state than prior to the disruption.

SCRes focuses primarily on manufacturing firms. However, unlike manufacturing firms that can manage resilience by implementing strategies like flexibility (e.g. diversifying suppliers) or agility (e.g. visibility), extraction of oil and minerals, planting of cocoa trees takes several years and needs long term investment (Rice and Caniato 2003; Christopher and Peck 2004; Sheffi 2005). Additionally, volatile commodity prices may influence investment decision-making, contracts may be fixed for at least 12 months, and cost efficiency and timeliness may not be possible.

Since CAS is originally an ecological concept (Surana et al. 2005), a wholesale importation to socio-ecological systems may result in glossing over important issues such as agency and power relations (Davoudi 2012). Self-organisation, for example, means that there is no central point of control within the supply chain, dictating the direction of change but human actions and choices play a role in the resilience of actors and the system as a whole. Also, some actors may exert influence over others and the resilience of an actor may have to be negotiated by engaging with various actors all with diverse interests (Davoudi 2012; Harris, Chu, and Ziervogel 2018). Different from our approach, much of the SCRes literature does not consider these issues.

Commodity supply chains, resilience and COVID-19

We adopt the CAS framework to analyse the impact of COVID-19 on commodity supply chains. Internationally traded commodities such as gold, oil and cocoa are a major source of income and employment to countries that are highly dependent on them. The most obvious priority for resilience, for an actor such as the state is the stability or growth of revenue and the livelihoods of chain participants. Modelling the commodity chain as a CAS provides insights into how, in the current crisis, the simultaneous interactions between the Ghanaian state and other actors in the network and the environment, affect the ability of the state to mitigate and/or adapt to changes to its income expectation. We therefore define state-centred resilience as “the capacity of a commodity chain, after a disruption or shock, to guarantee the state, at minimum, a predictable and stable flow of finances as it did previously, if not an improved flow”.

We restrict our analysis to the core actors that the state interacts with at the macro level and the external environment. The environment that influences the CAS may include global economic and financial conditions, local political, economic, social circumstances, climate change and changing consumer behaviour. We model the initial COVID-19 pandemic as a global natural disaster shock. A natural disaster is a low probability – high impact event that is an unanticipated, exogenous shock to the supply chain and rarely invested in by firms and other actors. Biological (e.g. bacterial and viral infectious diseases, insect infestation), hydrological (e.g. floods, landslide, avalanche) and geophysical (e.g. earthquake, volcano) are events classified as natural disasters (Guha-Sapir et al. 2012). These have direct consequences (loss of lives, damages to infrastructure, crops, livestock and houses) and indirect consequences (unemployment, loss of revenue and market destabilisation) (Guha-Sapir et al. 2012; Botzen, Deschenes, and Sanders 2019). In the context of COVID-19, we hypothesise that the shock to revenue and flow of finances materialises through three channels: prices, supply chains and finance, outlined here previously.

Adapting the CAS framework for our purposes, by considering issues of agency and power, the following five features are particularly important for resilience.

Individuality and adaptivity

Commodity chains are made up of a number of actors. In the cocoa chain, we may have smallholder farmers, commodity traders, grinders, chocolate manufacturers and consumers. These actors are autonomous and supply, demand and price indicators act as an incentive for them to react. Furthermore, factors such as changes in technology,

sustainability issues, and the local business climate, elicit a response. In their individual decision-making process, they make use of mental models, dominant rules, beliefs, values in the commodity chain (Denzau and North 1994; Choi, Dooley, and Rungtusanatham 2001). Actors adapt their current behaviour on the basis of these and individual and group responses to shocks in supply chains can generate new and possibly unpredictable behaviours.

Feedback loops and interdependence

Actors in supply chains have heterogeneous resources and assets, their own objectives and strategies (Tukamuhabwa et al. 2015), act autonomously and seek to optimise their own performance. However, they cannot achieve their objectives without considering what the others do. The goals or objectives of the actors are likely to be in conflict with each other but also complementary so there is interconnectedness and interdependence. As such, they are connected to each other through feedback loops. Feedback loops allow changes in one part of the supply chain to affect other actors and even other scales within the supply chain. Therefore, a small change at one node of the chain can result in large effects, while a large change can result in small effects (Choi, Dooley, and Rungtusanatham 2001; Pathak et al. 2007). Interdependence between actors may sustain, enhance, or diminish the resilience of specific actors and the system as a whole.

Self-organisation

A CAS is by definition self-organising. However, self-organisation in commodity chains is influenced by lead firms who exercise much control at particular nodes or stages with cascading effects throughout the rest of the chain. Heightened price volatility since the 1990s has led to an increasing consolidation of commodity supply chains through vertical and horizontal integration. Economics of scale in commodity trading and processing, as well as large capital requirements and new technologies that enable bulk trading, further contributed to the trend. With sluggish growth in core markets and low interest rates, growth in many primary commodity sectors took place predominantly through mergers and acquisitions with an increasing focus on the maximisation of shareholder value instead of expansion of production and consumer markets (Burch and Lawrence 2009; Baud and Durand 2011). For commodity-exporting economies, this resulted in increased buyer power. Chain governance significantly affects resilience outcomes of actors and the entire chain.

Path dependence

Resilience may be constrained by an actor's initial endowments. Actors may have to move to occupy a better position (most likely a higher node of the chain) in order to be (more) resilient. However, they may be unable to do so because they do not possess the capabilities or resources required and therefore, are locked into particular structures and growth paths. Furthermore, the type of chain governance may influence path dependence of certain actors. The entire chain's resilience may also be locked into a particular growth path because of past events. It is therefore important in an analysis of current resilience, to identify which strategies were used in the past to achieve resilience.

Co-evolution

Actors interact with their external environment. This may include the global economy, new technologies, environmental and sustainability concerns, political concerns and the social context in which they are situated and operate. These external factors also influence interactions between actors in the chain.

What is different this time?

The COVID-19 crisis hit at a time when commodity prices were already on the decline (especially oil), the debt burden of many low- and middle-income countries had become unsustainable and the global economy had gone into recession. It is within this context that the pandemic has caused a massive reduction of economic activity globally. According to July 2020 OECD Data, industrial production dropped by 30 per cent for the EU-27 countries and 20 per cent for the United States (which was affected with a slight delay) between January and April 2020. This is the largest ever drop recorded within such a short period of time. Global trade saw an 8 per cent reduction between February and March 2020, and at the time of writing, the WTO predicted a 13–32 per cent decline of merchandise trade in 2020.⁴ In this section, we will evaluate the price, supply chain and financial dimension of this shock to provide the context in which Ghana's macroeconomic resilience is evaluated.

Demand for primary commodities has always fluctuated with global economic activity (Kilian and Zhou 2018). However, the direction and degree of sensitivity of demand varies across commodities, and the three commodities taken as a case study here – gold, oil and cocoa – react very differently to changes in global economic activity. Historically, gold is a store of wealth, and demand increases in times of economic uncertainty. Demand for oil is strongly linked to global economic activity, as fossil fuels remain the largest energy provider. Cocoa is a luxury food crop, and hence, demand tends to decline during economic recessions. These dynamics are clearly depicted in [Figure 1](#) for the post-GFC period.

In the current crisis, the demand for oil has been heavily affected by the unprecedented decline in global economic activity. The decline was accompanied by a sudden reduction in trade, travel and freight, which has further aggravated the demand shock. The IEA predicts COVID-19 to become the single largest shock in oil demand since 1965, with a 9.3 per cent annual reduction; see [Figure 2](#).

The demand shock to cocoa has been less dramatic as for oil, but is expected to be severe as people lose employment and income. Western Europe is the biggest consumer market for chocolate, followed by the United States. In Switzerland, the country with the highest per capita cocoa consumption, the consumption of chocolate and biscuits has more than doubled during the lockdown in March 2020, compared to March of the previous year (via Statista). While households have initially stocked up on indulgent foods, past recessions have shown that per capita consumption of chocolate is sensitive to economic downturns. Also, a large proportion of the consumption of cocoa containing foods takes place outside the home at airports and in shopping malls. With major sales outlets closed and consumers' income squeezed, producers have reported a significant reduction in demand (personal conversation with an industry expert) and Easter sales have been significantly lower than in previous years across Europe.⁵

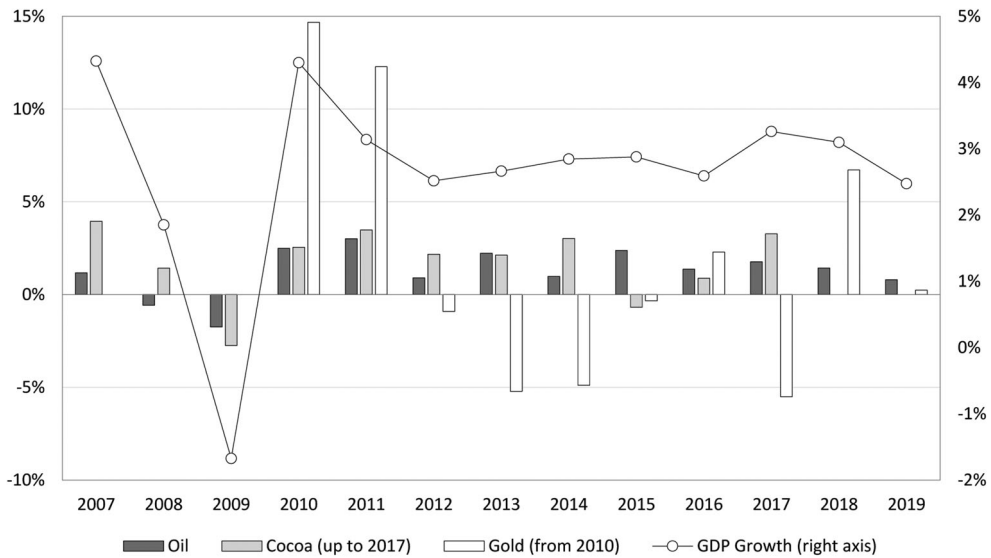


Figure 1. Changes in global demand for gold, cocoa and oil with world GDP (annual growth in %).

Note: Annual percentage change in global gold demand (2009–19), annual percentage change in apparent cocoa consumption (2006–17) and annual percentage change in daily crude oil demand (2006–19). Sources: IEA and World Gold Council (via Statista), ICCO, World Bank Data. Authors' calculations.

The demand for gold for investment purposes has increased by 93 per cent in the first quarter of 2020. However, a reduction in demand for jewellery almost completely outweighs this increase, and overall global demand for gold only increased by 1 per cent in the first quarter of 2020 (via Statista). However, the demand for gold as a store of wealth is likely to increase further as uncertainty prevails.

Overall, global demand for primary commodities follows previous patterns summarised in Figure 1. However, a few differences are notable. The demand shock to oil comes at a time of already sluggish demand, low prices and a price war between Saudi Arabia and Russia (World Bank 2020). Further, the shock is unprecedented in size, although, for now, believed to be transitory, as evident in Figure 2. Further, with a recession looming for the last two years, the demand for gold has already been high, as central banks have stocked up gold reserves since mid-2018 (via Statista). Hence, many of the dynamics expected to unfold were already unfolding by 2018. The COVID-19 crisis has accelerated and aggravated these dynamics.

Prices have reacted strongly to these observed and anticipated demand changes. Figure 3 depicts the monthly price levels of the commodity markets serving as benchmarks for Ghanaian gold, oil and cocoa since January 2000. Gold prices have reached new highs, oil has collapsed with the largest year-on-year decline since 2000, in April 2020, and has bounced back slightly since then. Cocoa has also seen a decline but more muted than oil. As outlined in the previous section, commodity prices tend to move with global liquidity cycles. The collapse of commodity prices in 2008 coincided with a strong contraction of global liquidity amidst high volatility and uncertainty (BIS 2011). While 2020 liquidity data is not available yet, the S&P500 volatility index

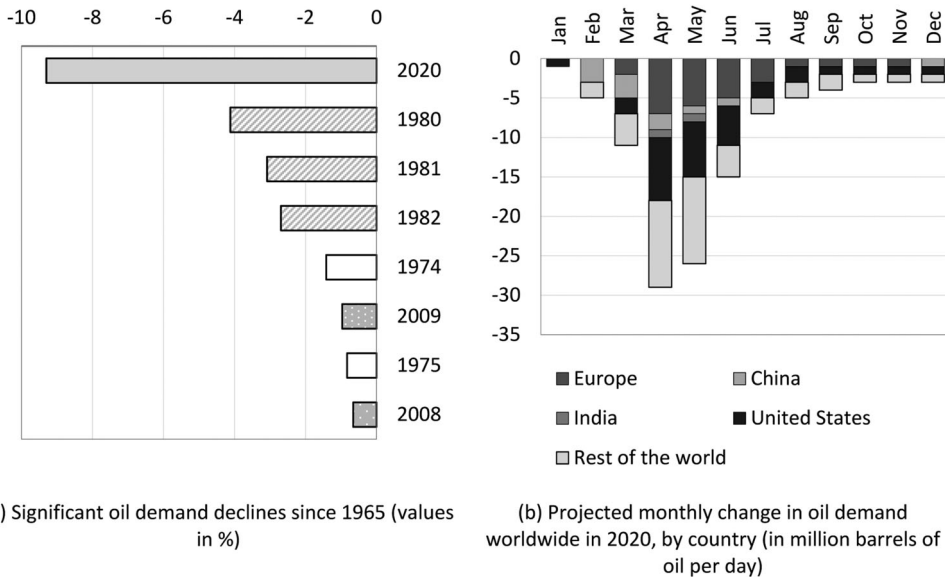


Figure 2. Oil demand, projected and historical declines.

Notes: (a) The chart shows all historical episodes when the annual oil demand has fallen by more than 0.5 per cent since 1965. The 2020 figure is the IEA forecast. COVID-19 crisis (grey), 1980s energy crisis and global recession (striped), GFC and subsequent recession (dotted), 1970s oil crisis recession (white). Sources: (a) BP Statistical Review; IEA; World Bank. Accessed via World Bank (2020). (b) IEA. Accessed via Statista (<https://www.statista.com>).

has reached similar highs in March 2020, as last seen during the GFC, signalling another contraction of global liquidity.

Looking more closely at trader positions and liquidity, Figure 4 depicts the same price movements but in weekly frequency, and since January 2020, together with open interest by two trader types: money managers (e.g. hedge funds and asset managers) and producers and users (e.g. commodity producers and processors). The open interest is further differentiated into long (buying) and short (selling) positions. We see a similar trend in all three markets. Money managers have reduced their buying positions between February and April, coinciding with a decline in prices over the same time period. The initial decline in oil prices was further supported by money managers betting on falling prices by going short. The same tendency is observed for cocoa. While demand shocks for the three commodities have been quite different, changes in speculative trader positions are synchronised across commodities, strengthening the hypothesis that these changes are driven by global liquidity cycles rather than commodity-specific fundamentals.

With global dispersion of the extraction and production of the majority of primary commodities, commodity prices have been driven more by demand shocks than by supply disruptions over the last decades (Kilian 2009; Jacks and Stuermer 2020). Disturbances or disruptions to supply chains mainly have been localised and effects on global prices have generally been short-lived. However, despite their localised and transitory nature, past supply chain disruptions had lasting consequences due to bankruptcy, loss of livelihoods and permanent reduction of productive capacity. For instance, the 2011 Great East Japan earthquake caused Japan's largest month-on-month fall in industrial

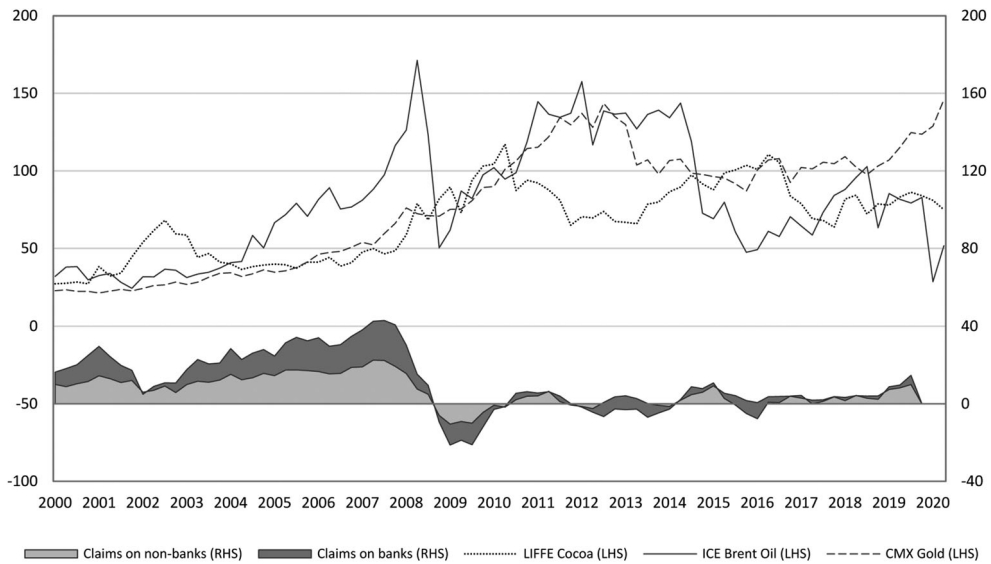


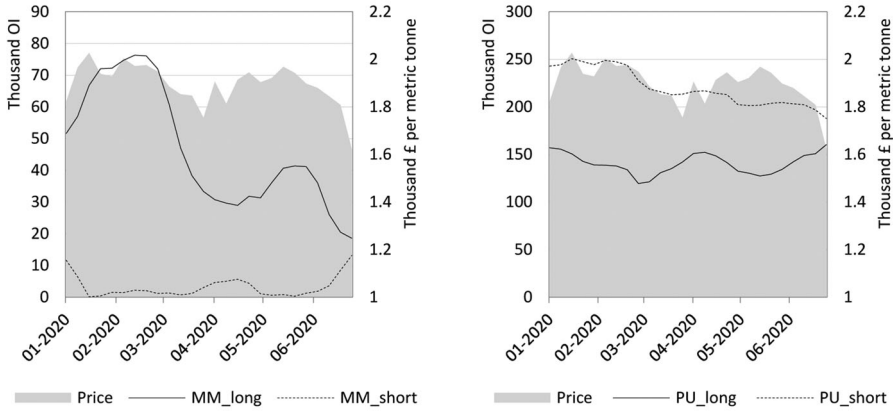
Figure 3. Commodity prices and global liquidity since 2000.

Note: End of quarter data. Price indices 2010 = 100. Global liquidity index is year-on-year percentage growth in international claims following BIS (2011); no data beyond Sep 2019. Sources: Datastream and BIS Data. Authors' calculations.

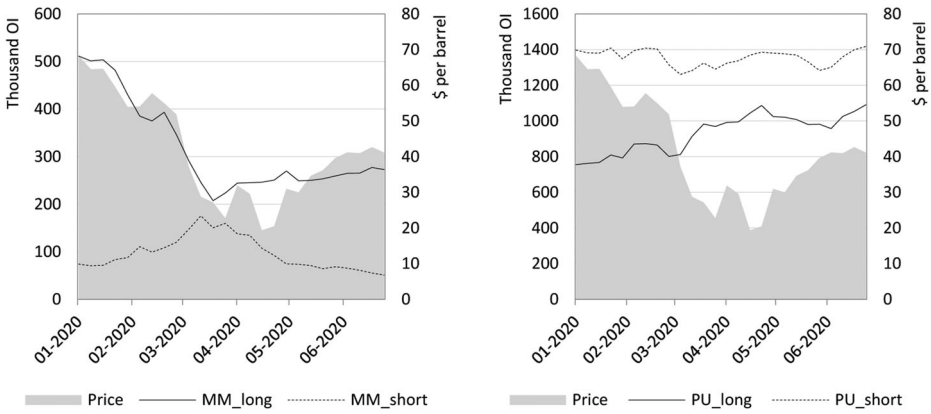
production on record (Danninger and Kang 2011; Nanto et al. 2011). Since Japan is an important supplier of product parts in the automobile sector, contagion effects disrupted production by General Motors in the United States and Peugeot-Citroen in Europe (Nanto et al. 2011). While the supply chain recovered, segments of the chain or relationships were permanently lost as some firms ensured their supply chains were more resilient by diversifying their suppliers and offshoring (Matous and Todo 2016; Zhu, Ito, and Tomiura 2017).

For oil, gold and cocoa, there is some evidence of transitory supply disruptions with potentially more prolonged consequences. Downstream disruptions were mainly due to the temporary halt of industrial production in Europe and the United States, which in some instances resulted in a backlog of primary commodities that could not be processed (even if demand was sustained). As a consequence, storage facilities filled. For instance, a day of panic at the NYMEX WTI oil market that led to negative oil prices being recorded for the first time in history on 20 April 2020, has been linked to storage filling, as well as the mass exit of managed money.⁶ The Brent oil counterpart remained in black numbers, as Brent oil is more flexibly stored.⁷ Gold markets have seen similar disruptions, with prices at the New York market deviating substantially from prices at the London exchange, as arbitrage through physical delivery was undermined by restrictions on air travel and closing of refineries in the United States.⁸ As will be detailed in the following section, disruptions upstream on the chain were also observed, with disruptions to the supply of key inputs being the most severe.⁹

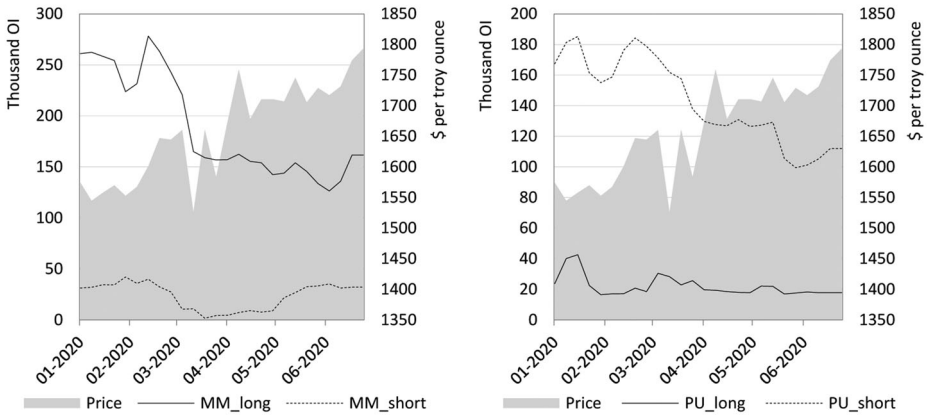
Although past supply shocks had only limited impacts on global prices, the current crisis could be a turning point. Ghana and neighbouring Côte d'Ivoire produce more than 60 per cent of the world's cocoa. The dominance of one geographic region in the



(a) ICE Europe Cocoa



(b) ICE Brent Oil



(c) CMX Gold

Figure 4. Trader Behaviour in Commodity Markets.

Notes: MM for money managers, PU for producers and users and OI for open interest. *Source:* Datastream. Authors' calculations.

global supply of cocoa beans bears risk of substantial supply shortages should the pandemic affect harvest and logistics within the region. Unsurprisingly, major supply chain stakeholders are eager to ensure farmers continue to attend to their farms, an example of a collaboration strategy to build resilience.¹⁰ However, the same stakeholders have also been eager to exploit the price slump following the mass exit of managed money and the increasing importance of shareholder interests means that short-term gains are maximised, even at the expense of long-term losses as demonstrated in the following section.

Turning to the financial channel, in early March 2020, the COVID-19 pandemic triggered an unprecedented net-portfolio outflow from the emerging market economies group, both from debt and equity. The reversal of debt (bond) flows was particularly striking, while equity was hit with a slight delay (ElFayoumi and Hengge 2020). Overall, the reversal of portfolio flows has been faster and larger than in previous episodes, and outflows were recorded to be five times the size they were during the GFC and the Federal Reserve (FED) taper tantrum episode of 2013 (BIS 2020; OECD 2020). After the initial flight to safety, investors have started returning in search of yield, and some foreign currency-denominated emerging market government bonds recorded a net-inflow in May 2020. However, the recovery is heterogeneous, with investors putting greater trust in the economies of the Asia-Pacific than African economies, with many of the latter's credit ratings being downgraded (ElFayoumi and Hengge 2020).

Overall, the direction of demand and price behaviour follows previous periods of economic recession and crisis. However, what is different this time is the size and speed of the demand shock, the simultaneity of demand shock and supply chain disruptions, the degree with which price effects are compounded with financial effects and the geographic reach and nature of the supply shock(s). For the latter, the duration and spread of the pandemic will be a determining factor. Countries hosting different segments of supply chains are at different stages of the pandemic. This means that supply chain disruptions are potentially staggered, with the whole chain being affected for a prolonged period of time. Recurring waves of infections in different geographic locations may further prolong the impacts. If different nodes of the suppliers cannot snap back quickly or survive through prolonged income losses, parts of the chain can be lost permanently with severe implications for the livelihoods of people depending on these nodes for income or consumption.

What does this mean for Ghana?

Ghana has achieved strong economic growth (in terms of real GDP) in the 2000s and reached lower middle-income status in November 2010 (Moss and Majerowicz 2012).¹¹ The statistical transition to lower middle-income status coincided with the opening of the Jubilee oil field, which initiated the exploitation of Ghana's oil and gas reserves at the end of 2010 (Abudu and Sai 2020). Ghana is not a major oil producer, but is the largest gold producer in Africa and the second largest cocoa bean supplier globally, with an estimated 1 million Ghanaian smallholder farmers and their communities depending directly on cocoa for their livelihoods.

Although Ghana remains heavily dependent on primary commodity exports for foreign exchange earnings and external balances, the economy has become more diversified, and oil and gas only accounted for 3.8 per cent of Ghana's GDP in 2018. Nevertheless, revenues from the newly established oil and gas industry have had a profound impact on Ghana's macroeconomy. Limited absorption capacity resulted in an initial appreciation of the real effective exchange rate and a deterioration of the competitiveness of the non-oil sector, partly eroding the growth impact from the oil and gas revenues (Acquah-Andoh et al. 2018).

With declining oil prices from 2014, Ghana accumulated external imbalances and rising costs of debt servicing due to a depreciation of the Cedi and the government obtained a USD918 million IMF loan in 2015.¹² The decline in concessional lending, partly due to the switch from low- to middle-income status, has resulted in Ghana increasingly relying on the international bond market for public financing.¹³ The changing debt composition means steeper borrowing costs and an increasing vulnerability to volatile swings in market rates (Moss and Majerowicz 2012). Since investor sentiments and rating agencies assessments align with commodity prices, as well as financial liquidity cycles, bond-based financing is inherently procyclical. Improvements in economic growth after the slump in 2015 were once again undermined by declining oil prices in 2018 and a continuously weakening Cedi.

Another slump in global commodity prices will have serious implications for Ghana's economic growth, government revenue, foreign exchange reserves, debt sustainability and overall macroeconomic stability. The GDP growth estimate has already been revised downward from its predicted 6.8 per cent to 1.5 per cent for 2020, which would be the lowest growth rate in 37 years.¹⁴ The correction is not least because of the loss in revenue due to declining primary commodity prices. Cheaper fuel prices (which makes up a large share of Ghana's import bill) and rising gold prices are expected to only partially offset the losses (Ali, Fugazza, and Vickers 2020).

Further, an important source of foreign exchange has dried up. Ghana is the only country that maintains a cocoa marketing board, and all cocoa harvested is sold via the Cocoa Marketing Company (CMC), a subsidiary of the Ghana Cocoa Board (Cocobod). Up to 70 per cent of the predicted crop is forward sold, and the forward contracts are used as collateral to take out a syndicate loan at competitive rates in August or September each year (van Huellen and Abubakar *forthcoming*). However, this year, international lenders refused to underwrite the USD1.3 billion loan for the 2020/21 crop season. Cocobod is now aiming for a smaller club loan pooled by a consortium of development finance institutions instead. At the time of this writing, the CMC struggled to secure enough forward contracts to be used as collateral, as multinational buying companies are delaying their commitment to future purchases due to uncertainty over future demand. Some chocolate manufacturers are also waiting for prices to decline further, knowing that the CMC will have to close forward deals soon to gain access to external financing (*ibid.*).¹⁵

The reduction in sales hit the CMC just after multinational buyers eagerly stocked up cocoa beans from the 2019/20 season in March 2020, due to worries over future disruptions in shipping. Buyers requested forward bought beans to be shipped early and bought additional beans for the spot market price, benefiting from already declining prices. As a result, Ghana was able to pay back its last syndicated loan early, and the ICE Europe

cocoa futures market has now become inverted (deferred futures contracts are trading at a discount), indicating storage is filling. With financial speculators draining liquidity further and betting on falling prices, a collapse of prices beyond what could be justified by declining demand in core consumer markets is likely. These developments have a particularly bitter taste, as, for the first time, the 2020/21 cocoa season should have guaranteed farmers a living wage. The imposition of a living wage premium on multinational buyers is a joint initiative by Côte d'Ivoire and Ghana. At the time of this writing, the two countries were able to impose the premium despite resistance from buyers, speaking to their combined market power (based on a conversation with an industry expert).

These dynamics are further reducing Ghana's access to foreign exchange and make debt servicing and financing of essential imports (including medical supplies) even more difficult. Ghana, like many other low- and middle-income countries has applied for the Debt Service Suspension Initiative (DSSI) agreed to in April by the G20 finance ministers. However, the DSSI only covers a minor part of countries' debt burden, as the agreement does not mandate any action from private creditors or even multilateral creditors, such as the World Bank (Oxfam 2020). In 2020, 59 per cent of Ghana's total debt service payments were owed to private creditors excluded from the DSSI scheme. Servicing of this debt further undermines the government's fiscal space (Oxfam 2020).¹⁶

Further, applying for the DSSI has potentially adverse consequences for the debtor country, as rating agencies are likely to downgrade their credit rating, making it more expensive to borrow in the future and service their existing debt. Resources seemingly freed through the DSSI are hence diverted to private creditors (Oxfam 2020).¹⁷ This outcome is not particular to the COVID-19 crisis but symptomatic of a wider trend of the private, finance-led development model, which is primarily designed to provide private investors with high risk-adjusted returns (Musthaq 2020). Moody's has already downgraded Ghana's credit rating, and on April 13, 2020, the IMF approved the disbursement of USD1 billion to be drawn under the Rapid Credit Facility to improve confidence of Ghana's creditors.¹⁸

In addition to the effects through the price and financial channel, supply chain disruptions are likely to have lasting effects on future revenue for the Ghanaian government and the livelihoods of citizens receiving income through these supply chains. Production and extraction of all three commodities analysed here has not been disrupted directly, despite partial lockdowns being imposed and reported cases of COVID-19 among workers and farmers. The country is not ranked among the hardest hit countries in the world, but increasing numbers of daily cases at the time of writing suggest that it is one of the worst hit in Africa. The Western and Ashanti regions account for 70 per cent of the country's cocoa production. With the Ashanti region being among the most impacted regions by COVID-19 in Ghana (via Ghana Health Service), some disruptions to attending the farms and harvesting are expected. Ghana's 14 gold mines have been operating without interruptions so far, as mining was exempt from the imposed lockdown. Some COVID-19 cases were reported at mines, but only one mine reported that production was negatively affected due to workers having to quarantine.¹⁹ Similarly, a COVID-19 outbreak at the Jubilee oil field did not impact production volume.²⁰ While disruption among primary commodity producers due to COVID-19 cases

among farmers and workers appears to have been minor so far, the situation could change with recurring waves of the pandemic.

However, supply chain disruptions have impacted service and input providers in the gold, oil and cocoa chains. Cocoa has been particularly hit hard, as spraying and fertiliser programmes have been delayed. This can have repercussions for future harvests. Ghanaian cocoa yields are already declining due to an aging farmer community and parts of the trees being diseased. The inability of Cocobod to secure external financing has further repercussions for the board's ability to pay its internal cocoa operations, and there are reports about payments to licenced buying companies, who buy the cocoa beans from farmers on behalf of Cocobod, being delayed.²¹ Delays mean that farmers are not being paid on time or cocoa purchases are being delayed. This could result in crops rotting before they reach CMC warehouses, as farmers have limited facilities to store the cocoa beans for prolonged periods of time.

While multinational buyers and chocolate producers have demonstrated a high degree of resilience to volatile prices in the past, cocoa farmers and the CMC, more specifically, can be less flexible. Multinational trading houses are in the business of both buying and selling beans; they thrive in periods of price volatility by timing their buys and sales. Further, during the last recession, chocolate producers, who are cocoa bean buyers, expanded into new consumer markets in South and Southeast Asia, producing cookies rather than chocolate and investing in the production of chocolate that can resist high temperatures for these markets, to diversify their consumer base. In addition, during periods of high cocoa prices, chocolate producers tend to reduce the cocoa content of their products and replace it with sugar and vegetable oils or shrink the size of the chocolate bars (van Huellen 2015). While a long-term decline in the global cocoa beans production is a worry for the industry, short-termism commonly dominates (as evident from recent behaviour of multinational buyers). Farmers, on the other hand, can be less resilient to changes in price and demand, as they cannot easily switch to other crops. Cocoa trees take 3–5 years to bear fruit and are, hence, a long-term investment. Low prices and disruptions to sales of beans and input provision will affect the ability of the Ghanaian government to finance its debt and imports, reduce its fiscal space and impact directly the incomes and livelihoods of smallholder cocoa farmers, with lasting consequences for future production and government revenue.

As for cocoa, a decline in revenue from the commodity operations in oil and gold will impact future investments, especially if prices remain suppressed for a prolonged period of time. Indeed, the same happened during the price slump in the 1980s (Nissanke 2012). The high cost of offshore oil and gas operations means extraction projects are less economically viable in a period of low oil prices, possibly postponing output and exploration activities.²² Ghana, like other commodity-rich economies, has set up sovereign wealth funds – the Ghana petroleum fund in 2011 and the Minerals Income Investment Fund in 2018, with the aim to provide countercyclical funding in times of commodity price slumps and to finance future infrastructure investment projects. Suffering from the “triple-drain” of a decline in value of financial assets that the funds had invested in, a commodity price slump squeezing funding allocation and liquidation of assets by governments to increase their fiscal space, African sovereign wealth funds are predicted to lose at least USD19 billion due to the COVID-19 crisis.²³ Repercussions for future infrastructure investments and funding availability for future generations are imminent.

Conclusion

Current developments indicate that, like in previous periods of economic crisis, global commodity markets are experiencing a price slump and heightened volatility, with prices overshooting and undershooting, as financial investors move into safer assets. At the same time, disruptions to global supply chains, transport and storage means that primary commodity producers are cut off from traditional consumer markets, further reducing revenues from commodity exports. As export revenues dwindle, debt servicing becomes more expensive, capital flows reverse and domestic exchange rates depreciate, thus, draining remaining revenues from commodity export-dependent economies in a procyclical manner.

Although the experience of past commodity price slumps and supply chain disruptions provide valuable insights, the current crisis is unique in two ways. First, the size and the speed with which the demand shock occurred, as well as the simultaneity of demand shock and global supply chain disruptions are unprecedented. Second, the degree with which price effects are compounded with financial effects is particularly high. The latter is driven by the financialisation of commodity derivative markets, the increasing use of non-concessional market-based finance and the use of sovereign wealth funds to cushion commodity price cycles.

Reviewing the resilience strategies of commodity chain actors, we note that corporations show a preference of short-term gains over long-term sustainability. This means that corporations are likely to exploit the opportunities of a price slump if it benefits them in the short run, and even if it threatens the long run supply of key inputs. However, as the case of cocoa demonstrates, market power of commodity-exporting economies, if they cover a large enough market share, can counter some of these effects. Despite their potential power as key suppliers, commodity-dependent economies and their citizens remain uniquely vulnerable, as their resilience strategies can be less flexible.

Against this background, it is likely that the COVID-19 pandemic will have a long-term negative effect on commodity-dependent countries' finances. The effect materialises through two channels: first, a reduction of productive capacity due to lack of investments and key inputs, resulting in a reduction of future revenue streams, and second, an increase in countries' debt burdens, resulting in an increasing outflow of revenue dedicated to debt servicing. Recalling the price, supply chain and finance channels, we suggest the following strategies that could enhance the resilience of the Ghanaian state.

Creating geographic pockets of production and processing could make supply chains more resilient to localised disruptions. A reorganisation of supply chains in this direction would depend on domestic and regional capabilities and consumer markets. As the efficacy of sovereign wealth funds for the management of commodity price volatility is undermined by the increasing synchronisation of commodity and financial cycles, export diversification towards higher value products remains the only viable strategy for commodity-dependent economies; see Chang and Lebdioui (2020); Nissanke (2019). However, such restructuring of supply chains and economies requires large-scale investments and capacity building, and hence, can only be a long-term resilience strategy.

In the short-term, the ability of the Ghanaian economy to cushion the impact of the crisis and mitigate the risk of long-term adverse consequences depends on the availability

of concessional loans. Commodity-dependent economies are particularly at risk here, as credit ratings and credit availability are procyclical, moving in lockstep with global commodity cycles. While bond markets are recovering, investors are still avoiding commodity-dependent economies. Unfortunately, multinational financial institutions are slow to make much needed concessional loans available; see Gallagher, Ocampo, and Volz (2020); Stubbs et al. (forthcoming).

As the COVID-19 pandemic is still ongoing, we cannot undertake a comprehensive, long-term resilience study of the supply chains and the economy of Ghana. However, the analysis has provided us with a first glimpse of what is likely to come. More work is needed to track these developments and also to extend the analysis to other commodity-dependent economies with different export profiles and macroeconomic contexts.

Notes

1. The price boom in the 2000s was driven by increasing demand from emerging market economies (Kaplinsky 2006), with price trends and volatilities aggravated by global liquidity cycles (Nissanke 2012).
2. The exceptions are commodities, which are not traded on futures exchanges, e.g. pineapples and other horticultural crops. These markets are often organised as semi-cartelised oligopolies, with prices being agreed upon by the major traders (Asante-Poku 2016).
3. The concept of resilience was coined by an ecologist, C. S. Holling, in 1973. Since then, resilience has been applied in disciplines, such as engineering, psychology, disaster management, supply chain management and economics (see Appendix Table A1).
4. [WTO](#) (20/05/2020).
5. [Euronews](#) (10/04/2020).
6. [ICE](#) (06/2020).
7. [Energy Intelligence Group](#) (19/05/2020).
8. [Reuters](#) (24/03/2020).
9. [Confectionary News](#) (14/05/2020).
10. [Centre for the Promotion of Imports](#) (20/04/2020) and [Confectionary News](#) (13/04/2020).
11. The transition happened abruptly when a technical error was corrected and GDP per capita jumped from USD800 to USD1363 overnight (Moss and Majerowicz 2012).
12. Oil price dynamics were not the sole cause of the economic crisis, but a strong contributing factor.
13. Ghana has issued several Eurobonds in the past, the last in early February 2020, just weeks before the COVID-19 crisis sent the global economy tumbling.
14. [Ministry of Finance of Ghana](#) (13/11/2019) and [Ministry of Finance of Ghana](#) (30/03/2020).
15. Forward contracts fix the price to the terminal reference price at the timing of signing the contract for future delivery.
16. In 2019, 39.1 per cent of government revenues was already allocated to debt service payments (Oxfam 2020).
17. BlackRock, the world's largest asset manager, has reported a 21 per cent profit jump from its bond exchange traded funds business in the second quarter of 2020 ([Wall Street Journal](#) 17/07/2020).
18. [IMF](#) (13/04/2020).
19. [Delegation of German Industry and Commerce in Ghana](#) (2020).
20. [Argusmedia](#) (01/06/2020).
21. [Bloomberg](#) (12/06/2020).
22. [Natural Resource Governance Institute](#) (26/05/2020).
23. [Konfidants](#) (05/2020).

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