OCCASION

This publication has been made available to the public on the occasion of the 50th anniversary of the United Nations Industrial Development Organisation.

DISCLAIMER

FAIR USE POLICY

CONTACT

Please contact publications@unido.org for further information concerning UNIDO publications.

For more information about UNIDO, please visit us at www.unido.org

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
Vienna International Centre, P.O. Box 300, 1400 Vienna, Austria
Tel: (+43-1) 26026-0 · www.unido.org · unido@unido.org

WORKING PAPER 01/2011

Commodities for Industrial Development: Making Linkages Work

UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

DEVELOPMENT POLICY, STATISTICS AND RESEARCH BRANCH
WORKING PAPER 01/2011

Commodities for Industrial Development: Making Linkages Work

Raphael Kaplinsky
Professor
Development Policy and Practice
The Open University

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
Vienna, 2011

Acknowledgements

This working paper was prepared by Prof. Raphael Kaplinsky under the supervision of Ludovico Alcorta, Director, Development Policy, Statistics and Research Branch, UNIDO.

Table of Contents

List of Figures

List of Tables

Executive Summary

It is widely believed that industrial development in commodity exporting low and middle income economies is disadvantaged as a direct consequence of the exploitation of natural resources, that is, that such economies suffer from a resource curse. The reasons put forward for this are varied. They are said to have suffered from the Dutch disease whereby large resource rents and appreciating exchange rates undermine traded goods sectors such as manufacturing. In addition, commodities have undergone both a long-term decline in their terms of trade with respect to manufactures, as well as experiencing high price volatility. Hence, commodities seldom provide the regular and sustainable surpluses required to promote development. It has also been argued that by their nature, commodity production is an enclave activity and has few external economies and that they entail few developmental spillovers to industry. In sum, therefore, the conventional wisdom has been that commodity exporting economies not only have relatively poor industrial prospects, but insofar as these exist, that industrial opportunities arise in sectors unrelated to commodities production.

In this working paper—the first of three focusing on the prospects for industrial development in commodity exporting economies—we challenge this conventional wisdom. We begin by reviewing the literature on the Resource Curse hypothesis and draw the conclusion that whilst there may be an association between commodity intensity and relatively low growth rates, this association is quite weak. Moreover, where it occurs, it is often due less to a causal relationship than to weak pre-existing industrial structures and inappropriate policy responses in commodity dependent economies. Indeed, a review of the historical experience of some high income economies such as the U.S., Canada, Sweden and Australia shows that these economies not only built their industrial competences in part by developing linkages from the commodity sectors, but also that these industrial competences fed back into their commodities sectors, thus enhancing commodity recovery rates and reducing costs.

Whatever the historical experience may have been, recent decades have seen three sets of changes which force a modification in the approach adopted towards industrial development in commodity exporting low and middle income economies. First, many of the policies which have delivered industrial progress in the past are increasingly being foreclosed. The reduced capacity to protect domestic industry and increased competition from imports has made inward-oriented industrialization less attractive. The possibilities for export-oriented industrialization have similarly been restricted by intense competition from China and other East Asian economies. Second, the boom in commodity prices—already longer than any previous boom in commodity

prices—is likely to be sustained for some years to come (despite the likelihood of a near-term collapse in prices due to the activities of speculative financial investors). Coupled with continued and indeed heightened competition in the global manufacturing sector, it is consequently possible that the historical decline in the commodities-manufactures terms of trade will be arrested, providing sustained natural resource rents. And third, the progression of global value chains has led to a change in corporate policies in which lead commodity firms have an active interest not only in outsourcing, but in near-sourcing the supply of many of their inputs. This suggests corporate strategic agendas which are diametrically opposed to the enclave mentality that has characterized their activities in the past.

In thinking about how commodity exporting economies can take advantage of these developments, it is helpful to use a taxonomy provided by Albert Hirschman in the 1970s. He suggests that three possible linkages exist between the commodity sector and the industrial sector. The first of these are fiscal linkages in which a measure of resource rents are appropriated by the government and used to promote industrial development in unrelated sectors. The recent commodities boom, of course, makes this much more feasible than during the era of declining commodity-manufactures terms of trade. The second linkage is the consumption linkage in which incomes earned in the production of commodities generate the demand for locally produced industrial goods. However, the removal of protective tariffs has meant that in the modern era, many of these consumption leakages are being experienced abroad rather than domestically. Third, according to Hirschman, are the production linkages—backward in the supply of inputs and forward in the processing of commodities. We add to this the possibility of horizontal linkages in which capabilities developed in backward and forward linkages into commodities serve the needs of other sectors.

In this working paper we focus on production linkages; subsequent reports will also consider fiscal and consumption linkages. We argue that there are a number of reasons to believe that there is substantial scope for the expansion of production linkages between the industry and the commodities sectors. This is in part attributable to the desire of lead commodity firms to increase their outsourcing and in part because commodity production is invariably affected by contextual factors—climate and the geology of individual deposits. By necessity, therefore, the commodity sectors require unique inputs and many of these can be used to promote distinct local industrial (and agricultural and service) capabilities. A number of examples are provided to demonstrate the potential of these linkages as well as the growth of input provision in low income economies, including those in sub-Saharan Africa (SSA). The working paper also

evidences a number of cases of horizontal and forward linkages. Within the context of increasing lead firm outsourcing, many of these linkages occur as a natural consequence of market forces. The purpose of effective government policy is to both speed up and deepen these linkages. Disabling government policy, by contrast, slows down and makes the extent of these linkages shallower.

For a number of reasons, governments have an important role to play in optimizing the nature and pace of these linkages. These linkages provide the potential for employment creation and as a contributor to economic growth. They also point to the path of industrial development—in Hirschman's words, "one thing leads to another". Third, because commodity production will generally be sustained, it may provide an arena for the development of dynamic capabilities through the expansion of the related National System of Innovation. Fourth, due to the development of horizontal linkages, the provision of inputs into the commodity sector and the processing of its outputs will also offer complementary benefits to other industrial sectors. Fifth, despite the fact that outsourcing is in the interest of lead firms, their supply chain development capabilities are sub-optimal and require support (as they do in industrially advanced economies). And, finally, the blocking of other paths to industrial development, arising in large part as a consequence of the growth of industrial capabilities in China and other low and middle income industrializing economies, places a premium on the development of industrial capabilities which feed into the exploitation of the commodities sectors.

Subsequent reports will not only consider how financial linkages can be used to promote industrial development in other sectors not directly related to commodities, but also the design of industrial support programmes that promote industrial development in low and middle income commodity exporting economies in general and production linkages, in particular.

1. Introduction

It is widely accepted that industrialization is critical for economic and social development, particularly in low and middle income economies. In the past, industrial development was fostered by protecting domestically-oriented industrialization. Then, as globalization deepened during the latter half of the 19th century, many countries progressed through export-oriented industrialization. However, for late industrializers both of these paths are now much more difficult to tread. The widespread acceptance that protection is no longer permissible (and perhaps not even desirable), enforced by successive rounds of GATT and WTO trade agreements, has ruled out the import-substituting route. The growing competence of China and its East Asian neighbours as sources of low cost manufacturers represents a growing challenge to export-oriented industrialization (Kaplinsky, 2008). This poses major challenges for industrial development in all countries, rich and poor alike. In this series of three reports we focus on the challenges posed for industrial development in commodity exporting economies.

Commodity producers are faced with two challenges in promoting industry. The first is how to use the commodity rents made available by the post-2002 price boom to promote industrial development in sectors unrelated to commodities extraction. The second is to build industrial development by drawing on linkages from the commodity sector. In this working paper we focus on the latter of these opportunities, namely developing linkages between the commodities and industrial sectors. In subsequent reports we will consider the broader opportunities for industrial development provided by the commodities price boom.

Before embarking on this analysis we begin with a brief review of the arguments for industrial development and an overview of the three primary families of commodities and their general links with the industrial sector (Section 2). We recount, and then challenge, the widespread belief that a causal link exists between low economic growth and a specialization in commodities. Moreover, as a direct consequence of the rapid and sustained growth of China and India and other low income economies, a reversal in the historical decline in the commodities-manufactures terms of trade (Section 3) has taken place. The growth of China's contribution to the global Manufacturing Value Added (MVA) followed from the fragmentation and globalization of global value chains as lead firms began to concentrate on their core competences and to outsource non-core tasks to suppliers. Following this contextual discussion of the links between industry and commodities and the changes in the terms of trade arising from China's rapid economic growth, we turn to the implications for linkages from the commodity sector to industry in Section 4. Based on a three-linkage framework developed by

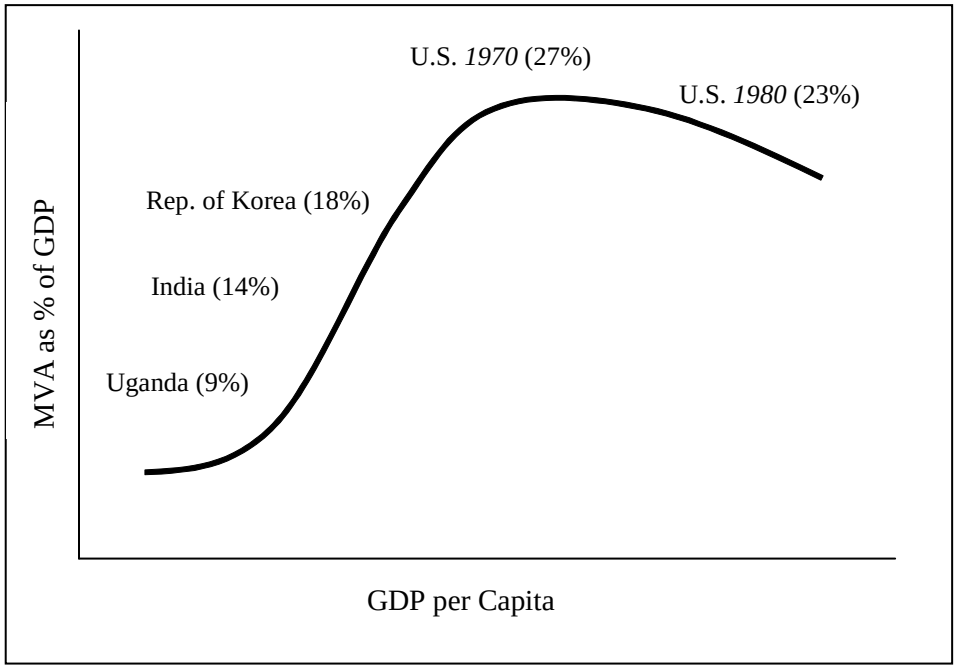
Hirschman we identify ways in which forward, backward and horizontal linkages can act as an incentive to industrial development (the role of fiscal and consumption linkages will be considered in subsequent reports). Building on this discussion, Section 5 provides a framework for rethinking possible linkage synergies between the commodities sectors and industrial development. The report argues that particular opportunities open up for backward and horizontal linkages, and evidences this with reference to the recent experiences of a number of African economies. In Section 6 the report briefly addresses why governments should become more involved in this process of linkage development, although this will be considered in more detail in subsequent reports.

The demonstration effect of industrialization and normal patterns of growth

It has long been recognized that there is a strong and positive relationship between per capita incomes and the share of industry in GDP. Although this relationship weakens as per capita incomes increase, this occurs at levels beyond those prevailing in most low and middle income economies. Drawing on earlier analysis by Chenery (1960) and Taylor (1969), a widely cited UNIDO study carried out in the late 1970s verified this correlation, taking account of country size (as countries with a large population in this period of shallow globalization allowed for economies of scale in production) and share of natural resources in GDP (UNIDO, 1979). It was concluded from these comparative studies of industrial structure that a "normal" growth pattern over time could be identified. We illustrate this "normal" pattern of structural transformation by focusing on the share of MVA in GDP in a broadly representative set of economies in 1970, namely Uganda, India, Republic of Korea and the U.S. (Figure 1). We have chosen 1970 as the measuring point as this was a period in which development strategies in most developing economies were heavily influenced by the demonstration effect of high income economies. We also include data for the U.S. in 1980 to show the declining role of industry in GDP at high levels of per capita income. At low levels of per capita income, industry accounted for only a small share of GDP—for example, Uganda (9.2 percent). As per capita incomes rose, this share grew rapidly—as in the case of India (14.2 percent) and Republic of Korea (17.8 percent). Further up the per capita income scale, the share of MVA grew even higher, reaching its peak with the U.S. share of 26.6 percent in 1970. However, when incomes increased even further, the contribution of MVA to GDP began to fall back below its peak as the growth in demand switched from manufactured goods to services. This falling share (from 26.6 to 22.8 percent) is indicated in Figure 1 for the U.S. in 1980. Figure 1 presents a general story. More detailed analysis reveals that the larger the size of a country, the greater the share of MVA in GDP; the greater the concentration of commodities in exports, the smaller the share of MVA in GDP.

Neither of these qualifications rules out the positive association between per capita incomes on the share of manufacturing in GDP.

Figure 1 The "normal" relationship between per capita incomes and share of manufacturing in GDP - Uganda, India, Republic of Korea and USA (1970), and USA (1980)



Source: Farooki and Kaplinsky, 2011.

What are commodities?

Three primary families of commodities can be identified (Figure 2). Broadly speaking, as a consequence both of their different production characteristics and primary users, they are associated with different degrees and types of linkages to the industrial sector. The primary sub-sectors of *soft commodities* are cereals (such as wheat and rice), beverages (such as tea and coffee), crops (such as cotton and timber), livestock (such as beef and pork) and fisheries. *Hard commodities* comprise precious metals (such as gold), ferrous metals (such as iron ore), non-ferrous metals (such as copper) and rare minerals (such as coltan). *Energy commodities* are predominantly oil, gas and coal. Each of these commodities feeds into a series of manufacturing sectors. With the exception of some of the industrial crops such as cotton and timber, agricultural commodities are mostly used in the food sectors. Excluding precious minerals, the minerals group of commodities are generally incorporated as inputs into the industrial and construction sectors. Energy commodities are used across the spectrum, both as an intermediate and as a final consumption input.

Figure 2 Three primary commodity families and their sector of use

Primary Sector	*Category*	*Major Use*	*Examples*
Soft Commodities	Industrial crops	Input in manufactures	Timber, cotton
	Fisheries	Final consumption (with limited processing)	Prawns, cod
	Cereal		Rice, wheat
	Beverages		Tea, coffee, cocoa
	Livestock		Cattle, dairy products
Hard Commodities	Precious metals	Input in manufactures	Gold, silver, platinum
	Ferrous metals	Infrastructure and construction Input in manufactures	Iron ore, steel
	Non-ferrous metals		Copper, zinc, lead, aluminium
	Rare metals	Input in manufactures	Molybdenum, plutonium, cobalt
Energy	Petroleum products coal nuclear renewables	Fuel for industrial usage Final consumption	Oil, natural gas, coal nuclear power, renewable power

Source: Farooki and Kaplinsky, 2011.

2. The conventional wisdom: commodities as a resource curse

In a cross-country regression analysis of the growth performance of 97 countries for the period 1970–1990, Sachs and Warner (1997) found that resource abundance, measured as the ratio of primary commodities exports to GDP, was negatively correlated with GDP growth. They estimated that a doubling of the share of primary products in total exports between 1970 and 1990 led to a reduction in the annual GDP growth rate of between 1.51 to 0.62 percent. Their results were statistically significant after controlling for a variety of explanatory variables affecting growth rates. These are geography and climate, the presence of oil in exports, integration into the global economy, capital accumulation, institutional quality, commodity price shocks and resource abundance (the ratio of mineral production to GDP, the share of primary exports in total exports and per capita land area).

Sachs and Warner (1997, 2001) concluded that the Dutch disease was the major driver of this growth-reducing resource curse. The high rents earned through commodities exports raised the exchange rate, creating difficulties for other tradable goods sectors which experienced problems in competing both in the external and domestic market. Moreover, many countries responded to the Dutch disease with protectionist policies to promote industrialization. This led to

inefficiencies in their productive sectors, compounding the problems confronting the manufacturing sector.

Sachs-Warner and other analysts of the Dutch disease were not the first economists to suggest that industrial development would be disadvantaged in commodity exporting economies. They identified the enclave nature of commodities production and the declining terms of trade and heightened volatility of commodities as additional blockers of industrialization (another set of explanations, which we will not consider in this paper, is the political economy of commodities production, where resource extraction in the hard and energy commodities sectors is often accompanied by war, corruption and human rights abuse). Since, as we shall see, there are reasons why much of this collected wisdom is open to discussion in light of recent developments in the global economy, it is helpful to briefly recap these arguments.

The enclave nature of commodity production

In 1950, Singer, one of the leading economists of the post-World War Two era, published a seminal critique of the enclave nature of production in the commodities sector (Singer, 1950). In this analysis he addressed the complexity of hard commodities production in low income economies and argued that, as a general rule, the extraction of these hard commodities occurred in isolation from the local economies in which the mines were based. As a consequence of their high capital intensity, few jobs were created and there were weak linkages to local suppliers. Instead, as the title of his seminal paper implies ("*The Distribution of Gains between Investing and Borrowing Countries*"), the beneficial spillovers from commodity production were largely reaped in high income countries where the large foreign-owned mining companies were based:

> *'I would suggest that if the proper economic test of investment is the multiplier effect in the form of cumulative additions to income, employment, capital, technical knowledge, and growth of external economies, then a good deal of the investment in underdeveloped countries [hard commodities sectors] which we used to consider as "foreign" [and taking place in low income economies] should in fact be considered as domestic investment on the part of the industrialised countries'* (Singer, 1950: 475).

Closely linked to Singer's argument was the assertion that the hard commodities sector offered little scope for technological progress and had few external economies. Singer claimed (although this was backed with little evidence) that the hard commodities sector was characterized by low technology, limiting the learning opportunities provided to the local

economy (this conclusion was at variance with his complementary observation that linkages were limited, since it was expected that low technology mines would lend themselves to input provision by local industry). Further, Singer argued, a specialization in the export of raw materials diverts scarce entrepreneurial activity and domestic investment away from manufacturing. Whilst admitting that these speculations were a "tantalizingly inconclusive business", Singer argued that in contrast to a specialization in commodities, manufacturing provides a greater scope for technological progress, for skills development, for the creation of new demand and for the demonstration effect which fosters diversified economic development.

Declining commodities-manufactures terms of trade and the price volatility of commodities

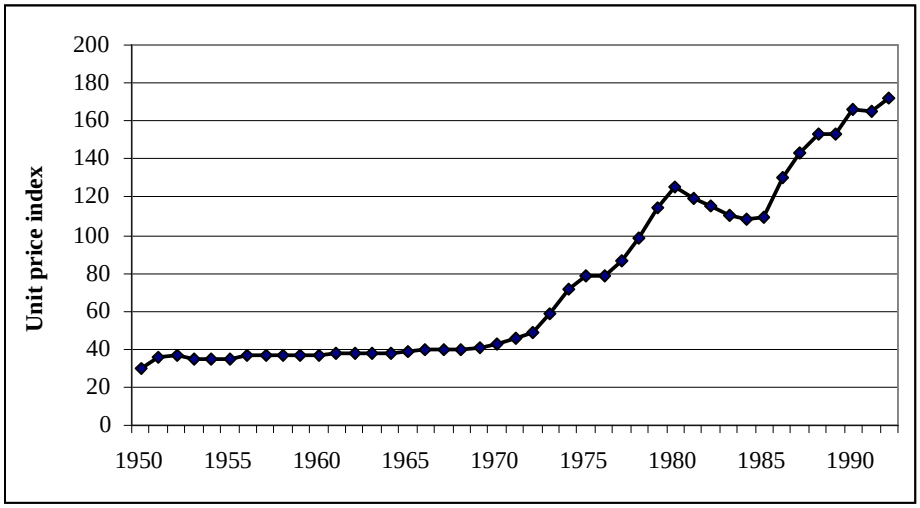
Until the end of the Second World War it had generally been assumed that the commodities-manufactures terms of trade would move in favour of commodities. This view was challenged by Prebisch (1950) and Singer (1950) in 1950. Focusing on the prices of UK exports (predominantly manufactures) and UK imports (predominantly commodities) in the period between 1878 and 1938, they drew precisely the opposite conclusion to prevailing conventional wisdom. Drawing on this evidence, they argued that the long-term trend was in fact for the prices of commodities to fall relative to those of manufactures.

The primary explanation provided by Singer and Prebisch was that these declining terms of trade were driven by labour market differences. Full employment in high-income manufacturing economies implied that cost-push pricing would result from the higher wages being demanded by powerful trade unions, and that the prices of exports of these economies would consequently increase. In low income countries, by contrast, surplus labour and the weakness of trade unions would not lead to the same cost-plus pricing, and the prices of their exports would either remain stable or decrease. In addition, Prebisch and Singer asserted that the nature of demand for different products and the development of synthetic substitutes for natural resources would further depress commodity prices. In subsequent analysis, Singer argued that manufacturing was subject to more Schumpeterian innovation rents (that is, difficult-to-copy technology) than in the commodities sectors, and as a consequence the barriers to entry in manufacturing were relatively high, protecting the incomes of producers in these sectors (Singer, 1981).

The terms of trade arise as a ratio of the prices of commodities to the price of manufactures. For most of the four decades after World War Two, the prices of manufactures continued to rise, sometimes (as during the 1970s) at a high annual rate (Figure 3). Yet within the same period the

prices of commodities were either stable or declining. This occurred despite two short-lived commodity price booms between 1951 and 1953, and 1972 and 1974. The earlier 1950s boom was not spread equally across all commodities, and the prices of energy commodities remained stable around their 1949 values. The latter price boom affected all three families of commodities, including (and very markedly so) the price of energy commodities. A significant feature of both of these short-lived price booms was that they were driven by an (as it turned out, unwarranted) expectation of future demand growth for commodities and temporary interruptions in supply (a combination of poor harvests in both periods and war-induced interruptions to supply and strikes in the second boom).

Figure 3 Index of average prices of manufactures, 1950–1992



Source: Based on Pfaffenzeller et al. 2007.

Whilst there is some controversy about the extent of the decline in the manufactures-commodities terms of trade (arising in part from the choice of the beginning- and end-points of the price analysis), the balance of informed opinion is that the Singer-Prebisch hypothesis on the declining terms of trade (based, as we saw, on a limited analysis of very partial data on the UK's trading experience) is confirmed, not only for the second half of the 20th century, but for at least the whole of the 20th century, and perhaps for the 19th century as well. This is evidenced by a wide range of investigations into the terms of trade.[1]

Beyond the declining terms of trade of commodities lies their price volatility. This is a well-observed and uncontested phenomenon. Cashin and McDermott (2002) documented a

[1] For a summary of this evidence, see Farooki and Kaplinsky, 2011, Chapter 3.

downward trend in the terms of trade of around one percent per year over the 140-year period between 1862 and 1999. However, their contention was that price volatility was a more damaging challenge to producers than a predictable and stable decline in commodity prices. Moreover, they observed an increase in the price volatility of commodities, both in the magnitude of price changes and in their frequency over time. Price slumps tended to be of a longer duration than price booms.

3. Has anything changed?

A number of factors are forcing a rethinking of this inherited wisdom on the relationship between commodities production and industrialization. One factor is increasing awareness that the historical relationship between manufacturing and industry is more complex than has been portrayed in much of the literature. Attention is being redirected to the Staples theory, initially developed in the 1920s and 1930s. This theory sought to explain the development of manufacturing in Canada as arising in large part from linkages to the export-oriented fish and fur soft commodities sectors (Innis, 1957, Watkins, 1963). The development of manufacturing in the U.S. in the 19th and 20th centuries, as well as the recent development of industry in Australia and Norway can also be directly traced back to the synergies arising between commodities production and industry (Wright and Czelusta, 2004). Similarly, Sweden's industrialization after 1850 was driven by export booms in cereals and sawn wood, and later in pulp, paper and iron ore. Each of these historical experiences involved a positive symbiosis in which industry was stimulated by linkages from the soft, hard and energy commodities sectors. In turn, the capabilities developed in industry fed back into commodities production by reducing costs and enabling the exploitation of less well-endowed mineral seams, oil deposits and agricultural land. These synergies between commodities and manufacturing can also be evidenced at the firm-level (Blomström and Kokko, 2007). For example, Nokia's business origins were in pulp and paper milling in the 1860s which subsequently provided the surplus for Nokia to move into cable manufacturing and, more recently, into mobile telecommunications.

Moreover, a variety of studies have challenged the conclusions drawn by Sachs and Warner. Davies (1995) examined the performance of mineral and non-mineral economies in relation to GNP per capita and social indicators such as the Human Development Index. He concluded that there was no evidence to support the contention that commodity-dependent economies had performed less well. To the contrary, whilst oil producers did best, non-fuel economies outperformed non-mineral economies in most cases. Lederman and Maloney employed additional estimation techniques using time series data that allowed for a more sophisticated

analysis of the dynamic interrelationship between growth and the commodities sectors (Lederman and Maloney, 2007). They also adopted a different proxy for resource-intensity, namely net resource exports per capita (rather than the share of natural resources in GDP adopted by Sachs and Warner). From this analysis they concluded that Norway, New Zealand, Canada, Finland and Australia ranked as the most resource-intensive economies rather than economies such as the DRC and Papua New Guinea in the Sachs and Warner analysis. Other corrections were also made, including using an average price over the period under analysis in order to take into account high price volatility. The consequence of these assumptions was that the natural resource curse identified by Sachs and Warner disappeared. Moreover, they found a positive correlation between resource intensity and GDP growth. Manzano and Rigobón (2007) and Bravo-Ortega and De Gregorio (2007) arrived at similar findings.

Two major conclusions emerge from these various attempts to empirically verify the Resource Curse theory. The first is that in some cases—countries such as the U.S. and Sweden, and firms such as Nokia—there is demonstrated evidence of a positive synergy between commodities and manufacturing. And, second, where commodity dependence is extreme, this is more often a result of the unrelated underdevelopment of the industrial sector rather than a consequence of the destructive impact of commodities production on industry. Thus, what emerges and is interpreted as a manufacturing sector causally weakened by a commodities specialization is in fact often a commodities specialization in an economy with no or little history of industrial development.

Leaving aside these theoretical challenges to the empirical analysis of the relationship between commodities and industrialization, a series of developments have taken place in the global economy in recent years, which provide new opportunities for economies specializing in commodities. Key amongst these has been the very rapid rise of the Chinese economy.

The re-emergence of China as a leading economy

For most of the last two millennia, China and India have been the two largest global economies (Maddison, 2007). In 1820, it was estimated that China accounted for more than one third of global GDP. In 1969, this share had fallen to less than four percent. But since the mid-1980s, China has grown at a compound annual growth rate of almost ten percent. By 2006, its share had re-grown to around 17 percent of global GDP, and before 2020 China is likely to once again become the world's largest economy.

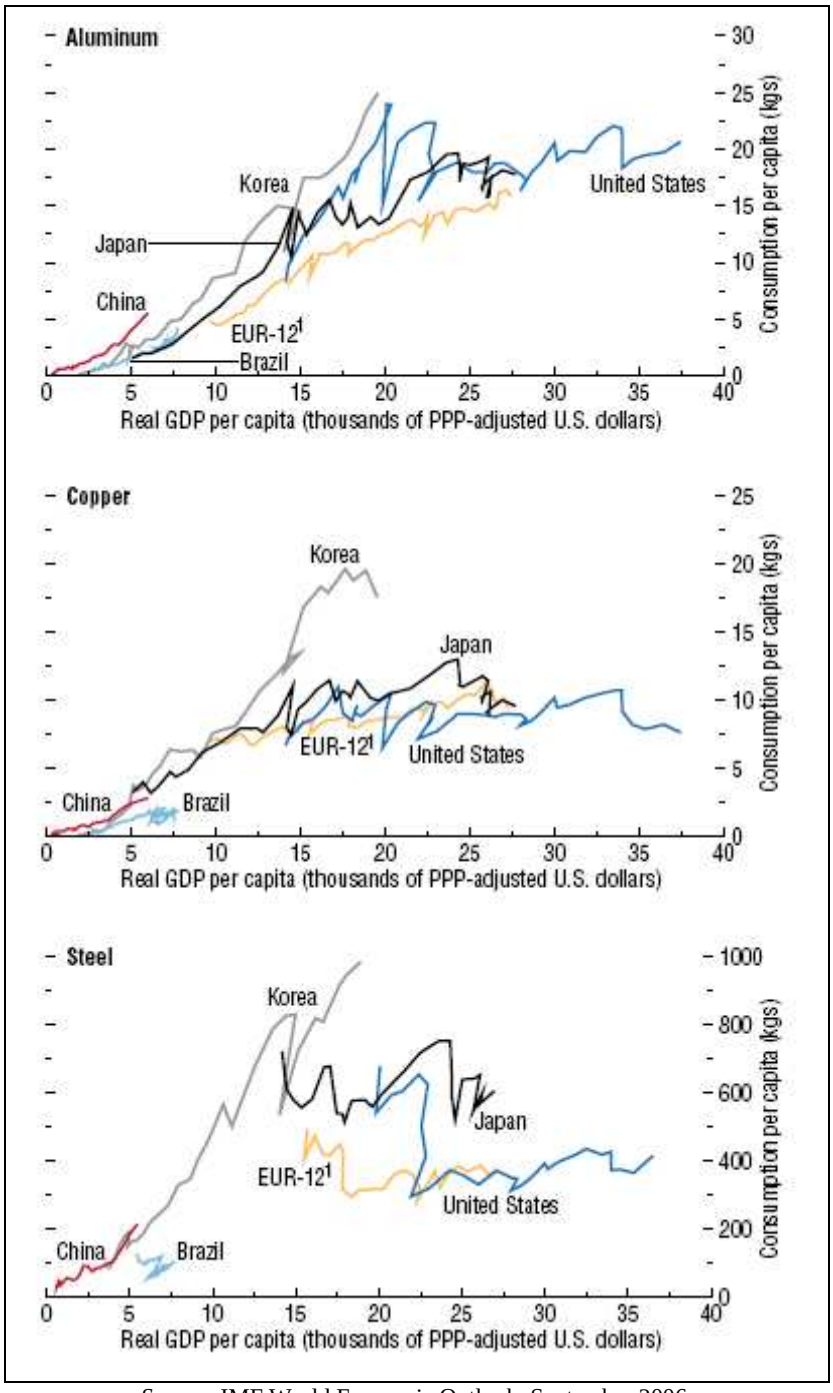
By virtue of its size, China's rapid growth and global footprint cannot be ignored and has a major impact on other economies (Farooki and Kaplinsky, 2011). It is possible to distinguish between complementary and competitive impacts on other countries, the former leading to win-win outcomes for both China and other economies, and the latter to win-lose outcomes. It is also possible to distinguish between the direct impacts of China's growth on other economies (arising from bilateral links with China) and the indirect impacts which arise as a consequence of a reshaping of the global economy resulting from China's rapid rise to once again become the world's largest economy.

There is a variety of ways in which the rise of China's economy affects industrialization strategies in general and commodity exporting economies, in particular. These arise from the given growth trajectory of the Chinese economy. Beginning with the direct impact of China's very rapid industrial development on other countries, there is increasing evidence in many countries of the displacement of manufacturing production destined for the local market (Kaplinsky, 2009; Jenkins, 2008). Yet it is the indirect impacts which may in fact be more significant, and since these are not as easy to understand and document as the direct impacts arising from bilateral trade relations with China, they are worthy of more in-depth discussion.

Returning to the Singer-Prebisch theory on the terms of trade, we observe that one of the major factors motivating the drive to industrialization was the income elasticity of demand for commodities, specifically for soft commodities. It was argued that as incomes grew, the growth in demand for commodities would lag behind that of manufactures and services. There is certainly compelling evidence that this is the case for soft and hard commodities (but less so for energy commodities where demand continues to rise as incomes grow). But the question is at what level of incomes the demand for commodities decreases. Here it is evident that in the case of most hard and energy commodities (Figure 4), the income levels at which the demand elasticity falls (beyond US$ 15,000 per capita in 2000 USD) are currently above the current per capita income in China (US$ 6,200). In fact, China is still at a relatively immature stage in its per capita consumption of most commodities, a demand trajectory which is primarily driven by investments in infrastructure, by growing urbanization and by the manufacturing intensity of its economy.[2]

[2] These drivers of China's high elasticity of demand for commodities are discussed in detail in Farooki and Kaplinsky, 2011, Chapter 4.

Figure 4 Per capita consumption of base metals

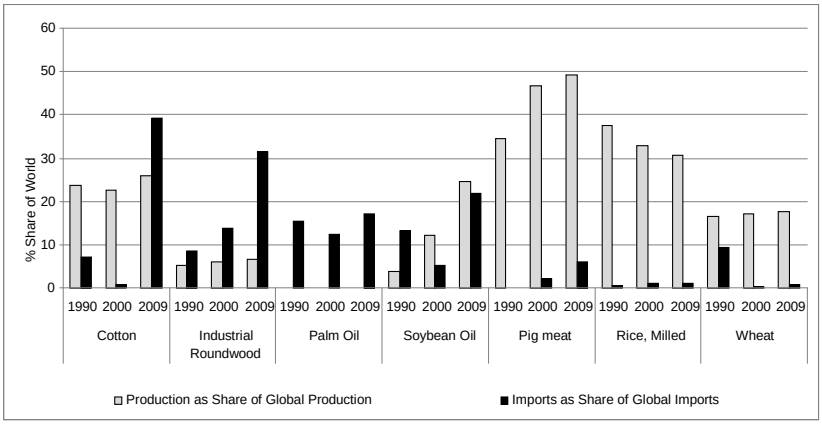


Source: IMF World Economic Outlook, September 2006.

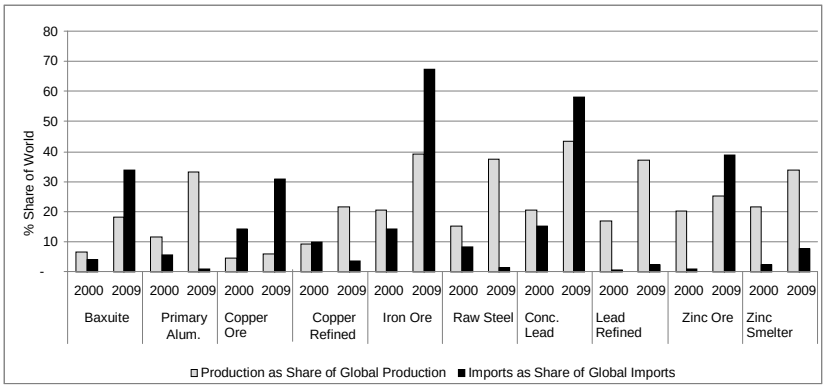
It is not widely recognized, but China is the largest producer of most of the world's soft, hard and energy commodities. Yet towards the end of the 20th century, this production competence failed to meet the country's needs. China's resource intensive growth path meant that the domestic supplies of most commodities could not keep up with demand, and in each of the three families of commodities China became an increasingly significant global importer (Figure 5).

Figure 5 China's share of global production and global imports, 1990–2009 (%)

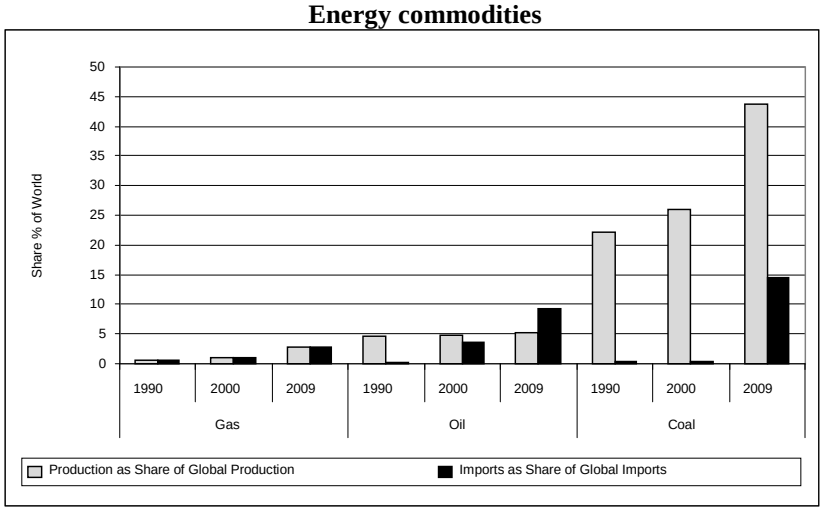
Soft commodities



Hard commodities



Energy commodities

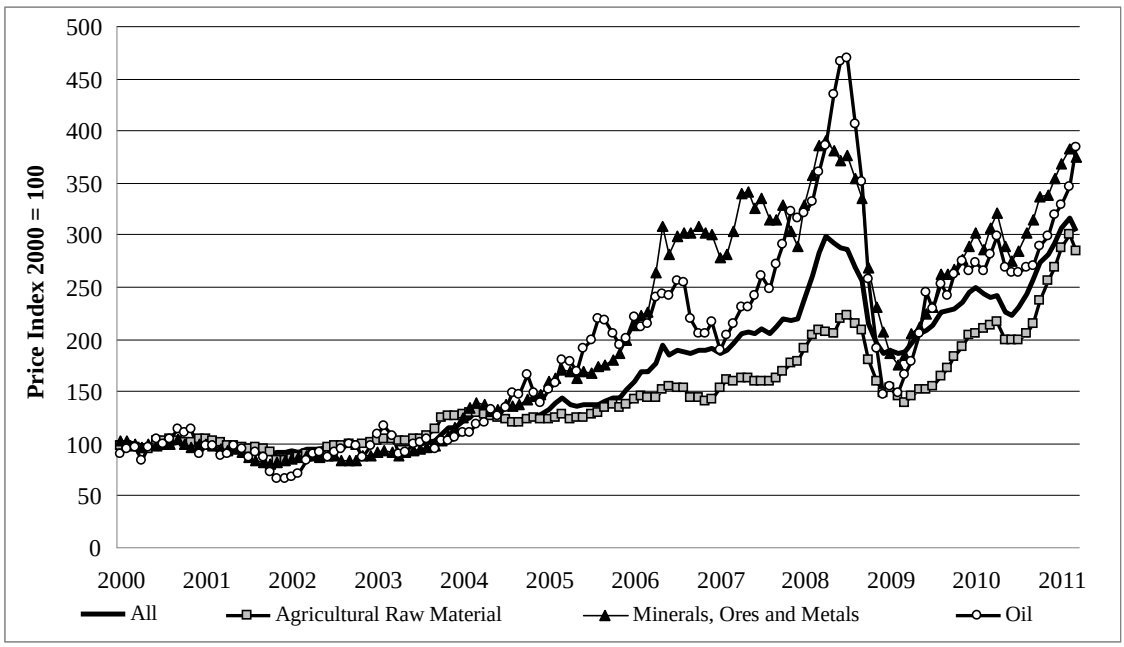


Source: Farooki and Kaplinsky, 2011.

After the turn of the millennium, global suppliers were unable to keep pace with China's growing appetite for imported commodities. In the soft commodities sectors, there are increasing limits to low-cost supplies, exacerbated by the growing impact of climate change and

the growth in demand for food from other low income economies (FAO/OECD). In both hard commodities and energy commodities, ramping up supply entails a long gestation period. Moreover, as in the soft commodities sectors, low-cost sources of supply have largely been exhausted. Consequently, after 2002, global commodity prices began to rise sharply, initially for hard commodities and energy commodities and then, after 2007, for soft commodities as well (Figure 6). This rise in prices was interrupted by the financial crisis of 2008, whilst the pre-2008 price upturn, the 2008–9 downturn and the post-2010 upturn were exacerbated by speculative financial investors.[3] These trend-augmenting impacts of the financial sector on prices reflected underlying supply-demand fundamentals and this provided a structural underpinning for the prolonged rise in commodity prices after 2002 (Farooki and Kaplinsky, 2011; Akyuz, 2011). There are indications that the squeeze on supplies will be sustained for most commodities for at least another decade, notwithstanding the onset of frequent price bubbles as the financial sector exploits these gaps in supply.

Figure 6 **United Nations Conference on Trade and Development (UNCTAD) monthly average price index, 2000=100 (2000 to March 2011)**



Source: Compiled from UNCTAD Stat. data. Online. <http://unctadstat.unctad.org/ReportFolders/reportFolders.aspx?sCS_referer=andsCS_ChosenLang=en> (accessed May 2011).

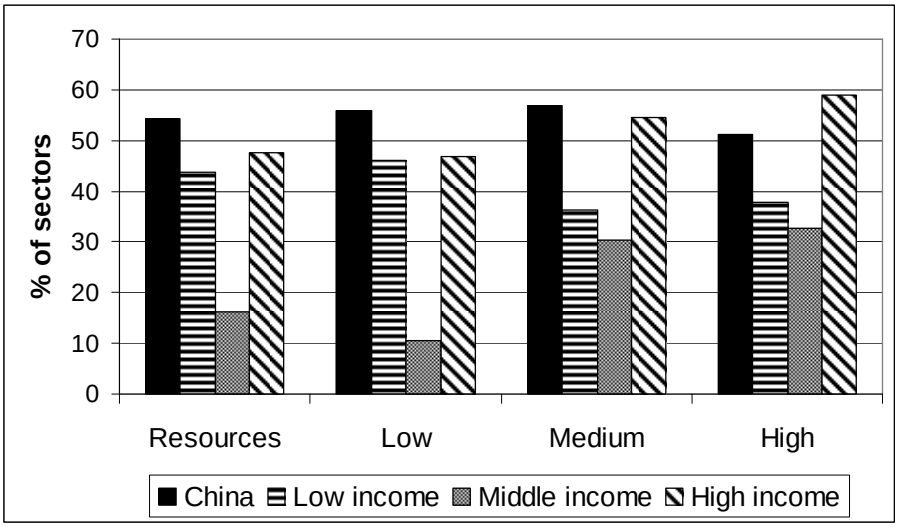
[3] See Farooki and Kaplinsky, 2011, Chapter 6.

While China's demand helped raise the prices of commodities, its manufacturing competence also placed pressure on the prices of manufactures. Between 2000 and 2010, China's share in global manufacturing value added grew from 7 to 15 percent. In 2005, it surpassed Germany as the largest exporter of manufactures (measured in terms of gross output value rather than MVA), and in 2010, it overtook Japan to become the second largest global producer of manufactures (measured by MVA).[4] Since the mid-1990s, China has increasingly evolved into the "world's factory". A key driver of this growing manufacturing pre-eminence has been China's low costs of production. Not only does China's manufacturing competence make it much more difficult for follower countries to emulate its experience, these developments have also had a major impact on the global price of manufactures, where two trends have emerged. The first is the trajectory of the prices of manufactures as a whole. Between 1970 and 1992, these had risen by almost 436 percent. However, after 1992, this rising trend was interrupted. The average prices of manufactures fell for more than a decade and it took 12 years before the 1992 price levels were regained (Farooki and Kaplinsky, 2011). After 2006, the prices of manufactures began to rise again, but at a slower pace than during the 1970s and 1980s. The second noteworthy feature is that these overall trends in the prices of manufactures masked the divergent development in the prices of different types of manufactures. The "average unit price" reflected some sectors in which prices increased and others in which they fell. However, a disaggregated analysis reveals that the prices of different types of manufactures were closely related to the growth of China's manufactured exports. This is illustrated in Figure 7 which shows the pattern of price changes of products imported into the EU, Japan and the U.S. between 1989 and 2007, based on a detailed disaggregation of global trade (at the six- and eight-digit trade levels). In each of the three major importing regions, the price trajectory of the 300 largest Chinese exports was compared with those of the same products exported by low income, middle income and high income economies, distinguishing between resource sector, low-tech, medium-tech and high-tech products. With the exception of the high-tech group, the propensity of China's product prices to fall was higher than for any other exporting region. These results confirm an earlier study of the link between China's exports and the export prices of other economies selling to the EU between 1989 and 2001 (Kaplinsky and Santos Paulino, 2006). Again focusing on the percentage of sectors experiencing falling prices, the figure was 26 percent for low income countries, 18 percent for lower-middle income economies, 17 percent for upper-middle income economies and nine percent for high income economies. By contrast, more than 30 percent of China's export sectors were characterized by falling prices. The impact

[4] All figures calculated from UNIDO MVA, accessed May 2011.

of China's export competitiveness on the global prices of manufactures—predominantly an impact which led to falling prices—is evidenced in both studies.

Figure 7 Percentage of sectors with falling prices, 1989–2007



Source: Kaplinsky (2005).

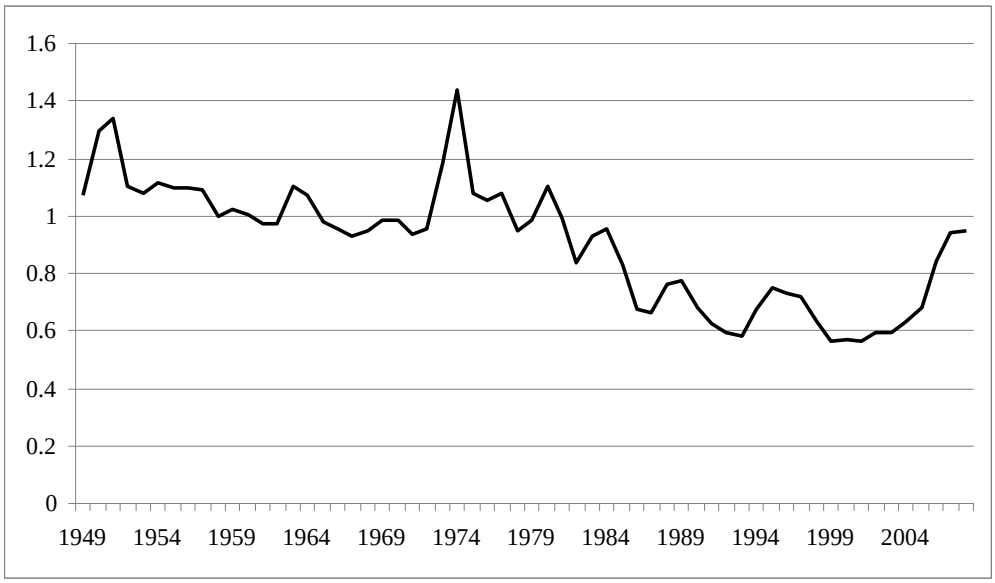
The downward pressure on the prices of traded manufactures began to abate as manufacturing wages in coastal regions of China—the heart of its exporting sector—begun to rise rapidly after 2007. However, much of the impact of this wage pressure on prices was held back by rapidly rising productivity in Chinese exporting firms. Moreover, low levels of value added in export-oriented assembly industries and the low share of labour costs in total costs meant that the impact of China's rising labour costs on final product prices has been muted. Further, many Chinese firms operating in coastal areas and Northern firms that have subsidiaries in these regions and subcontract to Chinese firms have begun to move their operations inland, where wages are lower than in coastal regions. Large investments by the Chinese Government in infrastructure have also reduced the costs of producing in the interior. In 2011, this shift towards the Chinese inland was evidenced with a major restructuring in the geography of the assembly of laptop and notebook computers. Finally, many of the rising prices in China's manufactured exports were fuelled as much by the increasing input costs arising as a consequence of the boom in commodity prices as well as by higher wage costs.

Beyond China lies a global reserve army of labour. By 2030, India will have a larger and much younger population than China. Other Asian economies such as Indonesia, Vietnam and the Philippines are also heavily populated, have high rates of unemployment and are increasingly

being targeted as sources of alternative final assembly as Chinese wage costs increase. We can thus anticipate that the global prices of manufactures, which had begun to rise towards the end of the first decade of the 21st century, will continue to face severe competitive pressures in the future.

Thus, it is evident that as a consequence of the structure of China's growth and the size of its economy, it is having a major impact on the trajectory of prices of both commodities and manufactures. Of course, China is not the only economy driving these price developments. Other, predominantly Asian, economies have also developed significant capabilities in manufacturing, and the demand for commodities in India, Brazil and other rapidly growing low per capita income countries is also increasing.[5] The upshot of these trends is that the terms of trade—for so long, as we have seen, turning against commodities—have now begun to turn in their favour (Figure 8). In light of the continued growth in demand for commodities, the long gestation period in increasing the supply of many commodities and the exhaustion of low-cost supplies, the likelihood is that this reversal in the terms of trade will be sustained for at least another decade, if not longer.

Figure 8 The commodities-manufactures terms of trade, 1949–2008



Source: Fu, Kale, and Kaplinsky (2009).

[5] For example, coffee consumption is growing very rapidly in emerging economies, particularly in Brazil (which became the largest consumer of coffee in 2010) and China.

The fracturing of global value chains

China's transition from an inwardly focused and largely rural based agricultural economy to becoming the "factory of the world" was critically dependent on developments outside China. It was not just that market access barriers were lowered in major consuming economies, but also that transnational corporations (TNCs), which dominated the manufacturing sectors in high income countries, underwent a fundamental reorganization from the late 1960s, gathering pace rapidly thereafter. The roots of this reorganization lay in a particular strategic response to the growing pressures of global competition. In essence, an increasing number of Northern firms discovered the appeal of concentrating on their core competences (Hamel and Prahalad, 1994). This required them to focus on processes and products in which they had a unique competitive advantage, which were difficult to copy and which were valued by their customers. All other aspects that did not meet these three objectives were outsourced. This allowed the firm to concentrate on what it did best and to invest in the maintenance of its dynamic competitive advantage. It also allowed such firms to play off suppliers against each other in order to reduce costs, improve quality and optimize the deliveries required to achieve lean production.

What at first initially began as a programme of domestic outsourcing rapidly spread into structured programmes of global outsourcing. Lead firms analyzed their chains, sliced them up into increasingly segmented links, and then played conductor to a global orchestra of competing suppliers (Gereffi, Humphrey and Sturgeon, 2005). These global value chain lead firms actively sought suppliers in low-cost environments, and in many respects, the export-oriented miracle of East Asia was as much a creation of global buyers as it was of global suppliers (Feenstra and Hamilton, 2005). Walmart is an excellent example of a global buyer exercising this role—by 2005, more than 70 percent of its non-food products were sourced from China and it had become China's eighth largest trading partner, importing more from China than either the UK or Russia. But it was not just retailers who were sourcing from China. Indeed, in the manufacturing sector, China was only one of the players in a complex process of firms concentrating on their core competences and outsourcing the production of component production and sub-assembly as well as final assembly across a global stage. Another good example of this process of global outsourcing is the cost structure of the iPhone (Table 1). Although the phone is labelled as "Made in China", only a small share of its total costs (US$ 6.50 of a total of US$ 178.96) are added in China.

The critical lesson to be gleaned with regard to the commodities sector from this brief review of the extension of global value chains in the industrial sector is that lead firms in global value

chains actively seek to outsource their non-core competence activities. This is of great significance for the development of linkages from the commodities sector and we will return to this issue below.

Table 1 Sources of value added in Apple iPhone, 2009

Manufacturer	*Component*	*Cost (US $)*
Toshiba (Japan)	Flash memory	24.0
	Display module	19.25
	Touch screen	16.00
Samsung (Rep. of Korea)	Application processor	14.46
	SDRAM-Mobile DDR	8.50
Infineon (Germany)	Baseband	13.00
	Camera module	9.55
	RF Transceiver	2.80
	GPS receiver	2.25
	Power IC RF function	1.25
Broadcom (U.S.)	Bluetooth/FM/WLAN	5.95
Numonyx (U.S.)	Memory MCP	3.65
Murata (Japan)	FEM	1.35
Dialog Semiconductor (Germany)	Power IC Application Processor function	1.30
Cirrus Logic (U.S.)	Audio Codec	1.15
Rest of Bill Materials		*48.00*
Total Bill of Materials		*172.46*
Manufacturing Costs		*6.50*
Grand Total		*178.96*

Source: Xing and Detert, 2010 (drawing on Rassweiller, 2009).

4. An overview of linkages from the commodities sector

An apocryphal story is often told of the tourist visiting Ireland who stops and asks someone in the rural areas – "Excuse me please, can you tell me the way to Dublin?", only to be told "Oh, if I were going to Dublin, I wouldn't start from here!" In other words, it may be that many countries that are heavily dependent on commodities would prefer to have different economic structures, perhaps to have the industrial competences found in Japan, Republic of Korea, Germany and China. But this is wishful thinking. Their economies are what they are (as was the tourist, lost in the Irish countryside), and they have to work with these given structures, even if they wish to transform them into something different.

Fortunately, as we have seen, the prospects for diversification in commodity producing economies have been lifted by three factors. First, a rethinking of the link between commodities, industrialization and growth does not substantiate the gloom that has often characterized the

challenge of structural transformation in low income economies. Second, after very many decades of declining relative prices, there is solid evidence that higher commodity prices are here to stay. Third, many of the lead firms in commodity value chains do not seek to become the enclave firms observed by Singer in the 1950s, 1960s, 1970s and 1980s. On the contrary, as a general rule, large companies are actively seeking to outsource a range of activities which are not within their core competences.

This is not to say that no obstacles stand in the way of industrial diversification—the problems of managing exchange rate appreciation remain and commodity prices have become increasingly volatile, which requires the development of appropriate smoothing and counter-cyclical macroeconomic policies. There are often also considerable technological and skills barriers to entry into industry. But leaving aside these continuing challenges, we now turn to the prospects opened up for a synergistic link between the exploitation of commodities and the development of industry. In order to better understand this potential, we turn to a perspective developed by Hirschman, one of the pioneers in post-war development studies.

Hirschman's theory of linkages

Hirschman characterized the development process in the following terms: "…development is essentially the record of how one thing leads to another" (Hirschman, 1981:75). In other words, successful economic growth is inevitably an incremental (but not necessarily slow) unfolding of linkages between related economic activities.[6]

Building on Innis' Staples theory, Hirschman proposed three major types of linkages from the commodities sector. The first are fiscal linkages, the resource rents which the government is able to harvest from the commodities sectors in the form of corporate taxes, royalties and taxes on the incomes of employees. These rents can be used to promote industrial development in sectors unrelated to commodities. The second major category of linkages are consumption linkages, that is, the demand for the output of other sectors arising from the incomes earned in the commodities sector. The third form of linkages are production linkages, both forward (processing commodities) and backward (producing inputs into the commodities sector) linkages.

[6] Hausmann, Hwang and Rodrik (2007).

Fiscal Linkages: Hirschman argued that fiscal linkages generally tend to be limited and provide no guidance on which sectors' commodity rents should be used to develop—the "ability to tax the enclave is hardly a sufficient condition for vigorous economic growth. For the fiscal linkage to be an effective development mechanism, the ability to tax must be combined with the ability to invest productively. [But] here lies precisely the weakness of fiscal linkages in comparison to the more direct production and consumption linkages… [since] no… guidance [on which sectors to invest] is forthcoming when a portion of the income stream earned in an enclave is siphoned off for the purpose of irrigating other areas of the economy" (ibid: 68–69). Hirschman also believed that in the context of poorly developed manufacturing sectors in many low income economies, consumption linkages would be felt abroad as the needs of domestic consumers would be met through imports. For him, therefore, the direct forward and backward linkages were the most likely to lead to the development of a more diversified economic structure. In other words, by relating directly to the output structure of the commodities sector, "one thing" would indeed "lead to another".

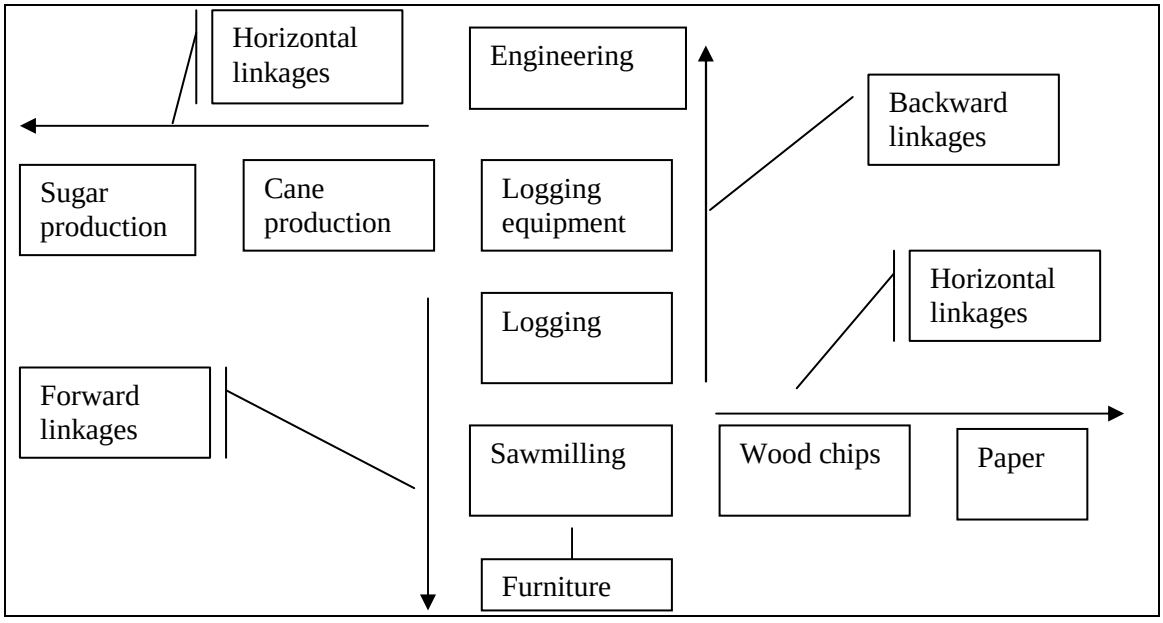
Consumption Linkages: The second form of linkages are those arising from the incomes generated in the exploitation of commodities. Writing in the context of the 1970s when many low income economies had little other commercial production than that occurring in the resource sector, Hirschman observed that the demand generated by employees in this sector had the potential to provide a major incentive to domestically oriented industry. In the context of heavily protected markets, industry could be built on the back of the demand for consumer goods, as workers and capitalists spent the incomes earned in the resource sector. Of course, once trade regimes were liberalized (in the 1980s and 1990s), many of these consumption linkages leaked abroad rather than reinforcing the demand for domestically produced goods.

Production Linkages: This report focuses on the direct production linkages between the commodities sector and the manufacturing sector. But before we can do so, it is helpful to augment the Hirschman framework in two ways. First, within the direct production linkage category, we propose adding a third form of production linkage, which we term the "horizontal linkage". These are linkages arising from the capabilities developed as suppliers provide inputs into the commodities sector and as they develop the capabilities to use the outputs of the commodities sector. Figure 9 illustrates this for the timber sector. Backward linkages arise from logging to logging equipment and from logging equipment to engineering, and forward linkages form timber to sawmilling and to furniture. Horizontal linkages are generated from logging equipment to cane growing (as in the case of Bell Equipment in South Africa, Kaplinsky and

Mhlongo, 1997), and from cane growing to sugar production. Horizontal linkages are also generated from sawmilling to the construction sector. As Hausmann and Rodrik have observed, "the probability that a country will develop the capability to be good at producing one good is related to its installed capacity in the production of other similar, or nearby goods for which the currently existing productive capabilities can be easily adapted." (HK, 2007: 13).

The second augmentation of the Hirschman framework addresses the sectoral specificity of linkages.[7] It relates to the three families of commodities identified in Figure 1 above. There are four ways in which the type of commodity has an important impact on economic institutions and the paths which linkages might take as "one thing leads to another": First, the complexity of individual value chains affects the extent of backward and forward linkages. Some commodities require relatively few inputs and can be processed in a limited number of ways. This provides less scope for the development of linkages and for spillovers to other sectors. Second, the technological intensity of individual value chains limits the extent to which local capabilities are able to respond as efficient suppliers and as efficient beneficiates of commodities. Third, the nature of the production processes involved in extracting and producing commodities affects the level and distribution of income streams, and this, in turn, determines the nature and extent of consumption linkages. And, fourth, the extent to which individual commodities reflect high and concentrated resource rents has a bearing on politics and governance, and hence on the capacity of the state and the local economy to develop forward, backward and horizontal linkages.

Figure 9 Backward, forward and horizontal linkages from the timber sector



[7] This discussion is an elaboration of Watkins, 1963.

It is important to bear in mind that these three forms of linkages from the commodities sector to the industrial sector are not exclusive. Whilst this report concentrates on production linkages, the two subsequent reports will also consider how fiscal and consumption linkages from the commodities sector can also incentivize industrial development.

5. Rethinking the relationship between commodities and industrialization

Based on the preceding discussion, two sets of issues emerge which illuminate our understanding of linkage development in the modern era. The first is the distinction between backward and forward linkages, where we are informed by a long history of discussion on industrial diversification. The second is the growth of corporate outsourcing. This is a more recent development which leads us to believe that there is a qualitative difference between the determinants of the nature and the extent of linkages to those which existed in the 1950–1990 period in which the resource curse perspective became the conventional wisdom.

Backward or forward? The path of least resistance

Policymakers have long been preoccupied with building on the commodities sector to promote linkages and to thus develop the manufacturing sector. But overwhelmingly, their attention has been focused on forward downstream linkages. In the soft commodities sector, governments have sought to promote the food processing sector, both on-farm and off-farm. Diversification in industrial soft commodities, such as timber and cotton, has been complemented with policies designed to promote the processing of raw materials. In timber this has led to support programmes for chipboard, veneer, plywood and furniture, and in cotton to the promotion of the textiles sector. In hard commodities, governments have taken measures to encourage downstream processing, in some cases with direct equity contributions, in others by providing loans and a range of fiscal and non-fiscal incentives. A particularly focused government support programme for forward linkages has been developed in Botswana to encourage the cutting and polishing of diamonds (Mbayi, 2011). In energy commodities, governments in oil-producing countries have both encouraged and invested in the construction of refineries, for example, in Angola (Teka, 2010). In many of these commodities sectors, particularly those which are characterized by large economies of scale and heavy capital costs, governments have provided substantial funding to promote these downstream linkages.

There are also cases of government support for backward linkages. These have predominantly involved two types of linkages. The first has been localization, either in the form of local ownership (of the commodity producers on the assumption that this will lead to backward

linkages to manufacturing) or regulations involving the employment of national citizens. The second has been local content policies. Unlike the forward linkage policy agenda which has frequently involved heavy commitment of government funds, including government as a co-investor, most of the support policies have been "passive" in the case of backward linkages, involving the establishment of targets (such as on local content) mandated to foreign-owned companies operating in the commodities sector. In general, in many low income countries, particularly in Africa, the performance of the commodity producing firms in meeting these targets has been poorly monitored. A pervasive trend affecting governments' attitudes towards the promotion of both forward and backward linkages has been the frequent assumption that local ownership in commodity producing sectors will lead to a broader and deeper pattern of linkages.

Why have governments not paid more attention to backward linkages, particularly in the hard and energy commodities sectors? In large part this (as we have seen above) is attributed to the inherited wisdom that the commodities sector is an enclave activity. There has also been confusion on the potential for technological spillovers from backward linkages. On the one hand is the legacy of Singer's argument that the commodities sector is characterized by low technology, and on the other hand are commentators who argue that, particularly in the hard and energy commodities sector, backward linkages (for example, in mine construction) require such large investments and complex technologies that the barriers to entry would be insuperable.

This negative perspective on backward linkages is, however, unwarranted for a number of reasons. These are technological spillovers, the degree of technological change in the commodities sector and the scope for the provision of intermediate products and services. Let us first turn to the issue of technological content in the exploitation of hard and energy commodities. A key characteristic of virtually every deposit of minerals, precious stones, oil, gas and coal is that it is location-specific. No two deposits will be identical. Hence, by necessity, there will be some need to tailor the exploitation process (and, even more so, the pre-production exploration process) to local circumstances. The technology and accompanying knowledge and skill inputs have to therefore be applied locally. This *in situ* application provides the possibility to draw on local skills and knowledge; indeed, skills and technological knowledge have advanced even in relatively poor economies with generally weak backward linkages such as Tanzania (Mjimba, 2011). In other cases, such as the South African coal industry, the necessity to wash the mined coal which is specific to South African deposits, hydraulic engineering capabilities had to be developed locally in the metal working sector supplying machinery to coal mines (Pogue, 2008). In the pre-salt oil deposits off the coast of Brazil, new extraction and

processing skills are required and this has provided opportunities for technological development which the Brazilian supply industry is beginning to exploit by targeting the offshore oil sector market in West Africa. In each of these cases, the skills are location-specific and provide the potential for local supply and, subsequently, also for export. Where there are multiple points of production in a single country (that is, a number of different and independently owned mines), specific possibilities open up for specialized suppliers to benefit from economies of scope, meeting the needs of a variety of customers (where exploitation involves a single mine, by contrast, adapting to the specific environmental conditions may be internalized within the mining firm).

Moreover, the traditional view of the soft and hard commodities sectors as being characterized by stable technologies is also open to question. To the contrary, in many commodities sectors the pace of technological change has been brisk and/or is increasing. For example, in the mining sector, IT-related technologies are diffusing rapidly, enabling higher extraction rates and lower costs of production. In some cases, and this generally does not apply to low income economies, this leads to largely automated mines (Kaplan, 2011). Other sources of technological change in all three families of commodities are the growing need to meet global standards (Kaplinsky, 2010) and the growing demand in final markets for differentiated products (Marin, Navas-Aleman and Perez, 2009). The consequence of this technological dynamic is that it offers the potential for upgrading capabilities by moving into more knowledge-intensive activities.

But beyond this question of technological content and technological spillovers in the exploration and construction phases of the commodities sector lies a range of provisions and intermediate goods, which the mines require to operate on an ongoing basis. Often, these inputs involve considerable skills. For example, Bell Equipment in South Africa began in the 1950s by producing machines for cutting timber and sugar cane. The capabilities which it built led to the development of horizontal linkages to other sectors, notably in the early years of sugar cane growing. Bell Equipment now produces large earthmoving equipment for the global mining sector (Kaplinsky and Mhlongo, 1997), selling under the John Deere brand name in the U.S. and the Hitachi brand name in Australia. But this example is one towards the extreme end of the scale of complexity of inputs required by the commodities sector. Less demanding is the assembly and sub-manufacture of the cables which link sub-sea oil wells to surface vessels and to land, a recently developed backward linkage in the Angolan oil industry (Teka, 2011). Other inputs into production are much less technology intensive and range from the provision of basic utilities (water and power), the provisions required to feed the workforce, spares and office

supplies. In the soft commodities sector, the range of inputs required to facilitate production includes seeds, fertilizers, packaging materials and transport.

In addition to these material inputs, ongoing production requires inputs from the service sector; some of these services may be technologically demanding and may have led to backward linkages. For example, in the Nigerian oil sector, there is evidence of considerable local supply in the provision of IT services (Oyejide and Adewuyi, 2011). In Zambia, engineering, repair and maintenance services have played an important role in building industrial capabilities (Fessehaie, 2010). Similarly, Chinese-owned oil companies in the Sudan have encouraged substantial local supply. This has involved 17 service firms and 74 manufacturing firms employing over 4,600 workers, but all of these have been Chinese-owned enterprises rather than Sudanese-owned firms (Suliman and Badawi, 2010). Yet other services, such as the provision of security staff to manage access to the site, transport and logistics, the maintenance of office equipment and auditing services have fewer technological and skill barriers to entry.

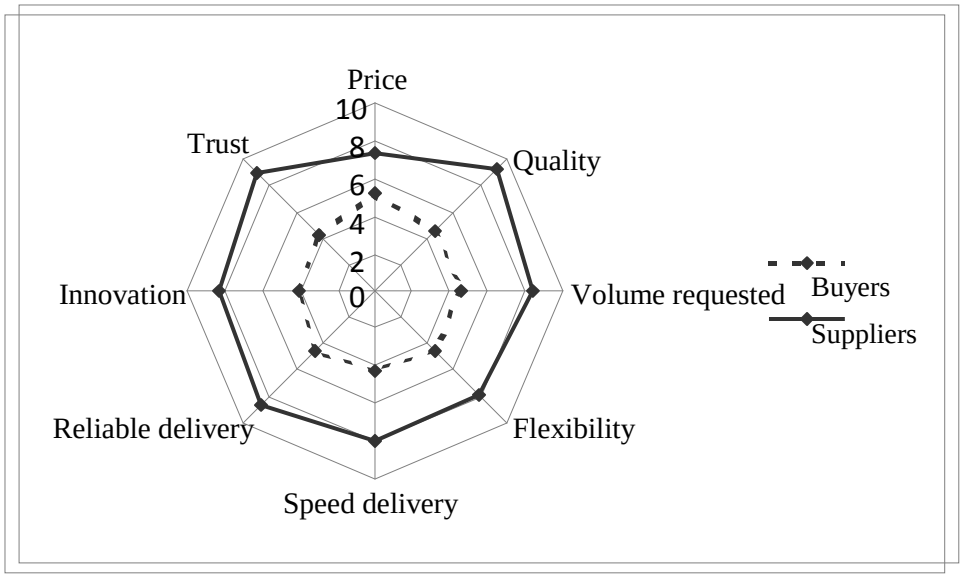
Putting this range of backwardly-sourced inputs together with the active desire of firms to outsource activities which are not in their core competence, we can see that there is a large potential for backward linkages from the commodities sector. Whilst some operations in the commodities sector itself (particularly in hard and energy commodities) may be large-scale and technologically complex by nature, this may not apply to many of the intermediate goods, provisions and services which the commodities sector depends on. It is therefore not surprising that despite the widespread belief that commodities extraction is an enclave activity, there are in reality many linkages which have been and are being forged with the local economies in which they operate. The extent of these linkages, of course, depends on the capabilities of local firms and logistics and infrastructure costs. But whatever the level of these local capacities, there will be categories of potential inputs which can and are being supplied by local firms.

Importantly, the majority of these linkages occur as a natural outcome of market forces, and this is because a rational firm actively prefers to have reliable, low cost and high quality suppliers on its doorstep rather than them being located abroad or some distance from the extractive activity. This fundamentally contradicts the enclave strategy which foreign-owned mining and energy firms are generally accused of adopting. Although the degree of these market-driven linkages is contextual (varying between sectors and countries and within sectors across different countries and within countries across different sectors), as a general rule they are a function of two major factors. The first is time. Particularly in commodities sectors governed by very large

technological barriers to entry, it will take some time for these linkages to be developed. Bell, for example, found that even in the most dynamic Asian economies the development of industrial competences in many sectors often took three decades or longer (Bell, 2006).

And, second, the depth and breadth of linkages also reflect local industrial and service sector capabilities. In Zambia, copper mining companies were not satisfied with the performance of the local supply chain, though they all pointed to the existence of a small number of very capable suppliers (mostly original equipment manufacture (OEM) and some engineering firms). Suppliers seemed to have underperformed in all of the critical success factors (CSFs) which were deemed important by these mines' purchasing managers, particularly in relation to trust, innovation and technological capabilities as well as lead times (Figure 10). Suppliers consistently overestimated their performance in all the CSFs. Because of this critical value chain misalignment, suppliers failed to understand the areas where improved capabilities were required and the reason underlying the buyers' decision to import (Fessehaie, 2010).

Figure 10 Buyers' perception of supplier capabilities in the Zambian copper industry (2010)



Source: Fessehaie (2010).

In contrast, the gold mining industry in Ghana provides an example of the development of linkages over time (Table 2). Although the bulk of inputs were imported, there is a considerable local spend, arising as a natural consequence of the development of the local gold mining industry over a period of 130 years.

Table 2 Value and composition of expenditure in the Ghanaian gold industry, 2008 (US$ m and share of total purchases)

	$ million	*Share of total purchases*
Wages and salaries	175	8
Capital expenditure	669	29
Fiscal contribution	148	6
Disbursements to communities	12	1
Local purchases (excl. fuel and power)	567	20
Fuel and power	428	18
Loans	52	2
Imported consumables	376	18
Total	2,427	100

Source: Bloch and Owusu, 2011.

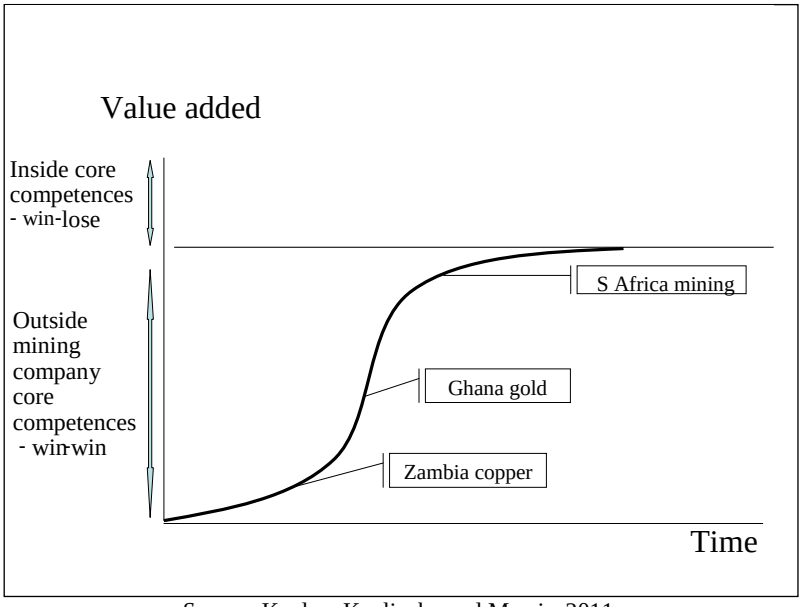
What factors determine the breadth and depth of linkages from the commodities sectors?

Working with these examples of backward and forward linkages we can build a general story of the factors which determine the breadth and depth of linkages from the commodities sector in the contemporary period. This is shown in Figure 11. The vertical axis measures the composition of value added in the provision of inputs into the production of a commodity. Here we can distinguish, on the one hand—based on the insights provided from the core competences and global value chain theoretical frameworks—a series of inputs which the lead firms have no intrinsic interest in maintaining in-house since they do not reflect their core competences. That is, the firms have no distinct competences in the production of these inputs, and/or the barriers to entry may be low. We characterize these as win-win linkages, that is, where lead commodity producing firms and local suppliers and customers have a common interest in developing local linkages. On the other hand, there is a range of inputs which are central to the firm's competitiveness and which it is reluctant to see undertaken by a competitor. We consider these to be win-lose linkages. Taking the case of diamonds as an example, the cutting and polishing firms may actively want auditing, office provisions and utilities to be provided by outsiders, and in the best of all cases, by reliable and low-cost suppliers who are based as close to their operations as possible. On the other hand, they are very reluctant and have to be forced to allow suppliers to participate in the cutting and polishing as well as in the logistics, which guarantees their control over diamond supplies, as these are their core competences and the factors that determine their profitability over time (Mbayi, 2011).

The horizontal axis of Figure 11 reflects the passage of time. The curve shows that as a general consequence of the building of local competences over time and the active search by lead firms

to outsource the production of inputs which are not within their core competences, there is a market-driven process in which an increasing proportion of inputs is sourced outside of the lead firm and to the local economy. The rate of change is low when countries have weakly developed industrial competences where commodity extraction is a relatively recent phenomenon and where relatively few inputs are required. We can situate the Zambian copper industry (relatively few linkages), the Ghanaian gold industry (moderate linkages with the development of mining supply industrial districts) and the South African mining industry on this graph. These are countries where market forces have been the predominant driver of linkages from the commodities sector to other sectors in the domestic economy. In the case of South Africa, some of the domestic firms are global industry leaders, so that even though they do not outsource core competences, they are provided domestically (in other words, these do not constitute local linkages, but do contribute, through internalization, to local value added). In each of these cases we observe backward linkages. But market-driven forward linkages are also found, particularly in the processing of food commodities and other soft commodities.

Figure 11 Market-driven linkages over time



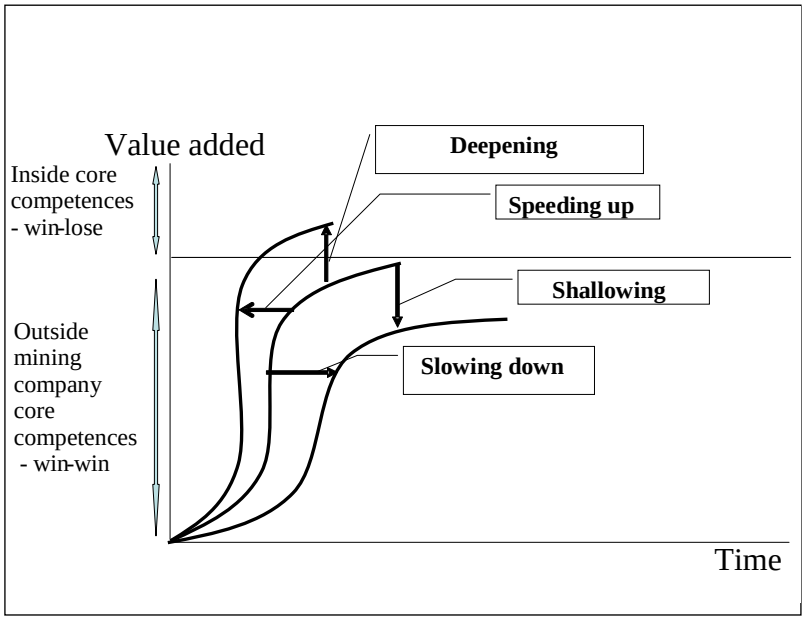
Source: Kaplan, Kaplinsky and Morris, 2011.

The Zambian copper industry is discussed in Fessehaie, 2011; the Ghanaian gold industry in Bloch and Owusu, 2011, and the South African mining industry in Kaplan, 2011.

Figure 11 describes a process of the largely market-driven development of linkages, determined as we have seen by a combination of the outsourcing objectives of lead firms, the capabilities in

the local economy, the build-up of capabilities over time and the nature of the sector. This is a general story about the development of linkages into the core commodity production process. But in itself it does not provide a picture of whether this outsourcing has been optimally undertaken domestically or via imports. Governments often intervene in this process of linkage building in order to maximize the extent to which local suppliers and users are incorporated in these fracturing value chains (Figure 12). This government involvement may be effective as such that it acts to both deepen and accelerate these linkages (the curve shifts up and to the left), or where policy is poorly focused and implemented to slow down and make the linkages shallower (the curve moves to the right and down). Botswana in diamonds (Mbayi, 2011), Angola (Teka, 2011), Nigeria in oil (Oyejide and Adewuyi, 2011), and Gabon in timber (Terheggen, 2011) are all examples of countries where government involvement has accelerated these linkages. In Tanzania, the failure of diverse government policies to work in the same direction has slowed down the pace of linkage development (Mjimba, 2011). In recent years, policies in South Africa designed to enforce black ownership have led to the migration of some firms (and skilled workers) abroad, thus reducing distinct global competences (Kaplan, 2011).

Figure 12 Market and policy-driven linkages over time



Source: Kaplan, Kaplinsky and Morris, 2011.

An important caveat to this model of the development of linkages over time, particularly when government has intervened to speed up and deepen linkage development, is that the outcomes may not be "economically optimal". That is, policies designed to increase local content in backward linkages or to promote forward linkages may be very costly with inefficiencies in

these linkage provisions consuming some of the resource rents generated in the commodities sector. Similarly, where government policies hold back the development of linkages which would have occurred as a natural consequence of market forces (for example, as in the case of gold in Tanzania. Mjimba, 2011), there may also be costs associated with not encouraging the development of linkages. In this case, it is the foregone benefits which are lost where faster and deeper linkage development would have provided local incomes, supported the development of local capabilities and saved foreign exchange expenditures. It is difficult to argue the case *a priori* whether short-run inefficiencies generally overwhelm short-long-run competitiveness, since this will vary across sectors and countries and over time. It is, however, a prime consideration as we shall see in a later report in the policies adopted towards increasing the breadth and depth of linkages in the commodities sectors.

6. Why should governments intervene in linkage development?

In this section of the report, we briefly set out the implications of our analysis for policy. These issues will be covered in greater depth in a complementary report directed primarily at the policy framework required to make the most of the potential for linkages between the industry and the commodities sector.

Governments are interested in the promotion of linkages from the commodities sectors for seven major reasons. First, most governments prioritize the promotion of growth and employment. In general, in the hard and energy commodities sectors which are characterized by capital-intensive processing technologies, the employment potential arising from forward linkages is limited. This does not, however, apply as a general rule in soft commodities, where forward linkages involving the processing of commodities are often labour intensive. By contrast, backward linkages into all three families of commodities are generally relatively labour intensive in nature, particularly at early stages of the development of local supply, and are thus an attractive source of diversification for governments. These linkages—forward and backward—may also increase real GDP, although where the profitability of suppliers and users is wholly dependent on extensive government intervention and support, this increase may be nominal rather than real.

A second reason for governments to take action to foster linkages into the commodities sector is that, as Hirschman pointed out, this provides direction towards the diversification of the economy. Notwithstanding the difficulties involved in producing inputs efficiently for the commodities sector or in using the sector's outputs effectively, the development of linkages

provides some form of signposting for the development of the industrial and service sectors. But following a linkage thread from the commodities sector does not necessarily translate into the development of an efficient and competitive diversified economy. Metaphorically speaking, this may turn into a signposting pointing to hell rather than to heaven!

Third, and related to the signposting involved in diversification from commodities, is the capacity which may be provided to develop dynamic capabilities over time. That is, whilst governments may know that in the short-term there is little prospect of developing efficient linkages activities, they may have good reason to believe that this is a problem which may be resolved, or at least be diminished over time. They may actively target these linkages as a fulcrum for their industrial policy in the belief that complementary development of the national systems of innovation may result in a competitive diversified economy in the future. This is a policy agenda which Botswana has explicitly adopted in the promotion of forward linkages from its diamond mining sector (Mbayi, 2011).

Fourth, linkages from the commodities sector may lead to the generation of external economies, including via horizontal linkages (Figure 9). We have already presented the examples of South Africa's agricultural and mining equipment industry, but it is also reflected in the capabilities which are developed in 2nd and 3rd generation biofuels, which may help meet the needs of the agricultural and pharmaceutical sectors. But these are examples drawn from the more knowledge-intensive side of the linkage spectrum. In Angola, which is characterized by a particularly weak metallurgical sector, the stimulation of a basic metal working capability required in the sub-manufacture and assembly of control lines between the sub-sea and the surface is helping to create a demand for metal working capabilities which will have wide-ranging implications for other manufacturing sectors and for the construction and infrastructure sectors (Teka, 2011). In Nigeria, IT skills developed to serve the needs of the oil sector are also being applied to other sectors (Oyejide and Adewuyi, 2011). Another important avenue for external economies are the intra- and inter-sectoral linkages arising from the development of infrastructure to meet the needs of the commodities sector. For example, the improvement of the Central Corridor, linking the Tanzanian coast with its interior, and subsequently eastern Rwanda and the DRC, is another example of how linkages developed in the mining sector may spill over into economic opportunities for agriculture and for mining in other sectors and other countries (Perkins and Robbins, 2011).

Fifth, government intervention to foster the development of linkages also follows from the failure of firms to strategize effectively and to then implement the development of their supply base. They often fail to "walk the talk". Why does this happen when the development of local suppliers holds such competitive advantages for these lead firms? In part, the explanation lies in the sociology of the firm and the routines which it generates (Nelson and Winter, 1982). Even in manufacturing—where supply chain management is most developed—outside of large Japanese firms and a few of their U.S. and European competitors, supply chain development is generally a commitment rather than a reality. The commodities sector is a latecomer in its commitment to supply chain development which compounds these problems of non-implementation. A further reason why lead firms in the commodities sector fail to develop effective supply chain development strategies for local suppliers arises from the nature of the contracts which are struck when investments are committed to build new mines and oil wells. The general rule is for the mining firm/or the oilfield operator to sub-contract mine building or well construction to a specialized construction and installation firm. These contractors operate at a global level and have long-established links with their own sub-contractors. More importantly, the firms involved in construction do not run the mine. Hence, standards are set for the mine/oil builder which may be poorly geared for using local suppliers on an ongoing basis. For example, in Tanzania, the firm responsible for building one of the new goldmines was based in Australia. The specifications it used for plastic piping and electric fittings met Australian rather than Tanzanian standards, thereby effectively ruling out local sub-sub-contractors in the mine building process (Hanlin, 2011). A third reason why lead firms do not make optimal use of local suppliers is one which arises particularly when the mine or well is located in foreign, isolated and often harsh conditions (Hanlin, 2011; Mjimba, 2011). The consequence is that supply chain management staff and the purchasing function characteristically work on short and intensive work cycles, perhaps eight weeks on and eight weeks off. Coupled with their failure to speak the local language, their short residency does not provide them with the opportunity to build the long-term personal relations with local suppliers which are often critical to an extension of local sourcing and to the successful implementation of supply chain development programmes.

Finally, the manufacturing challenge has become much more daunting in the early 21st century than it was in the 1960s and 1970s for the first generation Asian NIEs (notably Hong Kong, Republic of Korea, Singapore and Taiwan Province of China) and in the 1980s and 1990s for the second generation NIEs (especially China, but also India, Thailand and Vietnam). The very substantial competitive advantage of the East Asian production system (in which "Made in China" generally involves the assembly of components sourced from the region and capital

goods sourced from Japan and Republic of Korea) means that the task of third generation NIEs is made much more difficult. The follower countries have great difficulty in penetrating markets in the high income countries for labour-intensive manufactures such as clothing and footwear because of the success of the second tier NIEs (Kaplinsky, McCormick and Morris, 2010). And with trade liberalization, they experience fierce competition in their domestic markets from imports. Under these circumstances, the production of commodities and the linkages which are made possible by the production of commodities may represent a more viable path to industrial development and economic diversification. But, in general, this is an opportunity open mainly for countries that benefit from natural resource endowments.

7. Conclusions

As we have seen, there is a renewed opportunity open to commodity exporting low income economies which arises from a continuing and perhaps prolonged commodity boom. This provides for a number of potential linkages to the industrial sector, particularly fiscal and production linkages. In subsequent reports we will consider fiscal linkages in greater detail as well as consumption linkages. In this working paper we have focused on production linkages, arguing that as a consequence of the growth in outsourcing by lead commodity producing firms (reflecting a wider process in industry in general), there are considerable and largely unrecognized opportunities for the development of linkages to local industry. Handled effectively, this provides the potential to foster economic diversification by building on forward and (especially) backward linkages. But it is a strategic path which is littered with corpses of failed attempts, undermined by a combination of weak and inappropriate policy support and grandiose and unrealistic expectations about the capacity of the economy to develop dynamic comparative advantages.

Thus, policy responses need to be evidence based and strategic and complemented by joined-up policy instruments which provide appropriate incentives and sanctions. Moreover—and here it is important to learn a lesson from China's recent development experience—one-size does not fit-all, and policy needs to be pragmatic and flexible. Context is important, since not only do major differences between the three families of soft, hard and energy commodities exist, there are also important intra-family differences. Moreover, each economy is individual and experiences are a moving frontier of capabilities and political economic characteristics.

Perhaps the most important lesson to be learned from the development of outsourcing strategies by lead firms in global value chains is that the enclave mentality to diversification in low

economies is an anachronism. There is extensive scope for governments and the private sector—both firms directly involved in the commodities sector and those with the potential to develop linkages in the commodities sector—to work together to identify the range of win-win outcomes available in promoting diversification. The consequence of the legacy of mistrust in many countries, the blinkered visions of firms (a form of pervasive market failure) and historically inappropriate and ineffective policies may have dampened linkages in the past. But by the same token, they are suggestive of substantial opportunity in the future.

References

Akyüz, Y. (2011), "Capital Flows To Developing Countries in a Historical Perspective: Will the current boom End with a Bust?", Discussion Paper 37, Geneva: The South Centre

Bell, R. M. (2006), "Time and technological learning in Industrialising countries: how long does it take? How fast is it moving (if at all)?", International Journal of Technology Management, Vol. 36, Nos. 1/2/3, pp.25-39.

Bloch, R. and G. Owusu (2011). The drive to increase local procurement in the Mining Sector in Ghana: Myth or reality?. MMCP Discussion Paper No 1, Cape Town, the University of Cape Town, and Milton Keynes, the Open University.

Blomström, M. and A. Kokko (2007). 'From Natural Resources to High-Tech Production: The Evolution of Industrial Competitiveness in Sweden and Finland'. In Lederman, D. and W.F. Maloney (eds), Natural Resources: Neither Curse nor Destiny. Washington, DC: Stanford University Press and The World Bank, 213-256.

Bravo-Ortega, C. and de Gregorio, J. 2007. The Relative Richness of the Poor? Natural Resources, Human Capital and Economic Growth. In Lederman, D. and W.F. Maloney (eds), Natural Resources: Neither Curse nor Destiny. Washington, DC: Stanford University Press and The World Bank, 71-99.

Cashin, P. and J. C. McDermott (2002), "the Long-Run Behaviour of Commodity Prices: Small Trends and Big Variability." IMF Staff Papers 49(2).

Cashin, P., Hong Liang and C. J. McDermott (2000). 'How Persistent are Shocks to World Commodity Prices?' IMF Staff Papers, 47 (2), 177-217.

Chenery, H. B. (1960). "Patterns of Industrial Growth" The American Economic Review, Vol. 50, No. 4: 624-654.

Corkin, L. (2011). Chinese Construction Companies in Angola: A Local Linkages Perspective. MMCP Discussion Paper No 2, Cape Town, the University of Cape Town, and Milton Keynes, the Open University.

Davies, G. A. (1995). 'Learning to Love the Dutch Disease: Evidence from the Mineral Economies'. World Development 23 (10), 1765-1779.

Farooki, M. Z. and R. Kaplinsky (2011 forthcoming), The Impact of China on Global Commodities: The Disruption of the World's Resource Sector, London: Routledge.

Feenstra, R. C. and G. G. Hamilton, (2005), Emergent Economies, Divergent Paths: Economic Organization and International Trade in South Korea and Taiwan, New York: Cambridge University Press.

Feenstra, R. C. and G. G. Hamilton, (2005), Emergent Economies, Divergent Paths: Economic Organization and International Trade in South Korea and Taiwan, New York: Cambridge University Press.

Fessehaie, J. (2011), Development and Knowledge Intensification in Industries Upstream of Zambia's Copper Mining Sector. MMCP Discussion Paper No 3, Cape Town, the University of Cape Town, and Milton Keynes, the Open University.

Fu, X., D. Kale et al., (2009), The Evolution of Global Manufactures Prices, 1988–2006: China's Comparative Performance. IKD Working Paper, 49. The Open University (UK).

Gereffi G., T. Sturgeon and J. Humphrey (2005), "The Governance of Global Value Chains", Review of International Political Economy, Vol. 12 No. 1, pp 78-104.

Hamel, G. and C. K. Prahalad (1994), Competing for the Future, Cambridge: Harvard Business School Press Hirschman, A. O. (1981), Essays in Trespassing: Economics to Politics and Beyond, New York, Cambridge University Press.

Hanlin, C. (2011), The drive to increase local procurement in the Mining Sector in Africa: Myth or reality?. MMCP Discussion Paper No 4, Cape Town, the University of Cape Town, and Milton Keynes, the Open University.

Hausmann, R. and Klinger, B. (2006), "South Africa's Export Predicament", Working Paper 129, Center for International, Cambridge, Mass: Development, Harvard University.

Hausmann, R., D. Rodrik and C. Sabel (2007) Reconfiguring Industrial Policy: A Framework with Application to South Africa, mimeo.

Hausmann, R., J. Hwang and D. Rodrik (2007), "What you export matters," Journal of Economic Growth, Vol. 12, No.1, pp. 1-25.

Hirschman, A. O. (1981), Essays in Trespassing: Economics to Politics and Beyond, New York, Cambridge University Press.

Innis, H. (1957), Essays in Canadian Economic History (Toronto, 1957).

Jenkins, R. O. (2008), "The Latin American Case", in E. Dussel and R. O. Jenkins (eds.), China and Latin America: Economic relations in the twenty-first century, Bonn: German Development Institute.

Kaplan, D. (2011), South African Mining Equipment and Related Services: Growth Constraints and Policy. MMCP Discussion Paper No 5, Cape Town, the University of Cape Town, and Milton Keynes, the Open University.

Kaplinsky, R. (2008), "What Does the Rise of China Do for Industrialisation in Sub-Saharan Africa?, Review of African Political Economy, Vol. 35, No. 115, pp. 7-22.

Kaplinsky, R. (2010), The Role of Standards in Global Value Chains and their Impact on Economic and Social Upgrading, Policy Research Working Paper 5396, Washington: World Bank.

Kaplinsky R. and E. Mhlongo (1997), "Infant Industries and Industrial Policy: A Lesson from South Africa", Transition, No. 34, pp.57-85.

Kaplinsky, R. and A. Santos-Paulino (2006), "A disaggregated analysis of EU imports: Implications for the study of patterns of trade and technology", Cambridge Journal of Economics , Vol. 30, No. 4, pp. 587-612.

Kaplinsky, R., D. McCormick and M. Morris (2010), **"**Impacts and Challenges of a Growing Relationship between China and Sub Saharan Africa'" In V. Padayachee (ed.), The Political Economy of Africa, London: Routledge.

Lederman, D. and W.F. Maloney (2007). Trade Structure and Growth. In Lederman, D. and W.F. Maloney (eds), Natural Resources: Neither Curse nor Destiny. Washington, DC: Stanford University Press and The World Bank, 15-39.

Maddison, A. (2007). Chinese Economic Performance in the Long Run. Paris, OECD Development Centre.

Manzano, O. and R. Rigobón (2007). Resource Curse or Debt Overhang. In Lederman, D. and W.F. Maloney (eds), Natural Resources: Neither Curse nor Destiny. Washington, DC: Stanford University Press and The World Bank, 41-70.

Marin, A., Navas-Aleman, L., Perez, C., 2009. 'The possible dynamic role of natural-resource based networks in Latin American development strategies' Mimeo. Prepared for the CEPAL-SEGIB Project (July).

Mbayi, L. (2011), Linkages in Botswana's Diamond Cutting and Polishing Industry. MMCP Discussion Paper No 6, Cape Town, the University of Cape Town, and Milton Keynes, the Open University.

Mjimba, V. (2011). The Nature and Determinants of Linkages in Emerging Minerals Commodity Sectors: A Case Study of Gold Mining in Tanzania. MMCP Discussion Paper No 7, Cape Town, the University of Cape Town, and Milton Keynes, the Open University.

Morris, M and G. Einhorn, (2008), "Globalisation, welfare and competitiveness: the impacts of Chinese imports on the South African clothing and textile industry", Competition and Change, Vol. 12, No. 4, 2008.

Nelson, R. R. and S. Winter (1982), An Evolutionary Theory of Economic Change, Cambridge, Mass.: The Belknap Press of Harvard University Press.

Oyejide, T.A. and A. O. Adewuyi (2011). Enhancing Linkages to the Oil and Gas Industry in the Nigerian Economy. MMCP Discussion Paper No 8, Cape Town, the University of Cape Town, and Milton Keynes, the Open University.

Perkins, D. and G. Robbins (2011). The contribution to local enterprise development of infrastructure for commodity extraction projects: Tanzania's central corridor and Mozambique's Zambezi Valley. MMCP Discussion Paper No 9, Cape Town, the University of Cape Town, and Milton Keynes, the Open University.

Pfaffenzeller, S., P. Newbold, et al. (2007). "A Short Note on Updating the Grilli and Yang Commodity Price Index." World Bank Economic Review 21(1): 151-63.

Pogue, T. E. (2008), "Missed opportunities? A case study from South Africa's mining sector" in J. Lorentzen (ed.), Resource Intensity, Knowledge and Development. Insights from Africa and South Africa, Cape Town: Human Sciences Research Council Press.

Prebisch, R. (1950), 'The Economic Development of Latin America and Its Principal Problems', Economic Bulletin for Latin America *7*, N. York: United Nations.

Sachs, J.D. and A.M. Warner (1997), "Natural Resource Abundance and Economic Growth" in G. Meier and J. Rauch (eds.) Leading Issues in Economic Development. Oxford: Oxford University Press.

Sachs, J.D. and A.M. Warner (2001). 'The Curse of Natural Resources'. European Economic Review 45, 827-838.

Singer H W (1950), 'The Distribution of Gains between Investing and Borrowing Countries', American Economic Review, 15, pp. 473-85.

Singer, H. (1971), 'The Distribution of Gains Revisited', reprinted in A. Cairncross and M. Puri (eds.) (1975), *The Strategy of International Development*, London: Macmillan.

Suliman, K.M. and A.A.A. Badawi (2010), "An assessment of the Impact of China's Investments in Sudan", AERC Collaborative Research Project on The Impact of China-Africa Relations, Nairobi: African economic Research Consortium.

Taylor, L. J. (1969). "Development Patterns: A Simulation Study " The Quarterly Journal of Economics 48(2): 220-241.

Teka, Z. (2011), Backward Linkages in the Manufacturing Sector in the Oil and Gas Value Chain in Angola, MMCP Discussion Paper No 11, Cape Town, the University of Cape Town, and Milton Keynes, the Open University.

Terheggen, A. (2011), The Tropical Timber Industry in Gabon: A Forward Linkages Approach, MMCP Discussion Paper No 10, Cape Town, the University of Cape Town, and Milton Keynes, the Open University.

UNIDO (1979), World Industry Since 1960: Progress and Prospects, United Nations Industrial Development Organization, New York

Watkins, M.H. (1963). 'A Staple Theory of Economic Growth'. The Canadian Journal of Economics and Political Science 29(2), 141-158.

Wright, G. and J. Czelusta (2004). "The myth of the resource curse." Challenge 47(2): 6-38.

Xing, Y., and N. Detert (2010), "How the iPhone Widens the United States Trade Deficit with the People's Republic of China". ADBI Working Akyüz, Y. (2011), "Capital Flows To Developing Countries in a Historical Perspective: Will the current boom End with a Bust?", Discussion Paper 37, Geneva: The South Centre.

Printed in Austria
V.11-84471—July 2011—260

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
Vienna International Centre, P.O. Box 300, 1400 Vienna, Austria
Telephone: (+43-1) 26026-0, Fax: (+43-1) 26926-69
E-mail: unido@unido.org, Internet: www.unido.org