Commodities and Development Report 2017

Commodity Markets, Economic Growth and Development

UNITED NATIONS

Food and Agriculture Organization of the United Nations

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NOTES

Use of the term "dollar" ($) refers to United States dollars.

The term "billion" signifies 1,000 million.

The term "tons" refers to metric tons.

Use of a dash between years (e.g. 1999–2000) signifies the full period involved, including the initial and final years.

An oblique stroke between two years (e.g. 2000/01) signifies a fiscal or crop year.

References to sub-Saharan Africa in the text or tables include South Africa, unless otherwise indicated.

ACKNOWLEDGMENTS

ACRONYMS

CDDC	commodity-dependent developing country (for the purpose of this Report, it signifies commodity-export-dependent developing country)
CGE	computable general equilibrium (model)
CPI	consumer price index
EPZ	export processing zone
FAO	Food and Agriculture Organization of the United Nations
FDI	foreign direct investment
GDP	gross domestic product
GM	genetically modified
GNI	gross national income
HDI	Human Development Index
ICT	information and communication technology
IMF	International Monetary Fund
kg	kilogram
LDC	least developed country
MDG	Millennium Development Goal
NOGICD	Nigerian Oil and Gas Industry Content Development (Act)
NPI	nickel pig iron
PPP	purchasing power parity
R&D	research and development
SDG	Sustainable Development Goal
SITC	Standard International Trade Classification
UNDP	United Nations Development Programme

CONTENTS

BOXES

TABLES

FIGURES

OVERVIEW

The majority of developing countries are commodity dependent. Commodity-export-dependent developing countries (hereafter referred to as CDDCs) derive the bulk of their export earnings from primary commodities such as minerals, ores, metals, fuels, agricultural raw materials and food. Countries that have a high ratio of commodity imports to total merchandise trade are considered commodity-import-dependent. Both forms of commodity dependence may cause potentially harmful impacts and affect all dimensions of sustainable development. Most of the developing countries that depend on commodity exports and/or imports are characterized by low human development.

The effects of commodity dependence on human development are mediated through numerous direct and indirect channels that link global commodity markets with domestic economic, social and human development conditions. Understanding these links and how they affect short-, medium- and long-term development objectives is important to inform policy-making processes. This issue of the Commodities and Development Report series, produced jointly by UNCTAD and the Food and Agriculture Organization of the United Nations (FAO), seeks to contribute to an understanding of the linkages between commodity markets and development outcomes by highlighting a number of transmission channels through which commodity prices impact an economy.

In order to inform policymakers of the expected long-term effects of commodity prices on socio-economic indicators, a simulation model has been used to project the trajectory of the world economy and commodity prices to 2030. From its analyses, the Report draws a number of lessons, and proposes policy options to address commodity dependence and its effects on socioeconomic development. Several country-level commodity case studies are used to illustrate these effects.

COMMODITY DEPENDENCE AND DEVELOPMENT

The transmission channels of commodity dependence can be broadly grouped into three areas according to their point of entry into the domestic economy. First, there are impacts that emanate from the terms of trade. Second, commodity dependence presents fiscal and monetary policy challenges. Third, developments on international commodity markets can affect consumers and producers at the micro level.

The terms of trade of CDDCs are closely linked to commodity prices. Thus, a sudden drop in commodity prices generally causes a terms-of-trade shock, which in turn translates into an output shock that adversely affects growth prospects in CDDCs. Even in the absence of large shocks, commodity price volatility harms growth in CDDCs. Since growth is a prerequisite for the elimination of poverty, there is a link between price movements on global commodity markets and human development in these countries. In other words, commodity price movements transmit through the terms-of-trade channel a range of direct and indirect, short- and long-term, economic and non-economic impacts on human development.

Commodity dependence is also a potential source of stress in fiscal and monetary terms. Strong fluctuations of capital flows, such as those induced by commodity price volatility, cause economic disruption and pressure on the balance of payments. Government revenue in CDDCs is also typically closely linked to commodity prices. If commodity prices are lower than expected, this can undermine the fiscal balance and reduce policy space, causing a decline in public spending on crucial infrastructure and social programmes, thereby hindering national economic development and poverty alleviation efforts. Imported inflation is another risk faced by commodity-import dependent developing countries. In particular, in net-food-importing countries, food price hikes can erode real incomes and thus increase poverty. This was observed in several countries during the global financial and food crises of 2007 and 2008. Furthermore, commodity price shocks can compromise debt sustainability of CDDCs where public finance largely depends on revenues from commodity exports. Finally, commodity price fluctuations can also affect the exchange rates of CDDCs, with adverse impacts on long-term productivity growth, inflation and foreign currency reserves.

Commodity price shocks and volatility also have direct impacts on the livelihoods of poor households in developing countries, regardless of whether they depend on commodity exports or imports. Food commodity price shocks can have significant negative effects in developing countries with large agricultural sectors, and where food constitutes a large share of consumer expenditure, both at the macro and household levels. In particular, commodity producers such as farmers who often operate on a small-scale face considerable hardship during periods of falling prices. In many cases, credit constraints and lack of savings exacerbate financial stress for individual producers. In

this context, a drop in commodity prices can directly increase poverty, or indirectly affect human development through foregone expenditures on heath or education. Commodity price changes also affect the purchasing power of consumers. In this regard, a distinction has to be made between net food sellers, who benefit from increases in food prices, and net food buyers, who lose in terms of purchasing power. Fuel prices are also linked to poverty in developing countries, since fuel is an input in the production of a broad range of goods and services, which tend to become costlier as fuel prices rise. Finally, food price hikes can threaten food security in commodity-import dependent developing countries. Malnutrition and chronic hunger can have severe long-term health impacts and erode human capital. Hence, commodity dependence is associated with a host of potential micro-level impacts that have short- and long-term effects on economic and human development.

THE BEHAVIOUR OF COMMODITY PRICES: SIMULATING LONG-TERM TRENDS AND SOCIOECONOMIC IMPACTS

The recent commodity price boom (2003–2011) was a boon for many CDDCs that registered a large increase in export revenues and, generally, in their rates of economic growth. As the boom came to an end, CDDCs were reminded that some years of strong commodity prices do not alter the long-term pattern of their terms of trade, as described in the Prebisch-Singer hypothesis; that is, the terms of trade of economies dependent on primary commodities tend to deteriorate in the long run due to the secular decline of primary commodity prices relative to the prices of manufactured goods.

Chapter II presents the results of a simulation exercise, based on the computable general equilibrium model (CGE), which shows the likely effects of variations in commodity prices on incomes per capita in different regions, on the prices of factors of production (land, unskilled labour, skilled labour and capital), and on household expenditure by 2030. The results show that, in aggregate, primary food prices would essentially remain at their 2010 level and those of non-food commodities would grow by 11 per cent. With a 50 per cent increase, crude oil will register the largest price rise, mostly due to population and economic growth. Overall, the share in global consumption of non-food commodities, manufactures and services would increase from 87 per cent in 2010 to 91 per cent in 2030.

At the regional level, different patterns arise. For instance, in Africa, food prices are estimated to fall significantly due to production growth through intensification and expansion, while prices for processed food will rise.

In South Asia, strong demand growth is projected to drive up food prices in spite of productivity gains. A similar scenario is expected for East Asia, mainly due to demand pressure from China. In North America, prices of both primary and processed foods could increase, fuelled by economic growth. Overall, commodity price developments at the regional and national levels are driven by market fundamentals. Hence, in regions where demand growth is stronger than productivity growth, the projections show generally rising prices. The simulations show why understanding variations in the distribution of endowments, both across and within countries, matters when assessing the impact of long-run price movements on development outcomes. In terms of development policy, the results suggest that, in addition to economic diversification away from the commodity sector, targeted investments in specific factors of production, including human capital, have the potential to generate substantial benefits over the next 15 years. The simulation adds to the available knowledge on expected commodity price movements to 2030, providing information that could be valuable for the planning and assessment of policies and measures aimed at achieving the Sustainable Development Goals (SDGs) in CDDCs.

CASE STUDIES

Chapter III of this Report contains a series of case studies focusing on the policy choices pursued by different CDDCs. They illustrate the extent to which the commodities sector and the policies pursued in these countries have (or have not) contributed to inclusive economic growth and to the reduction of poverty and inequality over the past few decades. These case studies highlight the different development paths pursued by the selected CDDCs, and show the kinds of policy interventions needed to ensure that commodity dependence translates into domestic economic and human development.

Costa Rica is among the countries that have successfully transformed and diversified their economies, based almost exclusively on the export of primary commodities. During the 1950s, coffee and bananas accounted for the bulk of its export earnings, and the majority of the workforce was employed in agriculture. As a consequence, Costa Rica suffered from a range of negative impacts from volatile commodity markets, including high external debt caused by unanticipated declines in coffee prices. The Government launched several initiatives to stimulate diversification of the economy. These included the provision of financial incentives to develop non-traditional agricultural exports such as pineapples, of which Costa Rica has now become the world's largest exporter. The creation of export processing zones (EPZs) induced foreign direct investment (FDI) inflows into manufacturing and high-tech industries. Growth of the services sector, including

the establishment of a strong tourism industry, also contributed to diversification. Thanks to these successful horizontal and vertical diversification strategies, Costa Rica has been able to reduce poverty significantly.

The case study on the soybean sectors in Brazil and Argentina highlights how policies determine the way developments on global commodity markets are transmitted to the national economy. In both cases, the soybean sector contributed to poverty reduction during periods of high prices by generating growth, tax revenue and employment. In addition, a number of upstream and downstream linkages were established, including the creation of input and service providers; and inclusive growth was achieved through social protection mechanisms such as the Bolsa Família initiative in Brazil. However, the two countries adopted different approaches to taxation and regulation of their soybean sectors. In Argentina, the prolonged application of export taxes, export restrictions and an overvalued exchange rate, in conjunction with rising production costs, eroded the profitability of soybean farmers over time, and reduced producer incentives (though it is important to note that after some trade restrictive measures were revised the sector recovered). The Brazilian soybean industry did not adopt the same trade restrictive policies as Argentina and did not suffer to the same extent. These countries' experiences illustrate that policy choices are a determining factor in the sustainability and resilience of the commodity sector.

Another example of the importance of the right policy framework for the development of a commodity sector is provided by the case study on the diamond sectors in Botswana and Sierra Leone. While diamonds have contributed little to economic and human development in Sierra Leone, Botswana has moved from low-income status to an upper-middle-income country within three decades. Favourable macroeconomic and fiscal policies, including countercyclical spending and a limit on the public expenditure-to-GDP ratio, have contributed to the success of the Botswanan economy. Also, policies that have stimulated the emergence of a diamond cutting and polishing industry in Botswana have enabled a gradual move up the value chain towards more diversification. In contrast, Sierra Leone has not yet succeeded in creating the necessary institutions that would allow the country to replicate Botswana's relative success. Sierra Leone is still heavily dependent on volatile export revenues from a few unprocessed commodities. The comparison of the experiences in these two countries also illustrates how strong institutions are central to successful development in CDDCs.

The case of the cocoa sector in Ghana contains valuable insights into how a commodity sector can substantially contribute to poverty reduction, and it highlights the important role of policies and reforms in this regard. Prior to the 1980s, the cocoa sector was regulated by a government-run agency in a highly centralized manner that included fixing producer prices. As a consequence, investment and production decisions by farmers were disconnected from developments in the global cocoa market. This led to severe negative shocks to the economy and to public finances during periods of low prices, while during periods of high global prices the share transmitted to producers was relatively low. Reforms undertaken in the 1980s included establishing a close link between domestic and international prices, and allowing producers to obtain a higher share of the world price and to base their decisions on market signals. As a result, the cocoa sector has contributed substantially to poverty reduction in Ghana, and has generated employment and income opportunities for 800,000 households, most of whom are smallholders.

The cotton sector in Burkina Faso is a telling example of how efficiency and competitiveness of a commodity sector can be improved through policy reforms. In a first attempt at reform in the mid-1990s the Government gave up its full control over the cotton sector, transferring parts of its ownership to the private sector and to the union of cotton producers. In a second reform, producers were given greater bargaining power in the negotiation of domestic prices. These reforms led to a higher share of international prices going to producers, and strengthened incentives to invest, expand and modernize production.

Bangladesh's experience with its rice sector illustrates how policies to modernize and strengthen a key commodity sector can support overall economic and social development. Since rice is the most important food staple, and is mostly grown by smallholder farmers, the Government made it a priority to improve productivity and the quality of output. Investments in technology and infrastructure, as well as reforms to improve the competitiveness of the rice sector, have contributed to boosting employment, small farmers' incomes, food security and rural development. In addition, productivity increases in the rice sector have kept food inflation and wages low – a comparative advantage that has enabled economic diversification beyond agriculture and reduced Bangladesh's dependence on the rice sector.

The case of sorghum in Mali underscores the importance of taking a broad perspective when designing interventions in the commodity sector. The

Government introduced subsidies on imported food items such as rice and maize with the aim of protecting consumers in urban areas from high food prices. However, competition from cheap imports put sorghum, which is a key food staple for the rural population, at a disadvantage. As a consequence, incentives to invest in and modernize this sector were distorted, adding to the income gap between rural and urban populations.

The case study on Indonesia's nickel export ban shows the risks of trade policy interventions to achieve industrial policy targets. In 2014, Indonesia applied an export ban on nickel and bauxite in order to spur the development of local processing capacities and reduce the speed of resource extraction. (This export ban has since been partially reversed.) While the policy led to some success in terms of creating a few nickel smelters, it caused substantial losses in export earnings and government revenues. Also, as a reaction to the export ban, importers of bauxite ore increasingly turned away from Indonesia towards readily available substitutes on the international market.

Nigeria's attempts to increase local content of its oil and gas industry are analysed in another case study. In 2010, the country adopted a law on local content, which required giving preference to Nigerian independent operators in the award of oil licences as well as in recruitment and training programmes. This law led to an increase of investments in national oil and gas exploitation and to substantial growth of the indigenous oil services industry. However, in terms of job creation and its overall socioeconomic impact, Nigeria's local content policy has not been a complete success. The case study suggests that for broad-based socioeconomic progress in Nigeria, a sound macroeconomic, fiscal and institutional framework is likely to be more effective than any single policy intervention.

The case study on Zambia highlights the importance of inclusive growth for socioeconomic development. The copper industry is the dominant economic sector in Zambia, accounting for 72.5 per cent of merchandise export earnings in 2011. During the commodity price boom of the 2000s, rising export earnings contributed to high GDP growth rates and favourable macroeconomic indicators. However, progress in terms of poverty alleviation and reduction of inequality was limited during this boom period. For instance, the poverty headcount ratio soared from 49.4 per cent in 2002 to 64.4 per cent in 2010, despite high levels of GDP growth. Also, inequality increased between 2003 and 2011. Thus, the Zambian experience shows that growth is a necessary but not sufficient condition for poverty eradication, which can only be achieved if mechanisms are also put in place to make growth inclusive.

The main message of this Report is that while CDDCs have benefited from high export revenues during relatively short periods of price surges, commodity dependence generally has had a negative impact on their socioeconomic development. Unless these countries engage in deep structural transformation, they will most likely continue to experience development challenges, given that commodity prices are expected to increase only marginally over the next 15 years. CDDCs will therefore need to be more proactive in driving their structural transformation processes in order to reduce their overdependence on commodities. Such processes will need to be based on comprehensive economic, fiscal, sectoral, and social policies that are compatible with overall development objectives, and they will have to tackle the channels through which commodity price volatility is transferred to national economies. Coordinating these policies will, in turn, require improvements in governance systems that underlie the process of transformation. For this process to be successful, the country experiences discussed in this Report suggest that CDDCs will not only need to adopt different approaches, but also they will require more policy space to experiment in order to find the right model for sustainable development and growth that fits each country's specific circumstances. Ultimately, structural transformation should help these countries to successfully implement the 2030 Agenda for Sustainable Development and achieve that Agenda's SDGs.

INTRODUCTION

The trend of rising commodity prices that started in 2003 and the period of extreme price volatility that followed in 2008 have given way to declining global prices. It is now widely believed that prices will remain at lower levels in the medium term, as growth in emerging economies has decelerated and, in general, commodity supply has not fully adjusted to the consequent weaker demand. These events have renewed global interest in the relationship between commodity prices and economic development.

In most developing countries, economic performance is associated with developments in the commodity sector. The linkages between commodity markets, economic growth and development are both strong and complex. Commodity prices provide important economic incentives that influence decisions relating to production, consumption, income generation, investment, trade and employment. They also affect the use of natural resources, such as land and water, and their allocation across sectors.

The relationship between the commodities sector and the economy may be direct, such as through trade. Commodity exporters could benefit from higher export earnings that may be used to invest in the economy and finance development. Nevertheless, the relationship between commodity exports and development is not always straightforward. Commodity dependence – a widely researched condition where a large share of export earnings is derived from the export of a few primary commodities – can have negative effects on the economy and hinder development. Indeed, as currently observed in many commodity-export-dependent developing countries (CDDCs), economic growth has been adversely affected by the recent decline in commodity prices. A strong association between commodity prices and economic performance makes CDDCs vulnerable to the vagaries of international commodity markets. In CDDCs that rely on the export of major commodities such as fuels and minerals, but also on agricultural commodities such as cocoa and coffee, commodity prices can affect their macroeconomic variables, including exchange rates, inflation and other aggregates. Commodity price increases, but also drops, can have considerable impacts on the economy, ultimately affecting economic growth and development.

Net food- and/or energy-importing countries suffer directly from price hikes, as these erode real incomes and thus aggravate poverty. This transmission channel

of commodity price changes is particularly important for countries where food and/or energy account for a large share of the household consumption basket. Again, in these import-dependent countries, commodity prices can constrain their fiscal space and undermine development efforts.

Trade aside, commodity prices have significant implications for income and its distribution in general through their interaction with factor markets. For example, a price increase of a non-food agricultural commodity may increase the competition of land and labour between the production of a food and a non-food commodity. In countries where national diets rely heavily on one or a few food staples that are produced and consumed nationally, the prices of food staples can have a strong impact on wages, incomes, poverty and food security, thus affecting their path to development.

The analysis of the complex relationship between commodity markets, economic growth and development is the focus of this 2017 edition of the Commodities and Development Report. The Report, produced jointly by UNCTAD and the Food and Agriculture Organization of the United Nations (FAO), analyses how developments in the commodity markets may affect economic growth and development, including in CDDCs. It does so by highlighting the channels through which commodity prices can affect economic and development indicators, and by analysing commodity sectors – energy, minerals and agricultural – in developing countries, their corresponding commodity policies, and their impact on economic growth and development, income distribution, poverty and food security.

The Report is an additional tool to inform public policy analysis and deliberation, particularly in developing countries. By bringing together the complementary expertise of UNCTAD and the FAO, the Report creates synergies between UNCTAD's mandate to address the trade and development problems associated with the commodity economy, giving due attention to all commodity sectors, such as agriculture, forestry, fisheries, metals and minerals, and oil and gas, and the FAO's mandate to eradicate hunger, make agriculture more productive and sustainable, and promote rural development.

Commodity prices have a fundamental impact on sustainable development, and the current context of low commodity prices coincides with the beginning of efforts towards implementation of the 2030 Agenda

for Sustainable Development and the achievement of the Sustainable Development Goals (SDGs). But both commodity price surges and long-term declining price trends raise concerns about how price changes affect different population groups and impact inclusive growth and development.

This Report is in line with the 2030 Agenda for Sustainable Development. Indeed, commodity policies are directly associated with several SDGs, including the following: SDG 2 (achieving food security), SDG 7 (achieving energy security), SDG 9 (adding value to commodities), SDG 12 (ensuring sustainable consumption and production patterns), SDG 14 (conserving and sustainably using the oceans, seas and marine resources for sustainable development), and SDG 15 (protecting, restoring and promoting sustainable use of terrestrial ecosystems, sustainably managing forests, combating desertification, halting and reversing land degradation and halting biodiversity loss).

The structure of this Report is based on three broad segments: two thematic chapters, a series of country and commodity case studies and a final chapter that presents policy recommendations. In the spirit of the 2030 Agenda for Sustainable Development, the first chapter analyses the interaction between commodity dependence as defined above, and human development, as measured by the Human Development Index (HDI) of the United Nations Development Programme (UNDP). The premise is that commodity dependence could be an obstacle to structural transformation and the achievement of the 2030 Agenda for Sustainable Development. Indeed, such dependence is often associated with low rates of economic growth, high macroeconomic instability and weak private sector development.

Even though there are a few developed countries that have succeeded in harnessing their commodity sector as an engine for development, almost all CDDCs are developing and poor countries. Therefore, the commodity dependence issue is discussed as a fundamentally development problem. Indeed, chapter I finds that commodity dependence is negatively associated with human development, even when controlling for other factors that affect human development. Hence, addressing commodity dependence should be part of broader development strategies designed to achieve structural transformation. In this regard, achieving the SDGs requires, among others, addressing the challenges posed by commodity dependence.

The second chapter discusses the behaviour of commodity prices and the way they affect the economy. Declining terms of trade (i.e. the secular decline of primary commodity prices relative to prices of manufactures) and commodity price volatility are the major reasons for advocating policies that promote economic diversification in CDDCs. The recent generalized increase in commodity prices in the 2000s helped drive economic growth in many commodity-exporting countries, but it did not change the long-term trend in developing countries' terms of trade. Moreover, the fact that the prices of manufactured products imported by developing countries have declined remarkably since the 1990s does not seem to have altered this trend.

Most importantly, chapter II goes beyond the traditional issues of commodity dependence and terms of trade by presenting a simulation exercise that attempts to show how trends and changes in commodity prices can affect per capita incomes, the prices of factors of production and household expenditure across different regions to 2030. The results show that, while food prices are not expected to increase substantially, prices of non-food commodities could increase by about 11 per cent. Crude oil is expected to record the largest increase (about 50 per cent). The simulation highlights the avenues through which commodity prices can affect the economy, and estimates changes and regional differences in prices of factors of production (i.e. land, unskilled and skilled labour, and capital). In Africa, for example, the price of land is expected to increase by about 120 per cent by 2030. The simulation also shows that primary commodity prices are on different trajectories in Africa and Asia due to differences in land and labour endowments in these regions.

These results are important, as they point to key areas of interest for decision-makers, investors, households and individuals. In terms of development policy, chapter II suggests that diversifying the economy away from the commodity sector may not be the only policy needed to strengthen resilience and promote development. One of the most important contributions of this Report is to show that investing in specific factors of production, including human capital, will generate substantial benefits, depending on the region, as the benefits accruing to skilled labour will increase over the next 15 years. In turn, this will contribute significantly to helping CDDCs reach the SDGs by 2030.

Chapter III illustrates more specifically the relationships discussed in chapters I and II, based on several case studies of CDDCs. The case study on Argentina and Brazil shows how high soybean prices resulted in higher revenues, which could be deployed in social protection

programmes to help reduce poverty in these countries. The cases of cotton in Burkina Faso and cocoa in Ghana illustrate how the changes in the management of these sectors led to increases in producer prices in both countries, contributing to improved well-being and poverty reduction. The discussions of sorghum in Mali and rice in Bangladesh illustrate the importance of adopting policies aimed at boosting the production of staple commodities in order to improve food security. The Costa Rica case study provides an example of policies that developing countries could adopt in order to achieve diversification, both within and outside the commodity sector. The case of Botswana, an economy that is dependent on a non-agricultural commodity, highlights the importance of establishing institutions for the proper management of commodity windfalls to bring about sustained economic growth. The case study of nickel in Indonesia demonstrates the limitations of using trade policy alone to drive economic diversification. And the study of Nigeria's oil sector shows the limited success of the country's local content policy as a catalyst for development. Finally, Zambia's copper sector provides an example where the management of its copper windfall revenues during the copper boom ensured economic growth but not poverty reduction. This case study is a reminder that, for inclusive growth to be a reality, income distribution policies should be at the core of a commodity windfall management strategy and of a commodity-based development policy in general.

Based on chapters I to III, chapter IV draws a number of lessons and proposes policy options that could help countries reduce the nefarious effects of commodity dependence on socioeconomic development. More generally, the policies highlighted in chapter IV suggest some key ways in which developing countries could benefit more from their commodity endowments.

COMMODITY DEPENDENCE AND DEVELOPMENT

This chapter highlights the direct and indirect channels through which commodity dependence affects development outcomes. It argues that commodity dependence is an obstacle to structural transformation and to attaining the SDGs set in the 2030 Agenda for Sustainable Development. Achievement of the SDGs thus requires addressing the challenges posed by such dependence.

The chapter is organized in five sections. Section 1 defines commodity dependence and underscores its relevance for development. Section 2 examines the relationship between commodity dependence and human development, followed by a discussion of macro and microeconomic channels of transmission in section 3. Section 4 concludes.[1]

1. COMMODITY DEPENDENCE AND ITS RELEVANCE FOR DEVELOPMENT

A country may be dependent on commodity imports, exports or both. This Report defines commodity-export-dependent developing countries (CDDCs) as those that generate more than 60 per cent of their merchandise export revenues from food, agricultural raw materials, minerals, ores and metals, and/or energy commodities (see box 1). In reality, most CDDCs' export earnings are derived from a narrow range of commodities, further exacerbating the cluster risk posed by commodity dependence. For instance, in 2014–2015, Zambia generated 86 per cent of its export revenues from commodities, copper alone accounting for 80 per cent.[2] Such a concentration of exports and revenues carries enormous risks due to the high volatility of commodity prices. Also, there is the potential for real exchange rate appreciation and crowding out of economic activity in other sectors (a phenomenon commonly referred to as "Dutch disease"), among other factors.

Countries may also be highly dependent on the import of essential goods, such as food items or fuel. Therefore, it is important to have a measure that captures this type of commodity dependence. In this Report, a country is defined as commodity-import-dependent if its share of the value of food and fuel imports in total merchandise imports exceeds 0.3.[3] Commodity-import dependence also carries risks, with potentially negative consequences, in particular for developing countries. For example, the dramatic increase in global food

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[1] Note that a number of lessons from this discussion are summarized in chapter IV of this Report.

[2] Data are from UNCTADstat, unless otherwise specified.

[3] This corresponds to the average for developing countries in 1995–2014.

Box 1.   When is a country considered commodity-export-dependent?

Most countries in the world export a mix of different goods, including manufactures and commodities. When the share of commodities in total merchandise exports is large, a country can be characterized as commodity-export-dependent. An econometric study by Nkurunziza et al. (2017) sought to establish, in a given country, the association of the Human Development Index (HDI) to commodity-export dependence. Using a quantile regression of HDI on commodity-export dependence (including other controls), the coefficient of such dependence is strongest (higher than the average of -0.2, in absolute value) when the HDI is less than 0.6. Hence, the study finds the most compelling negative association between commodity-export dependence and human development for countries with an export share of commodities exceeding 0.6. This is therefore used as the minimum threshold for the definition of commodity-export dependence.

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prices in 2007–2008 and the widespread adoption of food export bans caused political and economic instability as well as social unrest in dozens of food-importing developing countries.

The introduction in this Report of the concept of commodity-import dependence is a novelty; traditionally, the analysis of commodity dependence has focused on commodity-export dependence. The case study of sorghum in Mali in chapter III provides an example of the effect of commodity import policies on key socioeconomic variables such as food security and rural development. Since commodity dependence is an established term in the literature that is used to characterize commodity-export dependence, in the rest of this Report, we use "commodity dependence" synonymously with "commodity-export dependence" and explicitly state "commodity-import dependence" whenever it applies to dependence on commodity imports (as opposed to exports).

The relevance of the questions addressed in this chapter can be grasped by inspecting figure 1, which shows extremely high level of volatility in commodity prices. For instance, the UNCTAD price index of minerals, ores and metals fluctuated between 80 points (October 2001) and 417.6 points (February 2012), a fivefold surge within a decade. The index stood at 251.1 points in February 2017.

Looking at commodity price indices by commodity group shows varying levels of volatility, as illustrated in figure 2. In particular, the volatility of crude petroleum prices, measured using the coefficient of variation, is higher than that of all other commodity groups, regardless of whether

Figure 1. Commodity price indices, Jan. 2000–Feb. 2017 (2000=100)
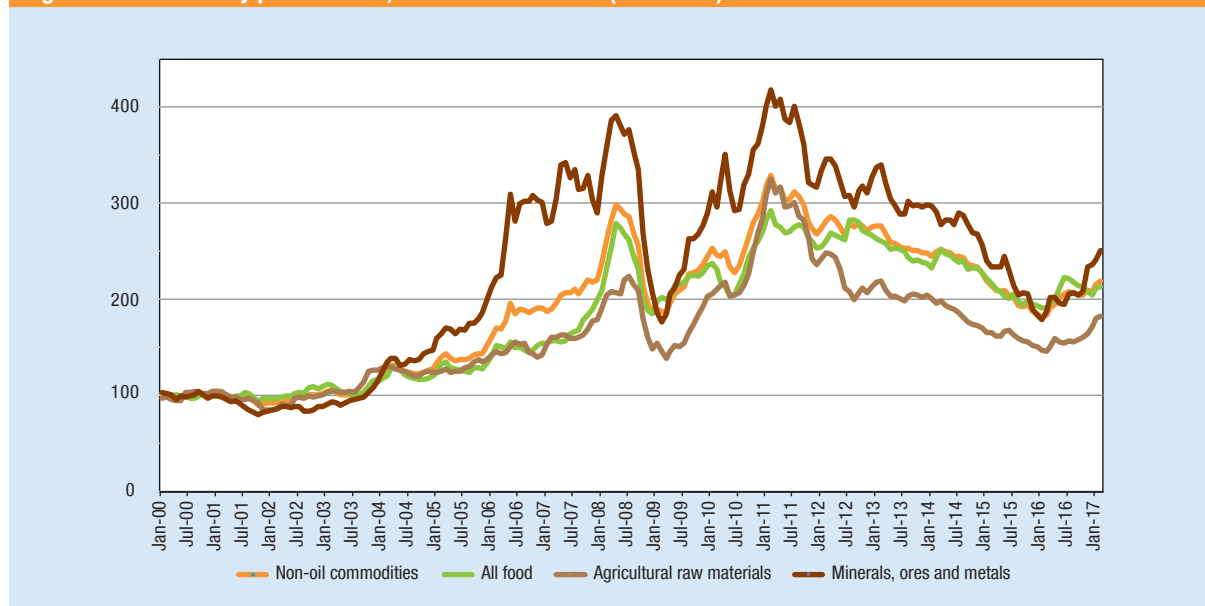
Source: Based on data from UNCTADstat.

it is measured in nominal or real terms (deflated by the unit value index of manufactured goods exported by developed countries). Nominal volatility of the minerals, ores and metals (excluding precious metals) group is the second highest among all commodity groups.

The transmission channels through which commodity price movements affect CDDCs are complex, and

a given commodity price change does not affect all CDDCs in a uniform manner. In particular, the benefits of commodity windfalls during boom periods are by far outweighed by the negative impacts caused by price volatility and low-price periods, which tend to be longer than boom periods. Moreover, the negative impacts on net food importers during periods of high food prices can be extremely severe, as witnessed

Figure 2. Coefficient of variation of monthly commodity price indices, Jan. 1960–Dec. 2016
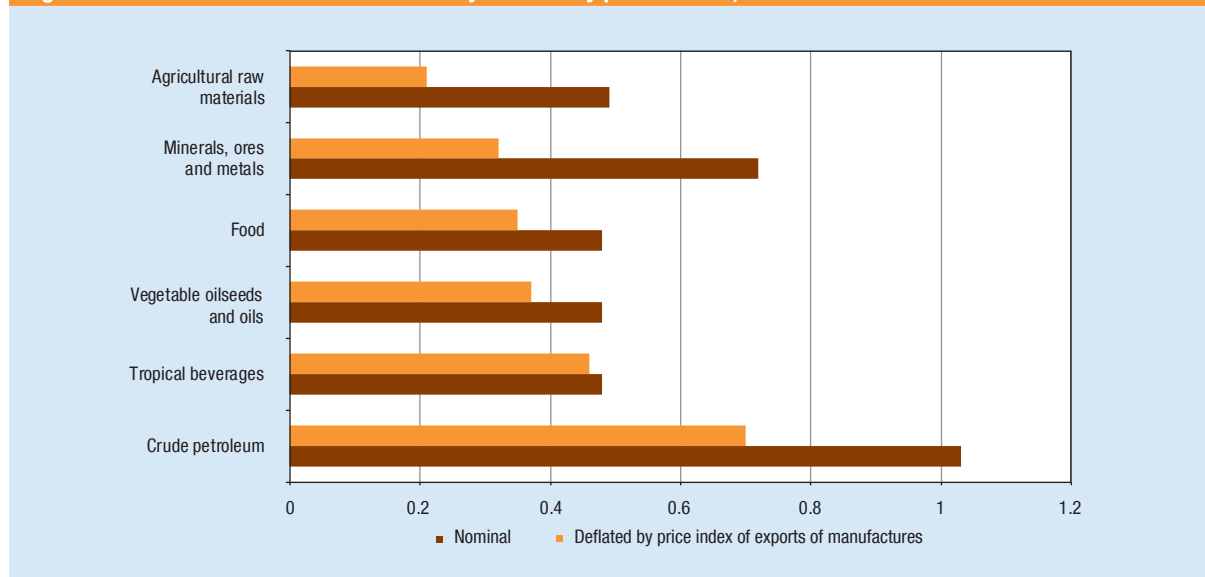
Source: Based on data from UNCTADstat.
Notes: The product groups correspond to weighted averages of the different individual commodities, and are proportional to the value (in dollar terms) of exports of developing countries from 1999 to 2001. To obtain the real price indices, the nominal price indices were deflated by the unit value index of developed countries' exports of manufactured goods (sections 5 to 8 less 68 of the Standard International Trade Classification (SITC), revision 2).

during the food price crises of 2007–2008 and 2010–2012. Furthermore, for many reasons, most CDDCs have not been able to use their commodity windfalls during commodity price booms to diversify their economies and make them more resilient to the devastating effects of future negative price shocks (see, for example, UNCTAD, 2014).

In terms of human development, high commodity prices and higher export revenues do not automatically translate into development gains in CDDCs. For example, Zambia enjoyed a GDP growth rate of 6.3 per cent, on average, between 2002 and 2010 due to rising copper prices, but poverty increased from 49.4 per cent to 64.4 per cent of the population during the same period.[4] Nigeria experienced an average annual GDP growth rate of 10.8 per cent from 2003 to 2009, while poverty remained constant at 53.5 per cent of the population.[5]

Commodity price movements can generate external stress that is harmful to economic and human development in CDDCs through multiple avenues at both the macro and micro levels. Volatile commodity prices can affect efforts towards achievement of the SDGs through their impact on income, investment, employment, inflation and growth, among others. In the economics literature, different studies (see, for example, Blattman et al., 2007) have found, empirically, a negative relationship between the degree of specialization of a country in commodities that are subject to volatile prices and its rate of economic growth. The econometric evidence presented in section 2 of this chapter confirms that, on average and over the long term, commodity dependence undermines human development. Therefore, this chapter focuses on the negative impacts of commodity dependence on CDDCs. In particular, the following sections explore some key direct and indirect transmission channels of external stress on human development due to commodity dependence.

2. COMMODITY DEPENDENCE AND HUMAN DEVELOPMENT: WHAT DO THE DATA SHOW?

This section explores the empirical relationship between commodity dependence (both import and export dependence) and human development.

2.1 AN INITIAL GLANCE AT THE DATA

The descriptive analysis in this section is based on a sample of 189 United Nations Member States for which data are available in UNCTADstat, covering the period from 1995 to 2014.[6]

The link between commodity dependence and human development is a highly relevant aspect of development policy since 64 per cent of developing countries are commodity-export-dependent and 45 per cent are commodity-import-dependent. Seventy-six per cent are either commodity-export-dependent or commodity-import-dependent, and 33 per cent are both commodity-export-dependent and commodity-import-dependent. Commodity dependence is particularly prevalent among the group of least developed countries (LDCs), where 79 per cent were commodity-export-dependent and 56 per cent were commodity-import-dependent over the sample period.

Countries are grouped into four categories, according to where they lie in the dimensions of commodity export and import dependence. The distribution of countries according to the two forms of commodity dependence (i.e. high dependence on commodity exports or imports) is presented in table 1 and figure 3 below.

The bottom right quadrant (i.e. the group of countries that are both commodity-export-dependent and commodity-import-dependent), consists exclusively of developing countries and economies in transition. Most developed countries (30 out of 38 in the sample) are in the top left quadrant (i.e. in the group of countries that are neither commodity-export-dependent nor commodity-import-dependent). This suggests that the challenges relating to commodity dependence primarily concern developing countries. The bottom left quadrant (export-dependent, but not import-dependent) includes a number of major exporters of oil and gas, such as Algeria, Angola, Gabon, Kuwait and Nigeria, as well as countries that export minerals and metals, such as the Plurinational State of Bolivia, Chile, Peru and Zambia. The top right quadrant (import-dependent, but not export-dependent) includes developing countries such as Haiti, Jordan, Lebanon, Morocco and Pakistan, but also developed countries such as Cyprus, Greece and Japan.

The above definition of commodity dependence refers only to commodities exported and imported, and does not include cases where national diets rely heavily on one or a few food staples produced and consumed nationally. In many Asian countries, for example,

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4   Based on data from the World Bank's World Development Indicators (WDI) relating to annual GDP growth and a poverty headcount ratio at $1.90 a day (2011 PPP).

5   Based on WDI data on annual GDP growth and a poverty headcount ratio at $1.90 a day (2011 PPP).

6   Data for Liechtenstein, Monaco, San Marino and South Sudan were not available.

Table 1. Countries with low and high commodity dependence ratios,1995–2014 (average)				
	Low commodity import dependence		High commodity import dependence	
	Developing countries	**Developed countries and transition economies**	**Developing countries**	**Developed countries and transition economies**

Low commodity export dependence	Antigua and Barbuda
	Bangladesh
	Bhutan
	Brazil
	Cambodia
	China
	Costa Rica
	Dominican Republic
	Egypt
	El Salvador
	GuatemalaPanama
	Honduras
	India
	Indonesia
	Lesotho
	Liberia
	Madagascar
	Malaysia
	Marshall Islands
	Mexico
	
	Philippines
	Saint Kitts and Nevis
	Saint Vincent and the
	   Grenadines
	Singapore
	South Africa
	Sri Lanka
	Thailand
	Tunisia
	Turkey
	Tuvalu
	Viet Nam
	(32)
		Andorra
		Austria
		Belgium
		Bulgaria
		Canada
		Croatia
		Czech Republic
		Denmark
		Estonia
		Finland
		France
		Germany
		Hungary
		Ireland
		Israel
		Italy
		Latvia
		Luxembourg
		Malta
		Netherlands
		Poland
		Portugal
		Romania
		Serbia
		Slovakia
		Slovenia
		Spain
		Sweden
		Switzerland
		The former Yugoslav
		   Republic of
		   Macedonia
		United Kingdom of
		   Great Britain and
		   Northern Ireland
		United States of
		   America
		(32)
			Bahamas
			Barbados
			Cabo Verde
			Democratic People's
			   Republic of Korea
			Dominica
			Grenada
			Haiti
			Jordan
			Lebanon
			Mauritius
			Morocco
			Nepal
			Pakistan
			Republic of Korea
			Samoa
			Swaziland
			(16)
				Albania
				Belarus
				Bosnia and
				   Herzegovina
				Cyprus
				Georgia
				Greece
				Japan
				Lithuania
				Republic of Moldova
				Ukraine
				(10)

Table 1. Countries with low and high commodity dependence ratios,1995–2014 (average) *(continued)*				
	Low commodity import dependence		**High commodity import dependence**	
	Developing countries	**Developed countries and transition economies**	**Developing countries**	**Developed countries and transition economies**
High commodity export dependence	Algeria Angola Argentina Bahrain Bolivia (Plurinational State of) Botswana Brunei Darussalam Burundi Chad Chile Colombia Congo Ecuador Equatorial Guinea Ethiopia Gabon Ghana Iran (Islamic Republic of) Kuwait Lao People's Democratic Republic Libya Malawi Myanmar Namibia Nigeria Oman Paraguay Peru Qatar Rwanda Saudi Arabia Sudan Suriname Syrian Arab Republic Uganda United Arab Emirates United Republic of Tanzania Uruguay Vanuatu Venezuela (Bolivarian Republic of) Zambia Zimbabwe (42)	Australia Azerbaijan Iceland Kazakhstan New Zealand Norway Russian Federation Turkmenistan Uzbekistan (9)	Afghanistan Belize Benin Burkina Faso Cameroon Central African Republic Comoros Côte d'Ivoire Cuba Democratic Republic of the Congo Djibouti Eritrea Fiji Gambia Guinea Guinea-Bissau Guyana Iraq Jamaica Kenya Kiribati Maldives Mali Mauritania Micronesia (Federated States of) Mongolia Mozambique Nauru Nicaragua Niger Palau Papua New Guinea Saint Lucia Sao Tome and Principe Senegal Seychelles Sierra Leone Solomon Islands Somalia Timor-Leste Togo Tonga Trinidad and Tobago Yemen (44)	Armenia Kyrgyzstan Montenegro Tajikistan (4)

Source: Based on data from UNCTADstat.

Note: Data were not available for all years for all countries. Hence, the calculation is based on the average of all available data points for the period 1995–2014. For Sudan, the average includes the commodity dependence ratios including South Sudan for the period 1995–2011 and excluding South Sudan for the period 2012–2014; taking only the former or only the latter period does not change the position of Sudan in the table.

Figure 3.   Distribution of countries according to their dependence on commodity exports and imports, 1995–2014 (averages)
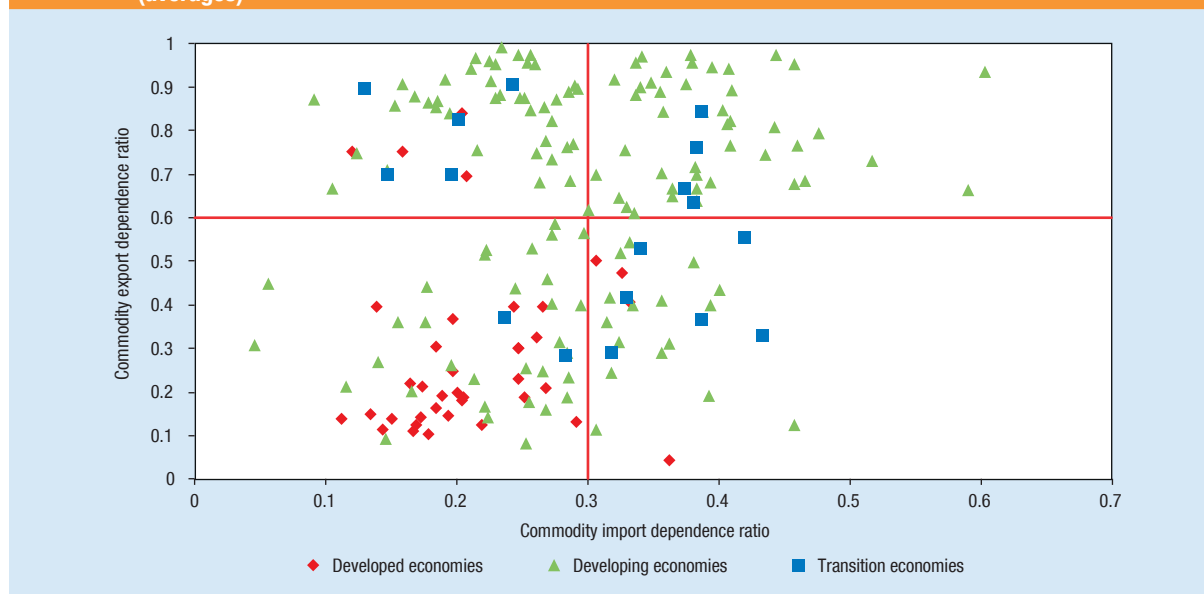
Source: Based on data from UNCTADstat.
Note: See note to table 1.

rice is the largest crop and a main food staple, but it is also traded worldwide. While these countries are not commodity dependent, price movements in the global rice markets can impact their incomes, poverty and food security significantly. Hence, several of the transmission channels of commodity dependence presented in sections 3.1–3.3 also apply to this group of countries.

2.2 ESTABLISHING A CAUSAL RELATIONSHIP BETWEEN COMMODITY DEPENDENCE AND HUMAN DEVELOPMENT

In this section, three sets of regression models are used in order to test whether there is a systematic, statistically significant relationship between commodity dependence and human development.

The following econometric analysis is based on a sample of 161 countries, and covers the period 1995–2013.[7] The HDI, a composite measure of life expectancy, education and gross national income (GNI) per capita, is the main dependent variable. Export and import dependence are the key explanatory variables of interest. Figure 4 shows two scatter plots with fitted regression lines between HDI and commodity export and import dependence ratios. The graphs

reveal a negative relationship between HDI and both measures of commodity dependence.[8] Also, the slope of the fitted regression line is steeper for commodity import dependence, suggesting a stronger negative association between human development and food and fuel import dependence.

The results of simple regression analyses confirm the correlations apparent from inspection of the scatter plots. For developing countries, cross-country evidence depicted in figure 4 shows a negative relationship between human development and commodity export and import dependence, with the latter form of dependence having a stronger effect. However, for developed countries, the inverse relationship seems to hold.[9] This demonstrates that commodity dependence need not necessarily have a negative impact on development, and that commodities can even drive human development, as observed historically in Australia, Canada and the United States of America, for example.

In a second set of econometric analyses, this time focused on developing countries, additional explanatory factors are added to the regression equations in order to refine and increase the robustness of the previous results. Quantile regression techniques are also applied to test whether commodity

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[7]   Countries with a population of less than 500,000 were excluded from the sample described in the previous section; also, at the time of the analysis, the HDI, the main dependent variable, was not yet available for 2014.

[8]   Depending on the model specification, this relationship is statistically significant at the 1 per cent or 5 per cent level.

[9]   For a detailed presentation of regression equations, estimation techniques and results, see Nkurunziza et al., 2017.

Figure 4.   Scatter plots of HDI and commodity export and import dependence ratios
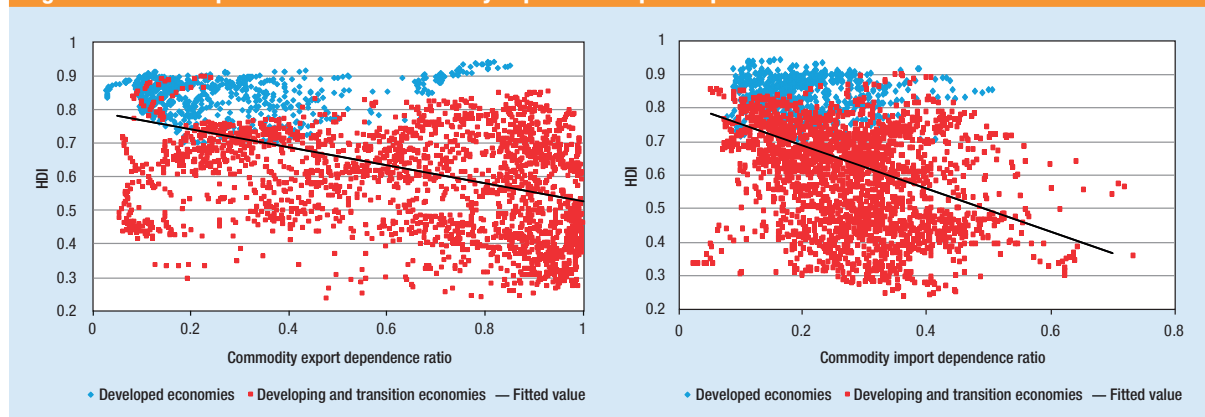
Sources: Based on UNCTADstat (for trade data) and UNDP (for HDI data).

dependence affects human development differently in countries at different levels of development. The results show that commodity export dependence is more strongly associated with lower human development in developing countries that have low HDI values. In the case of commodity import dependence, the overall relationship is also negative, but the link with a country's development stage is less clear-cut.

In the third stage of the analysis, dynamic panel data models are used in order to account for possible endogeneity issues. The results corroborate the conclusions drawn from the two previous sets of estimations: both commodity export and import dependence are associated with lower human development. For instance, a 10 per cent reduction in commodity export dependence is estimated to be associated with an increase of 0.055 in HDI (see annex A), which corresponds to the difference in HDI between Algeria and Gabon. These results are also in line with a study by Carmignani and Avom (2010), which indicates that commodity export dependence negatively affects development indicators relating to health and education.

Further results show a positive, although weak relationship between institutional quality and human development. Trade openness and government expenditure turn out to be statistically insignificant. This is likely to occur because these variables do not adequately capture the effects they are intended to measure. For example, government expenditure on social safety nets and programmes has been found to have an important positive impact on poverty reduction. This is evidenced by Brazil's Bolsa Família programme, discussed in this publication as a case study, which has been hailed as an anti-poverty breakthrough (Tepperman, 2016). Also, while the recent commodity

boom contributed to human development in CDDCs, the effect was quite small. This suggests that high commodity prices do not automatically translate into development gains. Moreover, since many developing countries are characterized by double commodity dependence (i.e. dependence on both commodity imports and exports), potential benefits from commodity exports might be cancelled out by higher food and fuel import bills in times of commodity price booms. Indeed, in periods of food price booms, the poor and the vulnerable can be disproportionately affected.

The empirical results highlighted in this section all point in the same direction: commodity dependence is strongly and negatively associated with human development in developing countries. Strategies to overcome commodity dependence will therefore need to be included in broad-based development plans to achieve the SDGs set out in the 2030 Agenda for Sustainable Development. In this regard, policy challenges and lessons learned from a number of developing countries are highlighted in chapter IV.

3.   COMMODITY DEPENDENCE AND DEVELOPMENT: TRANSMISSION CHANNELS

As highlighted in the statistical analysis of the previous section, commodity dependence poses specific challenges to developing countries. This section highlights some key channels through which commodity dependence negatively impacts development outcomes. These channels include direct links as well as effects that are indirectly transmitted via macroeconomic conditions in developing countries. Shocks to prices, negative price trends and overall price variability contribute to explaining

Figure 5.   Potential negative impacts of commodity dependence on development: Transmission channels
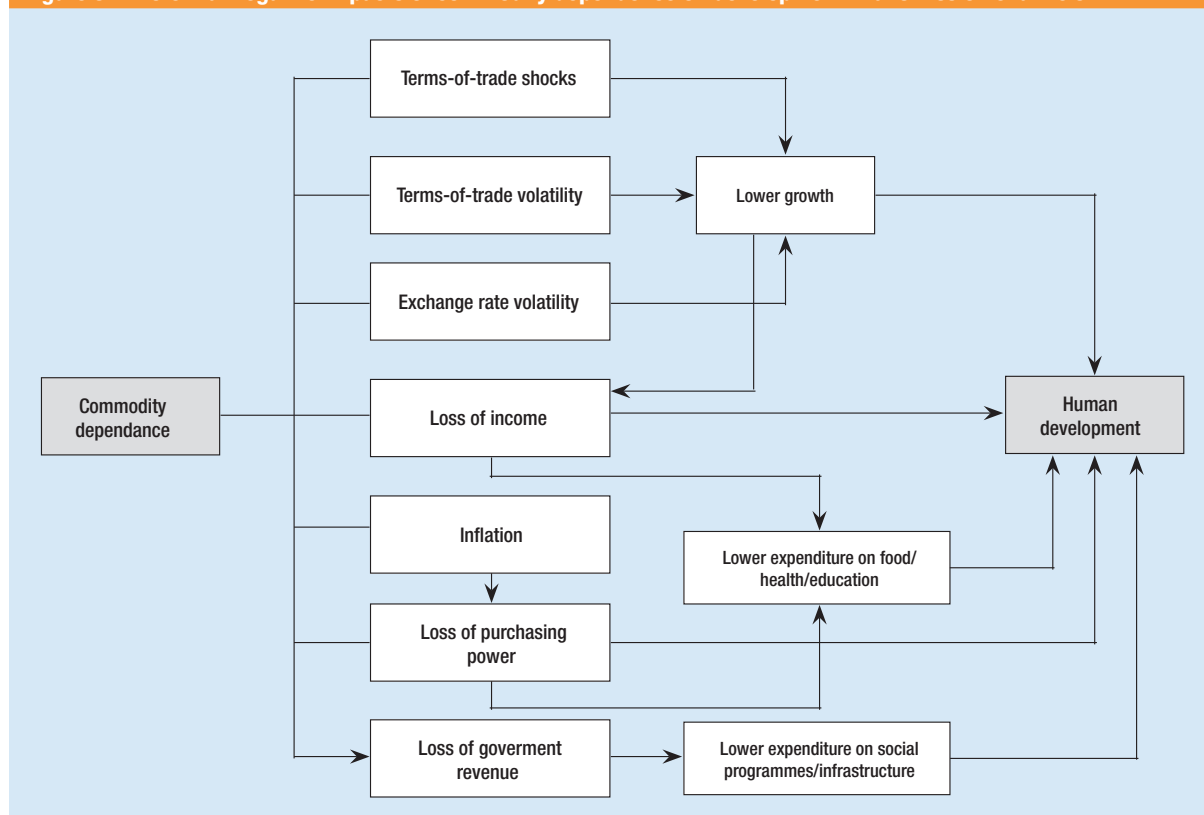
Sources: UNCTAD and FAO.

the link between commodity dependence and human development. Figure 5 below shows a simplified, highly stylized overview of the various transmission channels through which commodity dependence can negatively impact human development.

3.1 TERMS OF TRADE

The Prebisch-Singer hypothesis argues that the terms of trade of economies dependent on primary commodities tend to deteriorate in the long run due to the secular decline of primary commodity prices relative to the prices of manufactured goods (Singer, 1950; Prebisch, 1950). The main reason for this is that manufactured goods have a higher income elasticity of demand than primary goods. This means that with rising incomes, smaller shares of income are spent on primary goods. Therefore, developing countries' reliance on commodity exports is not a viable basis for a long-term development strategy, since the relative value of these exports follows a downward trend. In other words, the purchasing power of commodity exports, expressed in terms of the value of imports, decreases over time.

In order to ascertain the validity of the Prebisch-Singer hypothesis across different types of commodities, econometric tests generally found that the hypothesis holds, despite the occurrence of relatively short periods of commodity price surges (Lutz, 1999; Harvey et al., 2010), as discussed in chapter II. The discussion of the Prebisch-Singer hypothesis also highlights an important transmission channel of price shocks to CDDCs. Negative terms-of-trade shocks (i.e. price drops in international commodity markets) can have substantial adverse impacts on the economic performance of CDDCs. Indeed, such shocks explain a large share of the variation in growth rates across countries (Easterly et al., 1993). For developing countries, terms-of-trade shocks carry the highest output costs among a range of different external shocks (Becker and Mauro, 2006). This is a particular concern for low-income countries that suffer from severe terms-of-trade shocks almost six times more often than developed countries (IMF, 2011). Since cross-country analyses have established that, on average, economic growth increases the incomes of the poor (see, for instance, Dollar and Kraay, 2002; and Kraay, 2006), terms-of-trade shocks have a direct effect on the HDI and an indirect effect on poverty.

It is not only terms-of-trade shocks but also terms-of-trade variability that negatively affects economic growth (Mendoza, 1997). In addition, volatility in world commodity prices causes lower long-run growth in resource-rich countries (van der Ploeg and Poelhekke, 2009). The latter relationship is based on the link between volatility in commodity prices and output growth, which is associated with lower growth rates (Ramey and Ramey, 1995). This is a significant transmission channel for CDDCs, where growth is typically closely linked to their terms of trade. Since poverty is inversely linked to GDP growth and positively linked to volatility in GDP growth (Bourguignon, 2012), commodity dependence ultimately hampers human development in developing countries.

In sum, in addition to the negative effects of long-term trends in the terms of trade on CDDCs' development, this group of countries is prone to the vagaries of terms-of-trade shocks and volatility that have an adverse impact on economic growth, and therefore on human development. Since commodity prices are determined in international markets, the only way for CDDCs to narrow or close this transmission channel is to reduce the weight of commodities in their export and import baskets; in other words, it is necessary to reduce their commodity dependence by diversifying the composition of their export basket, with fewer commodities.

3.2 FISCAL AND MONETARY POLICY CHALLENGES

Strong fluctuations in capital flows due to commodity price fluctuations can create pressure on CDDCs' balance of payments. Consequently, CDDCs face a constant challenge to avoid economic disruption from such external stress and volatility.

Dependence on commodity exports creates a direct link between developments in international commodity markets (which individual developing countries cannot influence) and government revenues. In CDDCs, where public revenues depend to a large degree on commodity exports, price shocks on global commodity markets have a direct impact on governments' policy space. And price volatility in those markets creates a fiscal imbalance that leads to volatility in public spending. In many developing countries, this can threaten the continuity of social programmes, infrastructure development and other components of economic and social development plans (see box 2).

Commodity-import-dependent developing countries face the risk of imported inflation during periods of commodity price hikes. Since food typically absorbs a large share of household expenditure in developing countries, imported inflation can erode real incomes. The fuel and food price hikes of 2007–2008 caused significant increases in headline inflation in emerging market economies and low-income countries, with food prices being a major contributor to inflation in low-income countries. Viet Nam, for instance, saw its 12-month inflation rate increase by 12.6 per cent from end 2007 to May 2008 (IMF, 2008).

The exchange rate is another potential transmission channel of commodity price fluctuations to the real economy. In particular, in economies at low levels of financial development, exchange rate volatility can adversely affect long-term productivity growth (Aghion et al., 2009). Positive price shocks can also create a dilemma for commodity-import-dependent developing countries, requiring them to choose between devaluation (potentially further contributing to inflation) and erosion of foreign exchange reserves. For commodity-export-dependent developing countries, there is the additional risk of the so-called Dutch disease. This has been experienced in several developing countries, including Gabon and Malaysia, where oil booms have led to a decline in manufacturing output (Ismail, 2010).

A further challenge for CDDCs relates to the appropriation of rents from resource exploitation. Many CDDCs do not benefit from commodity exports to the extent desirable due to unfavourable fiscal arrangements with firms operating in the resource sector, in particular when multinational enterprises are concerned (UNCTAD, 2012).

3.3 IMPACTS AT THE MICRO LEVEL

Much like the overall economy, individual producers in CDDCs that are dependent on commodities for their incomes and livelihoods are negatively affected by commodity price volatility and shocks. Unpredictable incomes make financial planning difficult, in particular for poor households that do not have savings or access to credit to aid consumption smoothing or make necessary investments. A sudden price decrease may force commodity producers to forego important expenditures, such as on health or education, and this could have a long-term impact on human capital development. While the pass-through of international price developments to local producer prices varies by commodity, country and over time (UNCTAD, 2015), changes in world prices have a direct impact on individual producers. For instance, during a period of declining coffee prices from 1995

Box 2.   The commodity price slump, terms-of-trade effects and government finances in CDDCs

The decline in commodity prices since 2011 has led to a deterioration in the public finances of CDDCs. Falling earnings from commodity exports, depreciation of national currencies and adverse terms-of-trade effects explain the worsening of their fiscal balance. For example, public revenues of African CDDCs shrank from an average of 26.1 per cent of GDP during the period 2004–2007, to 21.2 per cent of GDP in 2011–2014. This may partially explain why these countries' average primary budget balances went from a surplus of 3.6 per cent of GDP to a deficit of 1.8 per cent of GDP between the two periods. As a result, many CDDCs have increased, or are contemplating an increase, in borrowing in order to shore up their finances.

The commodity price slump has had the worst effect in countries where a high threshold oil price was necessary to maintain a balanced budget. In Algeria and Saudi Arabia, for example, fiscal break-even oil prices were $129.80 per barrel (pb) and $111.30 pb, respectively, in 2014 (IMF, 2015). Even these were too high, and the margin between actual and break-even prices widened further in 2015. Oil prices averaged $62 pb in June 2015 and $46 pb in September 2016. As a result, many of the oil-exporting economies (Algeria, Angola, Iraq, Nigeria, Saudi Arabia and the Bolivarian Republic of Venezuela) were forced to cut spending and government investment. Saudi Arabia, which had built large foreign currency reserves during the commodity boom, drew down its reserves to cover a shortfall in oil revenue in 2015.[1] Other oil exporters also faced similar pressure on their international reserves.

The commodity price collapse also had similar fiscal effects on non-oil commodity exporters. In July 2015, Chile, the world's biggest copper producer, halved the growth rate of its projected fiscal revenues from the original estimate of 5 per cent to 2.4 per cent. The revision reflected the continuing decline in the price of copper from $3.12 to $2.75 per pound (Quiroga, 2015). In Zambia, where copper exports account for the bulk of its total export earnings and for 25–30 per cent of government revenues, the decline in the price of copper contributed to a growing budget deficit.

The falling commodity prices were associated with significant currency depreciations in a number of CDDCs. In 2015, currencies in many CDDCs, including the Zambian kwacha, the Angolan kwanza and the Nigerian naira, recorded some of their strongest depreciations against the United States dollar in several years. This pushed up the prices of non-commodity imports, further amplifying the sharp deterioration in these countries' terms of trade. Given their limited capacity to substitute imports with domestic goods, this suggests that many CDDCs will experience a deterioration of both their current account and government budgets in the short to medium term. Countries where budget deficits are being financed through external borrowing are exposed to currency risks, which may in turn adversely affect their debt sustainability. In the short term, the prospect of a twin deficit is likely to negatively affect these countries' standing in terms of sovereign risk and credit ratings.

The current pressure on CDDCs' government budgets suggests the need for strong policy actions to improve the governance of the commodity sector. The need to adopt countercyclical fiscal rules that require CDDCs to save during price booms and draw on the savings when prices collapse cannot be overemphasized. The current experience also highlights the importance of economic and fiscal diversification to reduce these countries' exposure to the vagaries of commodity market cycles. Furthermore, CDDCs' current difficulties suggest that, to the extent possible, the international community should adopt appropriate measures to reduce excessive price volatility in commodity markets. The Agricultural Market Information System (AMIS) — an initiative of the Group of Twenty (G20) established in the aftermath of the 2007–2008 food crisis — is a good example of an international measure to collectively address the issue of excessive fluctuations in food prices.

[1]   From April to September 2015, the country's central bank withdrew about $70 billion from global asset managers (Financial Times, 28 September 2015).
Source: United Nations, 2016.

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to 2000, producer prices fell by more than 50 per cent in 10 LDCs (UNCTAD, 2002).

Consumers in developing countries are also directly affected by increases in food and fuel prices. This micro-level transmission channel is particularly significant for countries that import these commodities. Food price increases affect incomes of different population segments in developing countries in different ways. Two key distinctions in this context are between net food buyers and net food sellers, and between short-term and longer-term effects. For poor net food buyers, the effect is straightforward in the short term: price increases have an immediate negative price effect, as higher food prices directly translate into lower purchasing power for these

households. Consequently, poor households fall deeper into poverty, and households living slightly above the poverty line become poor. For net food sellers, the relationship is less clear, in particular if food and fuel prices increase simultaneously (FAO, 2011). Overall, the short-term effect of food price increases seems to exacerbate poverty almost everywhere in the developing world (Ivanic and Martin, 2014).

In the medium term, adjustment processes might mitigate first-round effects on poverty, since producers in the agricultural sector may react to price signals by expanding production. This income effect benefits the rural poor – but not necessarily the urban poor – in terms of higher wages and increased employment opportunities in the agricultural sector. Factor ownership also plays a role in determining how various population groups benefit from an expansion of the agricultural sector. For instance, owners of agricultural land stand to benefit from higher agricultural output. Furthermore, the availability of local factors of production and other conditions affecting the relative supply elasticities of domestic production vis-à-vis imports determines how domestic and foreign farmers share the benefits resulting from an expansion of food production. The overall effect of higher food prices on incomes of the poor in commodity-import-dependent countries also depends on other factors, such as opportunities for poor households to substitute more expensive food items for less expensive ones and the types of government policy responses to food price increases.

Food price increases can also generate or exacerbate food insecurity in commodity-import-dependent developing countries, which may lead to chronic hunger, malnutrition and serious long-term negative impacts on health, and hence, on human capital. For instance, the estimated number of hungry people in the world increased drastically from 820 million in 2007 to more than a billion in 2009 (FAO, 2011). Food price hikes can limit the ability of the most vulnerable households to meet basic nutritional needs, and force poor households to consume less/lower quality food and to limit dietary diversity. The result could be severe health consequences, including wasting and increased child mortality. For instance, food price increases in Bangladesh led to less diversity in the food basket, and consequently, to a worsening of the nutritional status, especially of children (Sulaiman et al., 2009).

Selling productive assets, such as land or farm animals, is another coping strategy in times of high food prices. While food consumption can be stabilized through asset sales in the short term, producers risk falling into a persistent poverty trap over the medium

term due to falling income. Since demand for staple food is inelastic, a loss of purchasing power by poor households could also lead to lower expenditure on health and education. These coping strategies have potentially negative long-term consequences for affected populations if, for instance, school enrolment or immunizations are foregone or reduced.

Fuel prices are also linked to poverty in developing countries, although the transmission channel is somewhat different from that of food prices. In general, poor households in developing countries spend a relatively small share of their incomes directly on fuel. However, since fuel is an input for the production of a broad range of goods and services consumed by the poor, there is an indirect effect through which higher fuel prices impact the purchasing power of the poor. For example, food prices generally increase as a result of an increase in transport costs due to rising oil prices. This indirect effect on income can sometimes be more substantial than the direct effect (Coady and Newhouse, 2006; Arze del Granado et al., 2012).

4. CONCLUSIONS

There are numerous channels through which commodity price developments affect developing countries, both those that depend on commodity exports and those that depend on commodity imports. These include direct micro-level impacts and indirect impacts that are transmitted via macroeconomic conditions. All these transmission channels establish a firm link between commodity dependence and economic, social and human development.

The empirical analysis in this chapter suggests that commodity dependence is negatively associated with human development, and is therefore an impediment to the achievement of fundamental development objectives. As a result, commodity dependence should be understood as a fundamental development challenge which should be addressed as part of the broader development strategies designed to achieve structural economic transformation and to meet the objectives of the 2030 Agenda for Sustainable Development.

A few measures that can mitigate the impact of commodity dependence on development are discussed in chapter IV. These include fiscal, industrial and social policies that target the transmission channels. Overall, the lack of structural transformation and economic diversification remain the key challenges to be overcome by commodity export- and import-dependent developing countries in their efforts to achieve sustainable and inclusive development.

ANNEX A

Table A1. Results of dynamic panel data estimates (GMM) with HDI as a dependent variable			
Variables	**(I)**	**(II)**	**(III)**
Lagged value, HDI	0.9874***	0.9867***	0.9811***
Export dependence	-0.0055**	-0.0072***	-0.0103***
Import dependence	-0.0161***	-0.0152***	-0.0118***
Dummy, for commodity boom	0.0019***	0.0021***	0.0023***
Institutional quality		0.0007	0.0004***
Trade openness			0.000
Government expenditure			0.000
Constant	0.0192***	0.0202***	0.0244***

*Significance levels: 1% ***; 5% **; 10%*.*

Description of variables:

HDI: Human Development Index (Source: UNDP).

Export dependence: ratio of exports of primary commodities (i.e. agricultural products; minerals, ores and metals; and oil; that is, SITC 0+1+2+3+4+68+667+971) to total merchandise exports, in monetary terms (Source: UNCTADstat).

Import dependence: ratio of imports of food (i.e. SITC 0+1+22+4) and fuels (SITC 3) to total merchandise imports, in monetary terms (Source: UNCTADstat).

Institutional quality: index of institutional quality constructed using six individual indicators, namely voice and accountability, political stability and absence of violence/terrorism, government effectiveness, regulatory quality, rule of law, and control of corruption (Source: World Bank, World Governance Indicators, 2015).

Trade openness: exports plus imports of goods and services as a percentage of GDP (Source: World Bank, World Development Indicators, 2014).

Government expenditure: total government spending on goods and services (including employee compensation) over as a percentage of GDP (Source: World Bank, World Development Indicators, 2015).

Figure A1. Results of a quantile regression
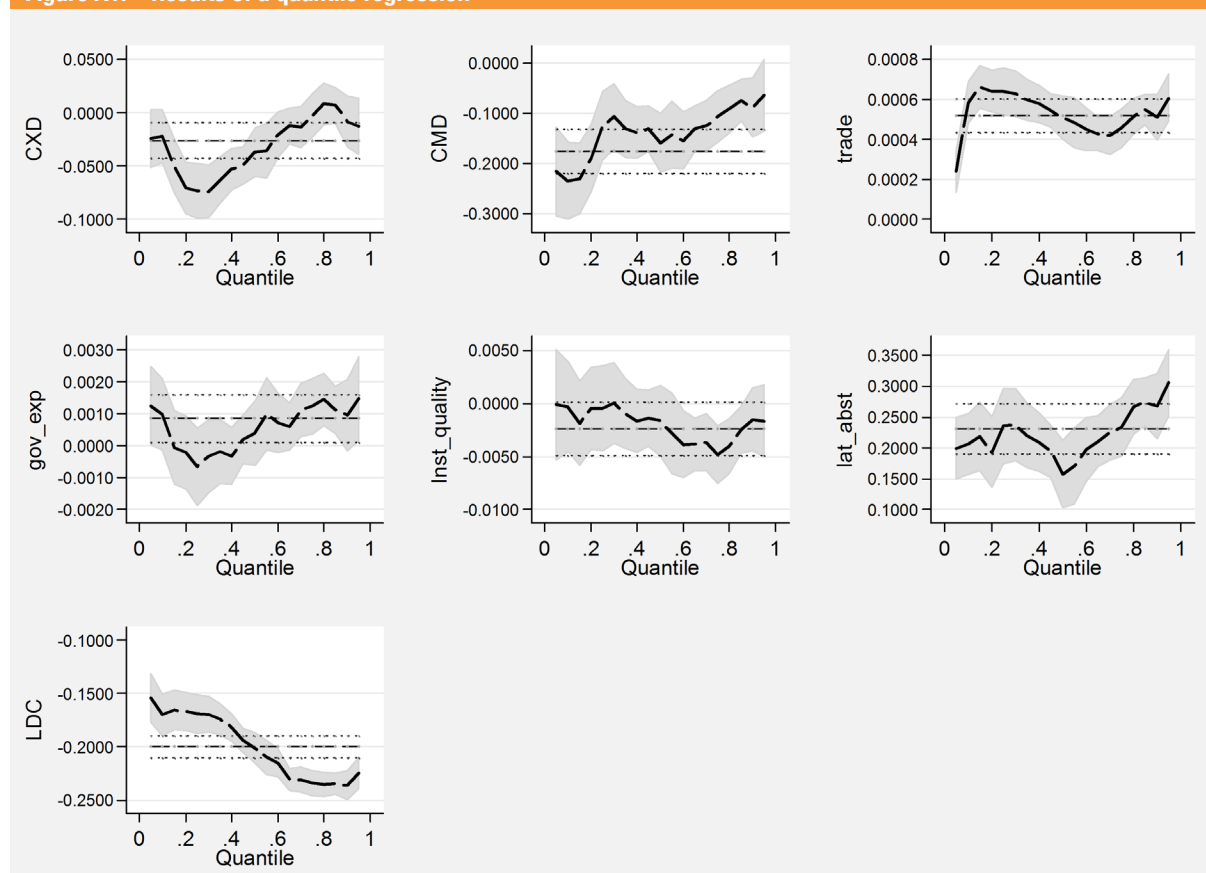
Note: CXD and CMD stand for commodity export dependence ratio and commodity import dependence ratio, respectively.

THE BEHAVIOUR OF COMMODITY PRICES: SIMULATING LONG-TERM TRENDS AND SOCIOECONOMIC IMPACTS

1. COMMODITY PRICES AND THE PREBISCH-SINGER HYPOTHESIS

Commodity price trends and volatility continue to be a matter of concern to the world economy.[10] Primary commodities account for about 25 per cent of world merchandise trade. Of the 189 United Nations Member States for which data are available in UNCTADstat for the period 1995 to 2014, 64 per cent of developing countries are commodity-dependent, and the most vulnerable countries show the greatest dependence on commodity exports. Among LDCs, 79 per cent are commodity-dependent. As chapter I has discussed in some detail, commodity dependence is associated with poor economic outcomes and low levels of human development.

The conventional wisdom concerning commodity prices is that they follow a long-term annual decline of around 1 per cent in real terms or relative to the price of manufactures. The Prebisch-Singer hypothesis shows the decline in relative prices as carrying over into a downward trend in the terms of trade of CDDCs, thus undermining their GDP growth (see chapter I). Moreover, sluggish demand for primary commodities and depressed prices

lead to a pessimistic view of the economic prospects for the commodities sector and for the countries that are commodity dependent. A cursory look at the data in figure 6 appears to support this view.

Commodity prices follow a long-run downward trend relative to the prices of manufactures, with sudden upward spikes, such as the price surges experienced during the recent commodity boom of the 2000s. Based on the assumption that developing countries typically export commodities and import manufactures, the relative prices of commodities might be considered an indication of the economic situation of commodity exporters.

Singer attributed the cause of declining terms of trade to the low prices and income elasticities of demand for primary commodities. Given that demand for food and raw materials is more inelastic than demand for final manufactured products, an abundant supply of the former leads to lower prices but does not generate a proportionate increase in demand. For food commodities, demand is further restricted by the workings of Engel's Law: as income rises, the share of income spent on food decreases. Technological developments that create synthetic substitutes (or increase efficiency in the processing of commodities) further slow the growth in demand for raw materials. The consequent slowdown in primary commodity exports weakens CDDCs' balance

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[10] This section is based on Hallam, 2017.

Figure 6. Grilli and Yang commodity price indices, 1900–2010
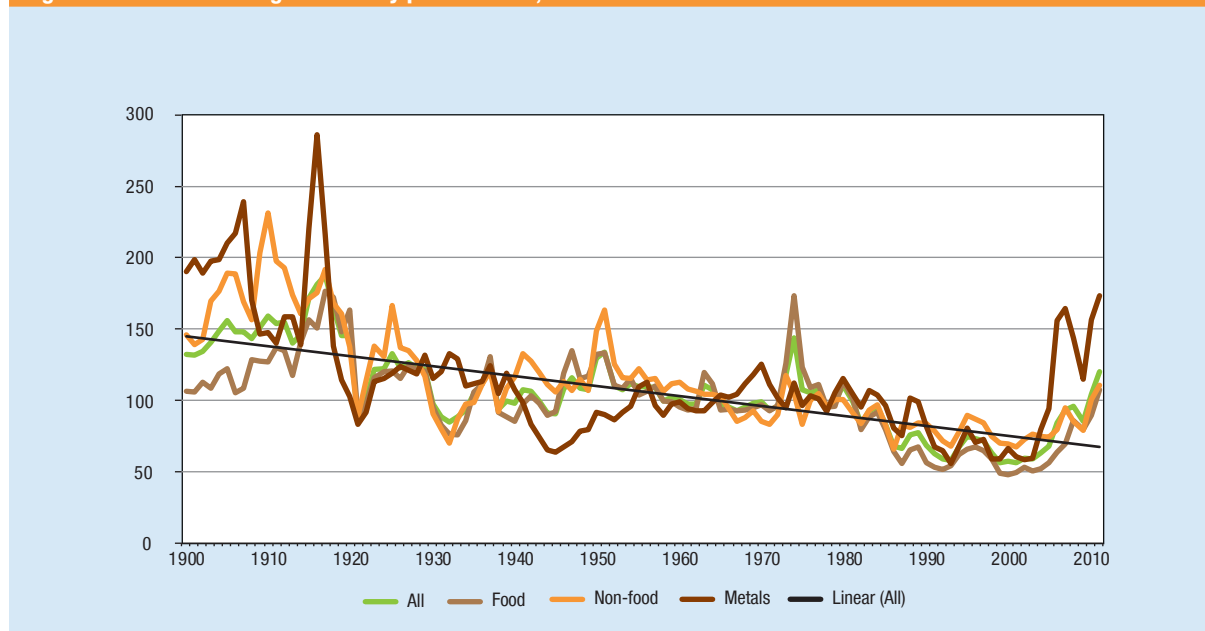
Source: Hallam, 2017.

Note: Grilli and Yang's commodity price indices are trade-weighted and deflated by an index of unit values of manufactures. The main commodity price index comprises 24 commodities: aluminium, bananas, beef, cocoa, coffee, copper, cotton, hides, jute, lamb, lead, maize, palm oil, rice, rubber, silver, sugar, tea, timber, tin, tobacco, wheat, wool and zinc. These are also used to construct three sub-indices for agricultural food commodities, non-food agricultural commodities and metals. While Grilli and Yang's original series ran from 1900 to 1986, it has been updated by a number of researchers (see, for example, Pfaffenzeller et al., 2007). The above update is based on Hallam, 2017.

of payments, leading to currency depreciation, and hence to further deterioration in their terms of trade (United Nations, 2016, box 2).

Prebisch's hypothesis focused on the effects of different market structures on productivity gains for commodity-exporting countries in the periphery versus industrialized countries in the centre. In developing countries, markets were competitive and labour supply effectively "unlimited", thereby keeping wages low, as in the Lewis model (Lewis, 1954); productivity gains led to lower prices. In industrialized economies, market power, cost-plus pricing and strong trade unions meant that productivity gains led to higher wages and profits, rather than lower prices. Profits and wages could be defended in industrialized economies in the face of slowing demand, ultimately forcing any price adjustment upon commodity-exporting developing countries. In essence, both hypotheses proposed by Prebisch and Singer articulated deteriorating terms of trade for developing-country exports, for which relative commodity prices provided a proxy.

Some analyses of the Prebisch-Singer hypothesis revealed differences of opinion as to the nature of the downward trend, and even whether a downward trend existed at all. Most analysts used the same dataset (assembled by Grilli and Yang as in figure 6), which is of relatively good quality, but adopted a wide set of econometric techniques. Many of these trend analyses appeared to support the Prebisch-Singer hypothesis. For example, Spraos (1980), Sarkar (1986), Scandizzo and Diakosavvas (1987), Grilli and Yang (1988), all found a significant downward trend of between -0.3 and -1 per cent per year, with an average estimate of about -0.6 per cent per year. Ardeni and Wright (1992), using a different statistical approach, also found a linear deterministic trend, again of -0.6 per cent per year.

The development of new econometric time series techniques for dealing with non-stationary data series allowed a more thorough analysis of commodity price trends. Cuddington and Urzua (1989), analysing the Grilli and Yang index, identified a downward shift in 1921, but no significant trends on either side of that structural break. This finding of no steady downward trend was echoed by Powell (1991), although he identified three structural breaks in 1921, 1935 and 1974. Cuddington et al. (2002) also concluded that the Grilli and Yang index had a level-shift break in 1921 and no significant drift on either side. Ocampo and Parra (2010) also identified discontinuities in the terms of trade in the 1920s and 1980s. Cashin and McDermott (2006) concluded that there was no reliable evidence of a long-term decline in the commodity terms of trade, and found no statistical evidence of a structural break in the Grilli and Yang index.

In addition to analysing the Grilli and Yang index, much research has focused on trends in individual commodity prices. Leon and Soto (1997) found that out of 24 commodities studied, 17 experienced negative trends, three were trendless and four were positive. Arezki et al. (2013) used a historic data set for 25 commodities with some data series going back to 1650. Their results varied according to the sub-period studied, but looking at 1900–2005, 50 per cent of the commodity price trends were negative and significant, providing support for the Prebisch-Singer hypothesis.

Although there have been many attempts to test this hypothesis through econometric analyses, the significant variability in commodity prices makes it difficult to distinguish long-run from short-run behaviour. Ultimately, despite these mixed results, the hypothesis is generally accepted in many policy circles, and has influenced policymaking for CDDCs over several decades (Hallam, 2017).

In the 2000s, the commodity price boom renewed international interest in the subject and reopened the discussion about the Prebisch-Singer hypothesis. These years were characterized by rising price trend lines across commodities, along with rapid price spikes. This challenged the conventional wisdom that commodities' real prices follow a long-run negative trend, as observed over the previous 30 years.

There are at least three different interpretations of these events. The first is that the price spikes have been entirely consistent with past commodity price behaviour – and the Prebisch-Singer hypothesis – and are just the latest in a continuation of the historic pattern of short-lived spikes before the long-running declining trend reasserts itself. The second is that there has been a structural break in price behaviour, with prices rising as a result of rapid income growth in emerging economies and new demands for biofuel production affecting grain prices. Strong demand also drove up prices of non-agricultural commodities. However, subsequent decreases in commodity prices suggest that such a break in the trend was not structural (or permanent). A third interpretation is that high prices reflect an upswing of the latest "supercycle" that, so far, may (or may not) have peaked.

The term "supercycle" was coined in 2005 by Alan Heap, former Managing Director of Citigroup, who defined it as "a prolonged (decade or more) trend in real commodity prices driven by urbanization and industrialization of a major economy" (Heap, 2005). Supercycles are therefore demand-driven, although it is the interaction between demand and supply, and more specifically the dynamics of supply adjustment,[11] which determines

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[11] Price rises are an important incentive to increase production. However, producers' ability to increase output in response to higher demand and prices depend on a number of factors related to the production cycle of each commodity, such as project development, land availability, production capacity, labour supply and the length of the crop cycle.

the duration and magnitude of a supercycle. Heap saw upswings as lasting 10–35 years and a whole cycle extending to 70 years. He identified two supercycles over the last 150 years: one from the late 1800s to the early 1900s, associated with economic growth in the United States, and a second one between 1945 and 1957, generated by post-war reconstruction in Europe and Japan. Growth in Chinese demand for raw materials was seen as triggering a new supercycle starting in the early 2000s.

Such demand-driven booms last until producers, prompted by the higher prices, respond by expanding production resulting in a catch-up of supply. Supercycles have "no predetermined historical shape" (Canuto, 2014). According to Heap's definition, the supercycle hypothesis is compatible with historic commodity price volatility. Analyses of supercycles by Ocampo and Parra (2010) and Erten and Ocampo (2012) has shown that the amplitude of the identified supercycles became progressively lower, which also supports the overarching hypothesis of a long-term downward trend in commodity terms of trade.

The debate summarized above is of considerable interest for CDDCs, as an understanding of the price trends of the primary commodities they export is an essential basis for national policymaking and development strategies. Both long-term trends and short-term variations in commodity prices, and hence in export earnings, have major macroeconomic, growth and development impacts through their effects on incomes, employment and government revenues. A number of case studies in this Report (for example, the analysis of the impact of oil prices on the Nigerian economy and the effect of soybean prices on the economies of Argentina and Brazil), underline the importance of commodity prices. Understanding commodity price trends is therefore fundamental to formulating appropriate macroeconomic, development and sectoral policies and strategies.

The varying views on recent commodity price behaviour outlined above carry different policy and strategic implications for CDDCs. If the recent price spikes are just the latest in a continuation of the historic pattern of short-lived spikes before the long-run declining trend reasserts itself, the crude policy implication would be that developing countries need to diversify out of commodities or fall further behind. However, the opposite policy conclusion might be drawn if commodity prices are believed to have shifted to a new higher plane, or if more of a supercycle upswing is yet to come. Different interpretations of the same price behaviour persist, and the empirical evidence does not provide a conclusive basis for judging which of them offers the better guidance. In the absence of a categorical conclusion, CDDCs would benefit from pursuing diversification policies. These are discussed in chapter IV of this Report, and include promoting investment in non-commodity sectors, expanding the policy space available to governments, and the creation of social protection mechanisms to foster structural transformation.

2. A SIMULATION EXPERIMENT: PRICE TRENDS AND ECONOMIC GROWTH

Prices and price movements play an important role in determining incentives for the allocation of resources and the adoption of productivity-enhancing technologies.[12] For CDDCs, the long-term trend behaviour of prices and periodic price surges have a determining effect on economic growth through trade, balance of payments and incomes, thus shaping their development paths. Commodity prices can also influence development indicators, such as poverty, income distribution, food security and the overall level of human development, in many developing countries, as discussed in chapter I.

Price movements can also significantly affect the commodity sectors of developed economies. For example, the collapse in oil prices in 2014 harmed the newly developed (and high-cost) shale oil production in North America as well as other global players that depend on oil exports. At the same time, low oil prices can spur global economic growth by lowering the cost of the global fossil fuel-based production system, and they directly benefit consumers who pay less at the pump. Commodity price movements also have an impact on government revenues, investments and macroeconomic variables, such as the terms of trade, the balance of payments, the real exchange rate and inflation. This Report presents case studies showing the transmission of the effects of commodity prices on growth and development through macroeconomic channels (e.g. nickel prices in Indonesia and copper prices in Zambia).

The role of prices of agricultural and food commodities is also fundamental for sustainable development, especially for countries that depend on agricultural exports (e.g. see the case study on cotton in Burkina Faso), or countries where agriculture is an important sector of the economy and food staples account for a large share of household expenditure (e.g. the case study on rice in Bangladesh). Agriculture enjoys strong income multipliers in the large rural sectors of developing economies where most of the poor live. However, there is a trade-off between the short-term negative impact of high food prices on the ability of the poor to buy food (price effect) and the longer term positive impact of agricultural employment opportunities that benefit the rural poor (income effect) (Timmer, 1983).

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[12] This section is based on Kuiper et al., 2017.

Whether or not an increase in prices diminishes or improves a household's welfare depends on whether the household is a net buyer or net seller of food.

One way to study the long-term effects of commodity prices on economic growth and selected development indicators is to simulate the impact of price trajectories through scenario analysis. To this end, projections are performed using the Modular Applied General Equilibrium Tool (MAGNET). These projections extend from the base year 2010 to the year 2030. They explore the path of prices and highlight their implications for incomes, expenditures and other indicators. Like all computable general equilibrium (CGE) models used in policy analysis, MAGNET is designed to quantitatively trace direct and indirect economy-wide adjustments triggered by changes in national policies, population growth, and other factors. It covers the global economy, tracing all economic transactions captured by national statistics. It traces domestic links between sectors through the use of output from other sectors (intermediate demand), competition for agricultural land (which can expand) and other factors of production such as labour and capital (and their returns), and the substitution of commodities in the consumption decisions of households and governments (final demand). Intermediate demand and final demand are also linked to developments in other countries through bilateral and international trade. The objective of this exercise is not to predict the future, but rather to analyse how key drivers (demand and supply) determine commodity prices, and the consequent effects on the global economy in terms of income, employment and the prices of factors of production, including skilled and unskilled labour.

As in the real world, within the model, commodity prices and price movements have important implications for the allocation of resources, such as labour and capital, wages, income distribution and poverty. The model's analysis includes prices for primary food products, processed foods, and energy (crude oil), as well as the price of a composite good comprising non-food commodities (such as minerals), industrial products and services. Price changes are driven by both demand and supply factors. Population growth boosts demand for goods and services and exerts upward pressure on their prices. Income increases add to this pressure. As people become richer, they not only consume a different basket of goods, including more energy, industrial goods and services, but also substitute traditional staples with animal products. Thus, population growth and rising incomes can have a significant impact on developing countries with large commodity sectors.

The analysis places greater emphasis on agricultural commodities, and is based on a number of assumptions that reflect no major divergence from historical patterns: there are no major technological shifts, and GDP and

population growth – two important drivers of demand for commodities – are moderate.[13] In the model, global population is projected to grow by 20 per cent between 2010 and 2030, with countries and regions following a rising trend but at differing rates. This amounts to an estimated world population of 8.3 billion by 2030. Global GDP is set to grow at an annual average rate of 3.2 per cent. For each region or country, projected GDP growth rates are based on assumptions of convergence (i.e. growth slows down with rising GDP). This results in higher growth rates for the initial years (2010–2020 period) and slower rates thereafter, most notably for China. Both GDP and population projections are SSP2 projections taken from the SSP database of the International Institute for Applied Systems Analysis.[14] Expected developments in the yields of crops and livestock are taken from Alexandratos and Bruinsma (2012). Developments in crude oil, gas and coal markets are taken from the 4 Degrees Scenario (4DS) framework assumptions of the 2015 Energy Technology Perspectives study by the International Energy Agency (IEA, 2015).

2.1 PROJECTED COMMODITY PRICE TRENDS THROUGH 2030

In the simulation, aggregate primary food prices remain largely flat at the global level, with a 1.4 per cent increase by 2030 (figure 7). Such a persistent weak trend occurs as global agriculture responds to the additional demand stemming from population growth and higher incomes by intensifying production, resulting in a projected upward trend for yields. The increase in global population by 20 per cent, in conjunction with higher incomes, also strengthens the demand for non-food commodities, manufactures and services, the prices of which are projected to experience a remarkable increase.

At the global level, increases in agricultural productivity keep production in line with demand and result in only modest increases in the prices of cereals. Prices of livestock also exhibit modest increases, as the poultry and pork sectors respond to stronger demand by increasing the efficiency of feed.

With rising incomes, consumption shifts further away from primary food products to more processed food and non-food products (which include non-food commodities, manufactures and services); the price of the composite non-food good increases by 10.6 per cent between 2010 and 2030. The demand for crude oil responds to both population and economic growth, its price rising by 50.3 per cent between 2010 and 2030 (figure 7). Economic growth fosters a structural shift of the global economy further away from agriculture. Globally, the share

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[13] The full paper also presents two alternative scenarios for high and low demand and prices respectively (Kuiper et al., 2017).

[14] See: https://tntcat.iiasa.ac.at/SspDb.

of non-food commodities, manufactures and services in total private consumption rises from 87 per cent in 2010 to 91 per cent in 2030.

These global aggregated results mask different patterns at the regional and country levels. Price differences across regions and countries persist, and international trade does not fully eliminate them. This is because the model assumes that goods produced domestically and imported goods are not perfect substitutes.

In Africa, the model projects a sharp fall in food prices, largely driven by declining cereal and livestock prices due to an intensification of production and an expansion of agricultural land. Prices of processed foods rise in line with income gains, while prices of non-food commodities, manufactures and services remain at 2010 levels. In South Asia, demand exerts pressure on primary food prices, which are projected to increase by 18.5 per cent in spite of a fast rate of growth of wheat yields assumed for India. In East Asia, cereal prices increase considerably, but the price response of meat is weaker. Although livestock feed efficiencies are projected to increase fast, these productivity gains are outstripped by higher demand resulting from rapidly rising incomes in China. In spite of strong demand being driven by fast economic growth in all Asian regions, greater productivity in non-food commodities, manufactures and services results in stable price reductions between 2010 and 2030. In North America, demand fuelled by economic growth

results in increases in primary food prices (3.7 per cent), processed foods (9.2 per cent), and the composite good of non-food commodities, manufactures and services (17 per cent). The projections suggest that Central and South America experience strong growth in the price of non-food commodities, manufactures and services.

As international trade cannot fully eliminate product price differentials across regions or countries, regional and country prices are determined by the fundamental forces of domestic demand and supply, which in turn are affected by variables such as the factors of production. In countries where population growth is expected to increase faster than the global average, and there is no room for further productivity increases, prices increase at a higher rate. Similarly, where the rate of production or productivity increase is higher than the demand growth rate, prices for one or more products fall.

The case of Uganda, where primary food prices are projected to double by 2030 relative to their 2010 levels, illustrates the reasons behind the persistence of price differentials. This large price increases are the result of the interplay between high population growth (78 per cent between 2010 and 2030) and limited availability of land – a 10 per cent increase in primary food prices can result in a 0.5 per cent increase in the land used for agriculture. Population growth creates a strong demand for food, which in turn increases the demand for land. As trade cannot fully respond to price changes, and only limited

Figure 7.   Projected global output price indices by commodity groups, 2030 (2010=100)
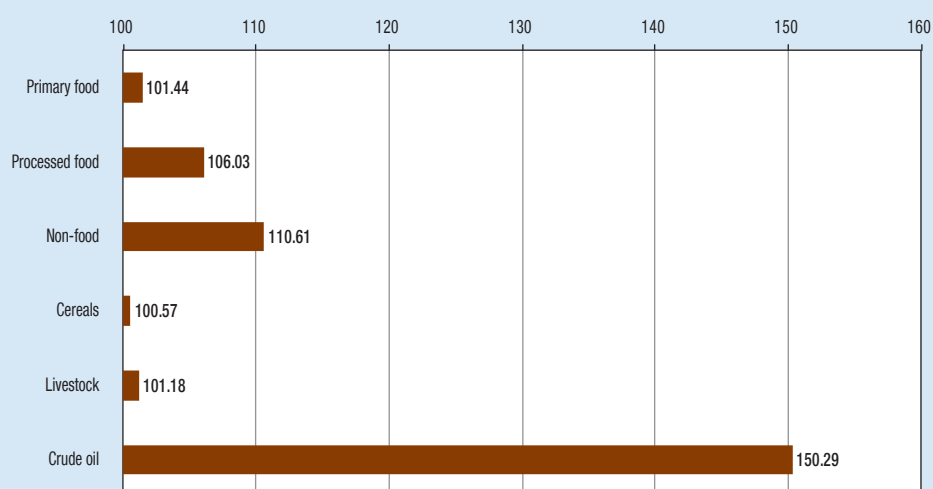
Source: Kuiper et al., 2017.

land can be brought into production to meet the additional demand, primary food prices increase (Kuiper et al., 2017).

2.2 GDP GROWTH, FACTORS OF PRODUCTION AND HOUSEHOLD EXPENDITURE

Based on the previous section's assumptions on the future trends of global GDP and population, the analysis suggests that GDP per capita in low-income developing regions will increase significantly. East Asia, and especially China, is projected to grow particularly fast, at an average annual rate of 4.5 per cent, overtaking the "Rest of the World". GDP per capita in the three poorest regions (Africa, South Asia and Southeast Asia) is projected to double, but will still remain well below the 2010 levels of the other regions (figure 8).

With rising incomes, the relative importance of economic sectors changes. At the global level, although the value of output of the primary food sector is projected to increase by nearly 35 per cent between 2010 and 2030, its economic importance could diminish from 2.5 per cent to 2.1 per cent of total production value, with the non-food and crude oil sectors increasing their shares significantly. At the global level, economic growth will be both the outcome and the trigger of structural transformation, with a decreasing share of agriculture in economic output and employment, and an increasing share of urban economic activity in industry and modern services.

Such improvements in GDP are expected to contribute towards reducing poverty. Nevertheless, it is the distribution of gains that determines the extent to which economic development is inclusive of the poor (see Zambia case study). Income allocation is governed by factor ownership, and the distribution of labour, land and capital helps to determine the inclusiveness of economic growth. Income accruing from these factors changes due to a combination of growth in endowments and changing prices. For example, population changes will determine the supply of labour, while the supply of land may be fixed if all suitable land is already under cultivation, and these developments would shape wages and land prices.

Both skilled and unskilled labour are assumed to grow at the same rate as population growth, but changes in wage rates vary by the type of labour responding to changes in economic structure (figure 9). Globally, increases in the wages of unskilled labour (projected at 28 per cent between 2010 and 2030) are expected to contribute towards poverty reduction. Nevertheless, in Africa, the Americas and South Asia, the wages of skilled labour would rise more than those of unskilled labour. For example, in Africa, the wages of skilled labour are projected to increase by 43 per cent by 2030, compared with 27 per cent for unskilled labour. With richer households typically owning skilled labour, this suggests a worsening of labour income distribution.

Figure 8.   GDP per capita in 2010 and projected GDP per capita in 2030 ($ per person)
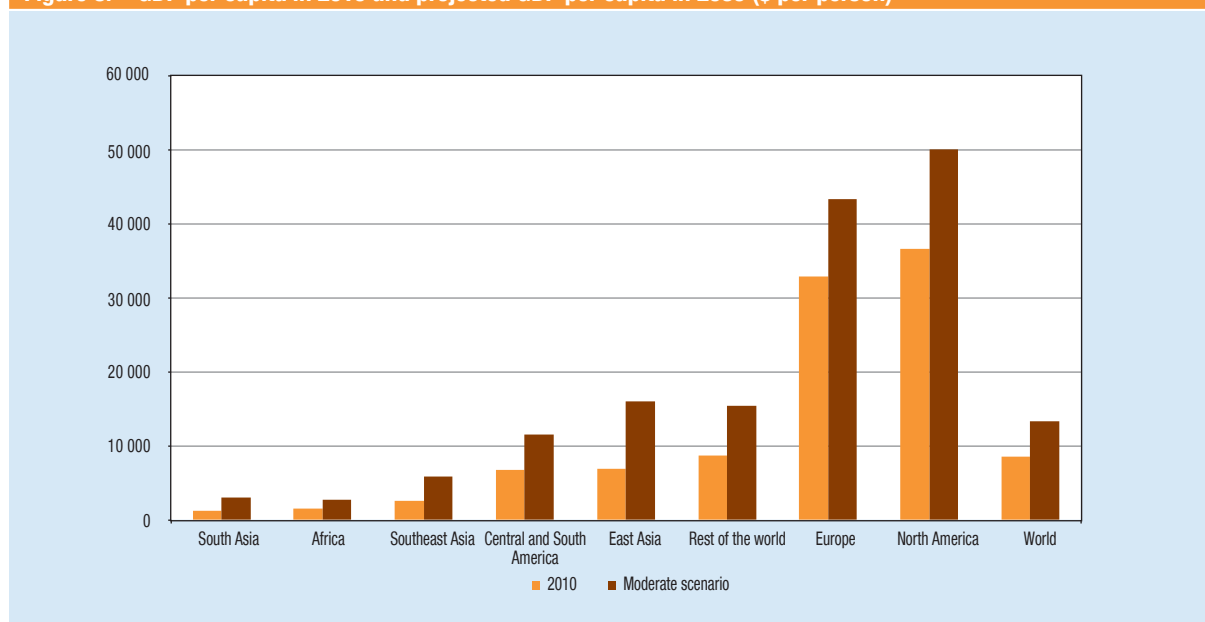
Source: Kuiper et al., 2017.
Note: Rest of the world includes Central Asia, the Middle East, Oceania, the Russian Federation, Turkey and Ukraine.

Figure 9.   Projected variations of prices of factors of production in 2030 (2010=100)
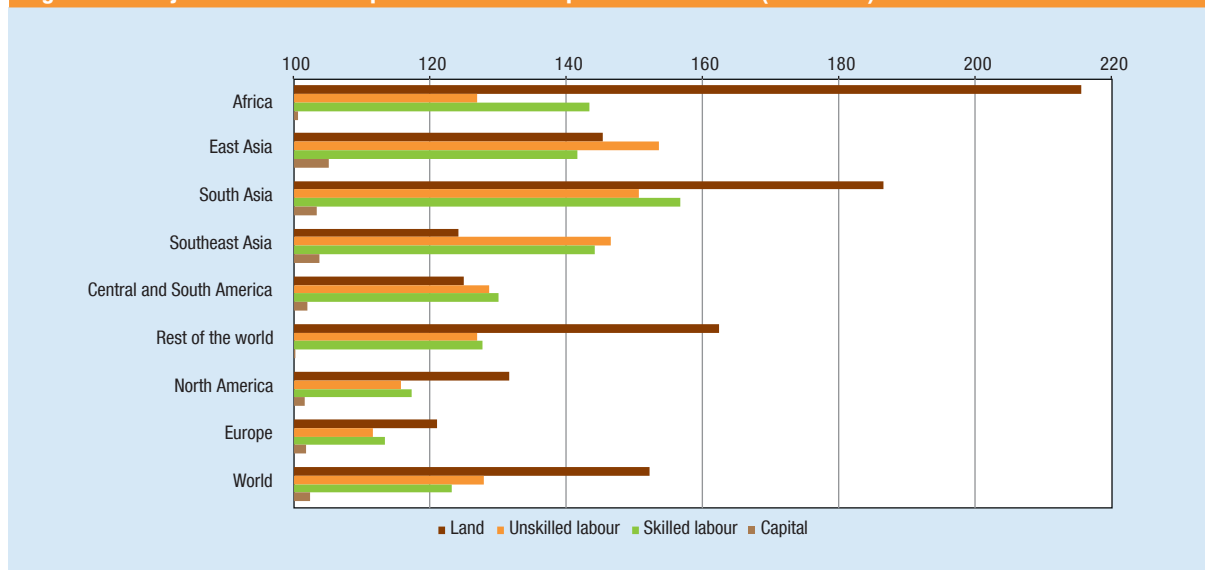
Source: Kuiper et al., 2017.

The opposite pattern would be found in East Asia, Southeast Asia, and the world as a whole, with wages of unskilled labour increasing more than those of skilled labour in percentage terms. For example, in East Asia, the wages of unskilled labour are projected to increase by 54 per cent by 2030, compared with a 42 per cent increase for skilled labour. Thus, while population increases and economic growth will result in changes in returns to labour, which will reduce poverty globally, improvements in income equality seem limited to East Asia and Southeast Asia. In Africa and South Asia, inequality indicators could worsen, as mentioned above.

With the primary food sector's importance diminishing in countries' economies – a trend consistent with increasing GDP per capita and structural transformation patterns – agricultural employment is projected to decline (Kuiper et al., 2017). In spite of population growth, the movement of labour from agriculture to other sectors would cause unskilled agricultural wages to grow at a faster pace than cereal prices, which would increase by a modest rate between 2010 and 2030 (figure 10). This is expected to improve the purchasing power of poorer households – who are the owners of unskilled labour – across all regions, resulting in poverty reduction and enhanced food security. In Africa and South Asia, the ratio of unskilled agricultural wages to cereal prices – an indicator of the purchasing power of poorer households, and therefore of access to food – is projected to increase by 14 per cent between 2010 and 2030 (figure 10). Significant gains in access to food are also expected in Southeast Asia and East Asia, where the ratios are expected to increase by 53 per cent and 90 per cent respectively.

With strong demand for food, land prices would increase. Globally the increase in cultivated land between 2010 and 2030 would be limited to 4 per cent. In Africa, a projected 20 per cent expansion of the agricultural area (only surpassed by a 23 per cent increase in Southeast Asia) may not suffice to maintain land prices at around their 2010 levels. Especially in Uganda, land prices are expected to increase significantly due to a combination of high population growth and limited land supply. This would have a major impact on rural development and poverty levels, benefiting rural households that own land.

Compared to labour and land, changes in the cost of capital would closely follow GDP growth rates. Regions with high GDP growth will see a relatively stronger increase in capital prices, and therefore in capital income. Although poorer regions are expected to grow fastest, thereby reducing poverty globally, with richer households typically owning more capital compared with poorer ones, income distribution is likely to worsen at the national level.

Globally, average household income is projected to rise. In the analysis, household income is reflected in household expenditure, which, together with government expenditure and savings, makes up the GDP. These broad macroeconomic components of GDP are avenues through which changes in commodity prices can affect the economy. For example, in Argentina and Brazil, higher soybean prices contributed towards increased government spending in the 2000s. In other developing countries, such as Bangladesh, Ghana and Mali, prices of rice, cocoa and sorghum impacted

Figure 10. Ratio of unskilled agricultural wages to cereal prices, 2030 (2010=100)
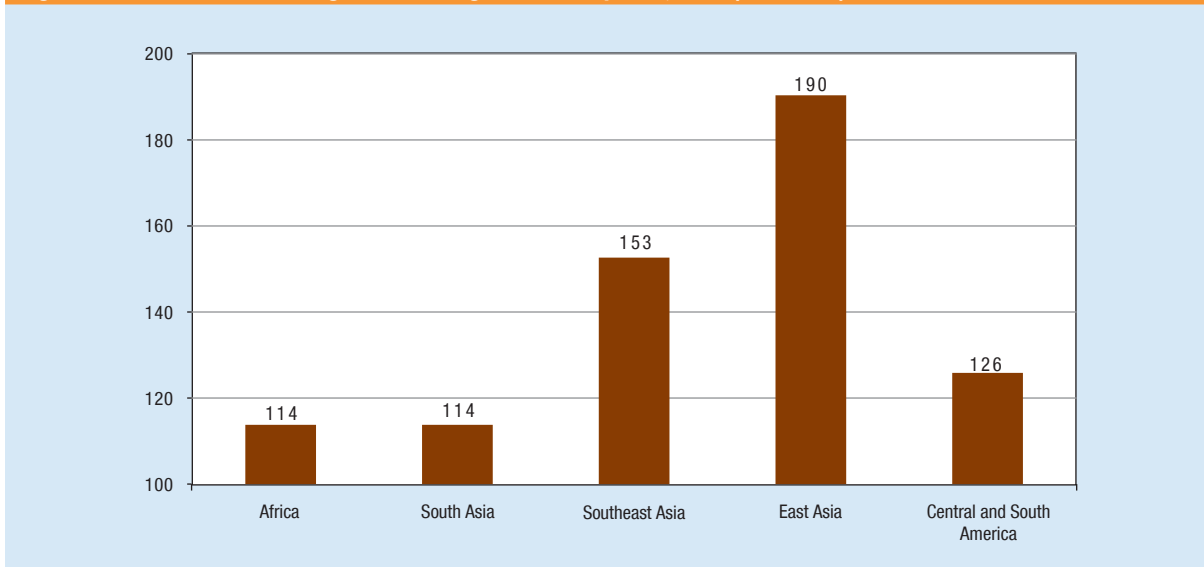
Source: Kuiper et al., 2017.

household consumption, income and wages (see the relevant case studies in chapter III).

Globally, households' real expenditure is expected to increase by 45 per cent between 2010 and 2030. In the poorer regions, as their GDP growth catches up with the national average, real household expenditure is expected to increase at a higher rate than the world average – by 130 per cent in South Asia, 110 per cent in Southeast Asia, and 78 per cent in Africa. However, these aggregate changes in household real expenditure do not reflect how income will be distributed across households. As mentioned earlier, the distribution of gains across households depends on their factor endowments.

Figure 11 shows changes in real household expenditure (national average, urban and rural) in selected countries.[15] Rural household expenditures in

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[15] MAGNET allows an analysis by household type, and includes several representative household types for six countries: China, Ghana, India, Indonesia, Kenya and Uganda. Here, we present results from the analysis of China, Ghana, Kenya and Uganda. For Indonesia and India, source data do not provide land ownership details by household types.

Figure 11. Real household expenditures in 2030 (national average, urban and rural), 2010=100
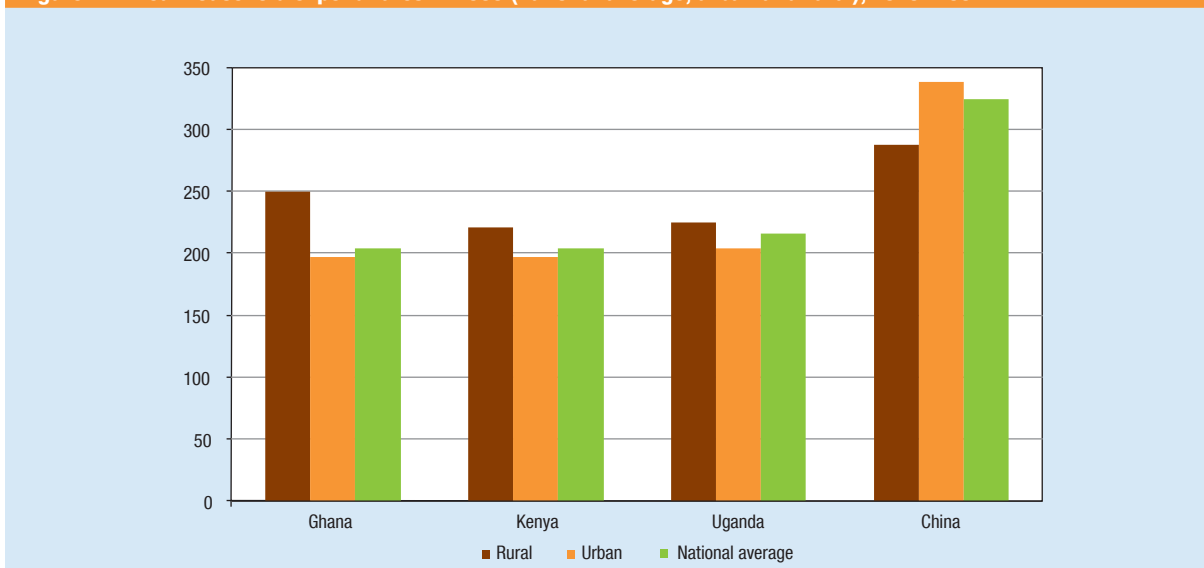
Source: Kuiper et al., 2017.

Ghana, Kenya and Uganda are projected to rise at a higher rate than the national average, whereas they are likely to increase below the average in Asia; and in China, they are expected to increase significantly less than urban household expenditures.

These differential developments are due to variations in factor endowments of the households. For example, in Africa land prices are expected to rise considerably, which would benefit rural households. In Ghana, urban households do not own any land, in Kenya they own a very small amount, while in Uganda they own only a small proportion of the total land. The income from increasing land prices and the expansion of land area in Africa will thus accrue mostly to rural households, translating in an above-average income gain.

In China, rural households' real expenditure is projected to grow at a lower rate than the national average. This is because land prices are expected to rise modestly (see figure 11) and are surpassed by increases in the unskilled labour wage. However, disaggregated results suggest that in China, unlike the East Asia region, wages of skilled labour will rise more than those of unskilled labour, reflecting stronger growth in non-food commodities, manufactures and services. Land prices exhibit slower growth compared to wages of skilled labour. As Chinese urban households own most of the skilled labour, they will experience an increase in their real expenditure relative to that of the rural households.

3. CONCLUSIONS

The Prebisch-Singer hypothesis offers a generally accepted and highly influential perspective on long-run trends in commodity terms of trade, providing a clear policy message for CDDCs, namely that they need to diversify. There are many examples of successful diversification within commodities, either by changes in the product mix or by capturing margins and value added through vertical integration (see, for example, the case study on Costa Rica, a country that diversified from coffee and bananas to high-tech manufacturing and tropical fruit).

In the absence of exogenous events that push commodity prices up or down abruptly, the projections presented above foresee modest increases in global prices through 2030, with the exception of crude oil. Based on assumptions that reflect no major divergence from historical patterns, this trend may be considered consistent with the economic theory of a long-term decline in real commodity prices, especially as far as food commodities are concerned. Although the level of aggregation may obfuscate

the projection of price trends and their impact on an economy (as non-food products comprise non-food commodities, manufactures and services), the results suggest that population growth and improved incomes could likely lead to worsening terms of trade for primary commodities. Nevertheless, this simulation experiment, based on specific assumptions, neither confirms nor refutes the hypothesis of Prebisch and Singer, but rather provides a stylized description of how price trends affect an economy.

The simulations suggest the importance of accounting for the variations in distribution of endowments – both across and within countries – when assessing the impact of long-term price developments. Different relative endowments of land and labour lead to varying primary commodity price trajectories in the African and Asian regions. Varying ownership of these key endowments across household types, combined with different rates of structural change in the economy, adds another layer of variation: rural household incomes catch up with urban ones in several African countries, while in China urban households gain more than average through an increase in demand for their skilled labour in manufacturing and services.

Certain policy prescriptions relating to commodity price movements are relevant regardless of the mixed evidence on long-term trends. Clearly, the case for maximizing revenues from commodity production and exports through effective institutions, productivity improvements, product differentiation and upgrading, and capturing value added does not change with the direction of a long-term trend (e.g. see the case of institutional development in Botswana's diamond sector). The issue of the distribution of those benefits between producers, multinational enterprises, governments in exporting countries and developed-country consumers, for example, needs to be a key consideration in policy reforms. With the right policies in place, governments can encourage private sector investment, foster development and redistribute income, as did Brazil with its Bolsa Família programme.

Similarly, whatever the trajectory of real commodity prices, CDDCs need to better manage windfall increases in revenues in the periodic, and possibly short-lived, upturns for strategic development. Policymakers in these countries often attempt to develop policies that both balance and respond to competing needs of producers, consumers and taxpayers within an environment of volatile and declining commodity prices. To better cope with the consequences of price volatility, countries will need to craft flexible policies that allow the expansion and contraction of public spending countercyclically.

CASE STUDIES

This chapter presents a series of case studies[16] that illustrate the extent to which commodities have contributed to economic growth and development in 12 countries. The case studies cover a wide spectrum of commodities – from oil in Nigeria to sorghum in Mali. They also analyse different impacts: from Zambia's dependence on copper exports to the strong linkages between unskilled wages and the price of rice in Bangladesh. The analysis demonstrates how different commodities have affected national economies through multiple avenues, and the policy responses that have aimed at strengthening resilience to global commodity price shocks, while at the same time leveraging commodity sectors' contribution to development, poverty reduction and food security. The case studies draw a comprehensive picture, showing how some countries have managed to harness commodities in promoting inclusive growth and development, while in others commodity dependence has hampered growth prospects owing to weak governance. Lessons can be drawn from the success stories, but also from cases where economies continue to suffer from the negative consequences of commodity dependence.

The chapter starts by discussing how Argentina and Brazil captured, managed, and redistributed fiscal revenues from their respective soybean industries to drive poverty reduction and social inclusion. Both countries used a period of strong global demand for commodities to implement policies that aimed at inclusive growth. Given that the structure of soybean production in both countries is based on medium and large-scale farms, social policies were important for redistributing benefits, and they resulted in significant progress in poverty reduction and food security. The case study also discusses the challenges associated with taxes on commodity exports. Although they ensure that a share of export revenues accrues to the government, they may weaken incentives for producers in the long run.

As discussed in chapter II, commodity prices are projected to increase only marginally until 2030 (in the absence of unforeseen events). Prices remain the key driver behind producers' investment decisions. Hence, it is essential that producers capture a fair share of global market prices. The case studies on the cotton sector in Burkina Faso and the cocoa sector in Ghana discuss pricing policies in these countries and the benefits that derive from increasing the share of international prices accruing to producers. When price incentives drive investment, productivity increases follow. In the case of agricultural commodities,

productivity increases contribute to higher incomes, which in turn drive demand for non-agricultural goods and contribute to broader economic benefits, poverty reduction and rural development.

Policies can also play a proactive role in promoting diversification and driving industrial development. The Costa Rica case study provides an example of how developing countries can promote diversification both within and beyond the commodity sector. A broad policy package, which included fiscal incentives and a greater degree of economic openness, encouraged agricultural producers to diversify the commodity sector beyond coffee and bananas towards higher value-added agricultural produce for export. It also promoted the diversification of the economy towards high-tech industrial activities. This case study presents interesting lessons on how diversification can be facilitated, but also on the difficulties in achieving inclusive growth.

The discussions of sorghum in Mali and rice in Bangladesh explore a specific category of commodities – that of food staples that are produced nationally and account for a large share of the poor's consumption expenditure. These commodities are also influenced by developments in international markets. In these cases, price movements in global markets can significantly impact incomes, wages, poverty, and food security. The price movements of food staples can also affect macroeconomic variables such as inflation. Policies that facilitate productivity increases – investments in research and development, infrastructure and technology, for instance – are important for a number of reasons: they help producers keep pace with increasing demand growth, and they can indirectly contribute to the development of other sectors by keeping food prices stable, and thus overall inflation and wages low.

As discussed in chapter I, commodity dependence is often associated with low human development. The case of Botswana demonstrates that good governance and strong institutions can help make up for the challenges associated with commodity dependence, and promote human development. Botswana used countercyclical policies to manage its diamond revenues, and redistributed gains from the extractive industry by investing in education, health, roads and other basic infrastructure. The country is also diversifying into diamond cutting and polishing as a way to add value to its extractive industry. Combined, these policies have contributed to macroeconomic stability and relatively improved poverty indicators. In Sierra Leone, the diamond sector has contributed little to human development, owing to different policy choices and challenges specific to the country.

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[16] The case studies in this chapter are summaries of working papers that may be consulted at www.unctad.org/commodities and www.fao.org.

The case study of nickel in Indonesia highlights the limits of using trade policy to drive private investment and value addition in a developing country. Such policies can be risky, as they affect investor confidence and can have adverse effects on markets and prices.

Capital-intensive sectors generally have weak linkages with the national economy, which poses specific challenges. The study on Nigeria's oil sector describes the country's attempt to establish deeper linkages with the national economy by stipulating that foreign oil extraction companies meet local content requirements in order to generate economic opportunities through local procurement and promote local entrepreneurship. However, this policy brought limited improvements, and is an important illustration that both effective policy implementation and a broader policy agenda are needed to successfully promote structural transformation. The case study on Zambia's copper sector reinforces this lesson: in the absence of strong linkages with the wider economy, high rates of economic growth coexisted with increasing poverty in the country during the commodity boom. Social protection policies tailored to local conditions could have helped redistribute the benefits generated in those years more equitably, while countercyclical policies could have strengthened the resilience of the national economy.

The collection of case studies that follow complements the discussion presented in the preceding chapters by analysing in more detail to what extent and through what channels changes in commodity prices have affected countries' pursuit of socioeconomic development.

1. THE SOYBEAN INDUSTRY IN ARGENTINA AND BRAZIL

Argentina and Brazil are two of the world's most prominent producers and exporters of soybeans and soybean products.[17] Together they account for nearly half of the world's soybean area and production, almost half of soybean exports, two thirds of soybean meal exports, and 60 per cent of soybean oil exports. The two industries are also important contributors to their national economies, with the soy complex[18] estimated to account for 5.5 per cent of GDP and 2.6 per cent of employment in Argentina, and 2.4 per cent of GDP and 1.6 per cent of employment in Brazil. In 2014, soy and soy products alone accounted for 28 per cent of Argentina's total exports and 14 per cent of Brazil's total exports (figure 12).

Growth of the soybean industry in both countries was motivated by international market dynamics and by developments in their respective domestic policy environments. High soybean prices provided strong incentives for the expansion of the soy industry, with positive knock-on effects on economic growth and poverty reduction.

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[17] This case study is based on Bianchi and Szpak, 2017.

[18] The soy complex refers to the agglomeration of agrifood businesses involved in the cultivation and production of soybeans and derived products (such as soybean flour, soybean oil and soybean oilcake).

Figure 12. Soy complex exports as a share of total commodity exports, 1993–2014 (per cent)

Legend: ■ Argentina ■ Brazil
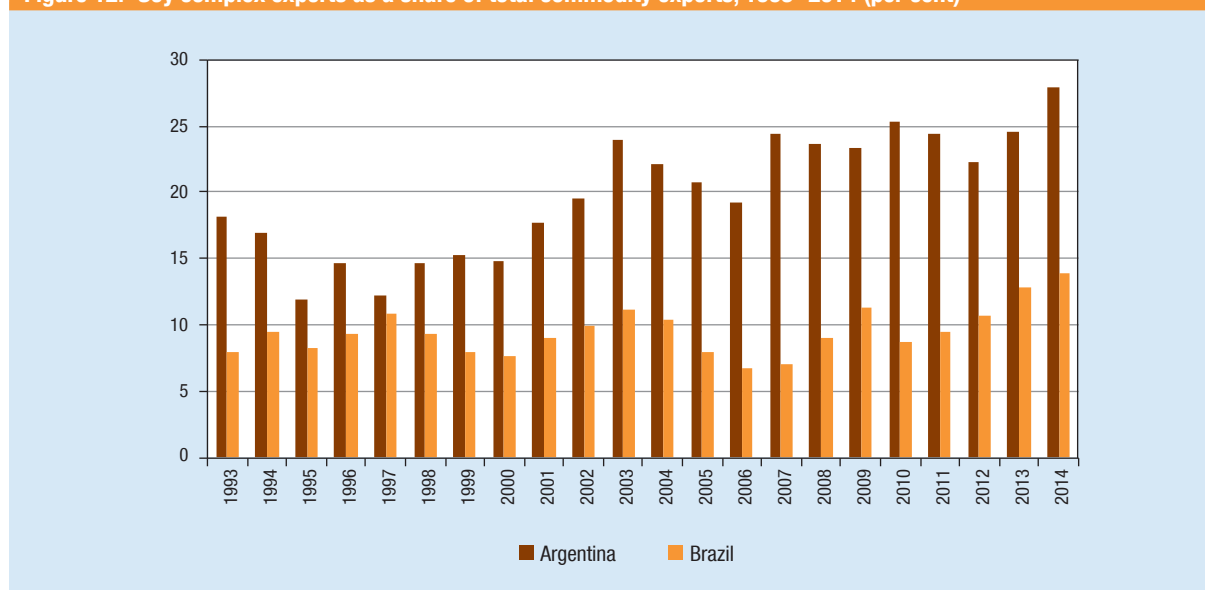
Source: Author's calculations based on data from UN COMTRADE, calculated as the share of the combined value of exports of soybeans (HS 1201), soybean flour (HS 120810), soybean oil (HS 1507) and soybean oilcake (HS 2304) in total exports.

DEVELOPMENT OF THE SOYBEAN INDUSTRY IN ARGENTINA AND BRAZIL

In the 1950s, both Argentina and Brazil implemented import substitution industrialization strategies, which heavily taxed the agricultural sector to facilitate the development of a national industry. Export quotas, licences and taxes were used to control domestic food prices and increase government revenue. Imports of agricultural inputs and machinery were restricted, which increased the costs of agricultural production. Overvalued currencies also served as a disincentive to agricultural production and trade.

The soy industry's outlook began to improve in the 1960s, when a confluence of factors led Brazil to promote soybean cultivation (Warnken, 1999). It was believed that increasing soybean production would reduce short-term foreign exchange expenditures on vegetable oil imports. Since vegetable oil was a major component of the Brazilian diet, especially for the poor, lowering its price was seen as a means of improving household food security and reducing the cost of the food basket. And because vegetable oil was an important component of the consumer price index (CPI), lowering its costs could help control inflation. Moreover, in the medium to long term, increased soybean production for export was expected to generate foreign exchange earnings. Soy was also promoted due to its potential for value addition: its production as a primary commodity and the simultaneous development of a processing sector to derive soybean meal and soybean oil would create jobs and foster economic growth. Concurrently, the Government began to promote poultry production as a low-cost animal protein for domestic consumers, and soybean meal could serve as a key input in that process. Lastly, establishing soybean production in the central-western states of the country would facilitate their integration into the national economy.

The Brazilian Government adopted a variety of mechanisms to foster soybean production. In the 1970s, the Brazilian Agricultural Research Corporation (Embrapa) was successful in developing new, more productive, varieties by adapting soybeans designed for temperate climates to the tropical conditions characterizing much of the country. In addition to publicly funded research and development (R&D), minimum price policies, loans for production and marketing, input subsidies, infrastructure development, supportive tax policies and differential export tax structures boosted the development of the crushing sector. These policy measures and an upward price trend resulted in the continued expansion of the soybean area and production.

Favourable world market conditions in the 1970s and 1980s helped spur the development of the soybean industry in Argentina and consolidate its importance in Brazil. Production shortfalls due to poor weather in other parts of the world led to drawdowns of stocks and higher prices in major grain and oilseed markets. Export restrictions by the United States induced importing countries to search for alternative markets, which benefited the Brazilian soy sector. Japan began investing in Brazil's soybean industry, and local producers started to expand plantings.

From the early 1970s to the early 1980s, Brazilian soybean production grew by over 200 per cent. High global prices also spurred production in Argentina, which had grown virtually no soy prior to the 1970s (focusing instead on cereals and feed grains). By the end of the 1980s, Argentina was producing 8.2 million tons of soybeans, while production in Brazil surpassed 18 million tons. This growth occurred despite unfavourable macroeconomic conditions in both countries, including high inflation, a heavy debt burden and export taxes. By the 1990s, both Brazil and Argentina had become established as powerhouses of trade in global soy products, with their soybean oil and meal exports accounting for 86 per cent and 70 per cent, respectively, of world trade in these goods, and together accounting for nearly one third of global soybean exports.

Pro-market reforms in both Argentina and Brazil, including the lowering of import barriers on agricultural inputs and the elimination of export taxes and quantitative export restrictions, served to further promote production by strengthening the transmission of world market prices to farmers and reducing production costs. The improved price transmission during a period of higher global prices in the mid-1990s boosted the industry and attracted investments in the crushing sector, including the entry of large agricultural multinationals. Argentine producers benefited from the arrival of biotech soybeans in the late 1990s as a means to reducing production costs and improving competitiveness. The legal framework for biotech cultivation in Brazil was approved in 2005. Deemed an "agribusiness model," the adoption of biotechnology involved specialized use of agrochemicals and greater utilization of no-till agricultural practices and technologies that promoted increasing returns to scale and the establishment of medium to large-size farms. Consequently, the development of the sector was characterized by an increasing prevalence of rented farmland, agreements between production firms and traders/crushers to better manage production risk,

and the allocation of greater resources to R&D both in the public and private spheres.

Soybean production created a number of complementary upstream and downstream linkages focusing on independent agents and specialized activities. And for much of the past few decades, market dynamics has driven improved productivity, efficiency and competitiveness throughout the value chain in both countries. The soybean industries of Argentina and Brazil, which were shaped by government policies and international market dynamics, today have a number of distinguishing characteristics. The drive for efficiency led to farm consolidation in the sector and stimulated growth in specialized small and medium-sized firms, particularly those engaged as input and service providers (such as custom harvesting or specialized marketing services).

SOYBEAN PRICES AND THE MACROECONOMY

Rising global demand during the 2000s, particularly for livestock feed in China and India, led to substantially higher soybean prices by the end of the decade, contributing to a price surge on the world market during the 2002–2012 period (figure 13). Higher prices, coupled with a favourable macroeconomic environment in Argentina and Brazil, enabled both countries to accumulate fiscal and trade surpluses. This allowed Brazil to reduce its external debt, while Argentina initiated a process of debt restructuring in

2005. Their improved fiscal situation also helped them to strengthen their social safety net programmes (see below).

Linkages between soy prices and economic growth can be readily traced in both countries, although in an indirect manner, as the crop is not cultivated by small family farms where the impact of higher prices on household income would be direct. Brazil's extensive poverty reduction programmes increased the purchasing power of the poorest, thus boosting demand for goods and services, which in turn contributed to growth and the reduction of inequality. Better macroeconomic conditions, higher soybean prices and increases in soybean exports were directly or indirectly linked to an improvement in the terms of trade (figure 14). This was different from previous experiences of economic growth (Bianchi and Szpak, 2017).

Notably, between 2003 and 2011 GNI per capita in Brazil increased at an average annual rate of 3.5 per cent, with 0.8 percentage points attributable to favourable terms of trade (ECLAC, 2013). Until the international financial crisis, increased export earnings allowed Brazil and Argentina to accumulate substantial foreign currency reserves.

In Brazil, high international soybean prices translated into a significant expansion of the soybean value chain, which contributed to economic growth thus further augmenting fiscal revenues. The share of international prices accruing to producers was higher

Figure 13. International prices of soybean, 1960–2014 ($ per ton)
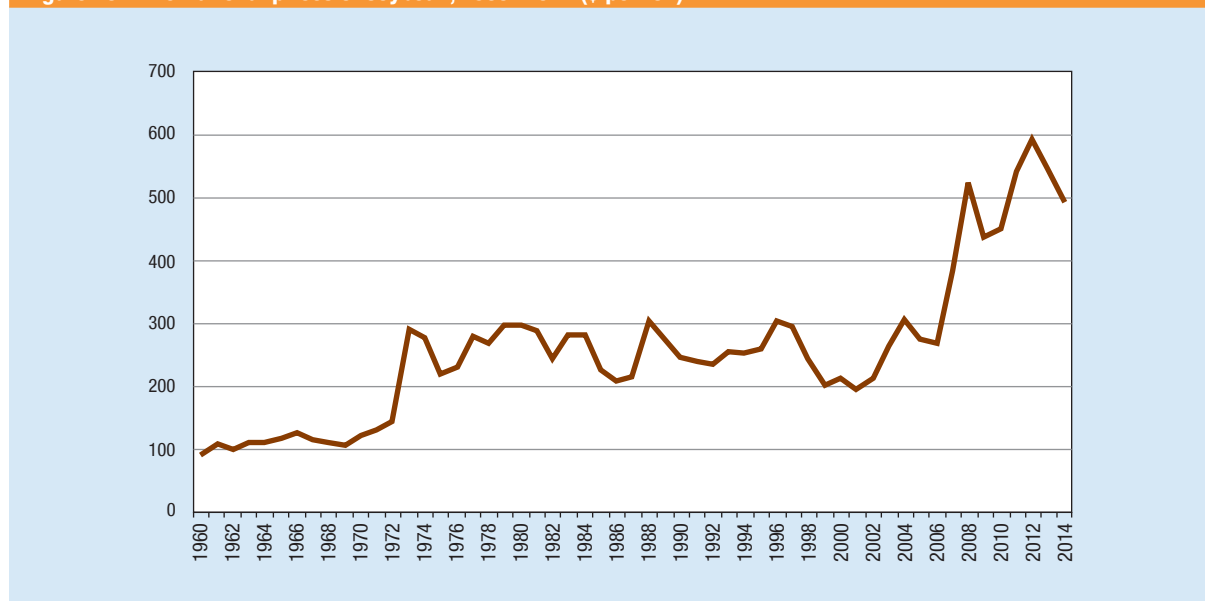
Source: Based on data from UNCTADstat.

in Brazil, but in Argentina, export taxes – applied since 2002 and raised four times thereafter – reduced the transmission of global prices to producers. Argentina applied differential export tax rates (e.g. higher export taxes on soybeans and lower taxes on meal and oil) in order to boost domestic soybean processing. Export taxes were also used as a mechanism to generate revenue and help control domestic price increases, particularly of soybean meal, which is a major input in the production of beef – a staple in the Argentine diet.

Exchange rate levels were another key macroeconomic factor affecting price incentives in both Argentina and Brazil. Overvalued currencies offset international price increases in domestic markets and can inhibit exports, while undervalued currencies favour exporters. Exchange rate effects have been observed in several instances in both countries over the past few decades. For example, the reimposition of export taxes in Argentina in 2002 was preceded by a currency devaluation aimed at maintaining stability in the domestic price of soybean.

By 2013, the macroeconomic situation in both countries had deteriorated, characterized by high inflation and budgetary constraints. Soybean prices declined in 2014–2015, and GDP contracted in both countries in 2015. Brazil experienced negative economic growth in 2015, a trend that continued in 2016. These developments led to an increase in poverty. Most recently, in Argentina the new administration that took office in December 2015 has eliminated all quantitative restrictions on exports and export taxes, except for soy products for which they were reduced by 5 percentage points.

POVERTY REDUCTION: THE CASE OF ARGENTINA

Despite similarities in the effects of soybean prices, the extent to which prices affected growth and poverty reduction in the two countries differed as a result of national policies.

In Argentina, linkages between prices, growth, and poverty reduction were more direct, as tax revenues were used to finance social protection programmes and cash transfers, such as the universal allowance per child that targeted the unemployed and their children.

Figure 14. GDP growth and terms of trade in Argentina and Brazil, 2000–2013
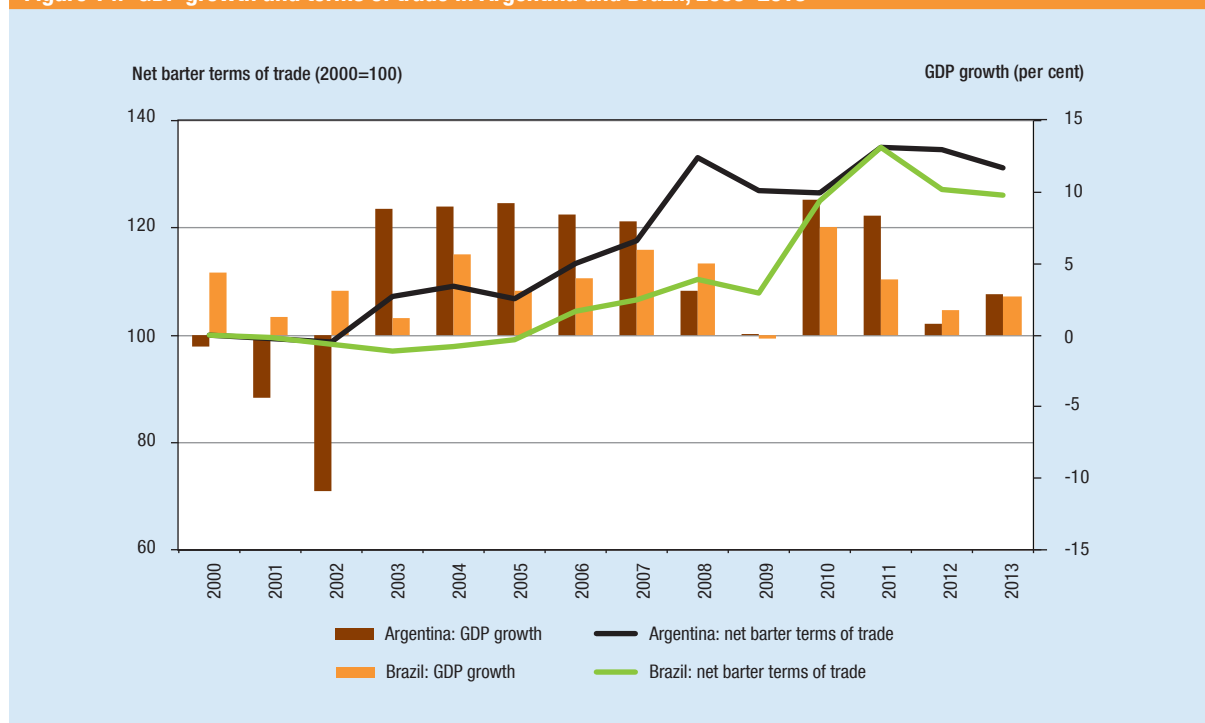
Source: World Bank, World Development Indicators, 2015.
Note: The Executive Board of the IMF issued a Declaration of Censure on 1 February 2013 on official CPI and GDP data provided by Argentina due to their being inaccurate. This Declaration was lifted on 9 November 2016 in recognition of improvements in the accuracy of the data provided (for details, see: https://www.imf.org/en/News/Articles/2016/11/09/PR16497-Argentina-IMF-Executive-Board-Removes-Declaration-of-Censure, accessed on 31 July 2017).

From 2002 to 2012, taxes on soy exports accounted for at least 8 per cent of total tax revenues in the country annually, peaking at 11 per cent in 2008. At the same time, broad economic growth and the health of the soybean sector contributed to larger tax revenues (from property and value-added taxes), enabling greater public spending. Economic growth and strong demand for labour exerted upward pressure on the wages of unskilled labour, and, together with cash transfers from social protection programmes, this led to a decline in income inequality. Argentina's Gini coefficient improved from 0.53 in 2002 to 0.42 in 2012 (World Bank, 2017a). It is estimated that 60 per cent of this decline is attributable to redistribution and 40 per cent to economic growth.

With the food price surge in 2007–2008, Argentina adopted policy measures aimed at curbing the rise in domestic food prices. These policies included export taxes, export quantity restrictions (to increase domestic supply) and consumer price controls. Export restrictions contributed to controlling the price of meat, which is a major component of the Argentine diet, but they were not effective in containing price increases of other foodstuffs, so that, overall, food inflation remained high.

The prolonged application of export taxes, export restrictions and an overvalued exchange rate, in conjunction with rising production costs, eroded the profits of soybean farmers over time, and reduced producer incentives. With the fall in most commodity prices beginning in 2012, the profitability of the Argentine soybean industry, along with its positive spillover effects, declined, with costs exceeding returns for nearly half of the country's area under soy cultivation.

Thus, despite the gains in poverty reduction and inequality (partially financed by soybean price increases), lower international prices and taxes on soybean exports eroded profits and weakened incentives to producers. A further decline in soybean activity in Argentina would have more serious economic repercussions than a slowdown in Brazil, as soybeans account for a larger share of both its total exports and the overall economy.

POVERTY REDUCTION: THE CASE OF BRAZIL

In Brazil, the Government introduced social safety nets and cash transfer programmes to include the vulnerable in the process of economic growth. Interventions included major social programmes, such as Bolsa Família, a conditional cash transfer programme through which parents received a monthly stipend in exchange for sending their children to school and complying with requirements for health check-ups. As the expanding soybean sector was based on large commercial farms, the Government initiated programmes aimed at benefiting the small family farm sector as well.

As in Argentina, the combination of these policies helped reduce income inequality and poverty by an estimated 18.4 per cent between 2003 and 2011, with 35 per cent of this decline resulting from redistribution and 65 per cent from economic growth. The Gini coefficient for Brazil increased by 3.7 per cent from 1985 to 2001, but declined by 6.1 per cent from 2001 to 2011 (Bianchi and Szpak, 2017, based on World Bank data).

Weaker international demand for soybeans slowed Brazil's economic growth resulting in substantial budgetary constraints. However, despite lower global prices the area under soybean cultivation continues to increase, due mainly to higher domestic prices (partly from currency depreciation) and the greater profitability of soybeans compared with other crops.

CONCLUSIONS

Rising soybean prices contributed to economic growth in both Argentina and Brazil, mainly through fiscal and trade surpluses. In both countries, policies and government interventions, particularly before the food price surge of 2007-2008, facilitated the development of the sector. Argentina was able to develop an export-oriented agribusiness sector that consists of medium to large farms and a processing industry. In both countries, the soybean sector contributes much more to GDP and employment than crop sectors in other emerging economies. Both countries implemented social programmes and cash transfers to promote inclusion of the poor and vulnerable populations, such as small family farmers, in the benefits of economic growth.

These policies, adopted under favourable economic conditions led to differing outcomes for the industries in each of the countries in the context of declining commodity prices and lower growth. A number of lessons can be drawn from these two experiences on how to maintain competitiveness in international commodity markets while promoting national policy priorities and poverty reduction goals.

Higher commodity prices do not necessarily trickle down to the poorest or translate into more equitable income distribution within an economy. This unequal distribution of benefits has to be corrected through fiscal and social policies to ensure better income distribution, social and political sustainability of development, and improved food security. Indeed,

the reduction of poverty and inequality in most of Latin America is primarily driven by labour market dynamics, given that 80 per cent of household income is generated by labour-related activities.

It is important for policymakers to pay attention to price movements, since fiscal policy tends to respond to commodity price increases in the form of increased public spending. The risk is to tie price cycles to the national economy, as price volatility is transmitted to the domestic economy in countries that depend on primary commodity exports. Evidence from an analysis that includes the commodity surge of the 1970s suggests that, despite policy advice from macroeconomists, fiscal policy in CDDCs has tended to be procyclical (Bova et al., 2016). However, there is also evidence that, during the recent price surge, policies have become more countercyclical. Many countries increased expenditures significantly during the boom phase, but were compelled to adopt procyclical cuts during the bust phase (Frankel et al., 2013).

Countries that depend on primary commodities also need to expand their policy space in order to be able to adopt countercyclical measures and a comprehensive fiscal policy that can respond to price volatility and market uncertainty. Such measures could include diversifying the economy, and thus the tax base, and building precautionary savings in the form of stabilization funds.

2. COTTON PRICES, GROWTH AND FARM INCOME IN BURKINA FASO

Since Burkina Faso gained independence, the cotton industry has played an important role in its development.[19] As one of the country's few formal economic sectors, this commodity has made significant contributions to both employment and the wider economy. According to statistics from FAOStat, FAO's statistical database, revenues from cotton exports have accounted for about 2.5 per cent of GDP, on average, over the past decade and cotton has been the country's main primary export commodity for much of the past 40 years.

With an arid climate and few resources, Burkina Faso's agricultural development in the post-colonial period has largely focused on cotton, with organizations such as the French Agricultural Research Centre for International Development (CIRAD) promoting the use of modern inputs, improved seeds and animal traction. Before policy reforms were initiated in the 1990s, the processing and marketing segments were owned and

operated by the Burkinabe Government's parastatal firm, SOFITEX, in cooperation with the French-owned Compagnie Française pour le Développement des Textiles (CFDT). The latter provided all inputs to growers before planting, and then maintained the rights to the harvested seed cotton, offering one guaranteed pan-territorial price that was announced prior to harvesting (Teft, 2004; Baffes et al., 2004). Ready access to input markets, credit, extension services and guaranteed prices shielded producers from market price risk, but at the same time reduced their share of the world price, which in some years was as low as 25 per cent.

COTTON PRICE MOVEMENTS AND POLICY REFORMS

Modest reforms of the sector began in the mid-1990s, following a crisis in the sector as a result of a period of low world prices. The sector has now been reformed to a greater extent than those of many other West African countries, including the Government's partial divestment of ownership of SOFITEX. Today, the country's cotton processing and marketing sector is jointly owned by the Government, a privately-owned French textile firm and the National Union of Cotton Producers of Burkina Faso. While pan-territorial pricing remains in place, prices are now negotiated with the participation of growers. Another accomplishment of the reforms was the establishment of both a stabilization fund (setting aside a portion of profits when prices are high in anticipation of periods when prices will be low) and a profit-sharing mechanism amongst the three stakeholders (OECD, 2006; World Bank, 2004).

In the post-reform years, much of the sector's efforts have been aimed at increasing competitiveness in an environment of slower growth of yields, and consequently a widening yield gap between West Africa and other major cotton-producing regions. Burkina Faso's climate in the cotton-growing regions makes it prone to pest infestations which are forecast to worsen with climate change. Severe infestations became increasingly common, and often led to the abandonment of cotton fields, as conventional pest control strategies became increasingly ineffective. This situation motivated industry stakeholders to consider new technologies to improve cotton productivity. After a lengthy period of considerations and trials Bt cotton, genetically modified (GM) to resist pest infestations, was approved for commercialization in 2009. Within six years, the yield advantage of Bt cotton resulted in its adoption by nearly 80 per cent of the country's cotton growers.[20]

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[19] This case study is based on Vitale, 2017a.

[20] However, while productivity increased, lint quality deteriorated, causing Burkinabe cotton to fetch lower prices in international markets. This prompted cotton companies in the country to start phasing out Bt cotton in 2016.

In international markets, the price of cotton has been fluctuating since the 1970s (figure 15) due to several factors. On the supply side, China and Central Asia expanded production in the 1980s, driving an increase in the global area under cotton production, a development that exerted downward pressure on cotton prices. In the 1990s, although the area under cotton cultivation shrank, large advances in cotton productivity occurred as a result of improved varieties, new technologies (including GM cotton) and expanded irrigation. On the demand side, cotton has faced increasing competition from synthetic fibres, which are now more widely used than cotton thread. The global cotton market has experienced large price swings over the past few decades, with an overall declining price trend. Price swings depend partly on the level of stocks in the world cotton market: in periods when stocks are low relative to total demand, prices tend to rise, and they fall when global supplies increase. Thus, an increase in global supplies in response to rising prices of cotton in the 1970s, combined with subsidy policies in developed countries, prompted cotton prices to fall.

Producers in Burkina Faso were largely insulated from global price trends and volatility due to the pan-territorial price-setting mechanism, but the prices set were substantially lower than international prices. Prior to the mid-1980s cotton producers in Burkina Faso never received more than 55 per cent of the world price, and in some years, they received as little as 25 per cent. Their share of world prices fluctuated in order to keep the price level in the domestic market

stable. Producers' shares improved during the early 1990s when global prices fell, but declined again when global prices turned upwards from 1993 to 1995. In the aftermath of the devaluation of the CFA franc in 1994, producers' shares began to rise again, but largely as a result of falling world prices. Estimates of nominal rates of assistance[21] from 1970 onwards suggest that producers were implicitly taxed under the parastatal system and pan-territorial pricing scheme; aside from the 2000s, the estimates suggest that such assistance was almost entirely negative (Vitale, 2017a).

In 2006, producers were given greater bargaining power for negotiating domestic cotton prices. In addition, a stabilization fund was established, which allowed a more flexible pricing mechanism, and created a stronger link between global and domestic market prices.

COTTON PRICES AND GROWTH

Cotton prices and GDP growth in Burkina Faso have mostly moved in the same direction over the past few decades, and the two are linked through various mechanisms (figure 15).

Cotton prices first began contributing to Burkina Faso's economic growth in the 1970s. Positive price trends, in conjunction with higher yields, boosted

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[21] The nominal rate of assistance is the return to cotton producers that surpasses what the returns would be without government intervention in the cotton market.

Figure 15. World cotton price and GDP per capita in Burkina Faso, 1961–2013
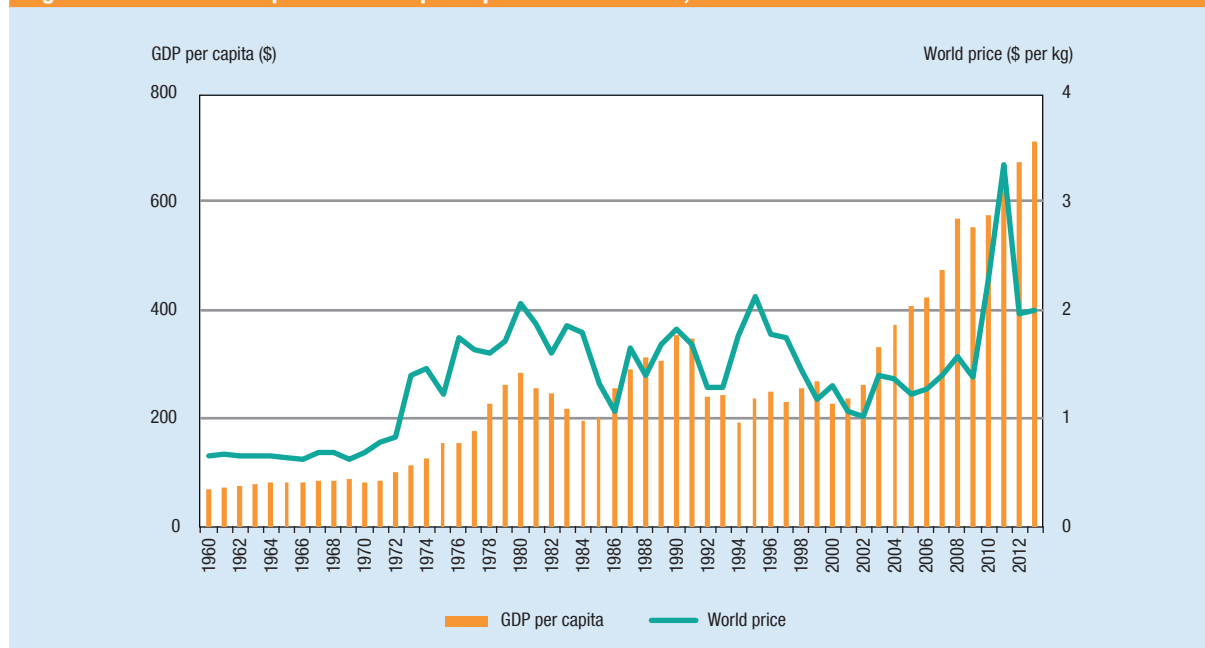
Source: Based on data from Cotton Outlook and World Bank, World Development Indicators, various years.

incomes along the supply chain as well as export revenues. Cotton production more than doubled during the 1970s thanks to higher yields as a result of: (i) the introduction of new technologies, including animal traction, improved seeds and higher fertilizer use; and (ii) shifting the cotton-producing area to the more fertile river valley, which was targeted for resettlement following the country's successful river blindness eradication programme.

The increase in cotton export revenues, along with higher government tax revenues likely further contributed to the country's growth. The difference between world and domestic producer prices was captured by the ginning sector, which realized substantial profits and invested part of these gains in infrastructure, research and extension services. But the benefit from these investments to the country was not optimal due to inefficient management by the parastatal company. Traditional cotton-producing areas nevertheless tend to benefit from more road infrastructure, and cotton retains an advantage in productivity over other crops due to the attention it commands.

The Burkinabe Government used part of its cotton tax revenue to finance agricultural and rural infrastructure development projects, though most investments in the country were financed by multilateral and bilateral loans. Growth in the cotton sector also contributed to rising demand for domestic manufactures, which

benefited from an import substitution policy, further contributing to GDP growth.

A decade of strong economic growth in Burkina Faso was cut short by a decline in international cotton prices in the 1980s resulting in an economic recession. Despite an increase of nearly 60 per cent in cotton export volumes between 1980 and 1986, the gains were not sufficient to offset the losses. With income from exports declining by nearly a quarter, government revenues fell, as did domestic demand for goods and services.

The largest impact of falling global cotton prices in the 1980s was felt in the ginning sector, while domestic prices accruing to producers – and determined by the parastatal company – increased. In spite of this, GDP per capita declined alongside world prices. World cotton prices reversed their slide in 1986, resulting in higher export revenues and improvements in the terms of trade, which once again stimulated economic growth (figure 16).

With the more favourable economic conditions, the national Government and the donor community began discussions on the need for structural macroeconomic adjustments. In the early 1990s the Government committed to greater fiscal responsibility, privatization of State-owned firms (including SOFITEX) and a devaluation of its currency. These actions had widespread repercussions for

Figure 16. Burkina Faso's terms of trade and GDP per capita, 1980–2012
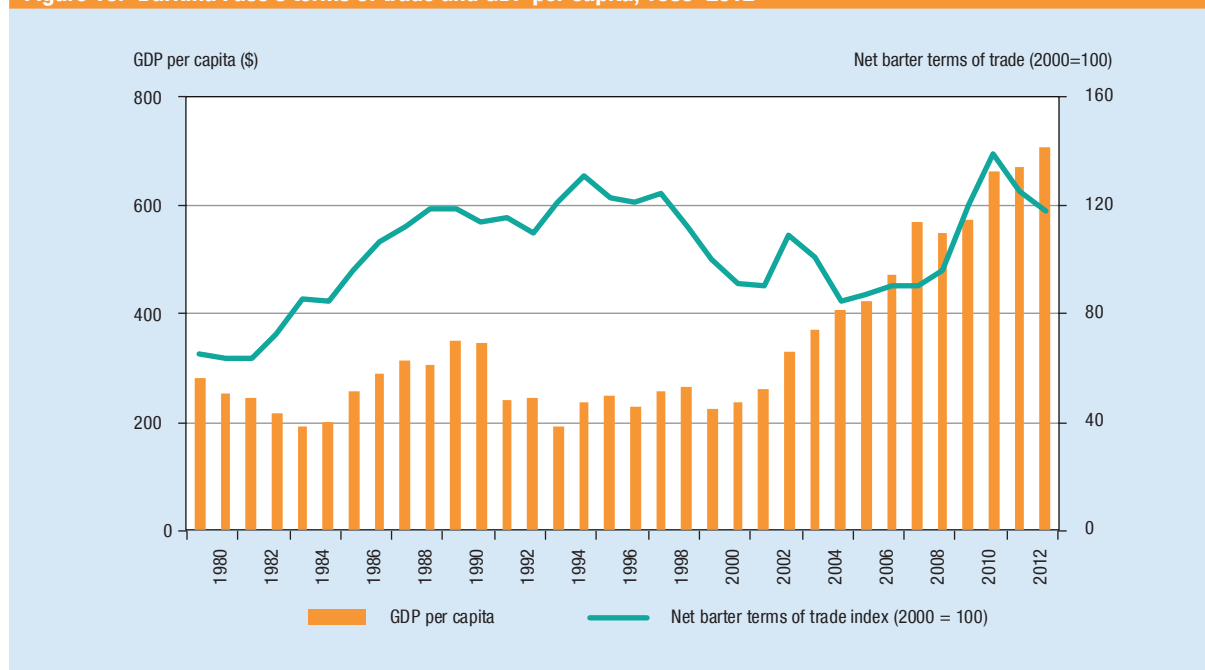
Source: World Bank, World Development Indicators (various years).

the national economy, including the elimination of inefficiencies that had characterized the State-owned parastatal company and a strengthening of the link between movements in cotton prices and investments. Domestic investment as a share of GDP increased during this period.

Privatization also increased the share of international prices accruing to cotton farmers and strengthened their participation in setting domestic prices. The combined effect of privatization and currency devaluation nearly doubled producer prices over a four-year period. As a result, the area under cotton cultivation doubled between 1994 and 2002, driving substantial production growth during a period when yields were mostly stagnant. Devaluing the currency also made imports more expensive and local products more competitive in the local market. The terms of trade improved markedly, contributing to positive economic growth until the late 1990s, despite declining global cotton prices.

In the 2000s, world prices resumed an upward trend and local cotton production continued to expand in response to higher prices. However, with conventional pest controls becoming less effective, sustained yield gains were largely compromised, which made it difficult for Burkinabe producers to remain cost-competitive in the world market (Oerke, 2002). In response, the country's cotton industry began exploring the option of cultivating GM cotton, which it eventually adopted in 2009, as mentioned earlier. Farmers who moved to Bt cotton reported yield gains of 22 per cent over conventional varieties, leading to higher average incomes (Vitale and Greenplate, 2014). This technology contributed to increasing the country's competitiveness even as world prices fell after 2011. However, the poor quality of Bt cotton meant that it fetched a lower price in international markets. Thus, despite higher productivity, starting with the 2015/16 growing season a decision was made to progressively phase out the use of Bt cotton seeds (Dowd-Uribe and Schnurr, 2016).

Since 2008, Burkina Faso has been attempting to diversify its exports away from cotton by exporting substantial quantities of gold. As a result, changes in cotton prices now have a lower impact on macroeconomic variables. In 2005, cotton accounted for three quarters of the country's total export revenues; yet in 2013, although revenue from cotton exports doubled from its 2005 level, it accounted for less than 18 per cent of the country's export revenue. Gold exports, on the other hand, accounted for 51 per cent, and petroleum and oilseed (principally sesame seed) exports also grew in importance.

COTTON PRICES AND FOOD SECURITY

Cotton has been a significant determinant of food security in Burkina Faso, not only due to the sector's links with the macroeconomy, but also through an indirect transmission mechanism that improved food production and incomes, and reduced poverty, principally amongst cotton farmers.

Figure 17. Rate of undernourishment and cotton prices, 1990–1992 to 2012–2014
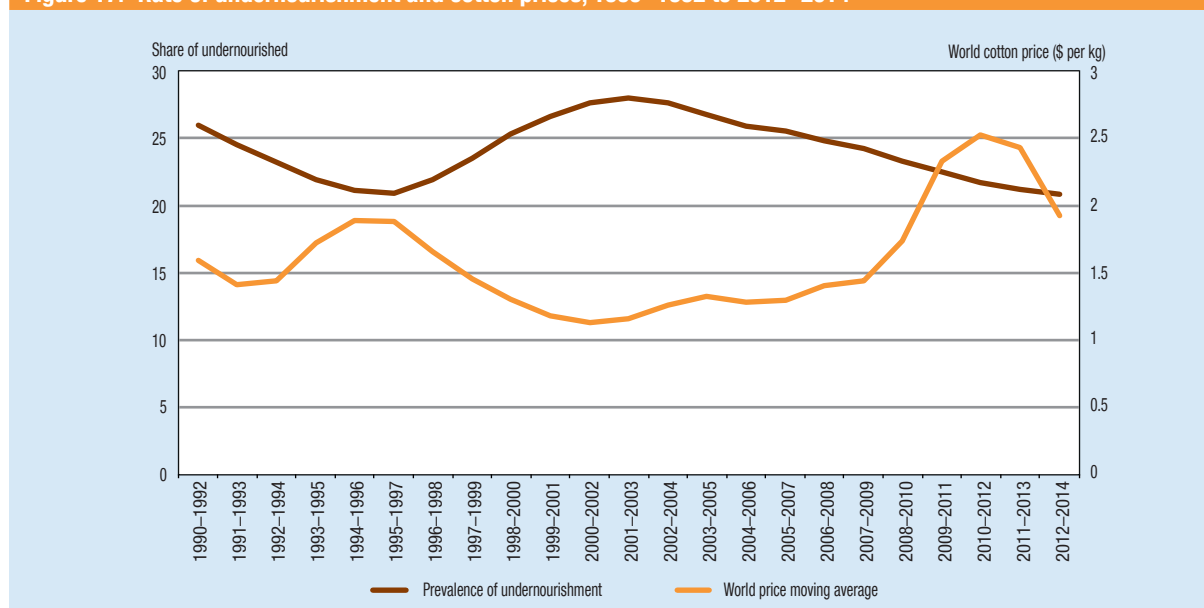
Source: Based on data from Cotton Outlook and FAOStat (various years).

The relocation of cotton farmers in the 1970s to the river valley areas where moisture levels were higher allowed crop rotation between cotton and maize, since those areas were more fertile. The maize crops benefited from residual fertilizer, animal traction and other inputs which were primarily used in cotton production (Savagado et al., 1994). This practice contributed to improving food security by raising the productivity of food crops. Maize yields were also higher than those of sorghum or millet, crops traditionally cultivated in drier areas, and households were able to produce more food per unit of land than previously.

In addition to the above effects, cotton prices determined growers' income, but also had an impact on government spending and employment, particularly through their effects on tax revenues, investment levels and terms of trade. Both effects linked cotton prices to food security and health: from the early 1990s until the 2007–2008 financial crisis, when world cotton prices rose the rate of undernourishment declined, whereas it rose again when cotton prices fell (figure 17).

CONCLUSIONS

Burkina Faso was successful in progressively reforming its cotton sector. Privatization, technology adoption and sound macroeconomic policies have all benefited the sector and contributed to increasing both productivity and food security. At the time of writing, the impacts of the ongoing phasing out of Bt

cotton seeds on incomes, poverty, food security and the macroeconomy were unclear. In order to reduce its heavy dependence on cotton exports, Burkina Faso shifted to boosting gold exports, but economic diversification remains a challenge.

3. LESSONS FROM COSTA RICA'S EXPORT DIVERSIFICATION STRATEGY

Throughout the post-war era, Costa Rica depended heavily on agricultural exports to sustain its economic growth.[22] Agriculture accounted for 41 per cent of the country's GDP and for 55 per cent of employment. Historically, the country's exports were highly concentrated in a few primary goods, particularly bananas and coffee, which represented 90 per cent of its total exports. These two commodities benefited from favourable international prices and drove Costa Rica's economy during the 1950s and through the 1960s.

However, this heavy dependence on just the two commodities for the country's overall economic well-being left it vulnerable to shocks, both domestic and external. In the 1960s, when the prices of these two commodities were flat or declining, they became unattractive to investment. Growth of export revenues was due to slightly higher production and export

[22] This case study is based on Ferreira et al., 2017.

Figure 18. Coffee prices and exports, 1961–2013
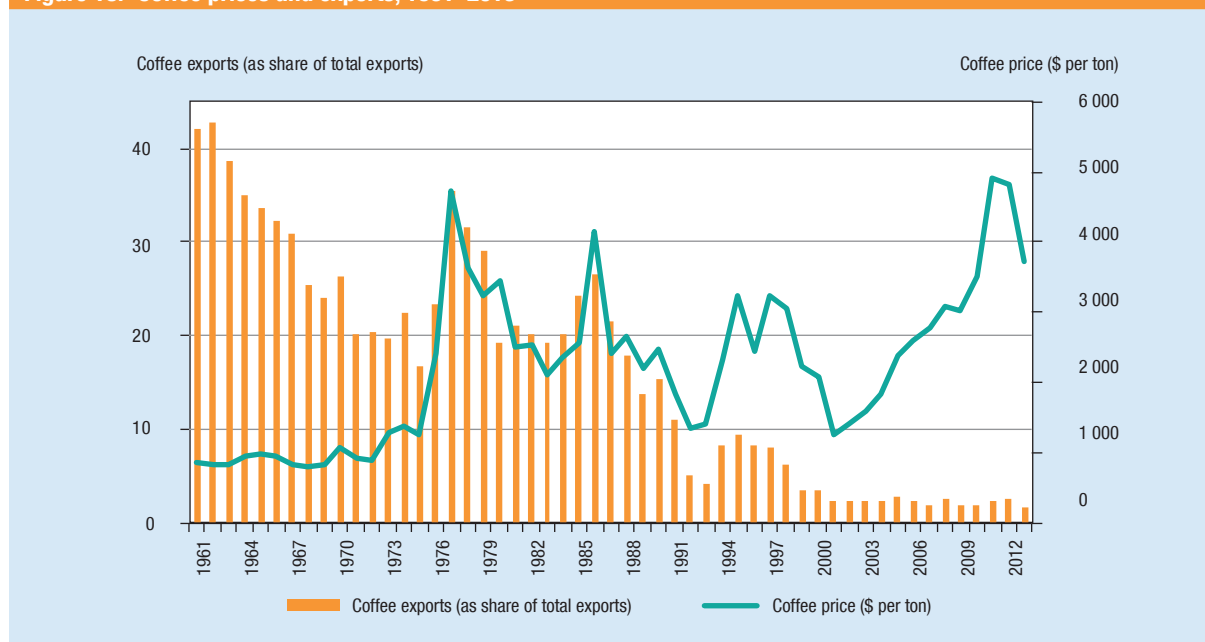
Sources: Based on data from ECLACStat and the World Bank's World Development Indicators (various years).

volumes, but the share of coffee in total exports began to decline (figure 18).

In 1976, coffee prices rose sharply, resulting in higher exports (in value terms) and a surge in export revenues, thereby contributing to stronger overall economic growth. Growers expanded plantings in anticipation of a new era of high prices, but these gains were not sustained as prices began to fall in 1978 until the mid-1980s. The significant fall in global coffee prices greatly affected the country's export earnings and coincided with a number of other adverse economic events, including high levels of foreign debt and rising interest rates. This resulted in a substantial drop in GDP and high unemployment rates.

The mid-1980s to the beginning of the commodity boom in 2003 was a period of high volatility in coffee prices, which had adverse impacts on Costa Rica's economy and was a contributing factor in the Government's decision to foster exports of non-traditional products. As a result, the country has managed to diversify its exports with its most traditional commodities of coffee and bananas diminishing in importance. Indeed, as figure 18 illustrates, Costa Rica's coffee sector and its exports did not expand in response to the increases in coffee prices starting in 2001.

POLICIES ENCOURAGING EXPORT DIVERSIFICATION

Costa Rica initiated measures to reduce its dependence on commodities in the early 1960s, adopting an import substitution industrialization model to develop its industrial sector and transition the economy away from agriculture. High import tariffs on final goods, lower import tariffs on intermediate goods, and export taxes on some products were imposed and domestic industry was briefly encouraged. When Costa Rica joined the Central American Common Market in 1963, it began exporting manufactured goods to its neighbouring countries. However, despite the growth in manufactures, bananas and coffee continued to dominate exports and influence the economic performance of the country until the beginning of the 1980s. This made policymakers wary of dependence on a limited number of export products. They also began to question the feasibility of import substitution as a growth strategy, partly because the Central American market was too small for manufacturing firms to reach economies of scale, but also because of the country's unsustainable levels of public debt.

The failure of the import substitution industrialization model in the aftermath of the debt crisis caused the Government to rethink its long-term growth strategy. Given Costa Rica's small domestic market, the Government identified export growth, export diversification, and attraction of foreign direct investment (FDI) as potential mechanisms for achieving long-term growth.

The first attempts to diversify exports occurred in the early 1970s, when growth in both the banana and coffee industries was largely stagnant. The Government began to offer financial incentives to encourage the establishment of non-traditional export industries. Agriculture was one of the few sectors to take advantage of these early programmes, experimenting with exports of melons, flowers, strawberries and other specialty crops.

In the early 1980s, a host of new policies were implemented alongside a programme of structural adjustment that involved reducing government expenditures and opening up the economy. A Ministry of Exports was created, as well as export and investment promotion centres. In addition, the Government granted tax exemptions for certain exports, subsidies and other export incentives. One of the first of these programmes, implemented in 1983, targeted the promotion of non-traditional exports, such as textiles, shrimps, cut flowers and pineapples (Clark, 1995; Clark, 2001). Partly due to these measures, growth in exports of non-traditional products outpaced that of traditional products, overtaking them in absolute terms in 1989. Exports of pineapples started in the 1980s, and grew exponentially from the early 1990s onwards, making Costa Rica the world's largest pineapple exporter with shipments of over 1.8 million tons in 2012 (FAOStat). The successful diversification into other, non-traditional products was also made possible by the fact that, as a result of Costa Rica's long-standing commitment to universal education, leading to a high literacy rate, the national workforce was well prepared to move away from coffee and banana production and benefit from emerging opportunities in other crops and sectors.

Non-traditional exports were also stimulated by the creation of export promotion zones (EPZs). These zones gave various incentives to export-oriented firms (defined as those exporting at least 75 per cent of their production), including tax breaks and reduced tariffs on imports of raw materials. The establishment of these EPZs led to large FDI inflows from high-tech and other manufacturing firms. In 1997, Intel established operations in the country, which substantially boosted exports and accelerated economic growth. Partly due to Intel, exports from EPZs overtook exports of traditional products in 1997, and in 2000, computer parts accounted for 40 per cent of Costa Rica's

Figure 19. Shares of primary goods and manufactures in Costa Rica's total exports, 1965–2013 (per cent)
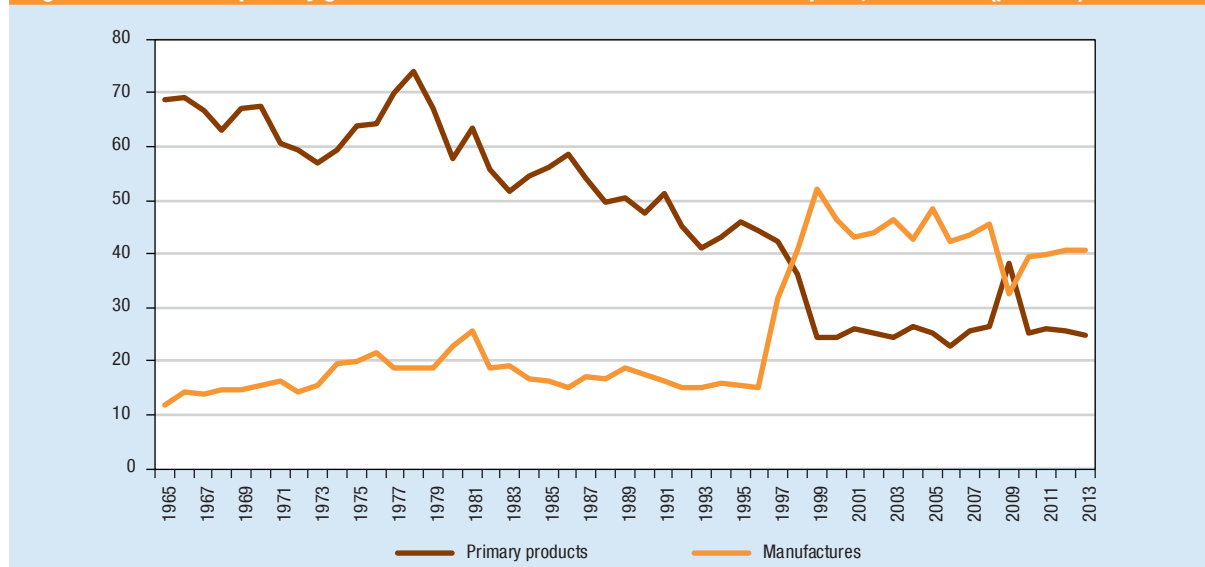
Source: Based on data from ECLAC Statistical Yearbook for Latin America and the Caribbean (various years), and the World Bank's World Development Indicators (several years).

exports, with the result that the country registered a trade surplus for the first time in 50 years (figure 19).

Decades of reforms and public policies aimed at boosting exports succeeded in increasing both the number of exporting industries (horizontal diversification) and the complexity of the products exported (vertical diversification, as measured by the percentage of manufactures in total exports). In 2013, more than 40 per cent of Costa Rica's exports were manufactures and there were more than 160 exporting industries, resulting in a substantially more diversified export portfolio than in the 1950s. The growth of exports in Costa Rica has been heavily linked to growth in FDI, particularly in the country's EPZs. Indeed, FDI growth has been virtually uninterrupted from the late 1980s through 2007 – a trend only cut short by the global financial crisis.

THE AGRICULTURAL SECTOR AS A DRIVER OF EXPORT DIVERSIFICATION

Despite the importance of high-tech industries, the food and agricultural sectors also played a key role in the country's export diversification from the 1980s onwards. Costa Rica not only began producing new agricultural goods such as pineapples and palm hearts, but also established new enterprises engaged in value-added agriculture-related activities such as packing, peeling, drying and juicing. In 2009, food processing accounted for an estimated 35 per cent of the country's manufacturing jobs and 4.2 per cent of total employment. The sector is also dynamic and

comprises mostly small and medium-sized firms – 67 per cent of which have 10 or fewer employees – owned either by nationals or as part of a family business (Nuchera et al., 2009).

The Costa Rican pineapple industry has been a prime example of both horizontal and vertical export diversification, facilitated by many of the policy initiatives outlined above. Although pineapples had been grown in Costa Rica for decades, they were not a major industry in the country until agricultural diversification programmes were put in place in the mid-1980s and new varieties were introduced shortly after. The segment has taken advantage of large global demand for tropical fruit products, and rising prices.

Apart from attractive returns, the growth of the Costa Rican pineapple industry received an impetus from companies that innovated in production techniques and product development. These innovations attracted both domestic and foreign investment, which further promoted growth. Other incentives to increase production have been the introduction of export contracts, technology packages, research and market information and the establishment of EPZs (where processing for export often takes place). Today, this industry comprises a mixture of small, medium and large producers, and is responsible for an estimated 26,000 direct jobs. In fact, independent producers make up 65 per cent of production, which has translated into rural development in areas where pineapples are grown.

Pineapple production has many linkages to value-added industries, including juicing, canning and cutting. As such, along with investments in production, there have been large investments in processing, packing and transportation infrastructure, resulting in positive spillovers for rural areas. As previously mentioned, Costa Rica has now established itself as the world's largest pineapple exporter, and pineapples are the country's largest agricultural export. Although pineapples and the associated industries have been Costa Rica's poster child for diversification, it is important to note that the country has made large inroads into other niche, high-value or value-added agricultural products, such as orange juice, yucca and various processed fruit.

Meanwhile, although bananas and coffee may no longer be the economic behemoths of the 1960s, they are still economically important to Costa Rica's economy. Bananas benefited from higher prices in the late 1980s and from some forms of government support, resulting in expanded production and exports. Since the 1990s, production has varied depending on global price movements, disease or the vagaries of the weather. Despite the highly concentrated production regime, with large banana plantations mostly controlled by three firms, direct and indirect jobs in the industry represent an estimated 8 per cent of the country's total employment. Bananas today account for 2 per cent of Costa Rica's GDP, almost one-third of agricultural GDP, and nearly 5 per cent of its exports.

The coffee sector's experience in the post-diversification years was much more turbulent. Price volatility continued to affect global coffee markets, and with large global coffee supplies, prices collapsed when the International Coffee Agreement failed in the 1980s. Production and exports have been declining since the 1990s, partly as a result of the shift in roast preferences away from Robusta and towards Arabica varieties, which reduced coffee production throughout Central America, and partly as a result of price volatility that made investment in the sector riskier.

As a result of global price volatility, many of the country's growers have shifted to producing quality premium coffee, which can be sold for a substantially higher price. Prices have recovered since 2000, but coffee exports continue to decline due to reduced production and disease. The industry still employs an estimated 32,000 coffee growers (most of whom cultivate less than 5 hectares) and 200,000 other workers, representing 8 per cent of the country's total employment. Coffee today accounts for less than 2 per cent of Costa Rica's total exports.

After Costa Rica's non-traditional exports took off, both coffee and bananas gradually became less important to the country's economy. Their combined exports, as a percentage of total exports, fell from 90 per cent in the 1950s to around 7 per cent in 2013, as stated earlier. However, while banana or coffee price movements now have less of an impact on the country's overall growth and macroeconomic indicators, they can have considerable localized effects, as both industries are labour-intensive.

The declining importance of banana and coffee export revenues to the economy as a whole can be partly illustrated by the evolution of the country's terms of trade. When Costa Rica was more dependent on the export of these two commodities, its terms of trade fluctuated greatly due to variations in international coffee and banana prices. As exports diversified both horizontally and vertically, volatility in Costa Rica's terms of trade consistently declined, even as coffee and banana prices continued to experience periods of volatility. Another factor contributing to greater stability in the country's terms of trade was the exchange rate. Costa Rica has had a relatively stable currency and a steady exchange rate with its largest trading partners since it undertook structural adjustment in the 1980s, which have contributed to consistent increases in exports, and hence to economic growth.

EXPORT DIVERSIFICATION AND POVERTY REDUCTION

Viewed from a historical perspective, Costa Rica's periods of high aggregate economic growth coincided with periods of robust export growth, although not all this growth can be fully attributed to exports. It was during the import substitution industrialization period that Costa Rica experienced the highest rates of economic growth partly as a result of the low initial conditions back in the 1960s and 1970s. From the 1980s onwards, most of the growth in exports was due to industries, mainly those based on high-value-added technologies, rather than to the traditional exports of bananas and coffee. Thus, diversification out of these primary commodities coincided with improved economic performance.

In addition to economic growth, the country's advances in poverty reduction over the past few decades are noteworthy. Since the late 1980s, poverty indicators (number of people in extreme and moderate poverty, and depth of poverty) have improved as exports have climbed. Interestingly, some of the biggest gains in poverty reduction occurred from 1986 to 1994 — before the arrival of Intel and the growth of technology exports (figure 20). This suggests that the earlier development of other sectors (including agricultural diversification

| Figure 20. Poverty and inequality in Costa Rica, 1986–2014 |
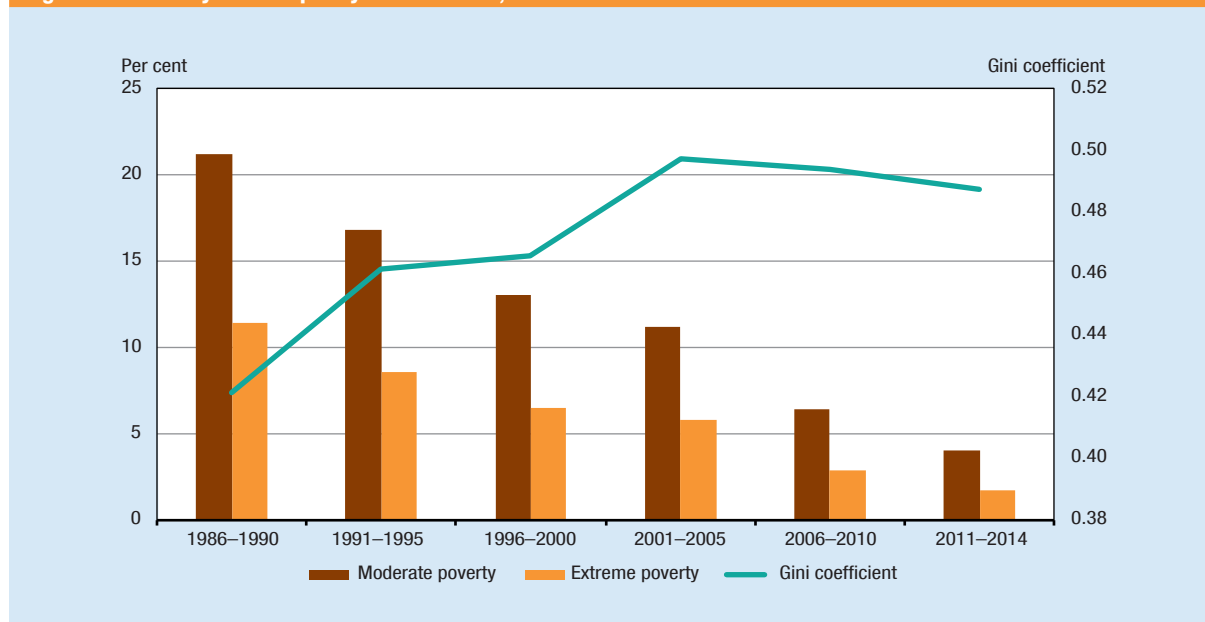
Source: World Bank, World Development Indicators (various years).

and the expansion of food-related manufacturing) had a greater association with poverty reduction than the high-tech-related sectors that dominate exports today.

While poverty has declined with export growth, income inequality persists in Costa Rica, and is comparable with that of its neighbours, even though Costa Rica's economy is the largest in Central America. This suggests that, in spite of its success with export diversification, structural imbalances persist. This may be partly because firms operating in EPZs have few linkages with the local economy. Indeed, if these firms are removed from calculations of economic activity, the country's growth rate is far more modest.

CONCLUSIONS

Costa Rica was successful in diversifying its exports over time, not only by expanding its agricultural exports beyond its traditional commodities of banana and coffee, but also by developing advanced export-oriented manufacturing enterprises and the services sector. With the share of the coffee and banana industries in the economy diminishing as a result of diversification, the overall economy became less vulnerable to the effects of international movements in coffee and banana prices. This is evidenced by the much lower volatility in the terms of trade from the 1980s onward (even during periods of considerable fluctuations in coffee and banana prices), as the country's exports diversified both horizontally and

vertically. Costa Rica's economic growth was correlated with growth in exports, mainly of non-traditional commodities. This growth was driven by both public policies (including the adoption of export-promoting institutions, tax exemptions, export incentives and, especially, the establishment of EPZs) and increases in FDI.

4. COCOA PRICES AND FARM INCOME IN GHANA

Despite the rising importance of mineral products in Ghana's export basket, the broader economy remains heavily dependent on agriculture, and cocoa is a particularly important sector in rural areas where it is produced.[23] Agriculture remains the source of nearly 30 per cent of the country's GDP and around half of all employment. Cocoa alone is the source of around 10 per cent of agricultural GDP, with important economic effects on rural areas. Nevertheless, production is mostly characterized by traditional technology and is labour-intensive

Ghana is the second largest cocoa producer in the world after Côte d'Ivoire. There are 800,000 households growing cocoa in the country, most of whom are smallholders. Cocoa has long been one of the country's primary exports, and as recently as 2010 cocoa and cocoa products constituted the bulk of Ghana's exports. However, since then, its relative

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[23] This case study is based on Vigneri and Kolavalli, 2017.

importance has been decreasing, and in 2014 it ranked as the country's third largest export by value (behind gold and petroleum). Cocoa has also played an important role in the country's overall development and poverty alleviation strategies since independence.

Since the period before independence in 1957, the Ghanaian Government managed the cocoa sector through the State-run Cocoa Marketing Board, also known as Cocobod, which was responsible for centralizing buying, quality control and export management. Government taxes on cocoa exports accounted for an estimated 30 per cent of total government revenues between 1955 and 1975 (Frimpongh-Ansah, 1992). Partly due to the stability offered by guaranteed government prices, cocoa production soared in the early 1960s, just as world prices for cocoa fell. As the Government maintained the domestic cocoa price level in the context of lower world prices, tax revenues fell substantially in the second half of the 1960s (Stryker, 1990). The effects of declining revenues were partially counterbalanced by an expansionary macroeconomic policy, but this led to high inflation and a sharp reduction in real prices accruing to cocoa producers.

Widening budget deficits were financed by bank loans to the Government and parastatals, which fuelled inflation. The severe foreign exchange scarcity due to volatile cocoa export earnings constrained the capacity to purchase essential imports for

consumption and production (Sowa and Kwakye, 1993). Market exchange rates were far higher than the official exchange rate, which sought to keep the national currency, the cedi (GHC), artificially overvalued (Stryker, 1990). As much as 20 per cent of its cocoa harvest may have been smuggled into Côte d'Ivoire between the 1970s and 1980s, where producers obtained higher real prices (Bulíř, 2002).

The sector began to recover with the implementation of the Economic Recovery Programme in 1983, which established a set of macroeconomic policies and measures aimed at boosting economic growth. These included an increase in the price offered to cocoa producers and devaluation of the national currency to encourage exports. In addition, reforms of the national marketing board and interventions aimed at improving production practices, in conjunction with rising world cocoa prices, provided the necessary incentives for producers to increase production. In 2003, Ghanaian cocoa production surpassed the 1964 record level, and rising world prices continued to motivate cocoa producers (figure 21).

POLICY REFORMS IN THE COCOA SECTOR

World cocoa prices have experienced significant swings over the past few decades, but the lack of price transmission to Ghanaian producers prior

Figure 21. Ghana's cocoa production and world cocoa prices, 1948–2014
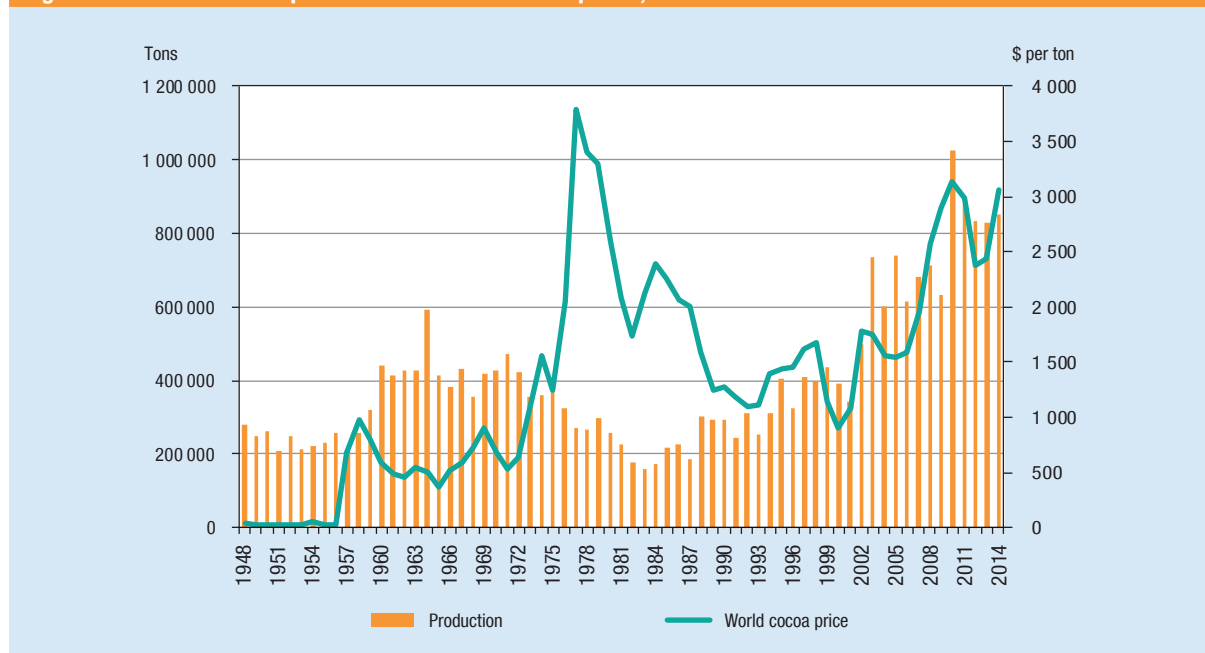
Source: Cocobod records and IMF, International Financial Statistics (various years).

Figure 22. World cocoa prices and share allocated to growers, 1991/92–2014/15
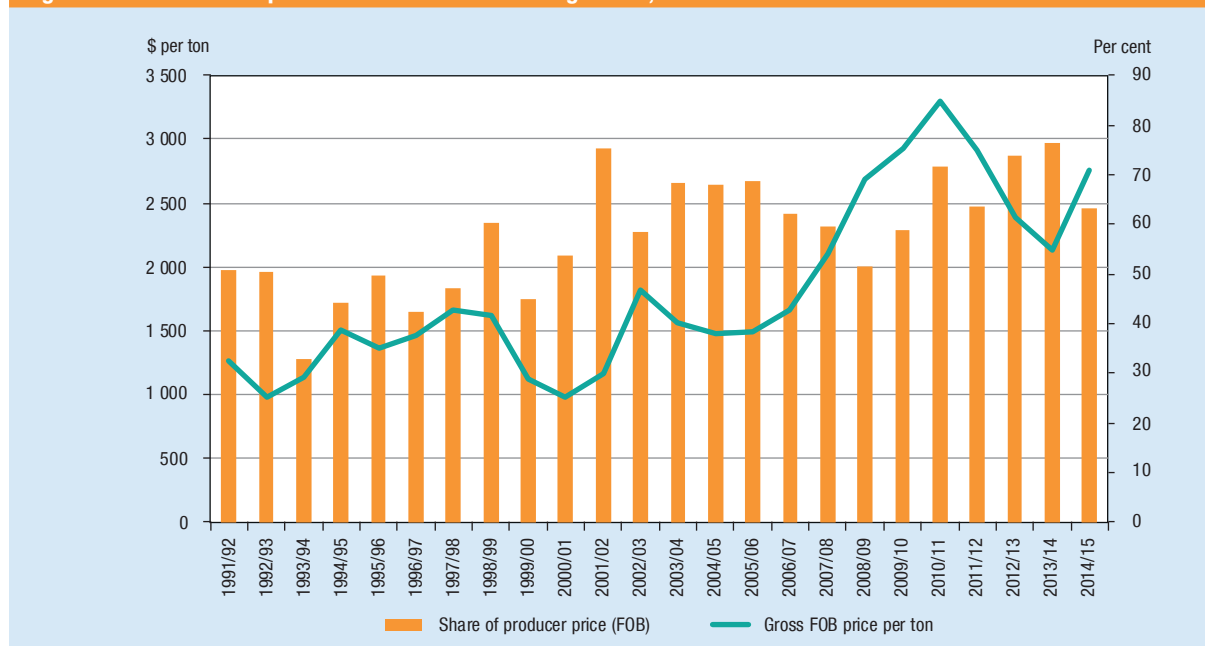
Sources: Cocobod records and IMF, International Financial Statistics (various years).

to the 1980s caused production decisions to be almost entirely disconnected from global market prices, which are determined by the fundamental forces of supply and demand. Due to rampant inflation and, at times, an overvalued exchange rate, real producer prices in Ghana fell steadily from the 1960s onward, with producers sometimes receiving as little as one fourth of world prices, despite a significant increase in global prices in the late 1970s.

In the 1980s, as part of reforms of the cocoa sector, the Government remodelled the mechanism for determining domestic cocoa producer prices. This resulted in higher real prices and ensured that cocoa producers obtained a larger share of global prices. At present, producer prices are set each year by the Producer Price Review Committee (PPRC) through a system that allocates shares of a "net" free on board (FOB) price to all stakeholders in the value chain. This net FOB price is derived by subtracting the costs of certain industry-wide initiatives that benefit all growers (such as spraying and fertilizer subsidies) from world cocoa prices.

As a result of this domestic cocoa pricing mechanism producer prices have been about 70 per cent of the FOB price – a significant increase, since the share of the world price allocated to cocoa producers before the reform ranged between 40 and 60 per cent (and could be even lower, as seen in figure 22). This higher share is also due to a reduction of cocoa export taxes, made possible by a general expansion in the government's

tax base. This expansion included new sources of tax revenue, such as from petroleum production, which offset the impact on government revenues of reduced cocoa taxation (Prichard, 2009; Kusi, 1998). Cocoa may be purchased by the Cocobod or any of a number of licensed companies, provided the price offered to producers is equal or greater than that set by the PPRC.

Since cocoa farmers have been able to capture a higher share of rising world market prices, they have responded to price incentives by increasing production significantly: cocoa production tripled between 1991 and 2005, and government revenues increased by a factor of 3.8.

COCOA PRICES AND INCLUSIVE GROWTH

Before the reforms, variations in international cocoa prices were reflected in national macroeconomic variables, establishing a direct price-growth relationship. As a result of the reforms, changes in international prices were transmitted to microeconomic variables, with a more direct impact on household incomes and poverty rates. As such, both the higher prices paid to producers and their ability to respond to market signals are associated with declining poverty rates among cocoa-producing households.

As producer prices for cocoa rose in the post-reform years, poverty rates among cocoa-producing households declined substantially, falling from 60 per cent in 1991/92 to 27 per cent in 2012/13 (even after

Table 2. Cocoa production and poverty, 1991/92–2012/13	Original poverty line			New poverty line	
	1991/92	1998/99	2005/06	2005/06	2012/13
Cocoa production (tons)	242 817	397 636	740 458	740 458	832 054
Producers' proceeds (constant 2000 GHCs)	2 432	5 964	11 732	11 732	23 076
Poverty headcount index: Cocoa-producing households	60.1	36.7	23.9	33.4	26.9
Poverty headcount index: Non-cocoa-producing households*				34.6	32.3
Poverty headcount index: National	51.7	39.5	28.5	31.9	24.2

Source: Ghana Statistical Service, Ghana Living Standards Survey.
Notes: The poverty line used up to 2005 was GHC 370.89; this changed to GH 1,314 in 2012. Poverty figures for 2005 were recomputed using this new poverty line in order to compare changes that occurred over the last two rounds of the Ghana Living Standards Survey, in 2005 and 2012.
*These poverty rates were computed using data only from cocoa-producing regions: Ashanti, Brong Ahafo, Western, Central, Eastern and Volta.

accounting for a rebasing of the poverty measure in the 2012 survey). Income derived from cocoa production was thus a determining factor in poverty reduction among smallholder cocoa-producing households resulting in significant reductions in their poverty headcount. Between 2005/06 and 2012/13, poverty among cocoa-producing households declined by nearly 20 per cent, compared with a reduction of 6 per cent among non-cocoa-producing households (table 2).

Ghana has met its Millennium Development Goals (MDGs) on both poverty and hunger, and cocoa production and income increases have contributed significantly to these achievements. Cocoa-producing households generate over 67 per cent of their income from cocoa, and income increases have beneficial spillovers in the rural economy (Vigneri, 2005; Barrientos and Asenso-Okyere, 2008). For example, in the southern forest belt of the country, where cocoa is produced, household data indicate that throughout the 1990s, households which primarily cultivated cocoa, along with those engaged in the other predominantly export-oriented activities (such as forestry and mining) experienced marked improvements in their living conditions, compared with food crop farmers (Coulombe and McKay, 2003).

Although specific data on food consumption of cocoa-producing households are not available, it is likely that greater access to food as a result of increased income from cocoa production had a significant positive effect on household food security — particularly in light of the fact that real food prices – deflated by the CPI – fell between 2000 and 2014. At the national level, significant improvements in food security indicators have been observed since 1990. The percentages of children under 5 years of age affected by wasting and underweight fell by more than half, to 4.7 per cent and 11 per cent respectively. The overall prevalence of undernourishment

declined even more dramatically, from 16 per cent in 2000–2002 to less than 5 per cent in 2010–2012.

THE CRUCIAL ROLE OF PRODUCTIVITY INCREASES

As mentioned above, higher incomes were the result of higher producer prices and production. Figure 23 shows prices and quantities purchased by Cocobod, used here as a proxy for production. From 2001 to 2010, land productivity (expressed in terms of yields) increased by 5.5 per cent annually accounting for 80 per cent of the increase in cocoa production (Gockowski, 2012). This remarkable increase in productivity was the result of a technology package – as opposed to an expansion of area under cultivation that occurred in the 1990s – which included subsidized fertilizer distribution, a disease and pest control initiative (including mass sprayings to collectively control pest issues) and the introduction of higher yielding hybrid seed varieties developed by the Cocoa Research Institute of Ghana.

Although the hybrid seed varieties were four times more productive than the local seeds in use, and represented an important technology achievement for long-term production, it was the increase in fertilizer use and the application of agrochemicals that drove productivity growth over this 10-year period. Panel data from the Ghana Cocoa Farmers Survey 2001/02–2009/10 indicate that from 2001 to 2010 the proportion of surveyed growers using fertilizer climbed by 48 percentage points, accounting for an estimated 57 per cent of the surveyed producers, with the adoption rate in the western region reaching nearly 80 per cent. Not only did the number of producers using fertilizer grow, but also the quantity of fertilizer applied per hectare increased exponentially during that period – from 4 kg per hectare in 2001/02 to 122 kg per hectare in 2009/10.

Figure 23. Cocoa production and producer prices, 1990/91–2014/15

Tons

Constant 2000 GHCs per kg

Quantity purchased by Cocobod   Real prices
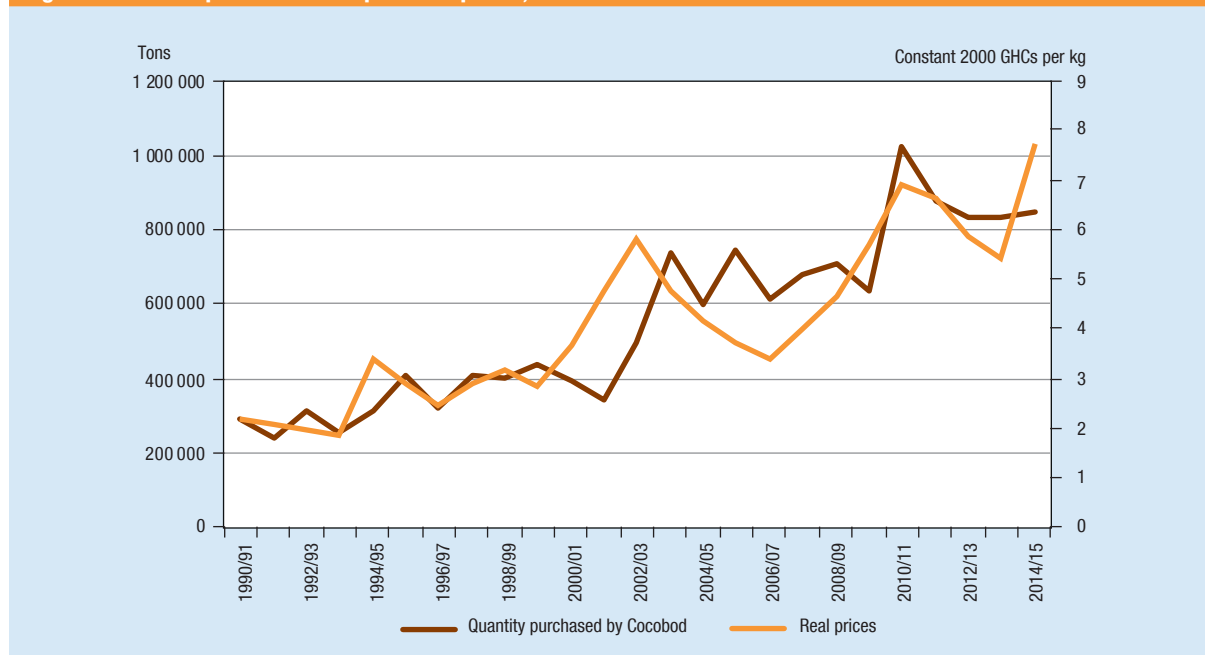
Source: Cocobod records and IMF, International Financial Statistics (various years).

The widespread adoption of fertilizer was the result of price incentives, the input subsidy programme, and increased competition and efficiency in the inputs value chain. With Cocobod setting higher pan-territorial prices, companies that used to trade cocoa and could no longer compete upfront with higher prices began to compete in the sale of fertilizers on credit, while also forming contractual arrangements to buy farmers' cocoa bean production. This innovative bundling of inputs – fertilizers and credit – opened the way for full financial intermediation by the banking sector, significantly relaxed the credit constraints faced by smallholder farmers, and contributed to increased access to inputs.

In addition to the 62 per cent increase in land productivity during the 2000s, labour productivity more than doubled, which made an important contribution to poverty reduction and food security. Increased access to inputs and technology improvements allowed smallholders to intensify production, and in many cases labour input declined as workers left rural areas to take advantage of opportunities in other sectors of the economy. While the increase in labour productivity is a positive indicator, this trend poses a significant challenge for the future of the cocoa sector in Ghana. Cocoa bean production remains a labour-intensive activity, and, with the youth migrating to urban areas, the average age of farmers is rising. As a result, smallholder farms are tending to get smaller and have to rely only on family labour.

Labour productivity gains across the board demonstrate that Ghana's cocoa policy reforms generated equitable growth, with interventions benefiting all farmers. The pricing mechanism ensured that all growers were able to sell their production for at least the same minimum price level, mass sprayings ensured that all growers had access to some plant protection treatment to control pests and diseases, and fertilizer dissemination on credit by cocoa buyers ensured that farmers with holdings of all sizes could access the technology.

CONCLUSIONS

The case of cocoa in Ghana provides an example of a sector that, while only undergoing partial liberalization, was able to substantially contribute to poverty reduction among its producers thanks to targeted efforts to increase the producers' share of world prices and improve farm yields.

In contrast to countries such as Côte d'Ivoire where the role of the State in the cocoa sector has been drastically cut, centralized policies remain in place in Ghana, involving pan-territorial price-setting, pest control and fertilizer distribution. Those policies have succeeded in increasing incomes for a large proportion of cocoa producers through higher prices, resulting in productivity gains and increased production. Since these gains were achieved largely as a result of higher fertilizer use in a context of mostly rising global cocoa

prices, further investments in research and variety development may be needed to ensure longer term yield growth.

5. SORGHUM PRODUCTION IN MALI

Much of the literature that analyses the relationship between commodity prices and economic growth tends to focus on minerals or cash crops for export, such as coffee, cotton or tea.[24] There are many potential mechanisms through which international commodity prices can affect growth, including terms of trade, fiscal effects and investment flows. Furthermore, analysing the effects of price fluctuations can be complicated when the commodity concerned is a food staple that is crucial for food security and a major component of consumer expenditures but also a major source of income for smallholder farmers.

Sorghum is a major food staple in Mali and one of the few food crops suitable for cultivation by smallholders in some of the country's most arid areas. The crop plays a vital role in Mali's rural economy, where it provides the primary source of income and nutrition in farming communities. It also contributes to national food security, and significantly reduces the need for food imports. For this reason, the price movements of sorghum can have significant effects on food security, poverty and rural development, as well as on Mali's broader economy.

MALI'S AGRICULTURAL CONTEXT

Malian farmers face many constraints (water scarcity, poor soil and specific pest-related pressures) with regard to the types of crops they can produce. Rice is produced in the country's river deltas, maize and cotton are cultivated in the comparatively wetter southern regions, and sorghum and millet dominate in the central regions where rainfall is minimal.

Agriculture is the main economic driver, accounting for 40 per cent of Mali's GDP in 2014. Cotton has traditionally been considered the most important crop as it generates export revenue, but cereal production is also important for economic growth and food security. The country produces, on average, about 70 per cent of its food needs, and its dependence on food imports has been among the lowest in West Africa (Terpend, 2006). Sorghum and millet meet about 80 per cent of Mali's grain consumption needs (MAFAP, 2013), while food imports account for an average of 4 per cent of GDP, and consist mainly of rice to meet urban consumer demand.

The agricultural sector has thus far been able to produce food at a relatively low cost, but Mali is currently undergoing structural transformation. Its

fast-growing population is moving to service and industry sectors, becoming more urban, earning higher incomes, and demanding a more diverse and protein-rich diet. This is an overwhelming challenge, given the fragile agro-ecological conditions and limited use of modern agricultural production techniques.

Sorghum is produced almost exclusively by smallholder subsistence farmers, and its production is characterized by low input levels and low productivity. In 1984, Mali was the first West African Sahel country to liberalize its cereal markets, such that sorghum and other food crops are now openly traded domestically through a network of private traders, merchants and vendors. Nevertheless, just a small proportion of sorghum production (less than 1 per cent) enters the market, while the remainder is retained for household consumption.

Poor transport infrastructure, road taxes and onerous paperwork increase marketing costs significantly, and hinder the development of a value chain. In addition, poor storage facilities and lack of access to credit compel many farm households to sell some of the grain soon after harvest to meet immediate consumption and financial needs. As a result of a thin market and limited temporal arbitrage, sorghum prices experience large seasonal price swings.

Efforts to expand the domestic market for sorghum by encouraging the beer and bread industries to use more sorghum in their production processes, and poultry operators to use it as feed (Sanders et al., 2015) have marginally strengthened the value chain. But this has also underlined the need to develop varieties tailored to the needs of the food processing and value-added industries. Export opportunities in the past were hindered by an overvalued currency, among other factors.

Domestic support for the sorghum industry is very limited. Government efforts focus on increasing rice production in the country's river deltas: between 2006 and 2010, expenditures on rice accounted for 61 per cent of government and donor funding for agriculture, compared with 7 per cent on sorghum, millet, and maize combined (MAFAP, 2013). In spite of this limited funding, Mali's sorghum breeding programme, managed by the Cinzana Research Station in conjunction with a USAID-funded project (INTSORMIL – Institute of Sorghum and Millet), has been highly successful in developing new sorghum seeds based on improved local landrace varieties (Vitale and Sanders, 2005). The new technologies developed by Mali's sorghum breeding programme are expected to generate an additional $55 million per year (Vitale, 2017b).

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[24] This case study is based on Vitale, 2017b.

Figure 24. International and domestic sorghum prices, nominal rate of protection, 2005–2010
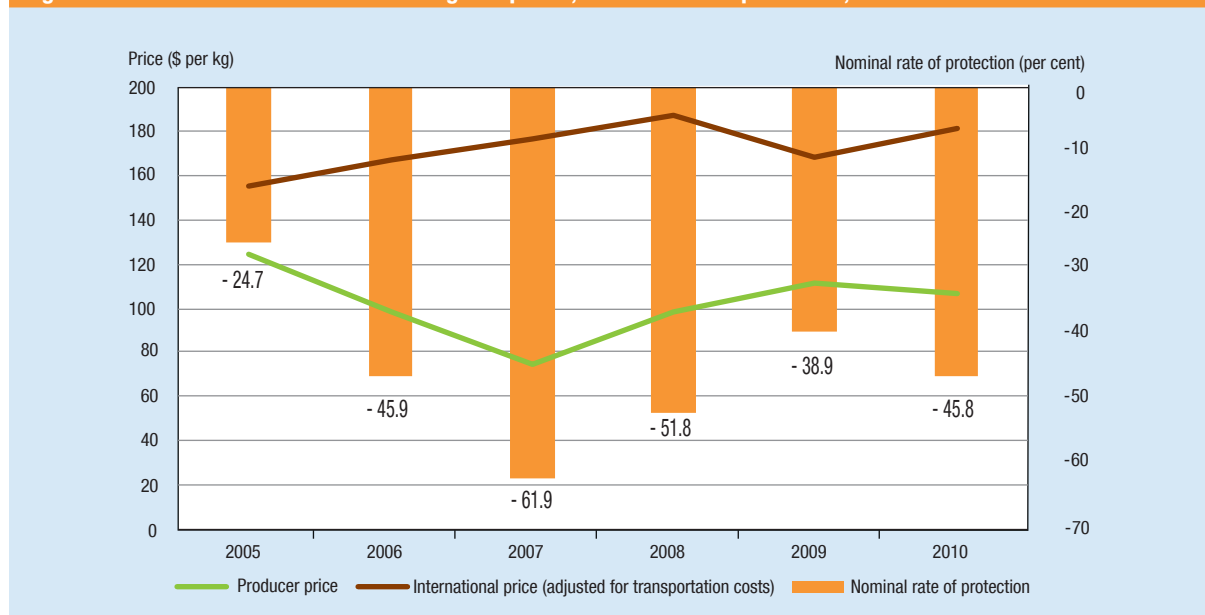
Source: Vitale, 2017b.

Note: The NRP reflects the difference between the actual price received by producers at the farm gate, and the world price that producers would receive at the farm gate after accounting for transportation, border fees and taxes, and freight losses. Positive NRP values provide empirical evidence that the policy environment favours producers through higher domestic prices than world market prices, while negative values imply that producers are penalized due to lower domestic prices that benefit consumers.

Over the past couple of decades, efforts have been directed to promoting a new technology package that combines improved sorghum seed varieties with greater use of inorganic fertilizer (Vitale and Sanders, 2015). This new technology package is expected to increase yields to 1,360 kg per hectare from 565 kg per hectare (which is the average yield using existing technologies) (Vitale and Sanders, 2005). Nevertheless, although about 50 per cent of farmers use improved seeds, maintaining seed quality remains problematic, and the use of inorganic fertilizers on sorghum is still extremely low. Since the food price surge in 2008, and under Mali's Rice Initiative, efforts to increase cereal production have included supporting fertilizer use in sorghum production.

PRICE MOVEMENTS AND POLICIES

In the international market, sorghum prices closely follow maize prices, as sorghum can be readily substituted by maize in animal feed. Nevertheless, global sorghum price signals are not always transmitted to Malian producers, and domestic prices are characterized by high volatility.

Although the liberalization of food markets in 1984 strengthened price signals, Mali's overvalued currency kept imported food prices artificially low, making imported foods a viable economic option to satisfy

food needs. However, this weakened the incentives for domestic food producers to invest, modernize and adopt more intensive production methods.

The dependence on food imports worsened Mali's balance of payments and terms of trade, as in several Sahelian countries, threatening its solvency. In 1994, the devaluation of the CFA franc, by 50 per cent relative to the French franc, increased the cost of imports. Domestic sorghum prices also increased significantly due to the effect of the devaluation on competing imported foods, such as rice, but they continue to be highly volatile. Since the devaluation in 1994, there has been a policy to subsidize imports of rice and maize when the domestic prices of these cereals rise in order to protect urban consumers. Given the high degree of substitution between the grains that are consumed, cheaper rice exerts downward pressure on both sorghum and millet prices.

Analyses indicate that the policies in place impose an implicit tax on sorghum (Dewbre and de Battisti, 2008; MAFAP, 2013; Vitale, 2017b). Estimates of the nominal rate of protection (NRP) suggest that in some years prices of sorghum produced locally were well below international market prices. Between 2005 and 2010, food import subsidies, together with poor infrastructure and thin markets for sorghum, contributed to keeping domestic prices below world

Figure 25. Food security indicators and sorghum prices in Mali, 1987–2006
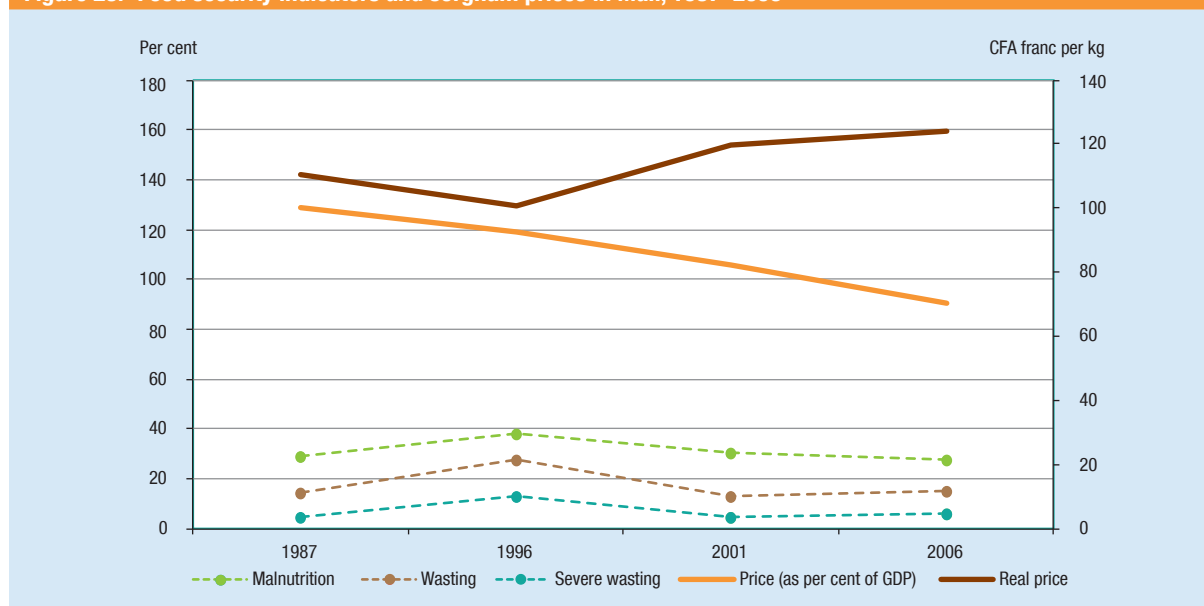
Sources: FAOStat and World Bank, World Development Indicators (various years).

market prices. On average, the NRP analysis suggests that Malian sorghum producers were effectively taxed during this period (figure 24), as the prices they received were nearly half the international prices, adjusted for shipping and overland transportation (Vitale, 2017b).

PRICES, GROWTH, AND POVERTY

Starting in the mid-1990s and after a long period of slow growth, Mali experienced rapid GDP per capita growth rates. Prices of sorghum followed this upward trend until the devaluation of the CFA franc in 1994, when prices began to display high year-on-year volatility. Prices of food staples affect growth and structural transformation in a developing country mainly through the share of food expenditure in total consumer spending and in the wages of unskilled labour.

The relationship between malnutrition and sorghum prices in Mali illustrates the impact of trends in staple food prices, as in many developing countries (figure 25). Indicators for malnutrition and wasting improved significantly between 1996 and 2006, which was also the period when real prices of sorghum increased by nearly 25 per cent, from 101 CFA francs per kg in 1996 to 124 CFA francs per kg in 2006. When adjusting sorghum prices to Mali's per capita GDP, we derive a proxy for annual income, reflecting the price level in the context of consumers' purchasing power (Vitale, 2017b). In other words, when taking into account the greater level of available income

generated by fast GDP growth, net food buying households had greater access to food in spite of the increase in sorghum prices, and net food sellers benefited from higher prices.

POLICY IMPLICATIONS

A policy of maintaining low food prices, especially as a result of cheaper imports as has been the case in Mali, can discourage smallholder farmers from adopting new technologies and investing in their farms, since price incentives are a key driver for any investment. In the longer term, such a policy could increase the income gap between rural and urban populations. As wages increase in sectors other than agriculture, rural incomes will remain stagnant or even fall, thereby increasing social pressures and presenting difficult challenges for policymakers.

Pricing policies are complex because of the difficulties of striking a balance between fair prices for farmers and affordable food prices for net food buyers. Sorghum producers would most certainly respond to higher prices with increased investment to raise productivity, which would contribute to Mali's overall economic growth and food security. An increase in the domestic supply of staples through productivity enhancing interventions could help keep food prices low. It would also help strike a better balance between rural and urban incomes, which could be further strengthened through social protection mechanisms in rural areas.

The next case study illustrates how Bangladesh navigated through these challenges, developing its rice sector to the benefit of both producers and consumers, while diversifying its economy.

6. RICE PRICES, GROWTH, AND POVERTY REDUCTION IN BANGLADESH

There are important similarities between the role of sorghum in Mali's economy and that of rice in Bangladesh.[25] Rice is a key staple food in Bangladesh, in addition to being its largest crop. Historically, it has dominated Bangladesh's agriculture and economy, contributing directly to GDP growth by way of the large share of food production in the national economy as well as its links to downstream trade, milling and processing.

The price of rice has therefore been an important but sensitive economic and political variable, affecting the macroeconomy and growth through wages, inflation, the balance of payments and the government budget. Along with its major contribution to total agricultural output, rice production is also an important source of rural employment for both men and women, accounting for nearly half of all rural jobs. A staple crop, it provides most of the calorie intake of rural households and the protein consumed by this group, shaping food security and poverty at the household level.

The decline in the rice sector's relative importance in the economy has been the result of agricultural diversification, a declining share of agriculture in GDP, and growth in both manufacturing (textiles), and services. In 2013, the share of the rice sector in total GDP was 7–8 per cent, down from 18 per cent in 1996. In spite of its gradually diminishing role in the overall economy over time, the rice sector has been contributing to growth in other sectors of the economy by ensuring food security and helping to keep food inflation low.

EVOLUTION AND REFORM OF THE RICE SECTOR

Rice is the most widely cultivated crop in Bangladesh, accounting for 75 per cent of the country's total arable area and about 70 per cent of its agricultural GDP. It is cultivated on small family farms and harvested three times a year. The two rainy season crops, Aman and Aus, are harvested in November–December and July–August respectively, while the dry season crop, Boro, is harvested in May–June. Aware of its dependence on rice, starting in 1972, Bangladesh's agricultural development policy gave

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[25] This case study is based on Murshid and Yunus, 2017.

Table 3. Annual growth rates of area yield and price of rice, 1972/73–2008/09 (per cent)			
Crops	**Area**	**Yield**	**Price**
Aus	-3.92	1.86	-0.43
Aman	-0.11	1.83	-0.07
Boro	4.79	1.72	-0.22

Source: Yunus and Shahabuddin, 2013.

priority to this crop with the objective of reducing the country's reliance on imported rice and improving food security. Its policy focused on making Green Revolution technologies (particularly a high-yield rice variety) available to farmers who relied on traditional methods and seeds.

Early public efforts were aimed at the rainy season crops, Aman and Aus. Eventually the focus shifted to Boro, the dry season crop, which requires irrigation and water control. Boro initially contributed very little to total production levels, causing a lean season and severe hunger in the northern districts of the country. Thanks to substantial investments in mostly small-scale modern irrigation techniques, it became possible to grow rice extensively even in the dry season. Bangladesh's total area under cultivation remained mostly unchanged between 1972/73 and 2008/09, but seasonal production levels changed greatly, making the dry season crop the most important harvest (table 3). Bangladesh's rice production tripled from 11 million tons in 1971 to 34 million tons in 2013 (Hossain, 2015), allowing the country to become largely self-sufficient in rice.

With rice production growing dramatically, cultivation moved away from being largely subsistence-driven to a more commercial activity, and important changes have taken place in the rice trade. The marketed surplus of rice is around 45 per cent of total production (Jabbar, 2010), indicating that some 15 million tons enter the market annually, but the bulk of it is sold by only 14 per cent of farms (Bayes and Hossain, 2007).

Milling capacity expanded dramatically with substantial investments in large-scale automated mills (Reardon et al., 2014). This technology added significant value by improving the quality and appearance of the final produce and employing modern bagging and branding techniques. Whereas some of the rice is sold locally, the bulk is handled by wholesale traders. Higher productivity and quality has led to two distinct market circuits: a small local circuit that caters to local demand and tastes, and a wholesale sector that caters to urban demand and tastes. The diversification of final product types has increased the profits of millers, and serves as an incentive for their continued investment in the sector (Murshid, 2015).

Figure 26. Evolution of rice prices in Bangladesh, India and Thailand, 1987–2014 ($ per ton)

Ex-Bangkok (5% broken)   Delhi (wholesale)   Dhaka (wholesale)
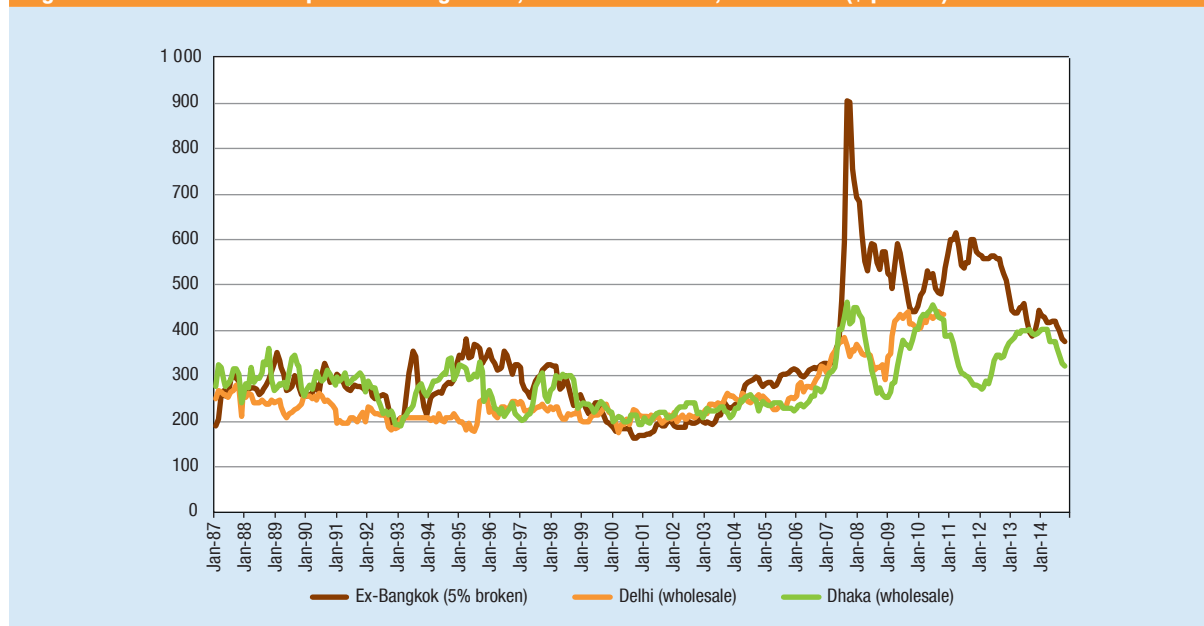
Source: Authors' calculations based on data from the World Bank and the Bangladesh Bureau of Statistics (BBS). Data on Delhi wholesale prices provided by Paul Dorosh.

The Bangladesh Government also promoted major institutional and policy shifts, moving away from interventionist practices and opening the domestic market to trade. For decades, much of the country's food security and trade policy had aimed at achieving food self-sufficiency through price controls of rice (Ahmed et al., 2000). These policies were partly motivated by the nature of the world rice market, considered to be very thin and not a reliable source of supplies to meet national demand through trade.

In addition to significant investments in agricultural research, irrigation and rural roads, the Government intervened in essentially all aspects of the market – production, trade, stocks, procurement and distribution – with the objective of attaining self-sufficiency and providing production incentives to farmers, while at the same time ensuring rice prices that were stable and affordable to consumers. For example, a large rationing and public distribution system, which entailed purchasing rice from farmers and then disseminating it to consumers at set prices, aimed at keeping consumer prices low and stable, and at ensuring a marketing outlet to producers. The Government was also the sole agent of food imports; trade by the private sector was illegal, as it was believed that it may result in excessively high prices. The Government also kept large reserves in order to ensure adequate food supplies at times of scarcity.

In the 1990s, due to the high cost of these policies and the related inefficiencies, the Government began

to gradually implement reforms designed to improve the competitiveness of the rice sector and scale back government intervention. It began to allow imports by the private sector, which resulted in a more rapid response to market demand, particularly at times of production shortfalls. On the consumer side, the rationing system ended, and public distribution was greatly reduced and redirected to a safety-net system. However, the Government continues to retain large reserves of rice stock in case of emergency. As part of trade liberalizing reforms, subsidies on inputs were cut and streamlined and duties on imported agricultural equipment were also reduced (which permitted, among other things, easier access to irrigation pumps). The reforms resulted in lower prices of capital goods and inputs, lower production costs and higher profits for producers (Ahmed, 1999).

Altogether, these initiatives helped increase competition and efficiency in the rice sector; the private sector entered the import-export market, handled input distribution more efficiently, and was able to respond more rapidly to changes in demand. Moreover, rice imports were particularly important in supplementing food grain supply and stabilizing prices following the 1998 flood which resulted in a 2.2-million-ton shortfall in rice production in the Aman season (del Ninno et al., 2001; Dorosh, 2001). In 2008, when India banned rice exports in a bid to stabilize rice prices in that country, prices in Bangladesh rose sharply, providing farmers with a strong incentive to produce more, resulting in a robust Boro harvest which calmed the market.

Figure 27. Rice prices and inflation in Bangladesh, 1987–2014
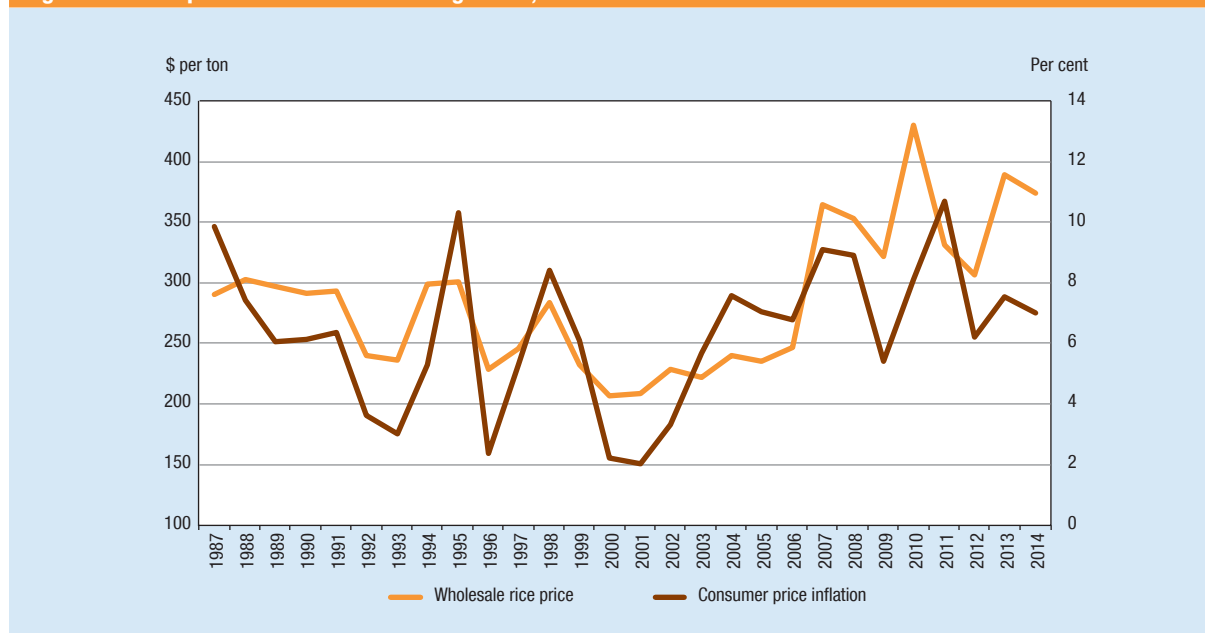
Source: World Bank, World Development Indicators for data on the inflation rate; data on prices derive from the authors' calculations based on data from the Bangladesh Bureau of Statistics.

The liberalization efforts of the 1990s opened Bangladesh to the world rice market, with domestic prices more closely following world market prices over time, although Bangladeshi prices tended to be higher than world prices for similar grades of rice (figure 26).

THE RICE SECTOR AS AN INTEGRAL PART OF THE ECONOMY

Due to the size of Bangladesh's rice industry and the importance of rice in the country's overall consumption, movements in rice prices are linked to the overall economy through various mechanisms, including inflation, government spending and employment.

Rice represents around 20 per cent of the expenditures basket in the country's CPI. For this reason, substantial movements in rice prices can drive the inflation rate, with potentially large macroeconomic effects. To the benefit of Bangladesh's economy, generally low and declining real prices of rice have contributed to low inflation over the past few decades, with annual rates never exceeding 11 per cent. In fact, Bangladesh's average annual rate of inflation of 6.4 per cent between 1987 and 2013 has been lower than the average rate for all LDCs, which was 8.1 per cent over the same period. Low inflation has provided a favourable climate for economic growth in Bangladesh through an increase in real income,

encouraging investment in the economy at large and promoting industrialization (figure 27).

Rice prices have also been related to employment and overall economic growth in various ways. The expansion of rice production during Bangladesh's Green Revolution created a large number of rural jobs, spurring demand and boosting employment.

At the same time, increased rice production kept prices low, which helped to increase real wages and improve food security. In the long run, and in nominal terms, the elasticity of the agricultural wage rate with respect to the price of rice is estimated at 1.89, implying that a 10 per cent increase in the price of rice leads to an almost 20 per cent increase in the agricultural wage. In other words, agricultural wages rose faster than rice prices between the early 1990s and 2014, contributing to greater food security and low food inflation. A different aspect of agricultural wages is that the expansion of rice cultivation during the dry season also narrowed the seasonal effects of rice prices on wages, contributing to poverty reduction. Stable rice prices stabilized real incomes not only in the non-farm sector, especially for women joining the manufacturing sector, but also from remittances (Zhang et al., 2013).

Rice prices had an additional and immediate impact on the balance of payments. Government policy sought to build rice stocks through aid and cover the remaining food deficit through imports. However, this exerted pressure on the balance of payments,

draining foreign currency reserves and influencing the exchange rate (Murshid, 1985). Today, this impact on the balance of payments has weakened due to large foreign currency reserves held by the central bank and lower food import requirements.

Similarly, the price of rice had a direct impact on the government budget. Demand for funds from the Public Food Distribution System (PFDS) to meet the cost of food subsidies, food-based safety nets, procurement operations and other interventions strained public finances. The budget continues to be affected by such operations, but liberalization of the sector, which included the downsizing of PFDS and the scaling-back of government interventions, has substantially reduced budgetary pressures (Murshid, 1998).

RICE PRODUCTION AND POVERTY ALLEVIATION

By creating the basis for the economy to achieve and sustain a growth rate of over 6 per cent, rice-led agricultural growth brought about a decline in poverty headcount rates. Empirical studies confirm that agriculture has been a major driver of poverty reduction since 2000, although no single factor is found to explain this; combining multiple activities and income sources appears key to reducing poverty (Khandker and Mahmud, 2012).

Historically the lean season has had strong adverse impacts on the poor as it has resulted in high pre-harvest food prices and a concurrent lack of work. It has been associated with a famine-like situation in the northern districts of the country, prompting impoverished peasants and workers to leave these areas in search of employment elsewhere. Therefore, the elimination of the lean season through technology adoption and investment in irrigation systems has had a particularly positive effect on the reduction of hunger and poverty.

While the effect of rice prices on urban households – assuming they do not produce rice – is straightforward, the net effect is more complex for rural households. Analyses suggest that an increase in the price of rice can bring about a small reduction in the national poverty rate – a 10 per cent increase is estimated to decrease the proportion of those living in poverty from 31.50 per cent of the total population (in 2010) to 31.23 per cent. Rural households, residents of the food surplus regions (Khulna, Rajshahi, Rangpur, and Sylhet), farmers and rich households gain from an increase in rice prices, whereas urban households and residents of the southern regions of the country lose.

These calculations do not take account of general equilibrium effects, such as an increase in the supply of rice, which in turn would generate additional employment. This induced demand for labour would put upward pressure on wage rates, and hence increase labour income of agricultural workers. To the extent that the poor obtain a significant share of their income from agricultural labour, this would strengthen the poverty-reducing effect of higher rice prices. As landlessness and the use of hired labour are pronounced in Bangladesh, the effect of rice prices on income via wage rates is likely to be even stronger.

CONCLUSIONS

Since the 1970s, technological improvements, investments in rural infrastructure and irrigation, and improved access by small family farmers to inputs and services have contributed significantly to increasing rice yields. Given that rice provides a considerable share of the population's calorie intake, rice prices are an important factor in Bangladesh's economic growth and development in general.

Reforms in the rice sector increased rice supply, while keeping rice prices low, which helped to reduce poverty and food insecurity. Increased efficiency and productivity enabled continued production expansion even when rice prices for producers were low. The price level also contributed to lower inflation, which created a more stable macroeconomic environment for investment, thus contributing to industrialization and economic growth. At the same time, with increasing wages as the result of structural transformation in the country, stable rice prices meant proportionally higher gains in real terms, especially for the poor and unskilled workers. Today, the rice sector continues to be an important part of the economy, but its contribution to GDP growth, inflation, wages and employment has been declining over time as a result of economic diversification.

7. DIAMOND EXPORTS FROM BOTSWANA AND SIERRA LEONE: THE ROLE OF INSTITUTIONS IN MITIGATING THE IMPACT OF COMMODITY DEPENDENCE ON HUMAN DEVELOPMENT

THE CONTEXT

Both Botswana and Sierra Leone are dependent on commodities to which they do not add significant value prior to export.[26]

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[26] Based on Boel, 2017.

Botswana has managed its revenues from diamond exports relatively well in order to develop its economy and reduce poverty. Consequently, its status has risen from a low-income country to an upper-middle-income country within the last three decades. Its poverty headcount ratio dropped from 29.8 per cent in 2002 to 18.2 per cent in 2009 (at the $1.90 per day poverty line in purchasing power parity (PPP)). This is a noteworthy performance compared with other African countries, even though a large proportion of the population remains vulnerable, particularly children under 15 years of age. Indeed, according to a recent poverty assessment by the World Bank, about 31 per cent of the poor were considered to be vulnerable over the period 2002–2010.[27]

Despite the challenges still facing Botswana, the country has been relatively successful in managing its economy. Several factors have contributed to its success, including diamond prices, governance and political stability. In 2014, exports of diamonds, pearls, precious and semi-precious stones accounted for 86 per cent of the country's total export revenues.

In Sierra Leone, commodities accounted for 97 per cent of its total merchandise exports, of which 12 per cent were from diamonds, pearls, precious and semi-precious stones in 2014–2015 (UNCTAD, 2017). The country has experienced very low levels of economic and human development due to a long civil war. Its poverty headcount ratio fell only slightly, from 58.5 per cent in 2003 to 52.3 per cent in 2011, according to the World Bank's World Development Indicators, and it is still classified as a low-income country.

This case study discusses the major factors explaining the distinct contribution of diamonds to economic growth, poverty reduction and development in these two countries.

Botswana has been exporting diamonds since the early 1970s, while Sierra Leone started exporting them much earlier, in the 1930s. The two countries are among the main producers and exporters of diamonds in Africa, almost all of which are exported. In 2016, Botswana produced 20.5 million carats of diamonds, while Sierra Leone produced 0.5 million carats. High export revenues, owing to high prices per carat, are expected to contribute to economic growth, poverty reduction and human development in both countries. Overall, despite higher export values per carat in Sierra Leone, Botswana has consistently produced larger quantities of diamonds (table 4).

[27] See: http://www.worldbank.org/en/country/botswana/publi-cation/botswana-poverty-assessment-december-2015

Table 4.	Production and export value of industrial diamonds in Botswana and Sierra Leone, 1999–2016			
	Production (thousand carats)		**Export value ($ per carat)**	
Year	**Botswana**	**Sierra Leone**	**Botswana**	**Sierra Leone**
1999	21 348	5	91	487
2000	24 635	42	74	32
2001	26 190	117	60	51
2002	28 368	205	70	84
2003	30 412	260	74	114
2004	31 036	692	89	183
2005	31 890	668	98	212
2006	34 293	603	97	208
2007	33 639	603	91	235
2008	32 276	371	110	266
2009	17 734	400	93	196
2010	22 018	438	121	242
2011	22 904	357	218	347
2012	20 554	541	171	302
2013	23 187	609	174	296
2014	24 668	620	188	357
2015	20 778	500	217	308
2016	20 501	549	178	289

Sources: UNCTADstat, United Nations data and the Kimberly Process online database (accessed 14 September 2017).

The diamond market, in general, and diamonds from these two countries in particular, have idiosyncratic characteristics that set them apart from the usual commodity markets. First, diamonds have a symbolic underlying value beyond their economic utility. According to the World Diamond Council, diamonds encompass deep emotional meaning, are considered precious and symbolize eternity. Second, Sierra Leone's alluvial diamond deposits (i.e. spatially dispersed in sand, gravel and clay) are mined by many informal artisanal miners. This poses challenges to coordination and effective supervision, and may have led to suboptimal production processes and greater illicit mining and exports. In contrast, Botswana's kimberlite deposits (i.e. found deep in the earth crust) are spatially concentrated and offer little opportunity for illicit mining. Production is therefore more centralized, with the State and its partners exploiting the mines collecting all the revenue (Davies and Dessy, 2012).[28] This highlights the critical importance of geology in the production and export of diamonds. Third, political and macroeconomic stability in Botswana has allowed the extraction of high volumes, while many years of conflict in Sierra Leone have deterred extraction.

[28] Sierra Leone started exploiting kimberlite deposits in 2003, which boosted production between 2004 and 2007.

Figure 28. GDP growth and diamond exports in Botswana, 1995–2015
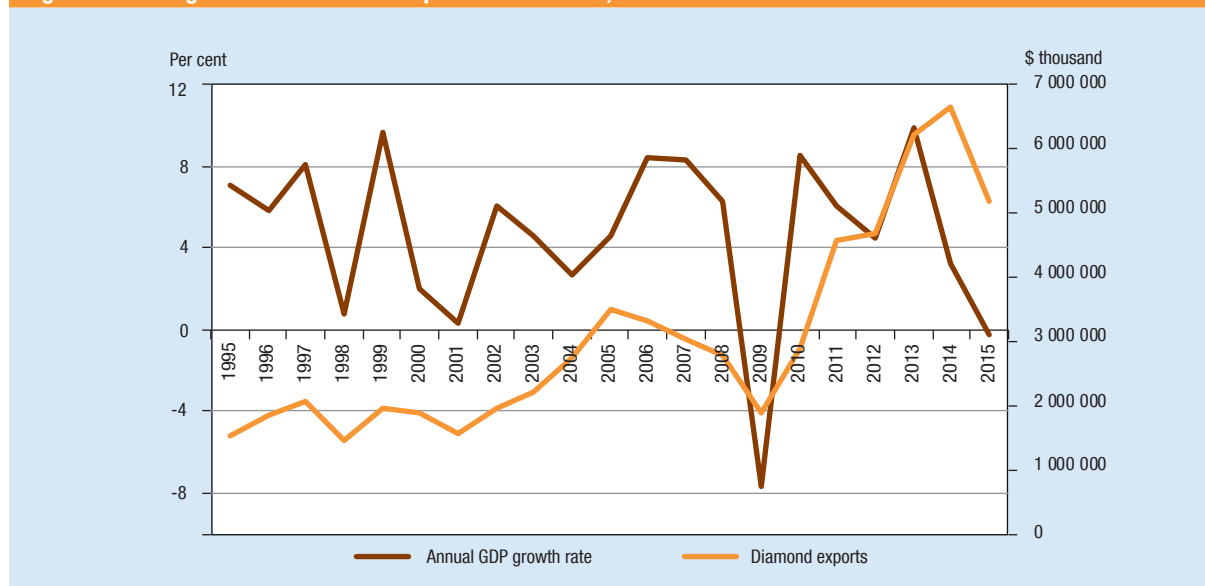
Sources: UNCTADstat and World Bank, World Development Indicators.
Note: Diamond exports refer to group 667 of the SITC, revision 3 (pearls and precious or semiprecious stones, unworked or worked).

Figure 29. GDP growth and diamond exports in Sierra Leone, 1995–2015

Sources: UNCTADstat and World Bank, World Development Indicators.
Note: Diamond exports refer to group 667 of the SITC, revision 3 (pearls and precious or semiprecious stones, unworked or worked).

CONTRIBUTION OF DIAMONDS TO THE ECONOMY AND JOB CREATION

In both Botswana and Sierra Leone, the diamond sector is a key economic sector, contributing to foreign exchange earnings, employment creation and tax collection. For example, in Botswana, the multinational company, De Beers (2015), claims that its direct and indirect contributions to employment amount to 34,160 jobs out of a labour force of 1,155,963 (representing 3 per cent of the total labour force). Government revenues from diamonds amounted to $2.2 billion in 2014. As at 12 October 2015, accumulated foreign reserves, mostly revenues from diamonds, were estimated at $8.3 billion (Cohen, 2015). Foreign exchange earnings from diamonds accrue equally to the Government and to De Beers, with which it has a joint venture for extraction and marketing.

In Sierra Leone, the Government does not possess assets in the mining companies. In addition, the number of people in mainly informal jobs generated by the diamond sector is estimated to be around one million out of a total labour force of 2,440,884 people, suggesting that almost 50 per cent of the total labour force is employed in the diamond-related informal sector.

Surprisingly, peaks in Botswana's diamond exports do not match peaks in its GDP growth (figure 28). The correlation coefficient between the two variables is only 0.14, suggesting that the contribution of diamond exports to GDP could be mediated through other factors, including governance. Indeed, Botswana ranks well in terms of its governance, whereas Sierra Leone has been systematically at the bottom of the list.[29]

In Sierra Leone, GDP growth has been relatively strong, especially between 2002 and 2013 (figure 29), and the relationship between diamond exports and GDP growth seems to be stronger than in Botswana, with a correlation coefficient of 0.43.

The economic performances of Botswana and Sierra Leone in response to changes in diamond prices indicate, to some extent, differences in institutional governance of the two countries.

MANAGING DIAMOND REVENUES: THE ROLE OF INSTITUTIONS

In Botswana, three funds have been in place since 1973 with the objectives of stabilizing the economy, servicing the public debt and fostering local development. The first is the Stabilization Fund, with the primary objective of mitigating the effect of fluctuations in the international price of diamonds, and therefore revenues accruing to the Government, on the economy and accumulating assets during boom periods. The second is the Public Debt Service Fund (PDSF), which is mainly responsible for servicing the public debt, but it also extends loans to public enterprises. The third is the Domestic Development Fund (DDF) which provides funding for development projects. These three funds are critical, since, through their stabilization function, they allow the Government of Botswana to plan and execute its investments with certainty. The funds also serve as effective channels for job creation, and help the country achieve its four national development objectives, namely rapid economic growth, social justice, economic independence and sustainable development (Maipose and Thapelo, 2009). They enable the country to pursue a countercyclical policy, accumulating foreign reserves during periods of high diamond prices and expanding

government spending during slump periods. Botswana's overall success has also been attributed to good State management and stable political institutions.

Botswana has also reformed its political process with regard to decisions on the use of revenues derived from diamonds. Its parliament is in charge of approving new investment projects contained in the six-year National Plan of Development (which is updated every three years). In addition, the parliament has decided to include recurrent expenditures on education, vocational training and health services in the country's investment projects. As a result, significant diamond revenues have been invested in education, health, roads and other basic infrastructure. For example, in 2005, about 26 per cent of total government expenditures in Botswana went to education, compared with 15 per cent in Sierra Leone; and Botswana spent 3 per cent of its GDP on health in 2013, compared with 1.7 per cent in Sierra Leone.

Botswana has recently adopted measures to move up the diamond value chain with the establishment of a diamond cutting and polishing industry to boost job creation and poverty reduction. By September 2013, about 21 firms were active in this sector (Honde and Abraha, 2015), but the effects of this policy on poverty reduction and on the broader economy are difficult to assess, since prices fluctuate based on the various forms of cut diamonds available.[30]

In Sierra Leone, no institution was set up to smooth the effects of price fluctuations. However, other types of institutions or funds were established. For example, the Diamond Area Community Development Fund (DACDF) was established in 2001 to fund development projects in producing areas by returning 0.75 per cent of duties on diamond exports to those areas (Maconachie and Binns, 2007; Kawamoto, 2012). Areas covered by the DACDF offered better job opportunities and had better infrastructure provision, but there were issues relating to mismanagement of these resources. To correct these shortcomings, the DACDF introduced new operational procedures and guidelines in 2008 with a view to improving local participation in the management of the fund and better accountability mechanisms (Kawamoto, 2012).

Sierra Leone joined the United Nations-supported Kimberley Process Certification Scheme (KPCS) in 2003 (United Nations, 2001). This process aims at preventing diamonds from funding conflicts, as they did in the country between 1991 and 2001. It helped Sierra Leone in its post-conflict era, even though the scheme's primary objective is to prevent diamond revenues from providing

[29] Worldwide Governance Indicators: http://databank.worldbank. org/data/reports.aspx?Report_Name=WGI-Table&Id=ceea4d8b

[30] https://www.bluenile.com/education/diamonds/shape/price-comparison

the means to buy weapons for war. Furthermore, in 2007, Sierra Leone joined the Extractive Industries Transparency Initiative (EITI) with the aim of enhancing its transparency and accountability. While this has yielded some results, it has not translated into a significant reduction in poverty. A number of implementation constraints, including limited institutional capacity and lack of effective participation by civil society, especially in the monitoring and evaluation phases, have limited the positive effects from the country's adhesion to the EITI (Maconachie, 2008).

LESSONS LEARNED AND CONCLUSIONS

The intrinsic differences between Botswana and Sierra Leone and their diverging policy choices explain, to a large extent, the different economic growth and development outcomes of these two countries.

Four elements facilitated Botswana's development: (i) a significant inflow of foreign aid; (ii) abundant diamond reserves in the form of kimberlite deposits (in contrast with Sierra Leone's alluvial diamonds); (iii) a successful partnership with a major multinational enterprise in the diamond market; and (iv) a small and homogeneous population (Maipose, 2008).

In addition, Botswana's choices illustrate well the benefits of public policies that give priority to investments in education, health, roads and basic infrastructure, all of which contributed fundamentally to its socioeconomic development (Pegg, 2010). The country has enjoyed macroeconomic stability thanks in part to a fiscal rule that limits the public expenditure-to-GDP ratio to 40 per cent. The Botswana Government's countercyclical policies set it apart from most of the resource-rich African countries that have tended to overspend during commodity booms and underspend, or be forced to borrow, in periods of commodity price downturns (Honde and Abraha, 2015). Botswana has escaped most of the symptoms of the Dutch disease experienced by most resource-rich African countries, and has mitigated the risks associated with high dependence on a single commodity relatively efficiently.

The country can continue to advance by consolidating its diamond cutting and polishing industry, pursuing further diversification, strengthening its economic policy and taking measures to reduce income inequality, which is among the highest in the world. Indeed, if Botswana were to significantly reduce its income inequality, poverty could drop to below 6 per cent of the population by 2030.[31]

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[31] http://www.worldbank.org/en/country/botswana/publication/botswana-poverty-assessment-december-2015

Some of Botswana's successful policies could inform Sierra Leone's policy choices in its pursuit of inclusive socioeconomic development. Stable institutions, peace and stability, and better governance, could enhance the contribution of diamonds to economic growth and human development in Sierra Leone.

8. USING TRADE POLICY TO DRIVE VALUE ADDITION: LESSONS FROM INDONESIA'S BAN ON NICKEL EXPORTS

This case study informs the wider debate over the use of trade policy in support of national development objectives.[32] Many CDDCs express frustration that after decades following orthodox development strategies based on free trade, they are no closer to diversifying their economies (UNCTAD, 2015).

The use of restrictions on the export of commodities drastically increased during the recent commodity price boom. For example, the OECD found that over 50 per cent of the 2,000 export restrictions on industrial raw materials in force worldwide in 2012 were implemented after 2009 (OECD, 2014). The desire to capitalize on high commodity prices explains some of this rush to tax or restrict exports. Trade policies with long-term development objectives that are unrelated to price, such as Indonesia's 2014 ban on mineral exports, also represent a more forceful approach by exporting countries to achieve commodity-led development outcomes that have largely eluded them. Other countries watched the outcome of the Indonesian ban with interest to gauge whether such an approach would help them achieve similar outcomes.

Indonesia imposed its export ban on unprocessed nickel and bauxite ores in January 2014, enforcing a requirement contained in Indonesia's 2009 Mining Law that miners process their ore domestically. With this export ban, the Government expected to compel miners and processors to build smelters in Indonesia, thereby increasing the country's share of value added from its mineral resources.

The Indonesian nickel export ban was the Government's response to a drastic acceleration in its nickel ore extraction rate, from an annual rate of 5 million tons in 1996 to 10 million tons in 2006, and to a further 71 million tons in 2013, on the eve of the ban. This acceleration was driven by demand from China, specifically from nickel pig iron (NPI) producers.

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[32] Based on Terauds, 2017.

Figure 30. Indonesian nickel ore exports vs. international nickel price, 2002–2013
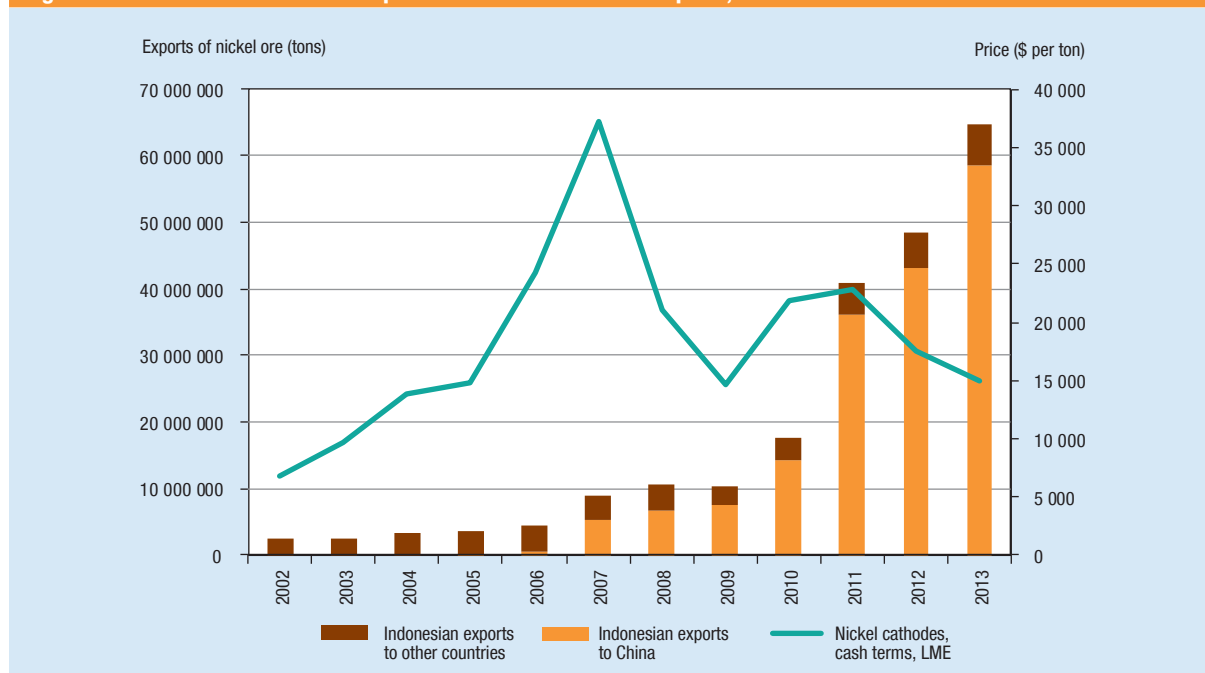
Sources: UNCTADstat for prices; Statistical Yearbook of Indonesia for nickel ore exports.

NPI is a primary product composed of nickel and iron, which is used as an input in Chinese steel mills. The NPI process was commercialized in China in the mid-2000s, after which production boomed to meet demand from the steel sector. Prior to the Indonesian export ban, the majority of Chinese NPI plants were calibrated to process Indonesian nickel ore, which has a higher average grade than competing sources. Figure 30 illustrates that the acceleration of Indonesia's nickel ore exports from 2007 to 2013 was due mainly to demand from China, and had a low correlation with international nickel prices.

Since Indonesia had vast nickel ore reserves, the concern was not related to depletion of the resource; rather it was believed that the export earnings – estimated at $4.5 billion[33] – did not justify the foregone value addition of exporting it in raw form, or the environmentally invasive methods used to extract the ore, which were among the major causes of deforestation in the country (FWI, 2014).[34] Nickel production in Indonesia generally takes the form of strip mining operations.

However, the ban entailed many opportunity costs. In addition to lost export earnings, the ban led to the closure of mines resulting in job losses. Jobs in Indonesia's mining sector had grown from an average of one million during the period 2004–2008 to 1.4 million by 2014. UNCTAD used the proportion of nickel in Indonesia's 2012 total export (by value) of "ores, metals and coal" (7.3 per cent) as a proxy to estimate the number of jobs generated by nickel mines. Its calculations indicate an estimated 100,000 workers employed in 2013, of which 30,000 were added during the 2009–2013 nickel ore export boom. Many of the new jobs created at strip mines that exported their ore directly were suspended following implementation of the 2014 mineral export ban.

Government revenues were another opportunity cost of the export ban. In the period 2012–2014, the Government collected average annual revenues from mining of approximately 51 trillion rupiah ($4.8 billion at average 2013 exchange rates). Applying the above index of 7.3 per cent, the rough annual contribution of nickel to government revenues is estimated to have been 3.7 trillion rupiah (or $350 million) in the period 2012–2014, of which raw ore exports contributed $270 million, representing the opportunity cost of the ban in government revenues.

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[33] Indonesia exported 64.8 million tons of raw nickel ore in 2013 (source: INSG) at an annual average price, delivered in Shanghai, of $70 per ton (source: Metal Bulletin).

[34] Although one of the objectives of the mineral export ban was to reduce deforestation and water pollution, the establishment of a domestic smelting industry poses significant threats to the environment and climate change.

On the eve of the ban, Indonesia had three operational nickel smelters. On Sulawesi, the two established smelters were the PT Vale nickel matte plant at Soroako, with a capacity of 80,000 tons of pure nickel equivalent (TNi), and PT Antam's ferro-nickel plant at Pomalaa, with a capacity of 20,000 TNi. On Java, the small PT Indoferro smelter began operations in 2013, with a capacity of 3,000 TNi of NPI. This total nickel smelting capacity of approximately 103,000 TNi consumed less than 10 per cent of the nickel ore produced in 2013. In the months following the ban, the Ministry of Energy and Mineral Resources registered more than 30 new nickel smelter[35] projects, nearly all of them NPI plants. The export ban cut off the supply of nickel ore on which NPI plants in China depended, disrupting that country's steel supply chains, given that the exports were in the form of NPI.

Beginning in early 2015, nickel prices collapsed, from nearly $16,000 per ton in December 2014 to below $9,000 per ton in December 2015. At these price levels, many of Indonesia's smelter projects became uneconomical and were abandoned. Nonetheless, by the end of 2016, the Jakarta Post reported that nine new nickel smelters had begun operations, most of them small in scale. Once these new plants reach full capacity, they will produce a total of approximately 150,000 TNi, more than doubling Indonesia's total nickel smelting capacity, to 250,000 TNi. This total capacity would consume approximately 13.9 million tons of nickel ore at an average grade of 1.8 per cent Ni, or 20 per cent of Indonesia's ore production in 2013. In addition, at full capacity, UNCTAD estimates that the new smelters will create 25,000 new jobs, given the average ratio of Indonesian smelters of one job per 6 TNi of capacity. Factoring these benefits, the policy could be considered a net success despite low nickel prices undermining many smelter projects.

In January 2017, the Government surprised nickel markets by relaxing its restrictions on exports of bauxite and nickel ores. According to the new changes, companies with smelters under construction will be allowed to export limited volumes of raw nickel ore, on the condition that they devote 30 per cent of their smelting capacity to low-grade ores (less than 1.7 per cent Ni), which are more expensive to process and therefore often discarded. The Ministry of Energy and Mineral Resources estimated that raw nickel ore exports

would total 5.2 million tons in 2017, which is still a fraction of the 64.8 million tons of nickel ore Indonesia exported in 2013.

This has raised questions as to whether the policy was indeed a success. The Government announced that its policy change was intended to help investors finance the continued construction of their smelters with earnings from their ore exports. The decision, however, came after government revenues plunged, due partly to the generalized crash in commodity prices from mid-2014 to mid-2016. As for the private sector, companies expressed concern that the profitability of their smelter projects would be undermined by the downward effect on nickel prices of a resumption of ore exports, as well as the costly new requirement to process low-grade ore. Uncertainty over shifting government policies can also make investors uneasy.

EARLY LESSONS

At a strategic level, the Indonesian ban on nickel exports is unlikely to be replicated by other CDDCs as part of their development strategies. Its preliminary success was largely due to the non-substitutability of Indonesian laterite nickel ore in the NPI process. A counter-example to the nickel export ban's relative success in compelling the construction of new smelters was the Government's ban on bauxite ore exports. With ready substitutes for Indonesian bauxite, aluminium refiners have shifted to sourcing bauxite ore from other countries, which have thus become net beneficiaries of Indonesia's ban. From this perspective, the Indonesian experience serves as a warning to other CDDCs to avoid a comprehensive export ban on commodities for which there are ready substitutes in the marketplace.

Moreover, the Government likely chose nickel and bauxite for the first phase of its export ban partly because these two minerals represent a relatively small share of its economy. At the time of writing, the Government continued to struggle to find a way to implement the export ban on more economically important and politically challenging minerals, such as copper. For CDDCs whose main commodity exports represent a strategic share of their economy, gambling on an export ban would be considerably riskier.

With respect to its implementation, Indonesia's nickel export ban is a successful example of resource-nationalist trade policy that does not run afoul of international trade law. The Government wisely limited the resource-nationalist tone of the ban, suggesting that it was aimed at pursuing

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[35] Smelting and NPI production involve two different pyrometallurgical processes. But for simplicity, "smelter" is used to refer to all plants using the different processes that transform nickel ore into primary and intermediate nickel metal products.

greater returns for Indonesians from their mineral resources without discriminating against foreign investors in this pursuit. For example, the ban does not challenge the sector's two established nickel metal producers in the country – PT Vale and PT Antam – and it welcomes Chinese steel producers as the main foreign investors in new smelter projects. This means the nickel export ban has thus far avoided provoking a dispute in the World Trade Organization (WTO).

However, the Indonesian example should also serve as a warning against including environmental conservation in the language of similar mineral export bans. Environmental concerns in the metals value chain demand considerable attention from policymakers, producers and consumers. But the primary compromise envisioned by the Indonesian ban – less ore extraction and more smelting – implies a corresponding environmental compromise: on one hand, a lower nickel extraction rate will reduce – although not eliminate – the role of nickel mining in deforestation; on the other hand, the new smelters will produce additional waste in the form of tailings and slag, as well as air and water pollution. The net environmental effect of this policy is mixed, and governments should consider other policy tools to address environmental concerns in the metals value chain.

This policy choice is also likely to harm relations with trade partners and foreign investors. To counterbalance the financial losses incurred by investors, the Government could address constraints they face. For instance, major challenges for investors building smelters in remote mining areas include a shortage of roads, ports, electricity and skilled labour. The Government could have accompanied its export ban with a coherent package of policies, programmes and investments to help investors overcome these challenges. This would also have contributed to the further development of the nickel-mining regions, and sent an important message to investors that the Government is committed to the development of the sector. As it stands, the largest share of the burden of the policy was borne by private investors whose supply chains were jeopardized by the ban. This undermines investors' confidence and harms possible long-term, mutually beneficial partnerships between the Government and the private sector.

Finally, similar interventionist trade policies may only be feasible when prices are strong enough to compensate for the significant opportunity costs of such policies.

9. ARE LOCAL CONTENT REQUIREMENTS A CATALYST FOR DEVELOPMENT? THE CASE OF OIL IN NIGERIA

INTRODUCTION AND BACKGROUND

For four decades prior to the 2014 oil bust, oil contributed about 80 per cent of Nigeria's annual export earnings and 70 per cent of the Federal Government's revenues.[36] However, oil in Nigeria has long been associated with a natural resource curse (Sala-i-Martin and Subramanian, 2003). Following the 1999 elections, it was hoped that the new Government would reverse this situation. A local content policy was adopted in 2000, with a series of directives that aimed at reaching a target of 70 per cent of local content by 2010 (Ovadia, 2013). Other flagship measures during the period 1999–2001 included the establishment of a 13 per cent derivation rule that provided for higher budgetary allocations to oil- producing states based on a sharing principle that implies the distribution of revenue based on where the oil originates. Thus, out of every dollar of oil revenue, 13 cents are allocated exclusively to the eight oil-producing states, 44 cents to the Federal Government, and 43 cents are shared among the state, local and federal capital governments. The Government also created the Niger Delta Development Commission with funding derived from a 3 per cent annual levy on oil companies. The Commission was mandated to assist the oil-producing states in the formulation and implementation of policies to ensure sound and efficient management of the resources of the Niger Delta area. In addition, a Fiscal Responsibility Bill was enacted in 2007 which provided for the allocation of excess revenue above a $60 per barrel price benchmark to an Excess Crude Account in the country's central bank.

In 2009, Nigeria adopted the Nigeria Vision20: 2020 Economic Transformation Blueprint aimed at making Nigeria an emerging country by 2020. It articulated the country's economic growth and development strategies for the period 2009–2020, and spelt out ambitious objectives of establishing medium-term national development plans and sector-specific policy targets. Economic diversification and industrialization were considered to be the main strategic drivers. It underlined the need for stronger intersectoral linkages and aimed to optimize human and natural resources for rapid and equitable economic growth. With regard to the petroleum industry, the Vision specifically stated: "A renewed effort will be made to ensure that the

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[36] Based on Chérel-Robson, 2017.

investments in the oil and gas sector have a desired trickle-down effect on the nation's economy and its populace. This will be done by re-invigorating the local content initiative in the sector. The starting point will be to ensure that the Local Content Bill and the Petroleum Industry Bill are passed into law" (Government of Nigeria, 2009). It also underlined the country's objective of increasing crude oil production and refining capacity to meet domestic demand as well as for export purposes.

Efforts for greater institutionalization of local content policies culminated in the adoption of the Nigerian Oil and Gas Industry Content Development Act in 2010 (the 2010 NOGICD Act). Its objective was to increase the economic and social impact of oil on the Nigerian economy through value addition, capacity-building and increased local participation along the value chain. As such, it created expectations of accelerating Nigeria's development trajectory. It made specific provisions for greater participation of Nigerians participation in the country's oil and gas industry, including the requirement that first consideration be given to Nigerian independent operators in the award of oil blocks, oil field licences and oil-lifting services, as well as in recruitment and training programmes. On the institutional front, the 2010 NOGICD Act established the Nigerian Content Development and Monitoring Board (NCDMB) and mandated it with the supervision, coordination, administration, monitoring and management of the development of Nigerian content. NCDMB was also tasked with overseeing capacity-building activities for local contractors and Nigerian companies.

The remainder of this case study discusses the limited effectiveness of Nigeria's local content framework in achieving its stated objective of "a trickle-down effect of the oil sector on the Nigerian economy and populace", and suggests the reasons for this.

LIMITED PROGRESS IN VALUE ADDITION AND SOCIOECONOMIC DEVELOPMENT

With regard to the impact of the local content framework on Nigeria's indigenous oil service companies, the NCDMB estimates that the national capture of annual investments in oil and gas increased from less than 5 per cent in 2000 to about 40 per cent in 2012. This represents tremendous progress, but it still lags behind the performance of countries such as Brazil, Malaysia and the Bolivarian Republic of Venezuela, where local content ranges between 45 and 75 per cent (Morris et al., 2012). In Nigeria, the proportion of domestic content was about 10 per cent in manufacturing, 55 per cent in fabrication and 90 per

cent in engineering over the same period. Regarding capacity-building, the competitiveness of a handful of Nigerian companies at the national and international levels provides evidence of the impact of Nigeria's skills development programmes (Ovadia, 2013). Nigerdock, for example, is credited with the fabrication of complex oil production platforms using 100 per cent Nigerian engineering and fabrication. However, the Nigerian oil sector is predominantly composed of activities in its downstream segment; value addition remains limited. With only three refineries functioning far below their capacity, the country continues to be a net importer of refined oil (World Bank, 2014a).

In terms of job creation, as expected from the capital-intensive oil industry, the local content policy had limited results. The NCDMB credited local content requirements with the creation of more than 30,000 new jobs by 2012, mostly in engineering, fabrication and oilfield services (Ovadia, 2013). However, oil workers account for less than 1 per cent of total employment, and expatriates dominate (PWC and World Bank, 2015). With regard to intersectoral linkages, structural constraints on the development of a vibrant private sector in the formal economy limited the indirect effects of the oil sector. Overall, aggregate unemployment rose from 12.7 per cent in 2007 to 23.9 per cent in 2011 (World Bank, 2015). Dutch disease contributed to the near collapse of the manufacturing and agricultural sectors. In the textile industry, for example, the number of workers employed in the mills fell from 350,000 people in its heyday in the mid-1980s to 25,000 in 2010 (Treichel, 2010). In the agricultural sector, the legacy of decades of policy neglect slowed down progress despite the Government's efforts to revive the sector. Agricultural growth was only 2.9 per cent in 2013, much below the sector's potential for expansion (World Bank, 2014a). In addition, environmental damage due to oil pollution in the Niger delta has led to the disappearance of livelihoods of farmers and fishing households in the region.

On the macroeconomic front, following decades of an erratic pattern, Nigeria's GDP growth rate fluctuated between 3 and 8 eight per cent during the period 2000–2010. Following the launch of Nigeria's Vision 2020, GDP growth was generally stable, hovering between 4 per cent in 2010 and 5.5 per cent in 2013. During those years, the Government was praised for its prudent fiscal, monetary and exchange rate policies (World Bank, 2014a). Moreover, the 2014 rebasing of the calculation of Nigeria's GDP revealed that the economy was more diversified and complex than had previously been estimated. By 2012, oil accounted for only 15.8 per cent of GDP – more than manufacturing (7.4 per cent) but less than agriculture (22.1 per

Figure 31. Composition of Nigeria's exports, 1962–2014

Exports of fuel (as a percentage of merchandise exports)

Exports of agricultural raw materials (as a percentage of merchandise exports)

Exports of manufactures (as a percentage of merchandise exports)
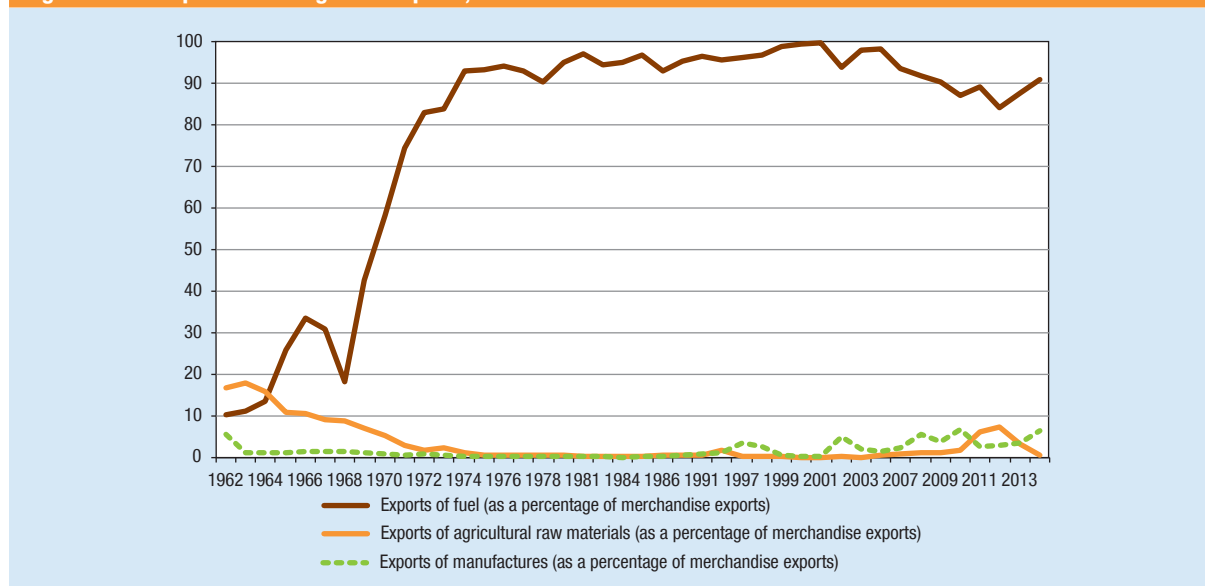
Source: World Bank, Word Development Indicators.

cent).[37] The rebasing also revealed that, paradoxically, the manufacturing sector appeared to be the single largest contributor to non-oil GDP growth in 2013 (22.1 per cent). Although oil remains central to Nigeria's economy, the sector has suffered from vandalism, theft, and the resulting higher security costs and low levels of investment, exacerbated by an uncertain regulatory environment (World Bank, 2014a). Notwithstanding these challenges, oil has consistently accounted for more than 80 per cent of Nigeria's merchandise exports since 1972, whereas the shares of agriculture and manufacturing remain negligible (see figure 31). As a result of the high dependence of Nigeria's budget and balance of payments on oil, the 2014 oil crash had a major impact on the country's macroeconomic performance. GDP growth fell from 6.3 per cent in 2014 to an estimated 2.7 per cent in 2015 (IMF, 2016), and by 2016, the Nigerian economy had entered into recession (IMF, 2017). This demonstrates the limited effectiveness of the 2007 Fiscal Responsibility Bill in reducing the impact of Nigeria's vulnerability to international oil prices.

Nigeria's socioeconomic performance during the period 2004–2010 also proved to be below expectations. Revised data from the Nigerian Bureau of Statistics (NBS) using adult equivalent scales indicate that the incidence of absolute poverty declined slightly, from 48.4 per cent to 46 per cent at the national level during that period. Limited progress occurred despite favourable conditions, at a time

when a series of local content measures designed during 2000-2004 were being implemented and when the price of crude petroleum rose from about $38 a barrel in 2004 to $79 a barrel in 2010. The incidence of poverty increased in three oil-producing states, namely Edo, Bayelsa and Abia, whereas it fell in Delta, Cross Rivers, Rivers, Akwa-Ibom, Ondo and Imo, and there was greater inequality in most of the states during the same period (figure 32).[38] The 10 states where the Gini coefficient was highest in 2010 include three of the five main oil-producing states, namely Delta, Cross River and Akwa Ibom. On the health front, official data show good progress on infant immunization, including in the major oil-producing states. Similarly, infant mortality rates at the national level declined significantly, from about 100 deaths per 1,000 live births in 2003 to 69 in 2013 (Government of Nigeria and ICF International, 2013). In addition, there has been significant progress in maternal mortality rates, access to safe drinking water and education (Government of Nigeria and IFC International, 2013). However, as on 2015, 30 per cent of youth, aged between 15 and 24 years, had not completed more than

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[37] Manufacturing includes food and tobacco (4.4 per cent of GDP).

[38] The discussion in this section is based on the revisions of poverty data extracted from the open data section of the website of the Nigeria Statistical Office. However, there are differing accounts of poverty figures in Nigeria. The Oil Revenue Tracking Initiative (ORTI), for example, states that, although in human development terms, the Delta is reported to fare somewhat better, contrary to reports of declining poverty, over 75 per cent of the people of the Delta rate themselves as poor, referring to poverty and underdevelopment in the region as a "glaring paradox" (ORTI, 2013).

Figure 32. Incidence of poverty across Nigerian states, 2004–2010 (adult equivalent scales)
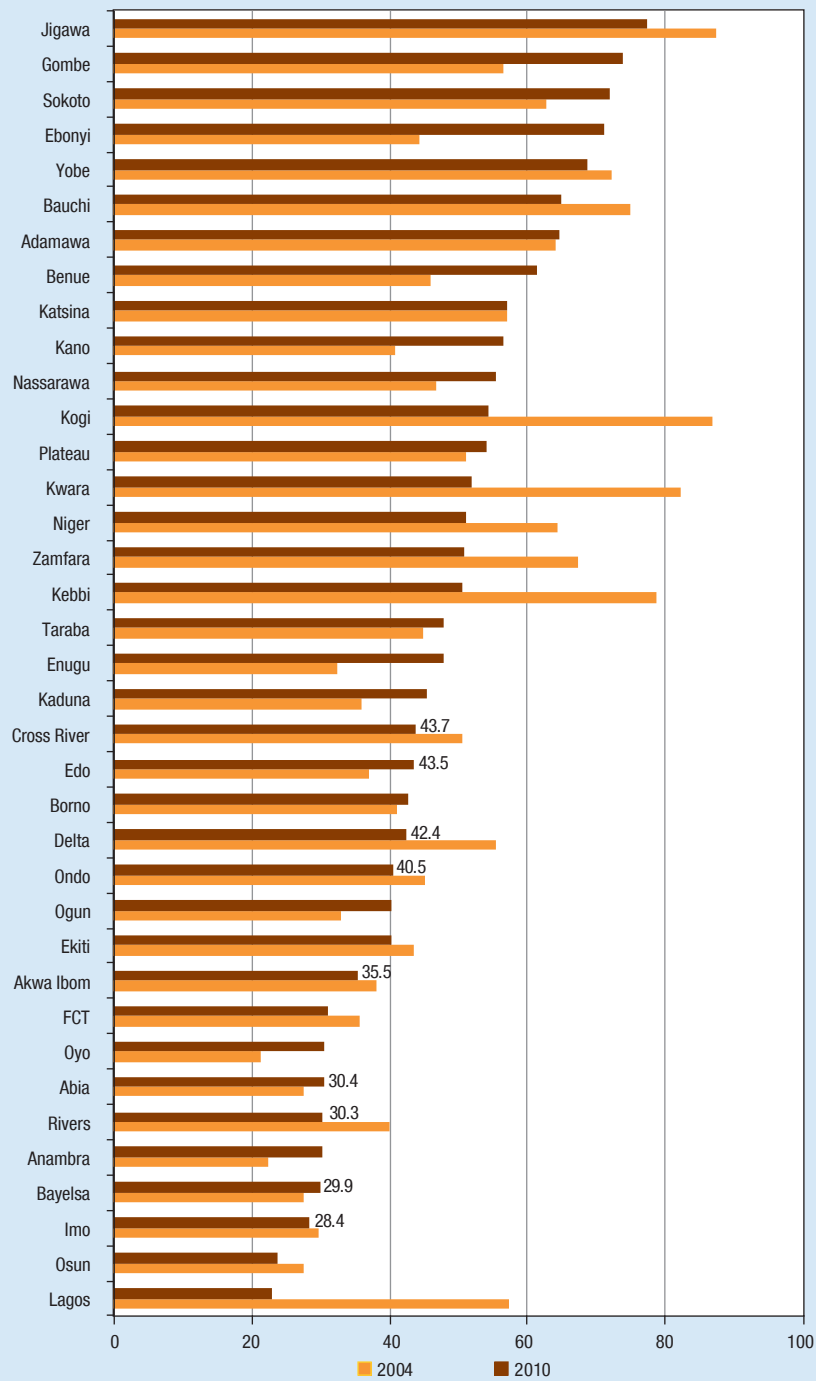
Source: Nigeria National Bureau of Statistics (revised data).

primary education, and illiteracy rates were high in many states, especially among girls in the northern states.

The pitfalls of the Nigerian experience are common in Africa where linkages between the extractive sector and the broader economy remain tenuous. Outside the continent, only a few mineral-rich developing countries such as Chile and Malaysia have achieved development that successfully built on their commodities. Another cohort of countries has shown mixed results. Oil-rich Indonesia, for instance, had similar political, socioeconomic and demographic characteristics as those in Nigeria. However, Indonesia's very different policy choices, including giving centre stage to macroeconomic stability and using oil revenues to develop the agricultural and manufacturing sectors, resulted in much better socioeconomic outcomes than Nigeria (World Bank, 2014b).

INSTITUTIONAL AND REGULATORY FRAMEWORKS

The uneven results in Nigeria's socioeconomic indicators from the implementation of its local content policies derive from several factors. First, although oil accounted for most of the Government's revenue, fiscal capacity was insufficient to collect revenue from non-oil activities, and only a small share of oil revenue was devoted to the social sector. Despite initial success in earmarking debt relief funds to the Government's efforts in working towards the MDGs, public expenditure on social sectors remained low, indicating the lack of specific mechanisms to promoted inclusive growth. Health expenditures, for example, represented only 1.7 per cent of GDP in 2013 (World Bank, 2014a). Second, loopholes in the legal and institutional framework relating to local content provided opportunities for corruption. The 2010 NOGICD Act, for instance, stipulates that the Minister of Petroleum Resources has authority over the awarding of oil blocks, oil field licences and oil-lifting licences in all contracts, and oversees the activities of all actors in the oil industry, including the collection of royalties, taxes and rents from oil companies (Government of Nigeria, 2010). And yet, there was no provision for checks and balances and no mechanism for accountability.

Third, the 2010 NOGICD Act was restricted to regulations pertaining to the oil and gas industry. The Act's primary focus was on company ownership by Nigerians, and the recruitment and training of Nigerians at the national level; it contained no reference to local content at the community level. Despite the emphasis on intersectoral linkages in the economic transformation blueprint of Nigeria Vision 20: 2020, the agricultural

sector was the only productive sector that had a transformation plan (Government of Nigeria, 2013). Master plans for other sectors such as manufacturing and infrastructure are either still in the making or had not yet reached the stage of parliamentary enactment. These deficiencies limited opportunities for optimizing the development linkages of the oil sector. Development issues at the state level were delegated to the Niger Delta Commission. However, there was little evidence of rigorous implementation of the Niger Delta Regional Development Plan.

Fourth, exogenous factors, such as the lack of appropriate regulatory mechanisms for illicit capital flows at the domestic and international levels, contributed to the diversion of billions of dollars of oil revenue. Throughout the 2000s, Nigeria consistently ranked among the world's bottom 25 per cent, according to Transparency International's Corruption Perceptions Index. It also tops the list of countries with the highest levels of capital flight in Africa (Ndikumana et al., 2015). The Government sought to tackle corruption through the establishment of an Independent Presidential Committee to investigate bad governance charges at the Niger Delta Development Commission, resulting in the uncovering of the diversion of resources related to Government contracts (Government of Nigeria, 2013). Although this was a major step forward, other measures, such as the establishment of the Nigerian Extractive Industry and Transparency Initiative, were not sufficient for addressing the fundamental sources of missing oil revenues in the country. Furthermore, at the international level, ongoing legal proceedings involving former ministers of petroleum resources and the Governor of the Delta State during the 2010–2015 period, as well as court investigations of cases of bribery by multinational companies, provide further evidence of insufficient regulations at national and international levels for preventing oil-related corruption and embezzlement.

CONCLUSION

Nigeria's local content initiative was successful in increasing domestic content and in creating a few competitive oil service companies in the country. However, its trickle-down effect in terms of socioeconomic development was limited and uneven. As such, it failed to be the right catalyst for fostering intersectoral linkages for sustainable economic diversification and industrialization. This failure originates in specific Nigerian characteristics, and confirms a number of assertions regarding the natural resource curse. Despite substantial progress in macroeconomic management during the period under study, Nigeria's GDP growth rate never reached the targeted 13.8 per cent set out in the blueprint for

economic transformation for the period 2009–2020. Furthermore, the persistence of oil theft, on-and-off violence in the Niger Delta and the threat of Boko Haram in the northern region show that the oil sector continues to perpetuate deep-rooted institutional deficiencies, rent-seeking and political patronage (Sala-i-Martin and Subramanian, 2003). The demise of agriculture and the constraints on further development of manufacturing represent missed opportunities in spurring industrial development in Nigeria, and in making it an emerging country by 2020. Finally, Nigeria's case demonstrates that local content policies in resource-rich developing countries are insufficient to translate natural resource wealth into development benefits. Rather, local content policies should be integrated within a broader development policy framework complete with carefully designed implementation plans and monitoring mechanisms.

10. THE MISSING LINK BETWEEN ECONOMIC GROWTH AND DEVELOPMENT: THE CASE OF COPPER-DEPENDENT ZAMBIA

Despite experiencing substantial economic growth and macroeconomic stability during the 2003–2011 commodity boom, copper-rich Zambia did not succeed in alleviating poverty and achieving sustainable development.[39] On the contrary, the share of its population living on less than $1.90 a day increased significantly, income inequality escalated and undernourishment reached record levels. These obstacles to sustainable development are inextricably linked to the country's acute dependence on copper exports.[40] While some CDDCs seized the opportunity of high commodity prices to support programmes targeted at the most vulnerable, Zambia has been hampered in this process by institutional and policy gaps, discussed below. As a result, the benefits of economic growth have not trickled down to the majority of the population.

This case study investigates the effects of commodity surges on development by reviewing Zambia's

[39] Based on a background paper by Jales, 2017.

[40] Copper accounted for 72.5 per cent of Zambian merchandise export earnings in 2011. Only five other developing countries derived more than 20 per cent of total merchandise export earnings from copper in the same year: Chile (54.6 per cent), Mongolia (51.6 per cent), the Democratic Republic of the Congo (48.9 per cent), the Lao People's Democratic Republic (39.1 per cent) and Peru (24.0 per cent). The four largest mining companies in Zambia accounted for 80 per cent of national copper production in 2015: Barrick Lumwana (wholly owned by the Canadian company, Barrick), FQM Kansanshi (majority-owned by the Canadian company, First Quantum Minerals), Konkola Copper Mines (majority-owned by the Anglo-Indian company, Vedanta Resources) and Mopani Copper Mines (majority-owned by the Anglo-Swiss company, Glencore).

Figure 33. Selected economic indicators, Zambia, 2000–2015
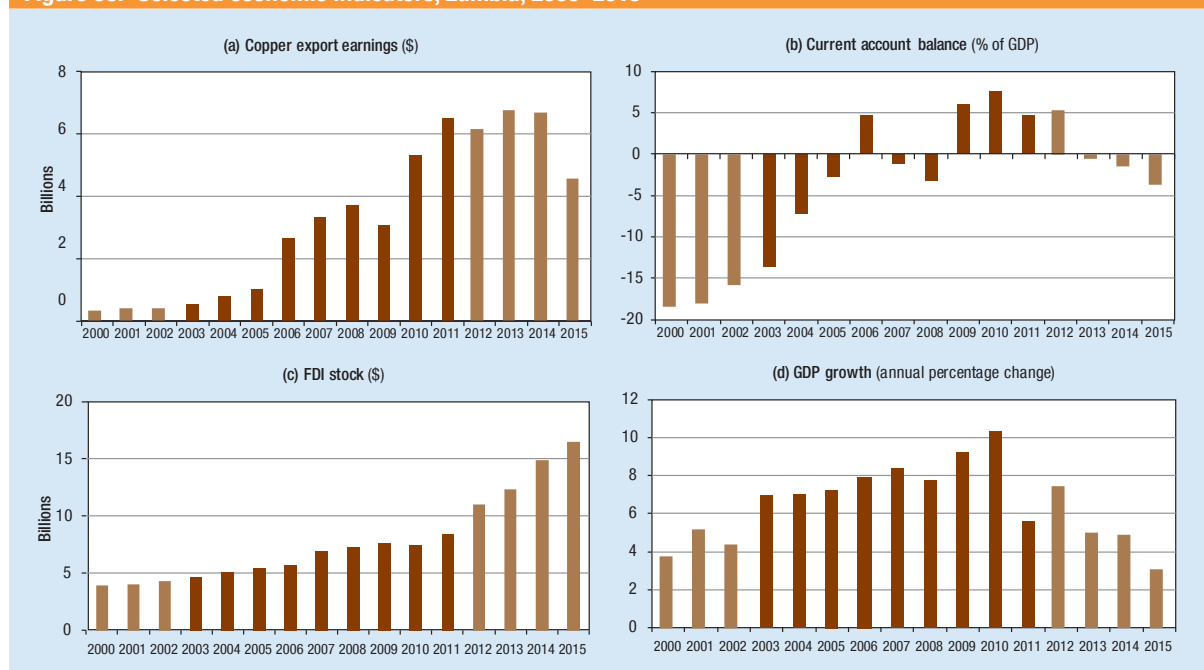
Sources: UNCTADstat and World Bank, World Development Indicators.
Note: The commodity boom years (2003–2011) are indicated in dark brown.

performance during the 2003–2011 boom vis-à-vis the track record of other copper-export-dependent developing countries. It identifies gaps in Zambia's development strategy that contributed to the deterioration of poverty indicators in spite of soaring commodity export revenues and high rates of economic growth. Inclusive economic growth that gives priority to employment generation for poor women and men, strong cross-sector linkages, effective government services and sound governance emerge as fundamental factors for ensuring equitable benefits for all.

ROBUST MACROECONOMIC PERFORMANCE

The commodity boom was instrumental in improving Zambia's macroeconomic performance between 2003 and 2011. The country obtained large windfall gains when the copper price (Grade A cathodes, London Metal Exchange) surged from an average of $1,779 per ton in 2003 to $8,822 per ton in 2011. Soaring prices increased copper export earnings more than tenfold, from $518 million in 2003 to $6.5 billion in 2011 (figure 33(a)). As a result, the current account balance reversed from a deficit of 13.5 per cent of GDP in 2003 to a surplus of 4.7 per cent in 2011 (figure 33(b)). Higher commodity prices also attracted investment, particularly in extractive industries: Zambia's total stock of FDI rose from $4.7 billion to $8.4 billion during the same period (figure 33(c)). Boosted by higher export revenues and investment inflows, the Zambian economy enjoyed an average annual GDP growth rate of 7.8 per cent between 2003 and 2011 (figure 33(d)), the seventh highest in Africa.

Zambia also benefited from sizeable foreign exchange reserves, low inflation, political stability, and a debt-relief package that cleared most of the country's foreign debt. Its apparent macroeconomic progress culminated in Zambia's reclassification by the World Bank as a middle-income country in 2011. Concurrently, Zambia was assigned a B+ sovereign credit rating by both Fitch and Standard & Poor's, which paved the way for the 2012 issuance of sovereign bonds, making the country one of only 11 sub-Saharan African international sovereign bond issuers.

The commodity boom exposed the highly inequitable distribution of copper mining rents in Zambia and facilitated efforts to increase taxation of the sector. Given the high upfront capital investment and long payback periods required to revive the mining sector following the privatization process of the late 1990s, the development agreements signed between the

Government and mining companies were very unfavourable for public revenues. For example, the mineral royalty rate of 0.6 per cent was among the lowest in the world. Additionally, the corporate income tax rate of 25 per cent was frequently not collected due to loss carry forward[41] and investment offsets against taxable income. As a result, the mining industry paid no corporate income taxes from 2000 to 2007. While the sector accounted for about 6.2 per cent of GDP in 2000–2007, its contribution to budget revenues corresponded to less than 0.1 per cent of GDP (IMF, 2015).

The unbalanced sharing of mining rents fuelled protests and strikes, especially as copper prices boomed, inducing the Zambian authorities to amend the fiscal regime. In 2007, the Government increased the corporate income tax rate to 30 per cent and the royalty rate to 3 per cent. In 2008, it introduced a graduated windfall tax and reduced the depreciation rate for capital expenditures for non-exploratory activities. In 2009, after threats of legal action and disinvestment by the mining industry, the windfall tax was replaced by a new regime with an effective tax rate of 47 per cent. These regulatory changes, along with increased copper prices and output, increased the mining sector's direct contribution to public revenue to nearly 3 per cent of GDP in 2010 (IMF, 2015). More remarkably, the share of government revenues in rents from the copper industry increased from 0.8 per cent in 2004 to 30.5 per cent in 2011, a level that was significantly closer to the norm observed in the copper sectors in Peru (33.7 per cent) and Chile (38.3 per cent among the 10 largest private firms), or the gold sectors in Peru (28.1 per cent), Mali (28.3 per cent) and Ghana (31.1 per cent) (UNCTAD, 2014).

Zambia's macroeconomic performance deteriorated significantly after 2011. Annual GDP growth, which had peaked at 10.3 per cent in 2010, declined to 3.2 per cent in 2015. The current account surplus of 7.5 per cent in 2010 reverted to a deficit of 3.6 per cent in 2015. Copper export earnings remained stable in 2012–2014, as production increases mitigated weakening prices, but fell by almost one-third in 2015 due to the scaling down of mining operations. Despite the slowdown, long-term investment remained attractive: Zambia's FDI stock nearly doubled, from $8.4 billion in 2011 to $16.5 billion in 2015. Nonetheless, fiscal accounts deteriorated sharply as a result of lower than budgeted revenues and higher expenditures on subsidies and wages. Faced with a sharp currency depreciation, high inflation and

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[41] Loss carry forward is an accounting technique that allows companies to apply current net operating losses to future profits, thereby resulting in reduced tax liability.

Figure 34. Poverty, food security and inequality indicators, Zambia, 2000–2015

(a) Poverty headcount ratio (bars) and prevalence of undernourishment (line), % of population
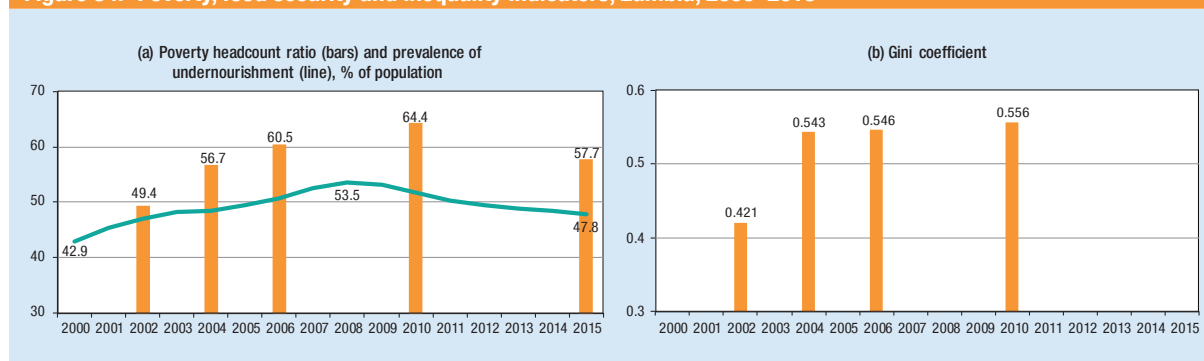
(b) Gini coefficient

Sources: World Bank, PovcalNet and World Development Indicators, and World Bank, 2017b.
Notes: Poverty headcount ratios and Gini coefficients were available for 2002, 2004, 2006 and 2010.

reduced investor confidence, the Government was left with limited fiscal space to compensate for slower growth. Sustained macroeconomic deterioration culminated in Zambia's request for support from the IMF in 2017.

DISAPPOINTING DEVELOPMENT RESULTS

Notwithstanding Zambia's positive macroeconomic outlook, there remained significant barriers to development during the period 2003–2011. Most notably, the country failed to reduce poverty and inequality, and eradicate hunger. Although the GNI per capita increased from $400 in 2003 to $1,390 in 2011, the poverty headcount ratio at $1.90 a day (2011 PPP) soared from 49.4 per cent of the population in 2002 to 64.4 per cent in 2010 (figure 34(a)). Given significant population growth during this period, the total number of Zambians living below the poverty line climbed from 5.7 million in 2002 to 9 million in 2010.

As adequate nutrition is the cornerstone for survival, health and development, Zambia's poor record on hunger eradication is cause for serious concern. The prevalence of undernourishment rose from 48.2 per cent of the population in 2003 to 53.5 per cent in 2008 and to 50.3 per cent in 2011 (figure 34(a)), the highest rate among countries for which data are available.[42] According to the World Bank's World Development Indicators, the absolute number of Zambians suffering from hunger soared from 5.5 million in 2003 to 7.2 million in 2011, and the food deficit depth increased from 368 to 442 kilocalories per person per day in the same period. Although the prevalence of undernourishment declined after the

copper boom, Zambia's rate in 2015 (47.8 per cent) was second only to Haiti's (53.4 per cent).

Zambia's macroeconomic progress in 2003–2011 also masked important inequalities in the distribution of welfare gains across the population. Along with skewed GDP growth, there was a substantial deterioration of the Gini coefficient, from 0.421 in 2002 to 0.556 in 2010 (figure 34(b)). According to the World Development Indicators, the share of consumption of the poorest 10 per cent fell from 6.1 per cent in 2002 to 3.8 per cent in 2010, while the comparable share of the richest 10 per cent rose from 33.7 per cent to 45.2 per cent. Thus, the sustained economic expansion derived from the copper boom benefited mainly a minority of Zambians.

Among the six developing countries that derived at least 20 per cent of total merchandise export earnings from copper in 2011, Zambia recorded the second highest average annual GDP growth rate during the period 2003–2011, but the worst performance in terms of poverty alleviation, hunger eradication and inequality reduction (table 5). With the exception of Zambia, all copper-export-dependent developing countries succeeded in reducing their poverty headcount ratios during the commodity surge. While the share of the population living on less than $1.90 a day declined by at least 10 percentage points in the Democratic Republic of the Congo, the Lao People's Democratic Republic and Mongolia, it increased by more than 15 percentage points in Zambia. A similar trend was observed for the prevalence of undernourishment.[43] The inequality record in copper-export-dependent developing countries was more heterogeneous: inequality fell in Latin America (Chile and Peru), remained virtually unchanged in the

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[42] Notable exceptions are the Democratic Republic of the Congo, Eritrea, Somalia, South Sudan, Sudan and the Syrian Arab Republic.

[43] Undernourishment data for the Democratic Republic of the Congo were not available.

Table 5. Selected socioeconomic indicators in copper-export-dependent developing countries, 2003–2011						
	Average annual GDP growth rate (%)	Poverty headcount ratio (%)		Prevalence of under-nourishment (%)		Gini coefficient	
	2003–2011	2003*	2011**	2003	2011	2003*	2011**
Democratic Republic of the Congo	5.9	94.1	77.1	n.a.	n.a.	0.422	0.421
Zambia	7.8	49.4	64.4	48.2	50.3	0.421	0.556
Lao People's Democratic Republic	5.8	26.1	16.7	34.8	21.4	0.347	0.379
Peru	6.3	12.2	4.3	20.9	10.7	0.537	0.455
Chile	4.3	2.8	1.3	<5.0	<5.0	0.546	0.508
Mongolia	8.3	10.6	0.6	34.7	24.5	0.329	0.339

Sources: World Bank, PovcalNet and World Development Indicators.
Notes: Countries are listed in descending order by poverty headcount ratio in 2011.
*   2002 data for the Lao People's Democratic Republic, Mongolia and Zambia; 2004 data for the Democratic Republic of the Congo.
** 2010 data for Zambia; 2012 data for the Democratic Republic of the Congo and the Lao People's Democratic Republic.

Democratic Republic of the Congo, rose in Asia (Lao People's Democratic Republic and Mongolia) and soared in Zambia. As a result, Zambia exhibited the highest income inequality among copper-export-dependent developing countries in 2011.

Nevertheless, not all social indicators deteriorated during the 2003–2011 commodity boom. Life expectancy at birth progressed from 49.5 years in 2005 to 57.5 years in 2011. The under-five mortality rate fell from 126.8 to 95.9 per 1,000 live births in the same period. The mean years of schooling for adults above the age of 25 years increased from 6.3 to 6.6, and the expected years of schooling for school-age children went from 11.7 to 13.2. Moreover, women's participation in household decision-making increased from 18 per cent of currently married women aged 15–49 years in 2002 to 39 per cent in 2007 and to 54 per cent in 2014. According to the 2013 MDG Progress Report, Zambia made significant progress towards meeting the eight MDGs in 2006–2010, particularly in primary school enrolment, child malnutrition and the fight against malaria. However, the country needs to make further efforts to reduce poverty and maternal mortality, prevent new HIV infections, ensure that children complete secondary school, increase access to clean water and sanitation, and ensure environmental sustainability (UNDP, 2013).

MISSING LINKS: POLICY AND INSTITUTIONAL GAPS

Economic growth is a necessary but insufficient condition for poverty reduction (Deininger and Squire, 1997; Dollar and Kraay, 2002; Bourguignon, 2004; Ravallion, 2007). The characteristics of a growth model – such as its capacity to integrate labour reserves into the productive system and distribute the gains from increased productivity fairly – are essential for delivering inclusive and sustained development. Zambia's poor record on poverty alleviation, food security and inequality reduction, despite robust macroeconomic performance, is due to a number of policy and institutional deficiencies, including weak cross-sector linkages, a poor business climate, unsatisfactory governance, inadequate distribution of welfare gains, and the absence of a solid social safety net to protect the most vulnerable.

Employment creation provides an essential link between economic growth and poverty alleviation. A development strategy that focuses on fostering inclusive growth must generate jobs for underprivileged population groups and raise their productive capacity through investment in skills and infrastructure development. However, the structural composition of the Zambian economy has contributed to persistent inequalities. Although the extractive industry was responsible for 22 per cent of GDP in 2011, it accounted for a modest and declining share of total employment: 2 per cent in 2008, 1.6 per cent in 2012 and 1.4 per cent in 2014 – a steep drop from the 15 per cent recorded in 1990 (Kalinda and Floro, 1992; CSO, 2011; CSO, 2013; CSO, 2016). Given the growing capital intensity of the copper sector, the large FDI influx during the 2003–2011 boom provided employment for a small, well-paid, skilled workforce, but created few opportunities for the majority of the population (over 60 per cent in 2011) who live in rural areas and depend mostly on subsistence agriculture for their livelihoods.

The structural vulnerability of Zambia's economy is exacerbated by the absence of significant upstream and downstream linkages to copper mining. As a result, the country does not benefit sufficiently from the potential spillovers that the copper sector could create. Direct State ownership, preferential sourcing and import substitution industrialization resulted in the development of a diversified local supply cluster in the 1970s, but mismanagement of the consolidated copper mining company in the 1980s and its subsequent privatization in the 1990s diminished local manufacturing capabilities and substantially reduced the depth of the mining supply chain (Fessehaie, 2012). Private mining companies currently rely largely on direct imports and sourcing from a network of agents and subsidiaries (Fessehaie et al., 2016). Although large mines source between 60 per cent and 86 per cent of goods and services required for their operations domestically, the vast majority of local suppliers are, in reality, merely importing intermediaries (AfDB et al., 2013). Therefore, Zambia's supply cluster is small in terms of value-added content, accounting for only around 4 per cent of total local sourcing, which was worth $2.5–$4 billion in 2012 (ICMM, 2014; World Bank, 2014c). While the 2013 Mineral Resources Development Policy introduced a framework for linkage development that relies on local content requirements for granting and holding mining rights, strong vested interests of intermediaries and importers have limited the scope and effectiveness of the reforms (Ramdoo, 2016). Skills scarcity and a weak manufacturing base present further hurdles to the expansion of local content, as also observed in the case study on Nigeria.

Zambia's failure to develop linkages between other sectors and the copper mining sector contrasts with Chile's success in fostering local content development and employment. The world's largest producer and exporter of copper, Chile has managed to use its mineral wealth to diversify the local economy and develop innovative industries, such as engineering. Without explicitly mandating local content requirements, Chile succeeded in developing downstream linkages by creating a strong enabling environment and culture of public-private collaboration. Moreover, the State-owned giant Codelco – the world's largest copper mining company – has contributed to the development of Chile's human capital and local industries through its internal policy of promoting the participation of local stakeholders. As a result, the proportion of engineering services provided by Chilean firms increased from around 10 per cent in the 1970s to 90 per cent in the 1990s (Havro and Santiso, 2008).

More recently, private copper mining companies have also partnered with Codelco to support local suppliers and strengthen their global competitiveness. And as Chilean copper industry suppliers have become increasingly competitive, they have started to penetrate international markets: 345 local suppliers exported goods and services worth $654 million in 2012 (Fundación Chile, 2016).

Zambia also suffers from a poor business climate and unsatisfactory overall governance. The country has made little progress beyond the introduction of trade and investment liberalization measures, in contrast with Chile's tremendous efforts to strengthen institutions and create a business-friendly environment. High finance and border costs, poor infrastructure, low human capital levels and lack of R&D capabilities are among the constraints that increase the vulnerability of the Zambian private sector to copper price fluctuations and hamper prospects for structural transformation. Data from the World Bank's Doing Business project suggest that the business climate has deteriorated since the 2003–2011 commodity boom: Zambia's global ranking fell from 80th in 2011 to 111th in 2015.[44]

The divergent poverty trajectories of Zambia and Chile reflect to some extent their varying development strategies. While Zambia privatized the copper sector and gave a prominent role to laissez-faire economic and social policies, Chile preserved State ownership of the country's main mining company, expanded income-support schemes for low-income families and increased public investment in social services. Socioeconomic inequality in Zambia was exacerbated by reduced public spending on health (from 4.2 per cent of GDP in 2003 to 2.1 per cent in 2011) and education (from 2.5 per cent of GDP in 2004 to 1.1 per cent in 2008). Meanwhile, Chile's public expenditures as a share of GDP increased both in the health sector (from 2.7 per cent in 2003 to 3.3 per cent in 2011) and the education sector (from 3.8 per cent in 2003 to 4.1 per cent in 2011). Contrary to Chile, which sought a balance between economic efficiency and public intervention targeted at human development, Zambia failed to promote social inclusion and improve the population's access to economic opportunities.

The rise in the prevalence of undernourishment and poverty in Zambia is also inextricably associated with rising food prices. According to the FAO Food Price Monitoring and Analysis Tool, the national average retail price of white maize, which is the country's

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[44] The 2011 and 2015 reports ranked 182 and 189 countries, respectively.

main food staple and covers around half of its total cultivated land, more than doubled between January 2004 (0.75 kwacha per kg) and March 2009 (1.79 kwacha per kg). As the relative price surge (140 per cent) was higher than the accumulated consumer price inflation rate during that period (125 per cent), the associated increase in food insecurity had a disproportionate effect on the most vulnerable.

The average retail price of white maize in Zambia continued to increase faster than inflation even after the 2003–2011 commodity boom, reaching a record level of 2.74 kwacha per kg in March 2016. Safety nets, which should play an essential role in the sharing of welfare gains from economic growth, cover no more than 1 or 2 per cent of the extreme poor in Zambia (World Bank, 2013). Therefore, the majority of the Zambian population has been left unprotected against food price shocks.

Finally, Zambia's vulnerability to the effects of climate change has further reduced the fragile economic gains made during the commodity boom. Severe drought, magnified by global warming, cut water levels in rivers and dams to record lows in 2016, gravely disrupting agriculture, electricity generation and mining. Resource-poor farmers, who rely on rain and lack irrigation facilities, were hit particularly hard. Since hydropower accounts for 95 per cent of electricity in Zambia, low water levels compelled the authorities to implement blackouts, which increased production costs and reduced employment in the energy-intensive copper sector.

CONCLUSIONS

Ensuring that growth is inclusive is at the heart of Zambia's socioeconomic challenges. The country's robust macroeconomic performance during the 2003–2011 commodity boom failed to benefit the majority of its population, resulting in increased poverty, undernourishment and income inequality. Transforming natural resource abundance into a blessing in Zambia will require political engagement, institutional reform and structural economic transformation.

RECOMMENDATIONS FOR POLICYMAKERS

This publication has discussed the linkages between commodity markets and development. Commodity dependence is strongly associated with lower human development in developing countries, and can hinder CDDCs' progress in implementing the 2030 Agenda for Sustainable Development and achieving its SDGs. The transmission of commodity price volatility from international markets to national economies has repeatedly challenged policymakers in CDDCs over the years.

This Report has used a CGE model to forecast commodity price trends until 2030 and their implications for economic growth and other variables that may influence development and inequality, such as GDP per capita, prices of factors of production, wages and household expenditures in different regions of the world. Generally, the results are driven by the fundamental forces of supply and demand.

There are numerous channels through which commodity prices can affect the economies of CDDCs at the macro level, including terms of trade, fiscal effects and investment flows. A sound understanding of these mechanisms is important to enable policymakers to build resilient economies and reduce their vulnerability to commodity price volatility, such as taking advantage of price booms and containing the effects of price slumps. Effective institutions that can implement countercyclical policies and policies that promote economic diversification in CDDCs can contribute to more stable growth rates and promote development and poverty reduction.

For many CDDCs, the challenge is to both expand and strengthen the linkages of commodity sectors with other sectors of the economy in a way that promotes inclusive growth, diversification, poverty reduction and food security. Often, the linkages with the local economy at the micro level are weak. This is particularly the case with capital-intensive sectors such as oil and minerals, which operate as enclaves and generate few direct jobs for the local economy. Agricultural commodities are more directly linked to inclusive growth, as the sector enjoys strong multipliers with the rural economy. In countries where food commodities account for a large share of national diets and consumer expenditure, fluctuations in prices of food staples, even if these are produced locally, can also affect the macroeconomy.

Sound policies that are necessary to enhance the commodity sector's contribution to inclusive growth include promoting value addition and embracing policy measures that enhance development linkages, for example. In addition, there needs to be greater investment in education and health, and in social

protection mechanisms such as the Bolsa Família in Brazil (which also has health and education components).

Strengthening the existing linkages of the commodity sector by increasing efficiency and productivity can have a significant and positive impact on growth. Especially for agricultural commodities, enhancing market transparency – particularly in local commodity pricing – and promoting the inclusion of commodity producers in the decision-making process are policy options that can bring widespread benefits and foster inclusive growth and development. In the extractive sector, strengthening the capacity of countries to provide field services, such as catering and transport, and subcontracting some maintenance services could generate substantial benefits in terms of jobs and income for domestic entities. Adding value to primary commodities, for example through value chains, where economically viable, is also an additional avenue for diversification. The Costa Rica case study illustrates how this could be achieved.

1. BUILDING A RESILIENT ECONOMY

1.1 SECURING GOVERNMENT REVENUES

Governments need to capture an adequate share of export revenues as a necessary means to fostering growth. Revenue constraints can undermine national capacity to implement countercyclical policies, provide social safety nets, promote diversification, and strengthen institutions. However, generating adequate fiscal revenue remains a challenge for many commodity-dependent developing countries.

Undertaxing extractive industries in order to attract foreign investors secures immediate gains at the cost of long-term, nationwide benefits, as illustrated in the case study on Zambia. In such cases, contractual arrangements and tax regulations need to be revisited to ensure a balance between private and public interests. Effective fiscal policies can enable governments to capture an adequate share of commodity export revenues to promote wider growth and development without undermining the sector's viability. For extractive industries, public capacity to negotiate, administer and enforce contractual arrangements and tax policies becomes essential for sustaining government budgets and macroeconomic stability. Measures to curb tax evasion are also important, in particular to combat illegal transfer pricing and misinvoicing of commodity export, both of which are often used to funnel funds abroad.

At the same time, ensuring that markets function well and that producers receive a fair share of global prices is

a fundamental incentive to sustain production and drive investment. In the case of agricultural commodities, governments should refrain from attempting to take too large a share of the production value at the expense of producers. A number of case studies in this Report have illustrated the risks associated with such practices, as they may undermine producers' incentives and the viability of the commodity sector.

Promoting and enabling economic diversification can broaden a government's tax base and reduce its dependence on one or a few commodities. Indeed, diversification reduces the exposure of government budgets to commodity price fluctuation.

1.2 PURSUING DIVERSIFICATION AWAY FROM PRIMARY COMMODITY EXPORTS

By reducing the weight of commodities in their export baskets, countries can contain the negative impacts of commodity price volatility on their economies and promote sustainable growth. By diversifying the economy and expanding production and exports of commodities and other products, CDDCs can reduce the importance of commodities in their terms of trade, public revenues and foreign exchange inflows, as the case of Costa Rica illustrates. This can significantly reduce the vulnerability of the national economy to commodity price shocks, thus strengthening its resilience. Diversification towards manufacturing and services exports can also underpin long-term economic growth by halting deterioration in the terms of trade due to the long-run trend decline in real prices of commodities, as discussed in chapter II.

The case studies on Nigeria and Zambia reveal the vulnerability of CDDCs to commodity booms and busts. For example, oil accounted for 80 per cent of Nigeria's annual export earnings in 2014, while copper accounted for 79 per cent of Zambia's total merchandise exports in 2014–2015. Owing to such high dependence of the Nigerian and Zambian economies on oil and copper, respectively, the slump in the prices of these two commodities had a significant impact on their economic performance, and thus on their development prospects.

Policies that promote diversification of national economies and their export baskets can go a long way towards addressing these challenges. For example, fiscal policies can be used to attract private sector investments in alternative sectors. The case study on Costa Rica illustrates well the avenues through which such policies can be pursued. The fiscal incentives granted to new enterprises helped diversify its economic base away from the production and export of bananas and coffee. A higher degree of openness, combined with fiscal incentives, and the creation of an

EPZ, attracted foreign investment and facilitated the development of a high-tech sector. Over the years, the country successfully reduced its historical dependence on coffee and banana exports and promoted growth, resulting in significant poverty reduction.

1.3 FISCAL POLICY AND COUNTERCYCLICAL EXPENDITURES

In CDDCs, the strong link established between economic performance and international commodity markets exposes national economies to fiscal uncertainty. CDDC governments have often adopted expansionary fiscal policies in times of high demand and high commodity prices, in what is characterized as procyclical fiscal policies. This has the effect of driving rapid economic growth, succeeded by a dramatic slowdown and even recession when prices decline. Many oil-exporting economies, including Angola, Nigeria and the Bolivarian Republic of Venezuela, have recently experienced this phenomenon.

In order to promote a more stable growth rate – that is, potentially lower growth than that driven by a commodity price boom, but longer periods of growth – governments should adopt countercyclical fiscal policies, accumulating savings during times of price booms, and increasing government spending during times of low prices to compensate for the economic slowdown. This would require political commitment, as pressure to increase spending is often observed during periods of commodity revenue windfalls.

It has been shown that revenue stabilization funds can help to smooth government expenditure (Sugawara, 2014) and avoid real exchange rate appreciation and the associated Dutch disease (UNCTAD, 2012). In this sense, revenue stabilization funds serve to regulate external volatility generated by commodity price fluctuations. In addition, stabilization funds can provide the means to transfer current revenue to future generations, and thus contribute to intergenerational fairness, in particular if commodity revenues are based on finite, or non-renewable, resources. However, stabilization funds are only effective if they are well managed and if spending and savings rules are well designed and adhered to.

The case study on Botswana's management of its diamond revenues shows that broad consensus over economic policy and strong institutions are key. Three different institutions with complementary mandates have mitigated the effects of fluctuations in diamond export revenues on the economy, serviced the national debt and funded development projects. The country also legislated on a fiscal rule that limits the expenditure-to-GDP at 40 per cent, facilitating countercyclical

policies and strengthening resilience to diamond price fluctuations. Such policies serve as stabilizing agents and contribute to national development strategies. By accumulating revenues at times of high export revenues, Botswana is able to plan for longer term investments.

1.4 GOOD GOVERNANCE

The existence of an enabling environment is a cross-cutting prerequisite for the design and implementation of the policies outlined above. National institutions dealing with the management of the commodity sector need the mandate, the technical capacity and the autonomy to implement policies that promote long-term national interests. In this regard, policy consistency and a long-term commitment by decisions-makers are fundamental to the creation of the favourable environment needed for CDDCs to achieve economic diversification and structural transformation. The limited success of the Nigerian local content policy shows that, once adopted, policies need adequate implementation mechanisms in order to deliver the desired results.

It is important to integrate the mechanisms that govern the commodity sector with the political processes that shape development. For example, in Botswana, revenues accrued from diamond exports are utilized in line with the National Development Plan to finance investment projects and expenditures on education, vocational training and health services, among others.

2. EXPANDING THE LINKAGES BETWEEN THE COMMODITY SECTOR AND THE REST OF THE ECONOMY TO PROMOTE INCLUSIVE GROWTH

2.1 ADDING VALUE THROUGH BACKWARD AND FORWARD LINKAGES

Expanding the linkages between the commodity sector and manufacturing and services can promote employment and income generation. Such linkages can be both forward (downstream) and backward (upstream). For example, in Costa Rica, policies and fiscal incentives promoted diversification not only of the national economy, but also of agriculture away from traditional exports, such as bananas and coffee, towards a greater variety of agricultural exports. In response to the incentives, Costa Rican producers also began to undertake export-oriented value-added agricultural production, establishing the country as a reliable producer of fresh and processed tropical fruits to the global market.

In Botswana, the establishment of a diamond cutting and polishing industry is an example of an industrial forward linkage in the mining sector. In Zambia, on the other hand, upstream and downstream linkages between the copper mining sector and the rest of the economy are weak. Local content policies could help create linkages to promote employment and growth. In Nigeria, local content policies have, to some extent, promoted backward linkages, with international oil companies operating in the country relying on domestic information and communications technology firms. However, although local content requirements may succeed in increasing the share of national participation in the industry, they are insufficient to promote wider development linkages and social inclusion as the case of Nigeria illustrates. This is because intrasectoral linkages are limited, and many mineral commodities are concentrated in only one or a few geographical areas. This results in insufficient "trickle-down" effects to the population at large. Local content policies should thus be an integral part of a broader set of policy strategies pursued by countries to achieve structural transformation.

Trade policies, and more specifically export restrictions, have also been used to stimulate value addition and create forward linkages. However, the case study on nickel in Indonesia illustrates that this policy option can be risky. Only rarely can CDDCs afford to impose an export ban or have sufficient leverage to require the private sector to invest in a specific sector. In Indonesia, the ban on nickel exports in 2014 resulted in an increase in the country's smelting potential, although the subsequent decline in nickel prices jeopardized the sustainability of such forward linkages. On the negative side, the ban resulted in a loss of mining sector jobs and export revenues. It should be pointed out that Indonesia could afford such a ban because nickel exports represented a relatively small proportion of the country's total exports. An export ban would be challenging and risky for a developing country that depends on only one or two commodities for export earnings, as is the case with many CDDCs.

2.2 SOCIAL PROTECTION MECHANISMS

Economic growth is a necessary but insufficient condition for reducing poverty and inequality. Governments need proactive policies and measures that target the poor and enable them to participate in and benefit from the economic growth and structural transformation processes. For CDDCs, ensuring that the governments obtain a fair share of the revenues from commodity exports remains a challenge. This applies, in particular to capital- intensive commodities such as minerals and oil exports. sharing the gains from export earnings remains a challenge, especially in the case of capital-intensive

sectors such as mineral and oil production. Often, economic growth spurred by commodity exports does not translate into poverty and inequality reduction, as in Zambia, for example, where food security and poverty indicators worsened considerably between 2003 and 2011, despite strong GDP growth.

Social protection policies that target the poorest, transfer income and promote social inclusion can complement policies that promote macroeconomic stability, make growth inclusive of the poor and the vulnerable, reduce poverty and inequality, and seek to achieve food security. Safety nets and cash transfers, when linked with stabilization funds that mitigate the effects of fluctuations in export revenues, can also help secure access to food in times of commodity price slumps. And during periods of rising prices of food staples, social protection mechanisms can contribute significantly to food security and nutritional outcomes for the poor. Social safety nets are effective if they are comprehensive and well targeted, and if they address the policy objective as directly as possible.

In commodity-import-dependent developing countries, social safety nets can help maintain access to food during times of stress or high prices. For instance, in reaction to the food price hikes of 2008, 23 countries introduced or increased cash transfer programmes, 19 introduced or increased food assistance programmes, and 16 took measures to increase disposable incomes (FAO, 2009). Many of these countries were dependent on commodity imports. Ideally, targeted measures are needed as part of social safety nets aimed at maintaining the real incomes of the poor. General subsidies for food or other essential consumption goods are often regressive, and may entail enormous fiscal costs during times of high prices. However, proper targeting requires administrative capacity and carries a cost (Ravallion, 2008). Promoting inclusive growth is all the more important for countries in which the commodity sector has few linkages with the local economy, which often characterizes minerals but also agricultural commodities produced by large commercial farms, such as those engaged in soybean production in Argentina and Brazil. Both countries implemented social protection policies with successful outcomes, including reducing food insecurity, poverty and inequality. Brazil's Bolsa Família, a conditional cash transfer programme requiring parents to ensure that their children attended school and had regular health check-ups, has become a reference for developing countries worldwide.

Allocating commodity export revenues to investments in education and health, as well as to infrastructure development can also contribute to the inclusion of the poor in the growth process. Botswana's performance in developing its economy and reducing poverty can be attributed to well-designed countercyclical policies

that have used the revenue from diamond exports for significant investments in education, health and infrastructure. However, even with these successes, Botswana still has a highly unequal society, with a Gini coefficient in excess of 0.5, which is among the highest in the world. This illustrates the challenge of achieving inclusive growth even with good management of commodity revenues, and strengthens the case for the use of social protection mechanisms.

3. PROMOTING INCLUSIVE GROWTH BY STRENGTHENING EXISTING LINKAGES BETWEEN THE COMMODITY SECTOR AND THE REST OF THE ECONOMY

3.1 INCREASING PRODUCTIVITY

Improving productivity in the agricultural commodities sector in CDDCs can augment export revenues and support interventions to promote growth and structural transformation. As such, they can contribute to inclusive growth in countries that depend on exports, as seen in the case of cocoa in Ghana, or in countries where food staples play a central in the national economy, such as rice in Bangladesh.

Sustainable productivity improvements result in higher incomes for smallholders, strengthen demand for non-food goods and promote employment and increases in unskilled wages, thereby initiating rural economic development.

Technology adoption (e.g. use of high-yield seeds, adequate levels of fertilizer use and irrigation) was the main factor contributing to an increase in rice yields in Bangladesh. This, combined with the gradual liberalization of the national rice market, provided farmers with the incentives needed to produce and sustain robust rice crops. Given the importance of rice in the local diet, the increase in productivity improved nutritional levels and rural incomes, and helped boost development in other sectors, including promoting Bangladesh's industrialization. Also, the availability of ICT-based agricultural services can improve the efficiency of the agricultural sector by disseminating information relating to market prices, weather forecasts and other relevant information (UNCTAD, 2015).

The establishment of EPZs can promote industries engaged in the production of non-commodity goods for export. A good example is the high-tech industry established in Costa Rica in the late 1990s, which has

now overtaken traditional sectors in terms of export earnings. However, it must be noted that EPZs, which help boost macro-level growth and export revenues, can only contribute directly to achieving poverty reduction and income equality if their linkages with the local economy are relatively strong. Costa Rica also invested in the production of high-value food products, added value and diversified its agricultural sector and its export basket of food commodities, all of which played an important role in poverty reduction.

Ghana has also made important socioeconomic improvements, made possible, in part, by considerably increasing productivity in its cocoa sector. This was achieved through a comprehensive package that increased fertilizer use, pest control, and take-up of higher yield cocoa varieties. Higher farm-gate prices, market transparency and enhanced market information also contributed to increased production. A change in policy that enabled farmers to obtain a higher share of international prices was an important incentive to Ghanaian farmers. Since Ghana's agriculture is based on small-scale farming, farmers' income gains had a strong direct impact on national poverty reduction. In order to sustain such productivity increases in the long term, it is indispensable that countries renew their commitment to invest in agricultural research and sustainable agricultural production intensification programmes that address current and emerging challenges, especially those related to climate change.

In Mali, sorghum production remains largely one of subsistence, in part because of lack of incentives to farmers to increase production. Mali's policy of keeping the price of rice – an imported food staple – low in order to satisfy urban consumers seems to have had a negative impact on sorghum production. Given that sorghum is important for food security and involves a large number of small farmers in rural areas, this policy could pose major long-term challenges to both national food security and the macroeconomy.

3.2 PURSUING TRANSPARENT PRICING POLICIES

Prices are important incentives to producers and play a key role in their decision-making processes. Excessive taxation and monetary policies that keep exchange rates artificially overvalued are a strong disincentive to investment.

Determining an optimal taxation level – one that boosts government revenues but does not undermine investors' profitability and interest in the commodities sector – is inherently difficult, and may change over time as productivity and market conditions shift and economies evolve. In the case of food staples, this is all the more

complicated, since optimum prices for producers and net food buyers compete in opposite directions.

The case study on the soybean industry in Argentina illustrates well the difficulty of keeping a balance between government and producer revenues in times of adverse economic conditions. With the decline in international soybean prices, taxes on soybean exports were maintained at unsustainable levels, rendering soybean production unprofitable for farmers. Once these policies were revised, the sector recovered. Prior to 1983, the cocoa sector in Ghana also suffered from a non-transparent pricing policy that transferred to producers a disproportionately low share of international prices. Ultimately, farmers had no incentives to maintain or increase cocoa output. This policy was later revised to provide important incentives to revive the sector. Those incentives included involving farmers (represented by a "chief farmer") in the decision-making process, and allocating to them a larger share of international cocoa prices, while also improving competition by authorizing the purchase of cocoa by licensed companies (in addition to the parastatal marketing board).

4. CONCLUSIONS

In the absence of unforeseen events, commodity prices are projected to increase only marginally until 2030 (with the possible exception of oil prices). A declining long-term trend in prices that may occasionally be interrupted by spikes continues to underline the need for sound management of commodity export revenues. Commodity-dependent developing countries need to explore the policy space available to them to overcome the challenges to their structural transformation.

This will require an improvement in governance creating an enabling environment, and designing and implementing a combination of policies and measures that prevent commodity price volatility from being transferred to national economies. These include fiscal, sectoral and social policies, many of which have been discussed above.

Successful implementation of the 2030 Agenda for Sustainable Development and achieving the SDGs will require concerted efforts by governments, academia, the private sector and civil society. Policy actions in CDDCs will need to go beyond sound macroeconomic management. Most of all, the adoption and implementation of redistributive policies remains a key challenge facing governments in these countries. The economic policies described above will need to be complemented by policies aimed at promoting social inclusion, nutrition, health and education to ensure that structural transformation truly leaves no one behind.

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