"One Thing Leads to Another" – Commodities, Linkages and Industrial Development:

A Conceptual Overview

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Making the Most of Commodities Programme (MMCP)

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Centre for Social Science Research P·R·I·S·M

Development Policy and Practice

The Open University

MAKING THE MOST OF COMMODITIES PROGRAMME

Like many other developing economy regions, Africa is benefitting from a sustained boom in commodities prices. Received wisdom has been that commodities production is an inherently enclave activity and that it undermines the viability of industry. The Making the Most of Commodities Programme challenges this negative view of the commodities sector. It's research analyses the determinants of backward and forward linkages, identifying policy responses which will broaden and deepen them. In so doing it contributes both to achieving sustainable growth and the spreading of benefits to a wider population. By incorporating younger researchers, building a research network, and dialogue with policymakers, the MMCP also seeks to build analytical and policy capacity, and to influence policy outcomes.

The MMCP focuses on a diverse range of commodity sectors in a number of African economies, as well as on key infrastructural determinants of effective linkage development. A number of common factors are identified which will increase linkages beneficially and which lend themselves to policy intervention - the role of ownership, the nature and quality of infrastructure, the national system of innovation, spillover of skills to and from the commodities sector, linkages in regional economies and the nature and consistency of policies directed towards the commodities sectors.

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13. *'Commodities and Linkages: Industrialization in Sub Saharan Africa', Mike Morris, Raphael Kaplinsky, and David Kaplan*
14. *'Commodities and Linkages: Meeting the Policy Challenge', Mike Morris, Raphael Kaplinsky, and David Kaplan*

The MMCP is a collaborative research and policy programme between Policy Research in International Services and Manufacturing (PRISM), Economics and CSSR, University of Cape Town and, Open University. The International Development Research Centre of Canada is the principal funder, with additional funding from the William and Flora Hewlett Foundation, Harry Oppenheimer Institute, and Open University. Further information and other Discussion Papers can be downloaded from:

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Abstract

Sub-Sahara African commodity exporting economies have benefitted greatly from the commodities boom of the past decade. The conventional wisdom argues that resource extraction is corrosive of industrial development. This is due to a combination of the macroeconomic consequences of resource exploitation and the assumed enclave nature of capital- and technology-intensive mineral and energy extraction. The paper challenges this pessimistic 'resource curse' argument and argues that there are unexploited opportunities for promoting industrial development through the development of linkages from the commodities sector. In particular, these opportunities may be greater for backward than for forward linkages, particularly in the minerals and energy sectors. In making this case, this Discussion Paper draws on the experience of high-income countries which have resource-intensive economic structures, the geographical specificity of many resources and the growing interest of large resource-extracting firms in outsourcing the production of inputs which are outside of their core competences, It sets out a general model of linkages between industry and services and the commodities sector which distinguishes between win-win and win-lose outcomes. The paper concludes with a brief review of the reasons why Governments might wish to intervene to support linkages between the commodities and the industrial and service sectors. Companion Discussion Papers 13 and 14 report the results of a detailed empirical research focus on the extent and determination of linkages in nine African economies, and on policies which may promote the broadening and deepening of linkages from the commodities to the industrial sector in Sub-Sahara Africa and other low income regions of the world.

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FOREWORD

*Making the Most Commodities Programme (*MMCP)/Africa results from a unique, cross-cutting collaboration by the University of Cape Town and the Open University with the International Development Research Centre (IDRC). The MMCP builds and consolidates on other IDRC supported research on Asian Drivers and their relations with Africa by expanding the research program to focus on the growth and boom in global commodity demand. The resulting data and analysis provided opportunities for vibrant and high quality capacity building processes which was an integral part of the core research process, as is evidenced in the various Discussion Papers.

These discussion papers offer new information that will help Sub Saharan African (SSA) countries to maximize the potential linkage opportunities emanating from the production of commodities so as to promote sustainable industrial growth, and ensure widespread access to the fruits of this growth. The analysis will help decision-makers integrate and target efforts to increase the returns from extractive natural resources and promote mutual benefits between partner countries. The findings are aimed at academics, policy makers and high level technical officers working on African industrialisation, including those focusing on Asia-Africa trade relations. The findings have also enhanced our understanding of the dynamics that SSA countries experience in management of their natural resources and the significant threats these pose to their governance, macroeconomic management, and industrial development. The MMCP also makes recommendations for developing countries to incorporate into local and regional decision-making and how governments can respond to development challenges associated with natural resources. This publication therefore encapsulates an area of critical importance to resource rich, but often poor, countries in SSA.

The MMCP's approach, based on innovative ideas and integrated research, created exceptionally strong links with industry and public stakeholders, hence the potential for widespread application in other developing countries. These final synthesis discussion papers ensure that decision-makers in Africa have the appropriate tools and information to minimize the potential costs of the boom in commodities prices and to maximize the opportunities to build industrial linkages to lead commodity producers. In achieving these objectives, the team applied a distinctive and innovative policy dissemination process. This involved taking the research results and policy proposals to forums where policy makers were present, not just in Africa, but in the UN system and the International Financial Institutions in Europe and North America. In doing this they contribute to a policy agenda which will ensure that new opportunities for SSA commodities will not bypass decision-makers, and countries will not have to lose significant amounts of wealth as new natural resources are exploited. The MMCP process has also played a major role in capacity development in SSA – in total seven of the young researchers in this project will have obtained their PhDs as a direct consequence of their participation in this programme. Moreover, links have been established with research institutions across the continent which will no doubt endure in future research collaborations.

I am confident that the information contained in this document will assist SSA countries to develop strategic responses to the boom in commodity prices and improve the management of their natural resources. I therefore hope that decision-makers will see the value of the analysis and apply the findings to inform future decisions. On behalf of the International Development Research Centre (IDRC), I wish to extend our sincere thanks to the lead researchers involved in this effort, the University of Cape Town and the Open University, as well as all participating institutions and stakeholders that contributed to the development of these Discussion Papers.

Paul Okiira Okwi, *Senior Programme Officer, International Development Research Centre*

CONTENTS

1. INTRODUCTION

The strengthening of the industrial sector lies at the heart of the development agenda. The success of China and other emerging economies in expanding their manufacturing sectors and enhancing their economic growth rates over the past two decades is suggestive of the fruits to be obtained from this development path. However, the challenge facing many developing economies in promoting industrialisation in the modern era is a complex one. On the one hand, the foundations of the success of China and other newly emerging economies were built on decades of import substituting industrialisation. This route to promoting industry is now heavily restricted by the trade-policy liberalisation which has accompanied deepening globalisation. On the other hand the export-intensive route which has underwritten the success of the first- and second-tier Asian economies is circumscribed for new entrants precisely because of the success of China and other successful exporting economies. Global markets for manufactures are now intensely competitive, making it not just very difficult for new entrants in external markets, but also in competing with imports in their domestic markets.

In recent years, commodity exporting economies have benefitted greatly from a sustained increase in the price of their exports and (as we shall see below) there are reasons to believe that commodity prices will remain robust in the medium-term, and perhaps in the long-term too. There are great dangers to relying on these resource rents however, since the capital intensive nature of many commodities sectors limits employment and the distribution of these rents. Moreover, despite the confidence which these economies may justifiably have in sustained high prices for commodities, prudence dictates that a diversified economy is more robust and less vulnerable to the shocks which confront monoculture economies, particularly in the commodities sectors which have experienced, and will almost certainly continue to experience severe price volatility. One route to industrial development in these commodity exporting economies arises from the possibilities of building linkages into and out of commodity production. It is this agenda which the Making the Most of Commodities Programme addresses. In this paper we will set out the conceptual reasons which lead us to believe that the strengthening of linkages to the commodities sector are an important avenue for industrial development. Detailed verification of these conceptual issues will be provided in a forthcoming synthesis paper, and in the individual project Discussion Papers which have resulted from the research programme.[1]

However, it is widely believed that the exploitation of commodities and industrial development do not go hand-in-hand, particularly in low income countries and economies which are heavily dependent on the export of natural resources. In its extreme view, the prevailing belief is not just that there are few synergies between the commodities and industrial sectors, but that the exploitation of commodities undermines industrial development. As we shall see, there are reasons to question the "hard version" of this conventional wisdom, partly because it misreads history, and partly because of profound changes which are now occurring in the global economy. These changes provide both threat and opportunity to commodity-

[1] http://commodities.open.ac.uk/discussionpapers; www.cssr.uct.ac.za/prism/publications

exporting countries. The challenge for policy is to ensure that the outcome is one which is promoting of both growth and more equitable development outcomes.

After briefly identifying the full range of commodities under review, we begin in Section 2 with a review of the Resource Curse thesis which argues that the exploitation of commodities undermines the development of industry. Together with the declining terms of trade of commodities and the positive correlation between industry and per capita incomes, this has contributed to a perspective in which commodities have been seen as an undesirable form of economic specialisation. However, it is our contention that this trade-off between commodities and industry is no longer justified (Section 3). The shift in global economic gravity from high income northern to low income southern economies suggests a reversal in the long-term declining trend in the commodities-manufactures terms of trade. Moreover, there has been a major shift over the past decade in the structure of global value chains in many sectors whereby lead firms actively seek to outsource non-core competences, and thus to promote linkages. This suggests that we may be entering a new era in the relationship between the exploitation of commodities and the growth of industry. In Section 4 we provide an architecture for assessing these synergistic opportunities based on pioneering analysis by Albert Hirschman in the 1960s. This is followed in Section 5 by a discussion of the factors which may determine the capacity for efficient linkage development in this new era, and we conclude (in Section 6) with a brief review of the reasons why governments may wish to intervene to speed up this process of linkage development. In subsequent Discussion Papers we report the results of our empirical investigation of the nature and determinants of linkage development in a range of SSA economies (Morris et al 2011a), and of the policies which may lead to a win-win outcome between lead commodity producing firms and the growth of domestic linkages in low income SSA economies (Morris et al 2011b).

Before we proceed on this journey, it is important to define what we mean by linkages. In discussing linkage development we distinguish between the *breadth* of linkages (the range of inputs purchased or outputs processed domestically) and the *depth* of linkages (the extent of local value added in these linkages). Further, unlike many SSA governments (see Morris et al 2011a) we do not conflate the development of domestic linkages with the development of national ownership of firms linking to the commodities sector. Ownership is seen as a factor which might or might not influence the breadth and depth of linkages in complex ways. But in our view it is not a first-order specific objective in linkage development. A third clarification is that domestic value added in commodities value chains is not synonymous with the extension of linkages. In some cases, value added may be increased within the core commodity exploiting firm. Although this may be an important contribution to economic growth, in this programme we only consider the linkage part of the domestic value added story, that is, those cases where increasing value added occurs outside of the lead commodity exploiting firm.

Finally, an issue which is addressed at various stages in the Discussion Paper, is the time horizon of achieving competitive production in the development of linkages. Although we identify some cases where there is scope for linkage development at little cost to commodities production, in most cases there will be costs in broadening and deepening linkages. At the same time, domestic capabilities will often grow over time as it will amongst global suppliers. *A priori* we are unable to make a general

statement of the conditions and linkages where it makes sense to accept short-term costs in the expectation that they will be eroded as domestic capabilities grow. This is a contextual judgement based on the sector, the linkage, domestic capabilities and social time-preference. However, the general principle that "efficiency" in linkage development should be seen as a dynamic process suffuses the analysis in this paper and in the complementary Discussion Papers.

Because the natural resource sector includes a diverse range of commodities, before undertaking this analysis, it is helpful to briefly describe the three major families of commodities (Figure 1). Although there are intra-family differences, the major differences arise between these three different categories of natural resources. As a consequence both of their different production characteristics and primary users, they are associated with different degrees and types of linkages to other sectors. 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 earths and 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 industrial crops such as cotton and timber, the agricultural commodities are predominantly 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 final consumption input.

Figure 1: 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
	Cereals		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	Iron Ore and Steel
	Non-Ferrous Metals	Input in manufactures	Copper, Zinc, Lead, Aluminium
	Rare earths and metals	Input in manufactures	Cerium Plutonium Cobalt
Energy	Petroleum products Coal Nuclear Renewables	Fuel for industrial usage Final consumption	Oil, Natural Gas and Coal. Nuclear power Renewable power

Source: Farooki and Kaplinsky, 2011

2. THE CONVENTIONAL WISDOM: COMMODITIES VERSUS INDUSTRIALISATION

In a cross-country regression analysis of the growth performance in 97 countries for the period 1970-1990, Sachs and Warner (1997) concluded 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 0,62 to 1.51 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).

In subsequent analysis, Sachs and Warner (1997, 2001) argued that the Dutch Disease was the major driver of this growth-reducing resource curse. First, they found services output to be higher than manufacturing output in resource-rich countries. This, they believed, confirmed their hypothesis that the natural resource sector diverted capital and labour into the non-tradables sectors. Second, resource abundance was associated with a reduction in the growth of the manufacturing and services sectors and in the merchandise export sector. Third, almost all countries responded to the Dutch disease with protectionist policies to promote industrialisation. This protective environment fostered inefficient firms and compounded the problems confronting the manufacturing sector.

Beyond these factors identified by Sachs and Warner as affecting the relationship between commodities, growth and industrialisation lie a number of analytical explanations which were long prefigured in the development literature. These are the enclave nature of commodities production, the declining terms of trade and heightened volatility of commodities, and the positive correlation between the share of industry in the economy and the increase in per capita incomes. (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 particularly the energy commodities sectors is often regarded as cause of the wars, corruption and human rights abuses which characterise many low income commodity dependent economies). Since, as we shall see, there are reasons why much of this received wisdom is open to question in the 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, produced a seminal critique of the enclave nature of production in the commodities sector (Singer, 1950). In this analysis he addressed the complexion 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 implied ("*The Distribution of Gains between Investing and Borrowing Countries.*") the beneficial spillovers from commodity production were largely reaped in the 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 this argument by Singer was the assertion that the hard commodities sector offered little scope for technological progress and had few external economies. Singer (1950) asserted (since this was backed with little evidence), that the hard commodities sector was characterised by low technology, limiting the learning opportunities provided to the local economy. Further, Singer argued, specialisation in the export of raw materials diverted 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 specialisation in commodities, manufacturing provided greater scope for technological progress, for skills development, for the creation of new demand, and for the demonstration effect which was promoting of diversified economic development. In summary, weak linkages would result from a combination of two factors. First, there was the sectoral effect, with commodities intrinsically having litle scope for linkages and technological spillovers. And, second, linkages within the low income producing economies would be limited, since whatever linkages did emerge would be reaped in the high income home economies of the lead commodity firms.

The enclave character of commodity extraction in developing economies was reflected in, and to some extent caused by the enclave oriented development of infrastructure in many developing economies in the post-colonial period. As a general rule, roads, ports and often also power and water facilities were developed to facilitate the extraction of commodities, their transport to the coast and their shipping to final markets abroad. This restricted pattern of infrastructural development then limited the development of industrial linkages, since commodity extraction generally took place in areas distant from settlement and the industrial sector.

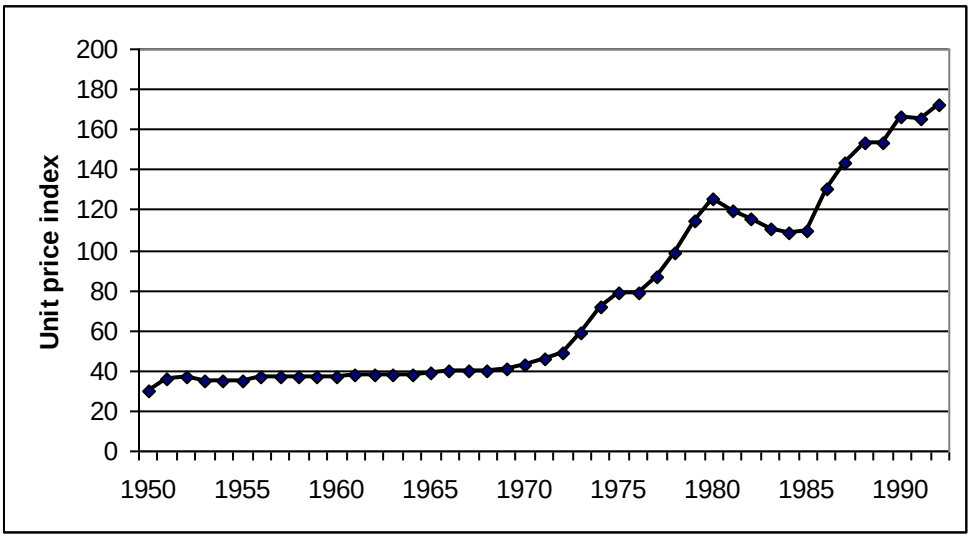
Declining Commodities-Manufactures Terms of Trade and the Price Volatility of Commodities

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 in 1950 by Prebisch (1950) and Singer (1950). Focusing on the prices of UK exports (predominantly manufactures) and UK imports (predominantly commodities) in the period between 1878 and 1938, they drew exactly the opposite conclusion to the 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 which Singer and Prebisch provided was that these declining terms of trade were driven by labour market differences. Full employment in the high-income manufacturing economies meant that cost-push pricing would result from the higher wages demanded by powerful trades unions, and the prices of exports of these economies would consequently increase. In low income countries, by contrast, surplus labour and the weakness of trades 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 believed that the nature of demand for different products and the development of synthetic substitutes for natural resources would further depress commodity prices. Singer argued in subsequent analysis 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 are a ratio of the prices of commodities to the price of manufactures For the first two decades after the war the price of manufactures was stable, but between 1972 and 1993 the average prices of manufactures rose sharply, by more than four hundred percent. (Figure 2). In the same period, the prices of commodities were either stable or declining. This was 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 1972-1974 price boom affected all three families of commodities, including (and very markedly) the price of energy commodities. A significant feature of both of these short-lived price booms is 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 2: Index of average prices of manufactures, 1950-1992



Source: Compiled from Pfaffenzeller and Newbold, 2007

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). However, the balance of informed opinion is that the Singer-Prebisch hypothesis on the declining terms of trade (based as we saw on limited analysis of very partial data on the trading experience of the UK) is confirmed, not just for the second half of the twentieth century, but for at least the whole of the twentieth century, and perhaps for the nineteenth century as well. There is less agreement on how long this terms of trade reversal will endure.[2]

Beyond the declining terms of trade of commodities, lies the adverse impacts arising from their price volatility. This is a well-observed, and uncontested phenomenon. Cashin and McDermott (2002), documented a downward trend in the terms of trade of around one per cent per year over the 140 year time period between 1862 and 1999. But their judgement 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.

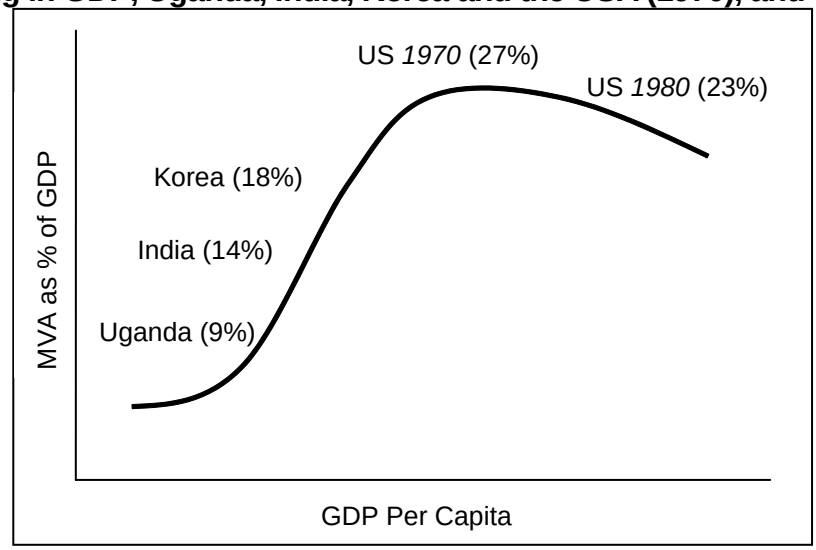
The demonstration effect of industrialisation, and normal patterns of growth

It has long been recognised 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 undertaken in the late 1970s evidenced this correlation, taking account of country-size (since countries with large populations in this period of shallow-globalisation allowed for economies of scale in production) and for the share of natural resources in GDP (UNIDO, 1980). It was concluded from these comparative studies of industrial structure that a “normal” growth-path over time could be identified. This “normal” pattern of structural transformation is shown in Figure 3, based on the relationship between MVA and GDP per capita in 1970 for Uganda, India, Korea and the US (and, in the case of the US, for 1980 as well). At low levels of per capita income, industry accounted for only a small share of GDP – for example, Uganda (at 9.2 percent). As per capita incomes rose, this share began to grow rapidly – as in the case of India (14.2 percent) and Korea (17.8 percent). Further up the per capita income scale, the share of MVA grew even higher, reaching its peak with the US 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 3 for the US in 1980. (After 1980, the falling share of MVA in GDP in the US began to reflect the outsourcing of manufacturing to China and other low cost suppliers, hence exaggerating the fall in the contribution of MVA at very high levels of per capita income). Figure 3.5 presents a general story. More detailed analysis showed that the larger the size of a country, the greater the share of MVA in GDP, and the greater the concentration of commodities in exports, the smaller this share. Neither of these

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

qualifications ruled out the positive association between per capita incomes on the share of manufacturing in GDP.

Figure 3: The "normal" relationship between per capita incomes and share of manufacturing in GDP, Uganda, India, Korea and the USA (1970), and USA (1980)



Source: Farooki and Kaplinsky, 2011

Three primary reasons were provided to explain this "normal" pattern of growth, away from resources towards industry, and within this, a gradual shift from light to heavy industry. The first was the elasticity of demand, that is the intensity of consumption of particular types of goods at particular levels of income and prices. "Engels Law" argued that at low per capita incomes, consumer demand would be concentrated on soft commodities (such as food) and industries using soft commodities (such as apparel, footwear and furniture). But as incomes rose, so the demand for these products would expand less rapidly, and demand for other more sophisticated industrial products and services would grow. It is important to bear in mind the time-period in which these strategic conclusions were developed since in most cases, the economies whose structures were being measured were predominantly operating as relatively closed economies, selling into local markets. (Nowadays, with firms selling into global markets, the structure of demand in any particular economy may be relatively unimportant, particularly in the case of small economies. The production structure in a country might therefore not reflect the consumption structure in that country, and hence a low income economy might develop an economic structure appropriate for selling products to high-income consumers in distant markets).

Second, closely related to this income elasticity of demand was the price elasticity of demand for natural commodities. The development of substitutes for many primary products (synthetic rubber for natural rubber, artificial sweeteners for sugar, fibre-optics for copper) meant that technological progress in other sectors dampened the demand for natural resources, particularly if the price of these natural resources grew. Third, it was argued that the skill and technological barriers to entry in many commodity sectors, particularly those in agricultural commodities, were much lower than those in manufacturing. Hence, economies would begin in low-skill commodity sectors and then make a natural progression to higher skill – and higher wage – industrial sectors.

For all of these reasons, it was believed that the natural – and indeed desirable – change in economic structure would be a transition from a commodity-intensive to an industrial economic structure.

3. HAS ANYTHING CHANGED?

A number of factors are forcing a rethink of this inherited wisdom on the relationship between commodities production and industrialisation. One is that there is an increasing awareness that the historical relationship between manufacturing and the resource sector 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 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). The development of manufacturing in the US in the nineteenth and twentieth 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 industrialisation after the 1850s was driven by export booms in cereals and sawn wood, and, later, by pulp, paper and iron ore (Blomström and Kokko, 2007).

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 and this provided the surplus for Nokia - drawing on its dynamic capabilities - to move subsequently into cable manufacturing, and more recently into mobile telecommunications.

Moreover, a variety of studies have challenged the Sachs and Warner analysis. 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 in respect of sustained growth or human development indices. To the contrary, whilst oil producers did best, in most cases mineral economies outperformed non-mineral economies. 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 sector (Lederman and Maloney, 2007). They also adopted a different proxy for resource-intensity that is, net resource exports per capita (rather than the share of natural resources in GDP adopted by Sachs and Warner). Utilising this definition of resource intensity, 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 not just that the natural

resource curse found by Sachs and Warner disappeared, but that there was a mildly positive correlation between resource intensity and GDP growth (Lederman and Maloney, 2007). Similar findings were reached by Manzano and Rigobón (2007) and Bravo-Ortega and De Gregorio (2007).

Two major conclusions emerge from these various attempts to verify empirically the Resource Curse theory. The first is that in some cases – countries such as the US 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 as a consequence of the destructive impact of commodities production on industry. Thus what shows up and is interpreted as a manufacturing sector weakened by a commodities specialisation, is in fact often a commodities specialisation 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 industrialisation, there have been a series of developments in the global economy in recent years which provide new opportunities for economies specialising 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 were 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 growth rate of almost ten percent p.a. By 2006 its share had re-grown to around 17 percent of global GDP, and before 2030 it 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 (Kaplinsky, McCormick and Morris, 2010).

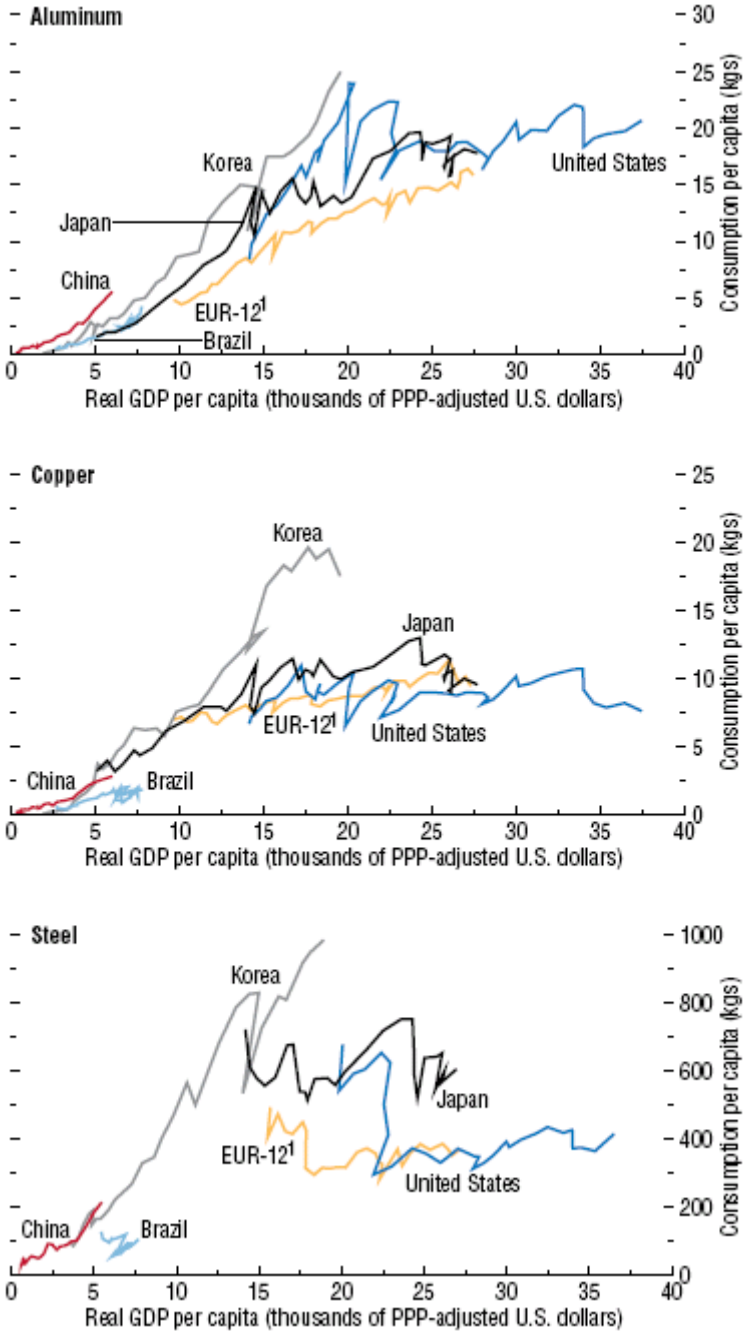
There are a variety of ways in which the rise of the Chinese economy affects industrialisation strategies in general, and in commodity exporting economies in particular. These arise from the particular growth trajectory of the Chinese economy. Beginning with the direct impact of China's very rapid industrial development on other countries, there is increasing evidence of the displacement in many countries of manufacturing production destined for the local market (Jenkins, 2008; Morris and Einhorn, 2008; Kaplinsky, 2009;). But 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, these are worthy of more in-depth discussion.

Returning to the Singer-Prebisch thesis on the terms of trade, we can observe that one of the major factors motivating the drive to industrialisation was the income elasticity of demand for commodities, and especially for soft commodities. It was argued that as incomes grew, so the growth in demand for commodities would lag 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 falls off. Here it is evident that in the case of most hard and energy commodities, the income levels at which the demand elasticity falls (beyond $15,000PPP per capita in 2000) are currently some considerable way above the current per capita income in China ($6,200). This falling-off of demand is evidenced for aluminium, copper and steel, from which it can be seen that China is still at a relatively immature stage in its per capita consumption of these commodities. A similar pattern can be observed across the range of hard and energy commodities, but less so in the case of food soft commodities, where Chinese consumption patterns are much closer to the norm of high income economies. China's commodities-intensive demand trajectory is driven by its exceptionally high investment rate, and particularly by investments in infrastructure, by growing urbanisation and by the manufacturing-intensity of its economy. [3]

[3] 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

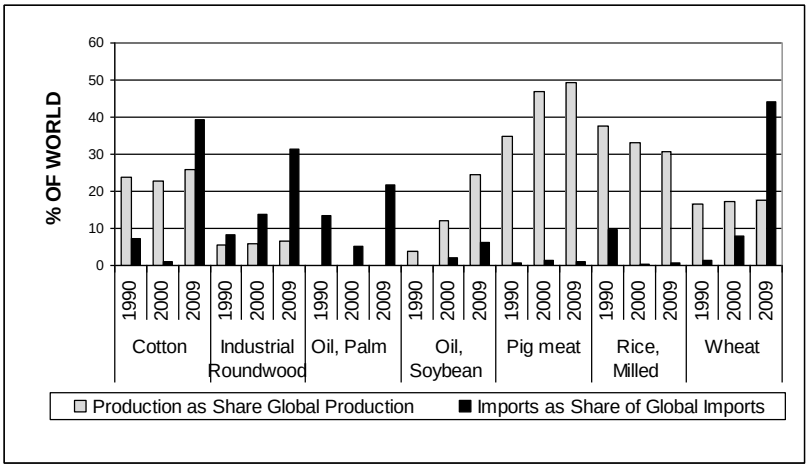


Source: IMF World Economic Outlook, September 2006

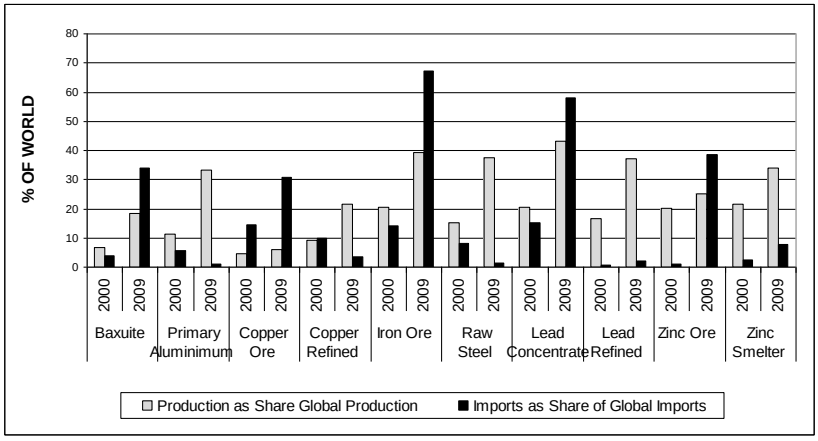
It is not widely recognised, but China is the worlds largest producer of most of the world's soft, hard and energy commodities. Yet, towards the end of the twentieth century, domestic production failed to meet domestic demand. China's resource intensive growth path meant that domestic supplies of most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

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

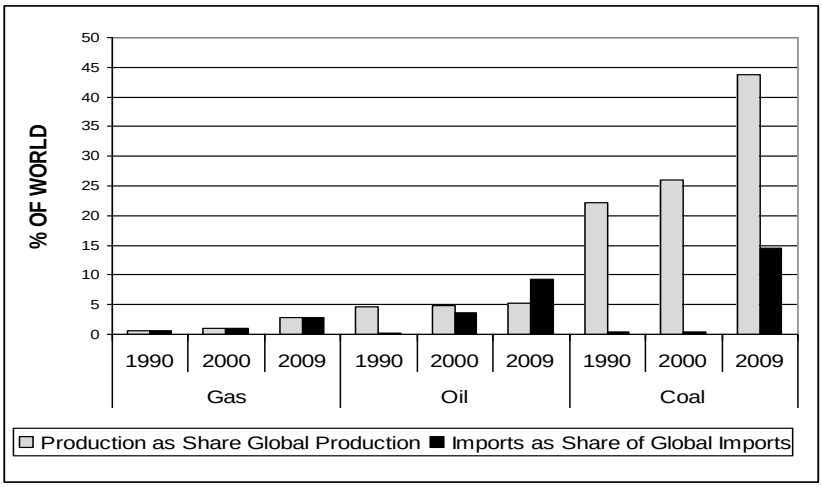
Soft commodities



Hard commodities



Energy commodities

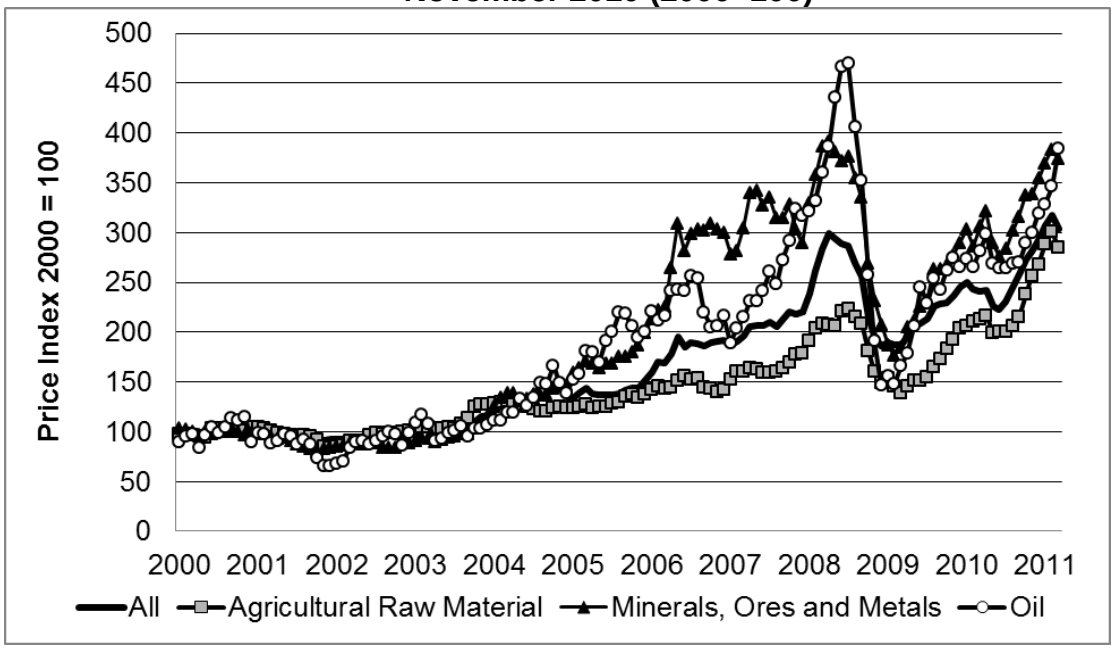


Source: Farooki and Kaplinsky, 2011

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 were 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, 2007). In both hard commodities and energy commodities, there is a long gestation period involved in ramping-up supply. Moreover, as in the

soft commodities sectors, low-cost sources of supply have largely been exhausted,, as there is little scope for expanding the extensive margin, and intensification of production (primarily through irrigation) is investment-intensive. Moreover, climate change is disrupting agricultural production systems. As a consequence, 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.[4] 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). Although contested, there is widespread recognition that the squeeze on supplies will be sustained at least for another decade for most commodities, notwithstanding the onset of frequent price bubbles as the financial sector exploits these gaps in supply (Farooki and Kaplinsky, 2011).

Figure 6: Monthly Averages of UNCTAD Commodity Indexes, Jan 2000 – November 2010 (2000=100)



Source: UNCTAD Statistics online <http://unctadstat.unctad.org/ReportFolders/reportFolders.aspx?sCS_referer=&sCS_ChosenLang=en> (accessed May 2011).

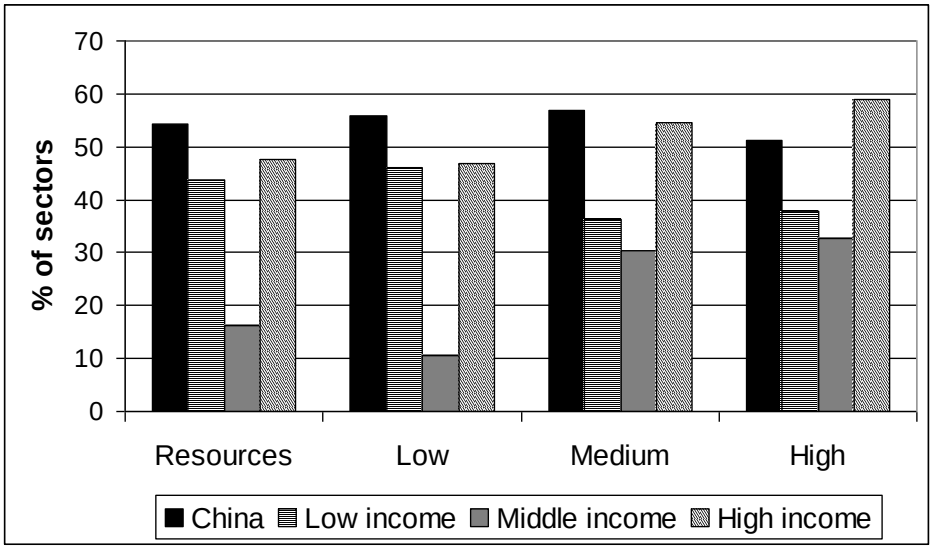
At the same time as China's demand helped to push up the prices of commodities, its growing competence in manufacturing also placed pressure on the prices of manufactures. Between 2000 and 2010 China's share of global manufacturing value added grew from 7 to 15 percent. In 2005 it surpassed Germany as 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).[5] From the mid-1990s, China has increasingly become the "world's factory". A key driver of this growing manufacturing pre-eminence has been China's low costs of production.

[4] See Farooki and Kaplinsky, 2011, Chapter 6.
[5] All figures calculated from calculated from UNIDO MVA Explorer(accessed May 2011)

These developments have 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 the prices of manufactures had risen by 436 percent. But after 1992, this rising trend was broken. The average prices of manufactures fell for more than 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 the 1980s.

The second noteworthy feature is that these overall trends in the prices of manufactures masked rather different behaviour in the prices of different types of manufactures. The "average unit price" reflected some sectors in which prices went up, and others in which they fell. However, it is clear from an examination of disaggregated prices that the price movements of different types of manufactures were closely related to the growth of China's manufactured exports. This can be seen from Figure 7 which shows the pattern of price changes of products imported into the EU, Japan and the US 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 export product prices to fall was higher than any other of the exporting regions. These results confirm an earlier study of the association between China's exports and the export prices of other economies selling into the EU between 1989 and 2001 (Kaplinsky and Santos Paulino, 2006). Again focusing on the percentage of sectors experiencing falling prices, the numbers were 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 manufacturing export sectors were characterised by falling prices. The impact 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: Drawn from data in Fu, Kaplinsky and Zhang, 2009)

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 the coastal areas, and northern firms who have subsidiaries in these regions and who subcontract to Chinese firms, have begun to move their operations inland. where wages are lower. Large investments by the Chinese government in infrastructure also reduce the costs of producing in the interior. Finally, many of the rising prices in China's manufactured exports were fuelled as much by the rising input costs arising as a consequence of the boom in commodity prices as by rising wage costs.

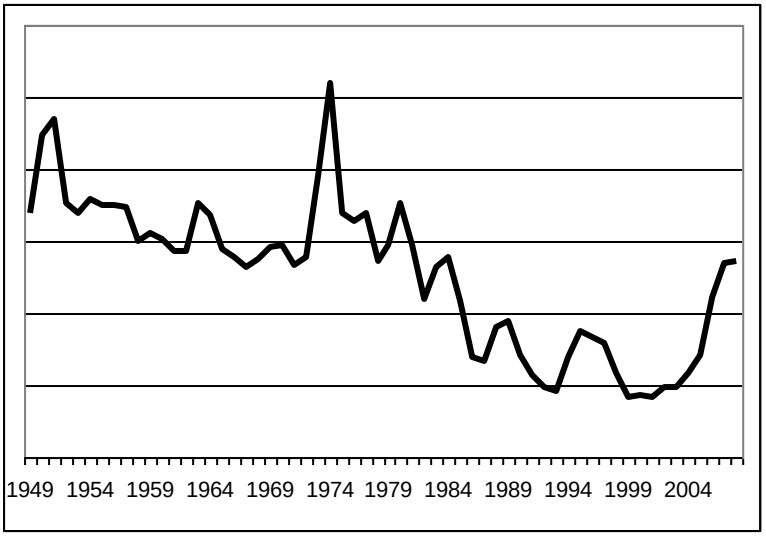
And beyond China lies a global reserve army of labour. By 2030, India will have a larger and much younger population than China. Other Asian economies such as Indonesia, Vietnam and the Philippines are also heavily populated, have high rates of unemployment and are increasingly being targeted as source of alternative final assembly as Chinese wage costs increase. We can thus anticipate that the global prices of manufactures, which had began 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 India, Brazil and other rapidly growing low per capita income are also increasing their demand for commodities. [6] The upshot of these trends is that the terms of trade – for so long, as we have seen,

[6] 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.

turning against commodities – have now begun to turn in their favour (Figure 8). In the 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, there is a strong possibility that this terms of trade reversal will be sustained at least for another decade, if not longer.

Figure 8: The commodities-manufactures terms of trade, 1949-2007



Source: Compiled from data from Pfaffenzeller et al (2007)

The Fracturing of Global Value Chains and the Growth of Outsourcing

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 the transnational corporations (TNCs) which dominated the manufacturing sectors in these high income countries went through a fundamental reorganisation from the late 1960s, gathering pace rapidly after that. The roots to this reorganisation lay in a particular strategic response to the growing pressures of global competition. In essence an increasing number of northern firms discovered the attractions 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. Everything else which did not meet these three objectives was 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 them to play off suppliers against each other in order to reduce costs, improve quality and to optimise 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 analysed 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 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 offerings 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 the retailers who were sourcing from China. Indeed, in the manufacturing sector, China was only one of a number of players in a complex process of lead firms concentrating on their core competences and outsourcing the production of component production and sub-assembly and final-assembly across a global stage. A good example of this process of global outsourcing can be seen in regard to the cost structure of the iPhone (Table 1). Although the phone is labelled "Made in China", only a small proportion of total costs ($6.50 out of $178.96) are added in China.

Table 1: Sources of value added in Apple iPhone, 2009

Manufacturer	Component	Cost
Toshiba (Japan)	Flash Memory	US$24.00
	Display Module	US$19.25
	Touch Screen	US$16.00
Samsung (Korea)	Application Processor	US$14.46
	SDRAM-Mobile DDR	US$8.50
Infineon (Germany)	Baseband	US$13.00
	Camera Module	US$9.55
	RF Transceiver	US$2.80
	GPS Receiver	US$2.25
	Power IC RF Function	US$1.25
Broadcom (US)	Bluetooth/FM/WLAN	US$5.95
Numonyx (US)	Memory MCP	US$3.65
Murata (Japan)	FEM	US$1.35
Dialog Semiconductor (Germany_	Power IC Application Processor Function	US$1.30
Cirrus Logic (US)	Audio Codec	US$1.15
Rest of Bill of Materials		**US$48.00**
Total Bill of Materials		**US$172.46**
Manufacturing costs		**US$6.50**
Grand Total		**US$178.96**

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

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 are actively seeking to outsource their non-core competence activities. This has great importance for the development of linkages from the commodity sector and we will return to this issue below.

The global mining industry has undergone a radical restructuring of its historically dominant production model. Mines have moved away from a high level of vertical integration towards outsourcing almost every stage in the mining process to independent firms (Urzua (2007). This incorporates not only the provision of equipment and capital goods, as well as inputs such as chemicals, but also key knowledge services. This has led to the emergence of specialised knowledge

intensive mining services providers (SKIMS), offering not only specialised services but also other high technology inputs. Companies such as SRK in South Africa, which started as a service provider to Anglo American have grown into a global consulting firm in the mining industry. Similarly, Bell Equipment in South Africa started by producing equipment for the forestry sector, and then diversified into the mining sector. Having built competences in the domestic mining sector, it then became a supplier of these machines into a number of global markets, including the mining, construction, sugar and forestry sectors (Kaplinsky and Mhlongo, 1997, Walker and Jourdan, 2003). Global Mining companies are also actively involved in building capacities in local suppliers. BHP Billiton Metals Base has put into operation an extensive supplier development program in Chile, to significantly upgrade a considerable proportion of their current suppliers. The aim is to upgrade not only production capabilities, but also to allow some to move into specialised knowledge services and to operate in the global market place as world class suppliers (Marin, Navas-Aleman and Perez, 2009).

4. AN OVERVIEW ON LINKAGE DEVELOPMENT: HIRSCHMAN'S THEORY OF LINKAGES

An apocryphal story is often told of the tourist visiting Ireland who stops and asks someone in a rural area - "Excuse me please, can you tell me the way to Dublin", only to be answered with "Oh, if I were going to Dublin, I wouldn't start from here"! In other words, it may be that many countries which are heavily dependent on commodities would prefer to have different economic structures, perhaps to have the industrial competences (and the per capita incomes!) of Japan, South Korea, Germany and China. However, 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 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, the reconsideration of the link between commodities, industrialisation and growth does not support the gloom that has often characterised the challenge of structural transformation in low income economies. That is, the Resource Curse's assertion that commodity specialisation reduces growth is unwarranted. Second, after very many decades of declining relative prices, there is solid evidence that higher commodity prices are here to stay, and for some years ahead. Third, many of the lead-firms in commodity value chains do not seek to become the enclave firms observed by Singer in developing economies commodities production in the 1950s. On the contrary, as a general rule, large commodity producing companies investing in the developing world (most of whom are foreign-owned) are actively searching to reduce their costs and to outsource a range of activities which are not within their core competences. In so doing, they also seek to deepen their specialisation in the rent-rich niches which they currently hold.

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 and these require the development of appropriate

smoothing and counter-cyclical macroeconomic policies. There are often also large technological and skill barriers to entry into manufacturing 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 begin by turning to a perspective developed by Hirschman, one of the pioneers in post-war development studies.

Hirschman characterised 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.[7]

Building on Innis's 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 to be utilised in commodity production).

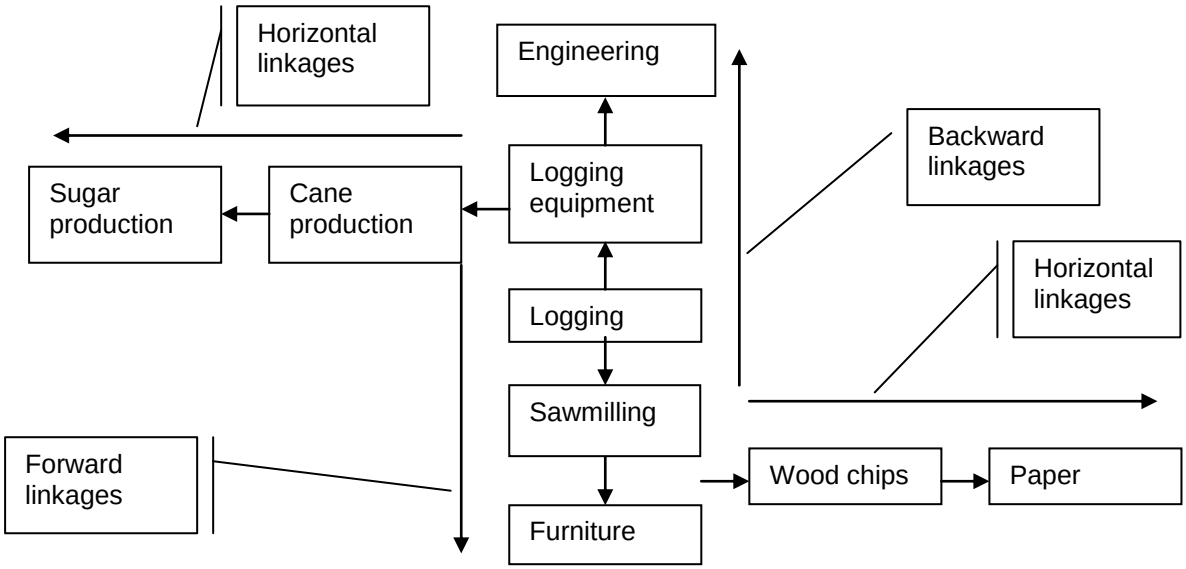
Hirschman (1981) argued that the fiscal linkages generally tended to be limited and provide no guidance as to which sectors the commodity rents should be used to develop - the "ability to tax the enclave is hardly a sufficient condition for vigorous economic growth. For the fiscal linkage to be an effective 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 Hirschman, 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".

In this Discussion Paper we will focus on the direct production linkages between the commodities sector and the manufacturing sector. But before we do so, it is helpful to augment the Hirschman framework in three ways. First, within the direct production linkage category we propose to add a third form of production linkage, which we term the "horizontal linkage" (Figure 9). This relates particularly to backward linkages and reflects a process in which suppliers who develop capabilities in the supply of inputs

[7] This approach has in recent years been echoed in the analysis of manufacturing development arising from related sectors (Hasuman, Rodrik and Sabel, 2007).

to the commodities sector, subsequently develop capabilities which have a wide range of applications in other sectors. Figure 9 illustrates the various forms of production linkage – backward, forward and horizontal - for the timber sector. Backward linkages arise from logging to logging equipment and from logging equipment to engineering, and forward linkages from timber to sawmilling and to furniture. Horizontal linkages are generated from logging equipment to cane-growing (as occurred in the case of Bell Equipment in South Africa, Kaplinsky and Mhlongo, 1997), and from cane-growing to sugar production. Horizontal linkages also are generated from sawmilling to the construction sector.

Figure 9: Backward, Forward and Horizontal Linkages from the Timber Sector



Focusing in on horizontal linkages, 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." (Hausman and Klinger, 2007:13). Beyond timber, a good example is the development of domestic backward linkages in the supply of hydraulically-operated machinery to the South African mining sector (Pogue,, 2008). Here specific geological conditions led to the development of unique capabilities in hydraulics, which then allowed supplier firms to sell equipment into a range of sectors not related to the mining sector.

The second augmentation of the Hirschman framework addresses the sectoral specificity of linkages.[8] It relates back 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

[8] This discussion is an elaboration of Watkins, 1963

technological intensity of individual value chains will limit the extent to which local capabilities are able to respond as efficient suppliers and as efficient beneficiators of commodities. Third, the nature of the production processes involved in extracting and producing commodities affects the level and distribution of income streams. For example, small scale distributed production systems in agriculture contribute to the distribution of incomes, whereas large scale capital intensive mines build or reinforce income inequality. These production characteristics will in turn determine the nature and extent of consumption linkages. And, fourth, the extent to which individual commodities reflect high and concentrated resource rents will have 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.

The third augmentation to the Hirschman framework is that there is a distinction to be made in forward linkages between the processing of commodities and what has come to be called the "beneficiation" of commodities. Processing involves a deepening of value added as a commodity is refined or processed prior to being exported. For example, iron ore is processed into steel, copper is smelted, timber is transformed into veneer, and cotton is rendered purer through ginning. In this sense, the "processing" of raw materials is located in the same, or a closely-related industry as extraction. By contrast, beneficiation describes a process of transformation in which the commodity is used in a different manufacturing activity. For example, aluminium may be transformed into engine cylinder heads or into pots and pans, cotton is spun and woven into textiles and wood is used in the production of furniture. Processing requires an enhanced technical understanding of the commodity in order to augment it, whereas beneficiating requires entirely different production and market destination skill sets.

5. A NEW ERA: CAN COMMODITIES REINFORCE INDUSTRIALISATION?

Based on the preceding discussion we can draw together two sets of issues 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 contemporary determinants of the nature and 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

Building on the commodities sector to promote linkages and thus to develop the manufacturing sector has long been a preoccupation of policy-makers. But overwhelmingly, their attention has been given to 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 textile sector. In hard commodities, governments have taken actions 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 commodity sectors, particularly those which have are characterised 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 localisation, either in the form of taking equity shares local ownership in commodity production (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 the heavy commitment of government funds, including as a co-investor, in the case of backward linkages most of the support policies have been “passive”, involving the establishment of targets (such as on local content and employment of local citizens) 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 government attitudes to 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 has been because (as we have seen above) the inherited wisdom has been 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 there is the legacy of Singer‘s argument that the commodities sector is characterised by low-technology, and on the other hand, other commentators argue that, particularly in the hard and energy commodities sector, backward linkages (for example, in mine construction) require such large investments and complicated technologies that the barriers to entry are insuperable.

This negative perspective on backward linkages is unwarranted for a number of reasons, - the character of technology in resource exploitation, the degree of technological change in the commodities sector, and the scope for the provision of intermediate products and services. Turning first to the character of technology in resource extraction.. 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 the accompanying knowledge and skill inputs therefore are of necessity to be applied locally. This *in situ* application provides the possibility of drawing 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 poor quality mined coal led to the development of capabilities and products that could be used in other areas - e. g. washing spirals in the Canadian tar sands. 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 in targeting the offshore oil sector market in West Africa. In each of these cases, the knowledge is location-specific and initially provides the potential for local supply. Thereafter, applications of this knowledge can be used in export markets with similar conditions. Where there are multiple points of production in a single country (that is, a number of different and independently-owned mines) particular possibilities are opened for specialised 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 internalised with the mining firm

Moreover, the traditional view of the soft and hard commodities sectors as being characterised 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 is generally not appropriate for low income economies, this is leading 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.

Beyond these questions of the nature and dynamism of technology in the resource sectors in the exploration and construction phases of the commodities sector, lie 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, and 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 US and Hitachi brand name in Australia. But this example is 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 linkages 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 and spares. In the soft commodities sector, the range of inputs required to facilitate production include seeds, fertilisers, 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. But even here there are signs of developing backward linkages in SSA. 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 4600 workers (although all of these suppliers in Sudan have been Chinese-owned enterprises) (Suliman and Badawi 2010). But other services, such as the provision of security staff to govern 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 a categories of potential inputs that can be supplied, and are being supplied by local firms.

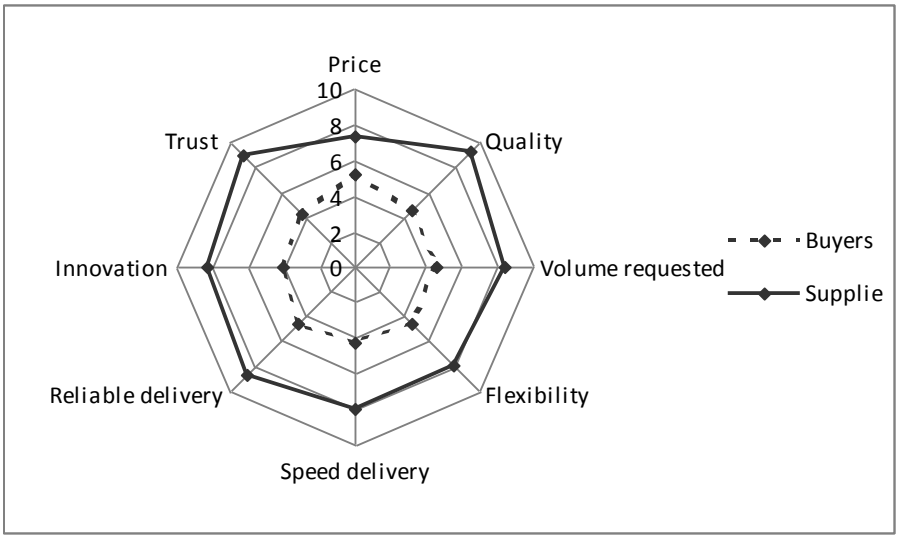
Importantly, the majority of these linkages occur as a natural outcome of market forces, and this is because a rational firm actively prefers to have reliable, low cost and high quality suppliers. In the first instance, the lead firms will typically search for the lowest cost suppliers globally, a phenomenon which is widely evidenced in the global value chains which feed the world with manufactures. But, once the lead-firm has made the decision in principle to outsource non-core activities and searched for the lowest cost global suppliers, the logic is wherever possible to have these suppliers on their doorstep, rather than located abroad, or some distance from the extractive activity. An efficient proximate supplier provides the capacity for flexible and tailored responses to the needs of the commodity extractor, allows for chain inventories to be reduced, and removes uncertainties associated with extended logistics. This unfolding process of initial outsourcing (“global sourcing”) to seek the lowest cost supplier which then extends in requiring the supplier to locate proximate to the factory (“follower supply”) was initiated in the automobile industry (Barnes and Kaplinsky, 2000). and has spread to many other manufacturing sectors

The same logic of unfolding outsourcing, initially to the lowest cost global suppliers and then, wherever possible to low cost proximate suppliers is beginning to be observed in many of the commodities sectors, including Chinese copper mining firms in Zambia, who are bringing their (Chinese) suppliers with them (Fessehaie, 2011). This desirability of finding an efficient local supplier is particularly attractive in Africa where transport and logistics are poorly developed and goods brought in from

outside may be subject to long and unpredictable delays. Both of these phenomena – a drive towards outsourcing and the promotion of local suppliers - is in fundamental contradiction to 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 will 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, and some engineering firms). Suppliers were seem to have underperformed in all the critical success factors (CSFs) which were deemed important by the purchasing managers of these mines, particularly in relation to trust, innovation and technological capabilities, and 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 3). Although the bulk of inputs were imported, there is a discernable local spend, arising as a natural consequence of the development of the local gold mining industry over a period of 130 years.

Table 3: Value and composition of expenditure in Ghanaian gold industry, 2008 (US$m and share of total purchases)

	$m	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

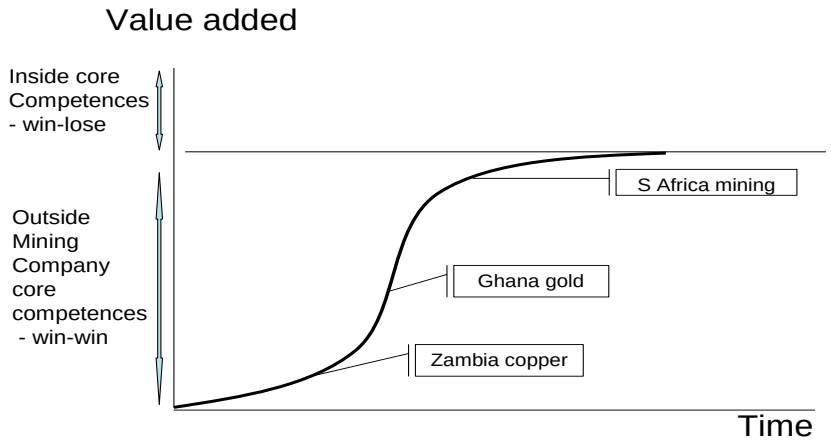
What factors determine the breadth and depth of linkages from the commodities sectors?

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 commodity producers 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 characterise 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 are 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. For example, in the case of diamonds 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 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, and in the logistics which guarantee their control over diamond supplies, for these are their core competences, and the factors which 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 commodity producers 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 are initially sourced outside of the lead firm, and subsequently to suppliers in 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 in general on this graph. These are countries where market forces have been the dominant 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 through they do not outsource core competences, they are provided domestically. (In other words, these do not constitute local linkages, but do contribute, through internalisation, to local value added). In each of these cases we are observing backward linkages. But market driven forward linkages are also to be found, particularly in the processing of food commodities and other soft commodities.

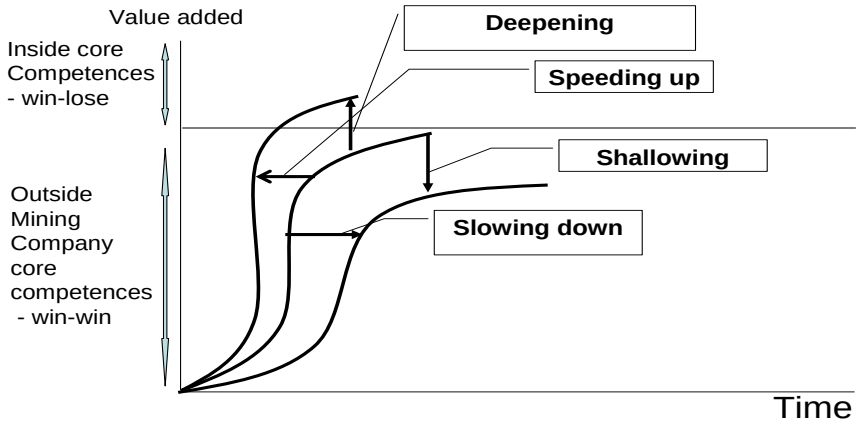
Figure 11: Market driven linkages over time*



* 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 above describes a process of the largely market driven development of linkages, determined as we have seen by the desire of lead commodity firms to outsource non core activities. But governments often intervene in this process of linkage building in order to maximise the extent to which these outsourced activities occur domestically. Government involvement may be effective such that it acts to both deepen and speed up these linkages (the curve shifts up, and to the left), or where policy is badly-focused and implemented, to slow down and make the linkages shallower (the curve moves to the right and down) (Figure 12). Botswana in diamonds (Mbayi, 2011), Angola (Teka, 2011) and Nigeria in oil (Oyejide and Adewuyi, 2011), and Gabon in timber (Terheggen, 2011) are all examples of countries where government involvement has speeded up these linkages. In Tanzania, the failure of diverse government policies to work in the same direction has if anything, 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 undermining the capacity of local suppliers to meet the needs of the mines (Kaplan, 2011).

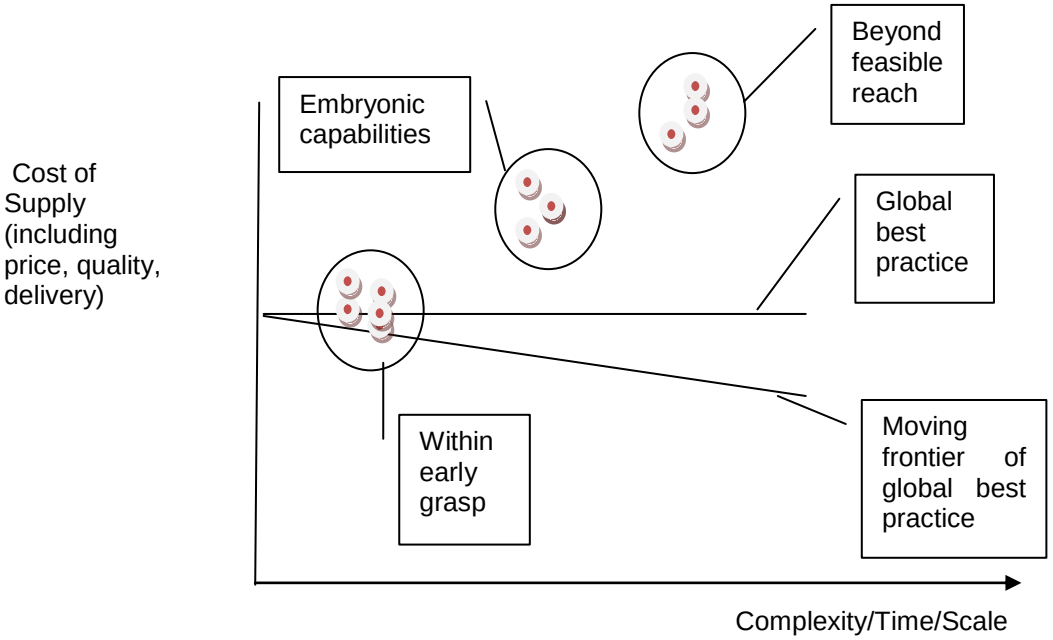
Figure 12: Market driven linkages over time: The impact of policy



The trajectory of the deepening of local content will change over time as a consequence of five major inter-related factors. The first is the bundle of critical success factors required by the buyers. This will involve a range of requirements, including price, quality and reliability of delivery, and these critical success factors will vary with the nature of the inputs. The second is time – the market-led incorporation of inputs is a natural function of time as lead commodity firms and potential suppliers assess competitive costing profiles and develop the capabilities to supply and to buy effectively. The third factor affecting deepening is scale – the larger the commodity extracting activity, the more likely that suppliers will be able to generate the scale economies to achieve competitive production. The fourth factor is the complexity of the input – the greater the degree of complexity, the less likely in most environments that suppliers will be able to respond in the short- to medium-term. And finally, the capacity of local suppliers to respond to the needs of buyers competitively will depend on their *dynamic* capabilities. “Global competitiveness” is a moving frontier, and the challenge for domestic suppliers is at the very least to keep up with this rate of improvement and ideally to increase the rate of their competitive improvement.

Given these five factors, it is possible to identify three sets of possible inputs (Figure 13). The first are the “low hanging fruit”, supplies which are either available locally at lower acquisition costs than imported supplies, or at costs which are close to the cost of imported supplies. The second set comprises suppliers who have the embryonic capacity to be competitive, but who need time and support in order to grow their capabilities if they are to approach the global frontier. And, finally, there are the sectors beyond early reach. It will be some time, if ever, before local suppliers can provide competitive inputs in these activities. These three categories of supplier competitiveness are intrinsically contextual. Which supplies are included in which group will reflect sectoral characteristics (for example, easier in agriculture than in deep-sea oil), country capabilities (linkages will be deeper and broader in South Africa than in Tanzania), technological change (the frontier of global competitiveness will shift to varying degrees), time (capabilities take some time to develop) and as we shall argue in later stages of this Discussion Paper, policy.

Figure 13. The trajectory of local supply



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 provision 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 opportunity 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 are an optimal way of developing efficient long-run capabilities, since this will vary across sectors and countries and over time. It is however a prime consideration, as we shall see in a later Discussion Paper, in the policies adopted towards increasing the breadth and depth of linkages in the commodities sectors.

6. CONCLUSIONS: WHY SHOULD GOVERNMENTS INTERVENE IN LINKAGE DEVELOPMENT?

In this section of the Discussion Paper we briefly set out the implications of our analysis for policy. These issues will be covered in greater depth in a complementary Discussion Paper directed primarily at the policy framework required to make the most of the potential for linkages between industry and the commodities sector (MMCP Discussion Paper No 14).

Governments are interested in the promotion of linkages from the commodities sectors for five major reasons. In the first instance, most governments prioritise the promotion of growth and employment. In general, in the hard and energy commodities sectors which are characterised by capital-intensive processing technologies, the employment potential arising from forward linkages is limited. This does not apply though 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 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 acting to foster linkages into the commodities sector is that, as Hirschman pointed out, this provides a major opportunity for 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.

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 reasons to believe that this is a problem which may be solved, 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 above). We have already given the examples of South Africa's hydraulic engineering industry. But these are examples drawn from the more knowledge-intensive side of the linkage spectrum. In Angola, which is characterised by a particularly weak metallurgical sector, the stimulation of a basic metal-working capability required in the manufacture and assembly of control lines between the subsea 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 created in serving 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 then Rwanda and the DRC, is an example of how linkages developed

in a 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 lead commodity producers to strategise effectively and then to implement the development of their supply base. They often fail to "walk the talk". Our research (MMCP Discussion Paper No 13) shows that there are insufficient examples of MNCs effectively mentoring and guiding potential local suppliers, even though most claim that this is a central concern for them. Why does this happen when the development of local suppliers holds such competitive advantages for these lead commodity producers and where many of the mining houses have formally committed themselves to encouraging and supporting local development? 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 US and European competitors, supply chain development is generally a commitment rather than a reality. In other sectors and other countries Governments have acted to shake up the inertia of leading firms. (This occurred in the UK in the 1980s and 1990s in the automobile sector). 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 specialised construction and installation firms. 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 gold mines, was based in Australia. The specifications it used for plastic-piping and electric fittings met Australian standards, rather than Tanzanian standards, thereby effectively ruling out local second-contractors in the mine-building process (Hanlin, 2011). A third reason why lead commodity producers 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, typically six weeks on, and six 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.

in conclusion, the growing obstacles to traditional drivers of industrialisation – import substituting and export-oriented industrialisation – make it imperative that all economies, including commodity-exporting economies, develop effective strategies to promote their industrial sectors. As we have seen, there is a renewed opportunity open to commodity exporting low income economies which arises from a continuing,

and probably prolonged commodity boom, and the development of corporate strategies designed to maximise the outsourcing of non-core activities. 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 the 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, aligned to corporate visions and implementation plans, and to be complemented by 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 just are there major differences between the three families of soft, hard and energy commodities, but there are also important intra-family differences. Moreover, each economy is individual, and experiences a moving frontier of capabilities and political-economic characteristics. It is also clear from international evidence that effective policy is a process rather than a document, and that it necessarily involves close interaction between public and private stakeholders (Rodrik, 2004), and in some cases also civil society stakeholders.

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.

In a companion Discussion Paper 13 we present the evidence of detailed enquiry into the nature and determinants of linkages form the commodities sectors in nine African Countries (Morris et al 2011a). In a third and concluding Discussion Paper 14 we address the detailed policy recommendations which follow from our analysis (Morris et al 2011b).

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