WHAT HAPPENS IN GLOBAL VALUE CHAINS WHEN THE MARKET SHIFTS FROM THE NORTH TO THE SOUTH?

Raphael Kaplinsky
Anne Terheggen
Julia Tijaja
Masuma Farooki

Development Policy and Practice,
The Open University,
Milton Keynes,
U.K.

R.Kaplinsky@open.ac.uk

Paper prepared for World Bank project on Global Crisis and Value Chain Governance by the Open University Commodities Programme (www.commodities.open.ac.uk)

January 2010.

We are grateful to Olivier Cattaneo and Cornelia Staritz for helpful comments on an earlier draft

SUMMARY

This paper charts the evolution of financial and economic crisis in the global economy and argues that the likely outcome will be sustained growth in the two very large Asian Driver economies of China and India and stagnation in the historically dominant northern economies. Given the nature of demand in low income southern economies, it is likely to be reflected in sustained demand for commodities, with other southern economy producers in global value chains being forced into lower levels of value added. Standards are likely to be of considerably reduced significance in value chains feeding into China and India. These issues are considered in the light of evidence drawn from the experience of Thai exporters of cassava, and Gabonese exporters of timber.

Keywords
Value chains
China
India
Financial Crisis
Cassava
Timber

1. BUYERS, MARKETS AND GLOBAL VALUE CHAINS

Until the late 1950s, economic growth was largely explained by the quantum of available labour, land and the investment, and growth was assumed to occur at the extensive margin. High savings-investment rates were at the centre of the Harrod-Domar family of growth models which informed development policy in the immediate post-war period. However, the "discovery" by Solow in the 1950s that an increase in the volume of productive inputs accounted for only around 87.5 percent of economic growth in the US increasingly shifted the focus of attention in growth models from the extensive to the intensive margin (Solow, 1957). The improvement in the quality of productive inputs has thus risen to central stage.

Both the emphasis on the extensive and the intensive margin reflect a preoccupation in growth theory and development policy with factors determining the augmentation of supply. However, in recent years, we have become increasingly aware of the role which demand plays in economic growth, and its derived impact on the growth of supply capabilities.

A key demand-related factor affecting economic growth is the size and rate of market growth. Rapidly expanding and large markets both spur productivity growth by allowing for scale economies in production (Verdoorns Law) and send a signal to producers that they can have confidence in investing for the future. It leads to a virtuous circle of growth and innovation, and is particularly influential in the context of very large domestic markets, or when producers sell into global markets.

But, it is not just the *volume* and rate of demand growth which affects productivity and capabilities. The *nature* of demand also has a significant impact on capabilities, and the returns to alternative patterns of production. Around the late 1960s, there was an important transition in final markets in the northern economies (Piore and Sabel, 1984). Once post World War Two reconstruction had been achieved and basic needs of most consumers had been met, consumers became increasingly discerning about the products they consumed. They demanded higher levels of quality, much greater product differentiation and faster rates of product innovation. In the context of this change in the pattern of demand, the ideal archetype in production organisation moved from mass production to mass customisation (Pine, 1993), in which producers developed the capabilities to meet different critical success factors (CSFs) in proliferating and dynamic market segments. Variety and flexibility – with little trade-off in costs – became the name of the game in competitive production.

A direct consequence of this search for low-cost flexibility was a transition in production organisation, from "just-in-case" mass-production to "just-in-time" lean production (Kaplinsky, 1994; Womack and Jones, 1996). A series of related changes in quality-procedures (with "zero-defects" becoming an essential building block of just-in-time production) and reduced batch-size, coupled with the drive by firms to concentrate on their core competences

meant that lead firms were required to take responsibility for the systemic efficiency of their increasingly global value chains (GVCs) (Gereffi, 1994). One important component of the tool-box which this entailed was the development of standards in production, often usefully summarised as QCD. The Q stood for standards over quality (increasingly measured in parts per million), the C for cost (annual reductions in price paid to suppliers) and D for delivery (more frequent deliveries in smaller batches).

Most of these standards were firm-specific. But in some cases industry-specific standards were also developed as the outcome of collaboration between private sector firms searching for competitive advantage. Increasingly, too, standards were introduced to foster the capabilities of suppliers to meet the new requirements of lean production, notably the cross-sectoral ISO9000 quality procedures, and subsequently ISO14000 environmental standards. The development and extension of these process standards began in the Japanese auto industry in the 1960s and then gradually spread to the global electronics sector and then more widely and rapidly to many sectors in subsequent decades. By the end of the twentieth century, these private sector standards had become an integral component in most GVCs feeding production into global markets, particularly for intermediate and final consumption goods characterised by variety.

A further development of standards reflected a different process, one in which the key drivers were final consumers and the state concerned with consumer welfare, rather than private sector firms searching for competitive advantage. In some cases, standards were set by governments to promote product safety, particularly in the food sector. But, increasingly, consumers' organisations became concerned with the processes involved in producing products to meet their needs, requiring fair returns to producers (FairTrade) and organic certification.

Figure 1 summarises the growing complexity of these standards, covering both product and process, and involving various types of codification including both private and public sectors.

Figure 1: Drivers of Standards Over Process and Product

	By Firms	***By Governments***	***By Civil Society***
Product	Quality standards such as permitted parts per million defects	Food hygiene standards Lead content in toys	Organic products
Process	Quality control procedures – such as ISO9000 Frequency of on-time delivery	Hygiene standards – such as Hazard Analysis and Critical Control Point conformance (HACCP) Traceability of pesticide content	Sustainability standards – such as FSC (Forest Stewardship Council) (timber) Child labour standards

How have the producers inserted in GVCs been informed about the growing prevalence and the nature of these evolving standards? Where the supply function has been internalised within a diversified firm, it has been the firm which has driven the standards through its subsidiaries. And to the extent that the large firm has focused on the systemic efficiency of its value chain (as, for example, in the Japanese auto industry during the 1980s, Cusumano, 1985), it has driven standards to its suppliers through supply chain management procedures, usually informing suppliers of the standards they are required to achieve, and in some cases also assisting them to achieve these standards (Bessant, Kaplinsky and Lamming, 2003). But in a growing number of GVCs, suppliers have often been left to make their own way in identifying the core relevant standards, and in establishing the procedures required to meet these standards. It is in these sectors that global buyers have come to play an important role (Box 1). By defining the role played by individual parties in the chain, the buyers can also block the upgrading paths of producers.

Box 1. The Role of Global Buyers

In many sectors not involving the direct ownership of suppliers, global buyers perform a number of key functions:

- They channel producers into different market segments, which have different requirements and provide different potential for sustainable profitability
- They signal to producers what customers in these market segments want (the critical success factors in these markets), and how this is changing
- They help producers to identify the capabilities required to satisfy these consumer demands
- In some cases, they actively assist producers to upgrade
- They assist in the location and in the acquisition of key inputs

If we relate these functions performed by global buyers to the challenge of capability-building, the story becomes a little more complicated. In order to understand these complexities we need to decompose what we mean by the "upgrading" implicit in the concept of "capabilities". Arising out of the GVC approach is an augmentation of the understanding in the innovation literature which has historically been predominantly focused on process-upgrading, with an ancillary focus on product-upgrading. The GVC framework, recognising the centrality of dynamic rents to the global fragmentation and relocation of economic activity (Kaplinsky, 2005) distinguishes four types of upgrading activity (Humphrey and Schmitz, 2001). The first two are familiar to the innovation literature – upgrading of process and product. The third is central to the GVC approach, referring to the upgrading of function. That is, firms may change their positioning in the chain, perhaps moving from physical transformation to design or marketing. Often, as in Figure 2, there is a hierarchy in this process of upgrading as firms move from assembly, to manufacturing-transformation, to design and to branding (or often a combination of these functions). In mature chains, when firms have developed capabilities, they may also upgrade by moving to a new chain.

Figure 2: Is There a Hierarchy of Upgrading?

	Process Upgrading	Product Upgrading	Functional Upgrading	Chain Upgrading
Trajectory				
Examples	Original equipment assembly (OEA) ↓ Original equipment manufacture OEM →	Original design manufacture →	Original brand manufacture →	Moving chains – e.g. from black and white TV tubes to computer monitors
Degree of disembodied activities	Disembodied content of value added increases progressively 			

Source: Kaplinsky and Morris, 2001.

The reason why these categories of upgrading are important is that the buyers, who have a key role to play in informing suppliers of market requirements, have their own interests to protect and will generally limit the upgrading path of their suppliers. Buyers naturally are focused on protecting their own rents in the chain and will therefore "guide" and often limit through contractual conditions, the upgrading path of suppliers. The nature of these constraints on upgrading will depend on the particular competences of the buyers. For example, in the global furniture value chain large global buyers such as IKEA will allow, and indeed foster, process upgrading by their

suppliers which reduces cost. But, at the same time, they will zealously guard the design and branding functions and keep these functions off-limits to suppliers (Kaplinsky, Morris and Readman, 2002). The more variety and brand-conscious markets are, the more likely that lead chain buyers will strive to maintain their control over design and branding.

Of course, the understanding of capability-growth must reflect both supply and demand factors. But it also will reflect the interaction between these two sets of factors. For example, responding to a series of analyses on the growth of supply capabilities in the newly-industrialising-economies, Feenstra and Hamilton point to the role played by the US retail sector in the evolving east Asian "export miracle". They show how the growing concentration of buying power in the US during the 1960s led to intense competition to find low-cost high-volume sources of supply (Feenstra and Hamilton, 2005). This led Walmart and other large retail chains to actively foster the growth of supply capabilities in Hong Kong, Korea, Singapore and Taiwan during the 1970s and 1980s, a process extended to Chinese and other global suppliers in the 1980s and 1990s. This doved-in with the simultaneous investment in the supply of capabilities by governments and producers in these NIEs (Wade, 1990; Amsden, 1989)

In summary, therefore, although economic growth is ultimately a story of augmented supply capabilities, there has been growing recognition of the key role which final markets play in inducing this growth in supply capabilities. Market size and market growth are one part of this story. But another part involves the nature of final markets, and the role which this plays in guiding the direction of capability growth amongst suppliers. Intermediation into final markets, and therefore the nature of buying power in global markets, is a further factor affecting economic growth, particularly in economies in which external trade plays a key role.

In this paper we consider the extent to which changing demand profiles might affect the nature and organisation of global value chains. In the context of the current global economic crisis, we explore the implications of the transition in final market from stagnant high income economies to dynamic low income economies in general, and China in particular. We focus on the degree of value added in these chains and the nature of standards incorporated in process and product though an analysis on two chains in the soft-commodities sector – cassava in Thailand and timber in Gabon. Both cases have seen a reorientation of their external markets from the North (in this case the EU) to the South (in this case China). In both cases, as we shall see, this change in final market has implications for the building of dynamic capabilities and in the degree of value addition in low income markets.

2. ECONOMIC CRISIS AND THE SOUTHERN DRIVERS OF DEMAND GROWTH

The recession following the financial crisis of autumn 2008 sparked the largest fall in output in the north since WW2, with an associated decline in output and exports in many low income economies, including the stellar-growth economies in east and south Asia. Between the onset of the crisis and the first quarter of 2009, global output fell by 2.4 percent, and that in the OECD fell by four percent (Holland et al, 2009). The unknown issue (at the point of writing, December 2009), is how this crisis will unfold and whether and how it will be resolved.

Essentially two major schools of analysis and policy response dominate the public debate on the evolution and resolution of the crisis. (Krugman amusingly refers to these schools in the US context as comprising of "saltwater" economists on the east and west coasts, and the "freshwater" economists in Chicago and other interior universities - Krugman, 2009). On the one hand, the "saltwater" Keynesians who have dominated policy responses argue that a necessary transitionary mechanism is government financing to sustain demand growth and prevent a downward spiral of confidence and economic activity. On the other hand, the "freshwater" mainstream economists are suspicious of big government, and fearful that deficit-financing will induce inflation, and argue for a very rapid rebalancing of government budgets.

What is missing from this polarised debate is a structural analysis of the crisis, and it is this which we need to understand in order to assess the likely role played by China and other large southern economies in the coming decade and beyond. Before presenting this structural analysis, it is helpful to think through a number of possible outcomes to the current financial and economic crisis (Box 2). The first outcome is the "V Scenario" – a rapid downturn followed by a fairly rapid upturn. At the time of writing in late 2009, growth is beginning to revive in the US and parts of Europe, as well as in China and elsewhere in Asia, and this is the positive (or rather, the "least negative" hoped-for outcome). The "U Scenario" (sometimes described as the "bath Scenario" when the upturn is delayed) suggests a similar outcome, but with a more protracted dip. Less comfortable is the W scenario – a double dip growth path, but with a subsequent revival to past growth trajectories. This is an outcome considered more realistic by some, such as the CEO of the Hong Kong and Shanghai Bank. The most pessimistic outcome to the financial crisis is that it will follow the same path as that experienced by the Japanese after its financial bubble burst in the early 1990s, that is a sharp downturn followed by a protracted period of stagnation. This is the "L Scenario". Somewhere between the L and the W Scenarios is "square root Scenario" ($\surd$), that is a sharp downturn, followed by a small rise (consistent with the revival of activity in late 2009), followed by a period of protracted stagnation. A recent study supports this likely outcome, - "we expect growth to resume by the end of [2009] in most countries, [but] the level of output in the OECD will remain permanently lower." (Holland et al, 2009: 9).

Box 2. How will the Economic Crisis Unfold?

A number of different scenarios can be identified as the economic crisis unfolds

The V Scenario

After a sharp and rapid contraction, growth revives to the pre-crisis growth path

The U Scenario

In structure, much like the V Scenario in the sense that growth revives to previous levels, but after some delay

The W Scenario

This is a double-dip crisis, involving a sharp fall, a rapid rise, followed by a subsequent fall and than a rapid rise to a revival of the pre-crisis growth path

"Is this a V recovery or a W? I think it's the latter " (CEO HSBC Bank, Financial Times, 5th Oct 09)

The L Scenario

A sharp contraction, followed by a long period of stagnation, much like that experienced in Japan after the bursting of its financial bubble in the early 1990s

The √‾ Scenario

A sharp contraction, followed by a minor revival and subsequent protracted stagnation

It is important, however, to avoid treating the global economy as an homogeneous entity and recognise the possibility – we believe likelihood – of diverse regional outcomes. The structural analysis which follows contrasts the likely outcome in the northern economies (Section 2.1) with that in two key southern economies, the Asian Driver economies of China and India (Section 2.2).

2.1. Structural Crisis in the North

High rates of global economic growth during the 1990s and the first decade of the new century were essentially fuelled by high rates of consumption in key northern economies, particularly in the large economies of the US, the UK and Spain, as well as in some smaller economies such as Ireland, Greece and Iceland. In each of these cases, this consumption boom was made possible through a series of financial bubbles, particularly in housing which allowed consumers to drawn on the "wealth" arising from inflating house prices. This resulted in two sets of related phenomena – falling rates of household and personal savings (in some cases falling into dis-savings) and a rise in balance of payments deficits. These deficits in external payments were filled by large payments' surpluses in key exporting economies, particularly China, Japan and Germany, made possible by restrained personal consumption arising from high rates of personal (and in recent years, corporate) savings and/or low rates of consumption.

Table 1 shows the extent of external payments deficits and surpluses in key large trading economies. The two most notable cases are the largest deficit economy, the US (its payments deficit hovered around five percent of GDP) and China (whose payments surplus in 2008 was 11 percent of GDP). Also notable is the case of Spain (deficit of almost 10 percent of GDP in 2008) and the UK (a deficit almost three percent of GDP). Some of the other smaller OECD economies showed even greater trade deficits, notably Greece (15 percent of GDP) and Iceland (40 percent of GDP in 2008). A significant feature of this performance was the growth in these structural imbalances during the 2000s. Table 2 shows the disparities in savings and consumption rates which underpinned these structural trade imbalances. The striking characteristics of this data are, first, the relatively low rates of final household consumption expenditure in China and, second, the high rate of private consumption (especially compared to low rate of savings) in three key bubble economies, Spain, the UK and the US. Concomitant with these imbalances has been the growth of foreign exchange reserves in the two leading surplus economies (China and Japan), which together accounted for nearly half of total global foreign exchange reserves (Table 3).

Table 1: Country Current Account Balance (Percent of Country GDP)

	Brazil	**India**	**China**	**Germany**	**Japan**	**Spain**	**UK**	**USA**
1985	-0.1	-1.8	-3.7	2.5	3.8	1.6	0.7	-3.0
1990	-0.8	-2.2	3.4	2.8	1.5	-3.5	-3.9	-1.4
2000	-3.8	-1.0	1.7	-1.7	2.6	-4.0	-2.7	-4.3
2005	1.6	-1.0	7.2	5.1	3.6	-7.4	-2.6	-5.9
2008	-1.7	-1.0	11.0	6.7	3.2	-9.6	-2.8	-4.7

Source: Calculated from OECD Database, accessed November 2009

Table 2: Savings and Household Consumption Expenditure (Percent of Country GDP)

	Gross Domestic Savings	Household Final consumption expenditure	Savings to Consumption Ratio
Brazil			
1990	21	59	0.36
2000	16	64	0.26
2008	19	61	0.31
China			
1990	40	46	0.86
2000	38	47	0.80
2008	49	37	1.34
India			
1990	23	66	0.35
2000	23	64	0.36
2008	33	56	0.59
Germany			
1990	23	58	0.40
2000	22	59	0.38
2007	25	57	0.45
Japan			
1990	34	53	0.65
2000	27	56	0.48
2006	25	57	0.44
Spain			
1990	23	60	0.38
2000	23	60	0.39
2007	25	57	0.44
United Kingdom			
1990	18	62	0.29
2000	16	65	0.25
2007	15	63	0.24
United States			
1990	16	67	0.24
2000	17	69	0.24
2006	14	70	0.20

Source: Complied from World Development Indicators accessed November 2009.

Table 3: Foreign Exchange Reserves (US$ Millions) 2009

	Country	($ Millions)	% of World Total
	World (sum of all countries)	**7,520,566**	
2009	China (including Hong Kong)	2,292,300	30%
2009	Japan	1,044,327	14%
2008	Eurozone (EU member states which have adopted the EURO, incl. ECB)	569,213	8%
2008	India	313,354	4%
2009	Brazil	223,713	3%
2008	Germany	150,377	2%
2008	United Kingdom	99,956	1%
2008	United States	67,000	1%

Source: The SWF Institute, accessed November 2009 (www.swfinstitute.org)

The imbalances in trade – feeding off the financial bubble – represents a core structural feature which is unsustainable in the medium and long term, particularly for very large global economies such as the US and China. To be resolved they require either (or a combination of) a reduction in consumption in the surplus economies, or a rise in consumption in the deficit economies, resulting in a fall in net exports in surplus economies and a rise in net exports in the deficit countries. These changes may work their way through the system through changes in exchange rates, personal consumption expenditure and government expenditure, and may or may not involve price deflation or inflation. The precise mechanisms involved in the resolution of the imbalances are less important for our discussion than the level of output and output growth in which the structural rebalancing will be achieved.

Some changes are already occurring. Thus household savings rates are beginning to rise, with consumption falling and trade deficits narrowing in key deficit economies. At the same time, payments surpluses have been falling in some economies, including China (Table 4).

Table 4: Changes in Trade and Savings for Major Economies (2008-2009).

	Current Account Balance (Percent of GDP)		Gross National Savings (Percent of GDP)		Trade (% Change in $ value June 2008/09 YOY)	
	2008	**2009[1]**	**2008**	**2009[1]**	**Imports**	**Exports**
Germany	6.4	2.9	26	20	33	34
Japan	3.2	1.9	27	23	26	24
United Kingdom	-1.7	-2.0	15	12	31	31
United States	-4.9	-2.6	13	11	24	-0.29

Source: Calculated from IMF World Economic Outlook and DOTS Database, accessed November 2009
1: Estimated by the IMF WEO.

However, the outcome of falling consumption in most northern economies has been a sharp rise in unemployment almost everywhere, with aggregate employment in the OECD falling by 2.2m between the 2nd quarters of 2008

and 2009 (Holland, et al, 2009), and unemployment growing to exceed 10 percent of the labour force in the US in late 2009. It has also led to a sharp fall in exports in major surplus economies (Table 4). In June 2009 Germany's exports had declined by 34 percent and Japan's by 24 percent compared to the same period in the previous year. China, too, saw a fall in employment after global trade fell significantly in the first year after the financial melt-down (13 percent fall in exports between June 08/09)

This decrease in output in the north, and increase in unemployment - both arising out of falling personal consumption - have been met by a massive "saltwater Keynesian" injection of funds through bank-bailouts and quantitative easing in most of the deficit economies, fuelling a "freshwater" response warning of the dangers of inflation. Although not historically unprecedented, government debt as a share of GDP has risen sharply in almost all economies as actual (and projected) fiscal deficits have grown (Table 5). Without this growth in government expenditure, there is little doubt that the already almost unprecedentedly large fall in output and rise in unemployment would have been substantially greater. As a result, there has been some revival in economic activity, with both the US and the EU moving out of recession (in the sense that output stopped falling) in the final quarter of 2009 and a revival of China's exports. Virtually no observer doubts the reflationary consequences of government deficit-financing – the debate is on the sustainability and long-term consequence of this deficit spending programme and the extent of the economic revival.

Table 5: General Government Fiscal Balance (Percent of GDP)

Country	Germany	Japan	Spain	United Kingdom	United States
1980	-3	-5	-2	-3	-3
1990	-2	2	-4	-2	-4
2000	1	-8	-1	1	2
2005	-3	-5	1	-3	-3
2008	0	-6	-4	-5	-6
2009	-4	-10	-12	-12	-12
2010	-5	-10	-12	-13	-10
2011	-4	-8		-11	-8
2012	-2	-8		-9	-6
2013	-1	-8		-8	-7
2014	0	-8		-7	-7

Source: IMF World Economic Outlook Database, accessed November 2009. Shaded area are estimates

We are thus faced with two clear trends in major northern economies. First, personal consumption has fallen back and is unlikely to rise in the near-to-mid-term as households rebuild their savings and cut personal debt. Second, continued government dis-saving has limited the fall in aggregate consumption and output, but it is unsustainable in the medium and long-term, both for fiscal reasons and because of sustained trade deficits. So, the issue is in what other ways can the structural deficits in key northern economies be resolved if the past growth trajectory is to be sustained, that is if any of the V, U or W Scenarios are to be achieved. One possibility is for there to be a rapid

growth in consumption and imports in China, Japan, Germany and other economies in trade surplus. Here the portents are not positive. Scarred by its history of inflation during the 1920s, Germany has made it clear that it wishes to minimise deficit financing. It has also explicitly committed itself to remaining an economy with a substantial trade surplus. Japan, despite efforts to reflate consumption in the past, also does not suggest itself as an economy capable of pulling-in significant imports from the deficit economies, and allowing them to benefit from rapid export-led growth. As a recent IMF Report concluded, "the scope for advanced economies such as Germany and Japan to contribute to rebalancing is limited, given their need to build savings to prepare for population ageing" (IMF, World Economic Outlook, 2009:33). So China, and to a lesser extent India, hold the hopes of sustaining the V, U or W Scenarios.

The problem is that there is little realistic sign that China-led reflation will draw in the imports to allow the major deficit economies to resume past levels of consumption growth whilst at the same time rebalancing their external payments accounts. It is true that the Chinese government has embarked on a major spending programme. But, much of this has focused on infrastructure and on public services where, in 2009, government spending expanded rapidly in health (38 percent), education (24 percent), and social safety (22 percent) this year (Source: World Bank China Quarterly Review March 2009). These infrastructural expenditures do have derived import requirements but, as we will see below, these are unlikely to have a direct first-round impact on the exports of the US and the EU.

Of course there are indirect trade mutlipliers operating in both these forms of domestically-oriented expenditure in China, but they are likely to be small in nature, at least insofar as they affect the demand for goods and services exported by high income northern economies[1]. Moreover, employment-growth in China has been key in sustaining political stability in the face of rising inequality, and insofar as China's labour-intensive exports decline, the emphasis will necessarily be placed on promoting domestic production to meet rising consumer demand. In addition, despite China's rapid economic growth and large size, it remains a small player in international trade. In 2008, total Chinese demand was equivalent to less than one-quarter of total consumption in the US and the EU. All of these factors also apply to India, but since its global footprint is smaller than that of China, its capacity to stimulate exports from the northern economies is even more limited.

From this we conclude that beyond the short term unsustainable deficit financing by governments in the large deficit economies, in reality the rebalancing by these economies will occur through a reduction in consumption, and hence in imports. We should not see this as an historical aberration. Rather, it was the post 1990s boom in consumption in the large

[1] There will, of course be a positive second round general equilibrium impact on high income country exports to those countries whose exports to meet China's infrastructure investments are expanding. But these indirect impacts are likely to be delayed and, moreover, increasingly low income countries imports are being sourced from China and India rather than the EU and the US.

deficit economies which was aberrant, arising from a series of financial bubbles and leading to growing consumption in the (high income) deficit economies being subsidised by high savings in some (low income) surplus economies (notably China and India). We can also anticipate that this fall in northern consumption will persist for some time, perhaps even as long as the 18 year post-bubble recession which the Japanese economy has experienced since 1991. Thus, the real issue is whether these northern economies will experience an L or a √ scenario, that is whether output grows, but below pre-crisis levels before it stabilises and stagnates.

2.2. Sustained Consumption in the South

China's recent growth, at least since the beginning of the 1980s, has been stellar, averaging more than nine percent p.a over the period. India, too, has experienced very rapid and sustained growth, albeit only from the early 1990s. it is tempting to see these growth trajectories as exceptional, an "economic miracle". Yet neither of these two country's growth experiences are unique. If we chart the evolution of their growth paths – both in relation to output and exports – since the onset of their growth-inflection, and compare these with the similar experiences of Japan (after 1960) and Korea (after 1963), it is evident that other economies have experienced similar economic "miracles" in the past (Kaplinsky and Messner, 2008). What is significant about the China-India experience is the size of these economies. Together, Japan and Korea never exceeded five percent of the global population. In 2008 China alone accounted for 20 percent of the global population and together with India, for almost 37 percent of the global total. (It is partly for this reason that they are increasingly referred to as the "Asian Drivers" – www.asiandrivers.open.ac.uk).

Three key relevant features stand out with regard to the recent growth experience of these two Asian Driver economies. The first is that their growth rates have been significantly greater than those of the key northern economies. If these past trajectories are sustained, then it is estimated that China will be the second largest economy by 2016 and India the third largest by 2035 (Goldman Sachs 2001). Of course, if past growth relativities are not sustained in the future (for example, if as suggested in Section 2.1 above the northern economies experience a protracted period of stagnation), then China and India's relative size will grow in a shorter time span than these projections of past performance suggest. Second, both China and India are in substantial trade surplus. They do not need to reduce or hold back consumption in the same way as do the large northern economies. And, third, by virtue of their large size, they have the capacity to grow and realise scale economies by expanding their very large domestic markets. An illustration of the size of these Asian Driver markets is provided by a recent analysis of the locus of consumption by the global consuming class ("the Middle Class"), defined as those consumers with annual incomes of between $10 and $100 per day in 2009 (in 2005 PPP $) (Kharas, 2009). Projecting forward to 2030 on the basis of growth rates in the past two decades, the centre of gravity of global consumption shifts decisively (Table 6). The share of Europe and US falls from 64 percent in 2009 to 30 percent in 2030, whilst that of the south in

general and Asia in particular, rises. The share of Asia and the Pacific in the global consuming class is projected to increase from 23 percent in 2009 to 59 percent in 2030. Bear in mind, though, that these projections are based on past growth relativities. If northern economies do stagnate and the Asian Drivers and the surrounding regional economy continues to grow (albeit at a reduced rate), the shift of global consumption power to Asia, and to low income economies in Asia, will be accentuated.

Table 6: Spending by the Global Middle (Percent of Global GDP in $PPP) (2009 to 2030)

	2009	2030
N. America	26	10
Europe	38	20
C. and S. America	7	6
Asia Pacific	23	59
SSA	1	1
M. East, N. Africa	4	4

Source: Selected from Table 3, Kharas (2009).

Nothing guarantees sustained growth in the Asian Driver economies. The fall in consumption in the northern deficit economies may be so large that it undermines export-oriented growth in China and India, with a potential combination of negative multiplier effects on economic activity and political disruption as unemployment grows. It may also be that environmental externalities grow so substantially, exacerbated by changing and unpredictable climate, that output growth is not sustainable. And it may be that global political instability spills over into the Asia-Pacific region, with a harmful impact on economic growth. So, as in the case of the analysis of likely growth paths in the northern economies (Section 2.1), there are clear uncertainties in projecting forward, particularly in the context of a disruptive global financial crisis. Nevertheless it is our judgement that just as growth is likely to be reduced or to stagnate in the northern economies in the future, so growth in Asia in general, and in China and India in particular, is likely to be sustained. If nothing else, the relativities in growth paths between these two worlds in the past two decades is likely to be sustained, and even to increase. If this is the case, then it is important to understand the nature of demand in these two large southern drivers of growth, an issue which we now consider.

3. PATTERNS OF DEMAND IN SOUTHERN DRIVERS OF GROWTH

Despite differences in country-size and endowments, there are well-established paths of development through which most economies pass (Kuznets, 1966; Chenery and Syrquin, 1975). Low income economies tend to be agrarian, with the primary sector dominating GDP. As incomes rise and manufacturing expands, the industrial sector takes over as the major driver of GDP growth. Continued income growth leads to higher demand for services, and at higher income levels it becomes the dominant contributor to GDP. These structural shift represent a well established pattern, observed in a large number of countries over time. What interests us in this analysis is that in the context of China (and India) becoming the major driver(s) of global demand in the coming decades, what implications the structural shifts in these Asian Driver economies have for low income country exporters in general, and for low income country exporters of commodities in particular? Here there are two major issues – the structure, and the nature of import demand – and in both cases we will consider them in relation to the evolution of the Chinese economy.

3.1. The Structure of Import Demand

There are three major consequences of changing economic structures which affect the product composition of imports. First, at low per capita incomes, the income elasticity of demand for agricultural products in general (and food in particular) is relatively high. As incomes rise, the relative income elasticity of demand for manufactures grows, and as incomes increase further, the demand for services becomes increasingly important in final demand. Secondly, with the changing sectoral distribution of GDP, there is a shift in labour and employment across sectors. As the industrial sector expands, labour and employment migrate from agriculture in the rural areas to the manufacturing sector in the cities. Third, as economic output becomes more diversified specialisation and interchange grows. Together with the growth of urbanisation, this requires heavy investments in infrastructure.

These three trends result in a growing demand for commodities. “Soft commodities” feed agricultural inputs into food, and provide intermediate inputs (such as cotton and timber) into manufacturing. The demand for “hard commodities” (such as minerals and metals) and energy grows as a consequence of investments in infrastructure and the expansion of the manufacturing sector.

China’s (and India’s) growth-paths reflect each of these trends. Significantly, it reflects the experience of an economy at an early stage in the evolution of this growth-paths. We can illustrate this by focusing on some of the key parameters of China’s recent growth trajectory (see, also, Farooki, 2009). China’s economy has shown a rapid transition from agriculture to industry. The share of agriculture in GDP fell from 27 percent in 1990 to 11.3 percent in 2008. In the same period, the share of industry increased from 42 percent to

49 percent of GDP. This was accompanied by large scale rural-urban migration. In 2007 45 percent of the population (594m) lived in urban centres. By 2015 the urban population is projected to rise to 684m, and to 890m in 2030. This growth in urban population between 2007 and 2030 will exceed the total combined population of the US and Europe.

This process of urbanisation is reflected in the growth in demand for infrastructure in general, and new infrastructure and housing in particular. It is one of the reasons leading observers to conclude that infrastructure-intensity is highest at the early stages of industrialisation ant at relatively low levels of per capita income (Canning, 1999; Auty, 2008). New projects tend to be much more commodity intensive as compared to expansion and reconstruction investments (World Bank, 2009). As Table 7 shows, the share of new projects in urban fixed investment increased from less than a third to almost a half between 1995 and 2007.

Table 7: Percent Share of Total Investment in Fixed Assets in Urban Areas by Type of Construction in China (1995-2007)

Year	New Construction	Expansion	Reconstruction	Maintenance and Equipment
1995	30	29	12	29
2000	32	24	15	29
2007	44	17	12	27

Source: Chinese Statistical Yearbook 2008

Second, the growth of China's manufacturing sector has also made intensive use of commodities, particularly hard commodities and energy. To a considerable extent this is reflected in the metals and minerals-intensity of China's rapidly-growing manufactured exports which comprised the bulk of exports between 1990 and 2006 (Figure 3).

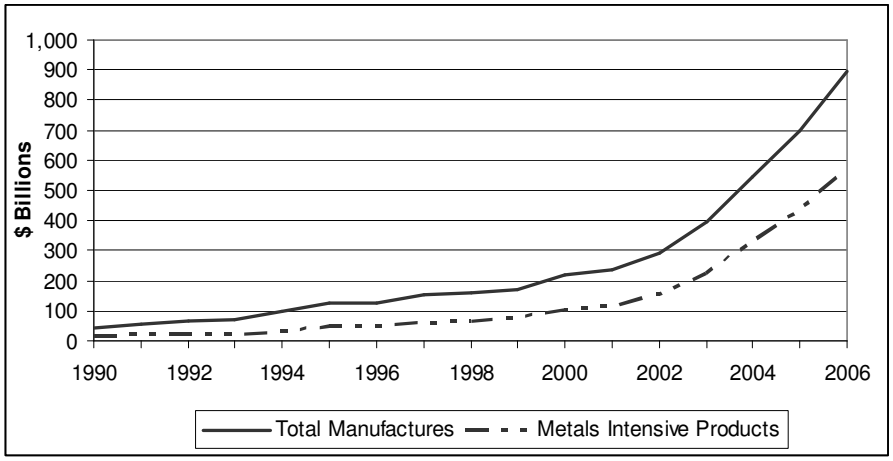
As a result of these combined factors, the elasticity of demand for energy and metals grew rapidly between the 1990s and the 2000s, and for key resource inputs such as coal, pig iron, crude steel and rolled steel, comfortably exceed a value of one (Table 8). That is, for example, every one percent increase in GDP saw a more than two percent increase in the demand for rolled steel.

Table 8: Elasticity's of Energy Consumption and Metal Production in China (1991-2005)

Period	Coal	Crude Oil	Pig Iron	Crude Steel	Rolled Steel
1991-1995	0.441	0.569	0.900	0.614	0.958
2001-2005	1.105	0.832	2.222	2.340	2.545

Source: Selected from Zhang and Zheng (2008)

Figure 3: China's Metal and Minerals Intensive Exports in Total Manufactures Exports (1990-2006).



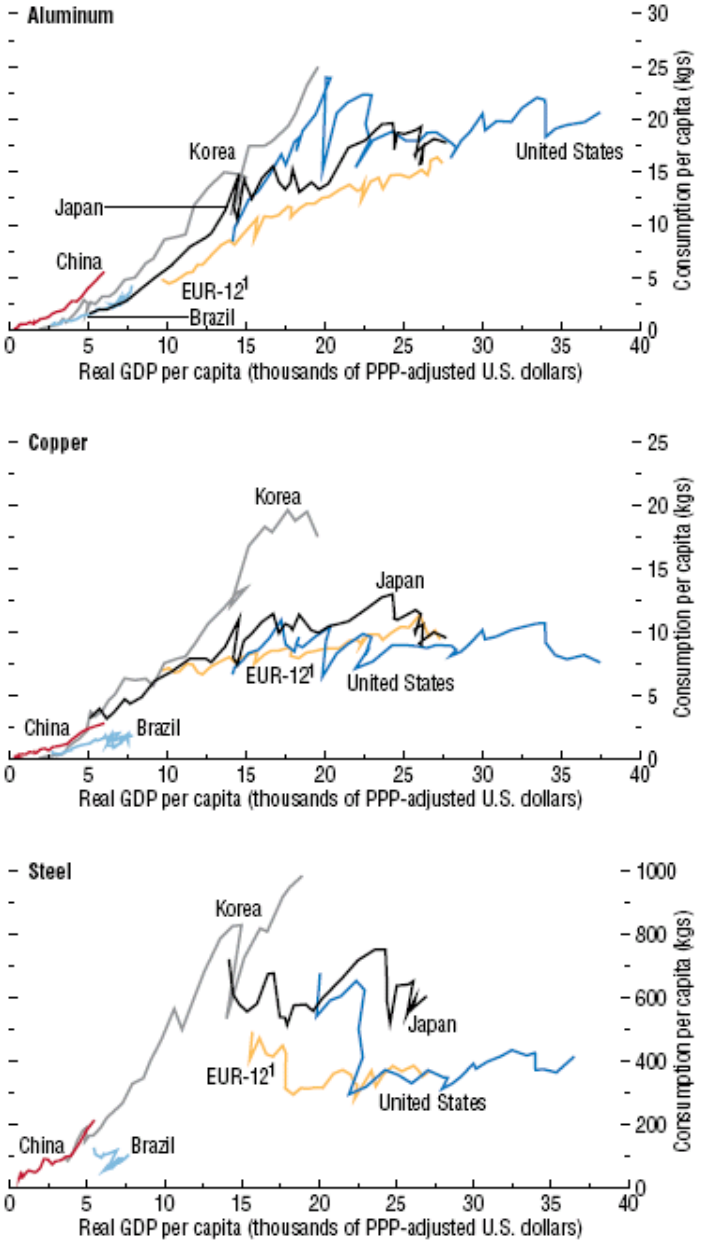
Source: Farooki (2009), from COMTRADE data accessed via WITS in November 2008. The listing of metals-intensive sectors is available in Farooki (2009; Annex 1)

With regard to agricultural inputs, a key component of demand at low per capita incomes is that for food products. Studies of urban consumers in China show that the income elasticity of demand for food falls from almost unity (0.96) at household incomes around Yuan2,500 ($375) p.a., to 0.4 for household incomes of Yuan7,500 ($1,125) and to 0.33 for household incomes of Yuan10,000 ($1,500)[2]. Thus, even though incomes are growing (and the income elasticity of demand for food is falling), there is considerable scope for sustained demand for food, particularly as in 2007, around 75 percent of Chinese households had an annual income of less than Yuan38,000 ($5,500) (Figure 5 below). Moreover, as incomes grow, the demand for meat expands, and this makes intensive use of grain (approximately four kilos of grain are required to produce one kilo of meat, Conceição and Mendoza, 2009). Thus food-availability is likely to be of considerable importance in the future in China, not least because whilst it has 20 percent of global population China possesses seven percent of global arable land.

What these data show is that China's growth path is particularly commodity-intensive. There is nothing exceptional in this resource intensive growth path. It closely reflects China's per capita income, which in 2008 was $5,510 compared to $43,000 for the USA (PPP$). But two factors are worthy of notice. First, as Figure 4 shows, there is some way to go in per capita income levels before the resource intensity of growth declines. Based on the historic resource intensity of demand for aluminium, copper and steel in Korea, Japan, the EU-12 and the US, it seems unlikely that China's (and India's) demand for minerals and metals will decline in the foreseeable future, despite rapid economic growth and rising per capita incomes.

[2] Adapted from Gale and Huang (2007

Figure 4. Per capita consumption of base metals



Source: IMF World Economic Outlook, September 2006

Second, both China and India (as we have seen) are very large economies. Thus, in analysing their impact on global trade we have to suspend the small country assumption that no single economy's trade pattern will shift the structure of global trade or the prices at which products are traded. As Table 9 shows, China accounts for a rapidly-growing share of global consumption of key base metals and meat, and this has led some commentators (including ourselves – Kaplinsky, 2006 and 2009; Farooki, 2009) to conclude that at the least this helped explain the boom in commodity prices between 2001 and

2008, and perhaps may also play a historically-significant role in promoting a structural shift in the global commodities-manufactures terms of trade in favour of commodities

Table 9: China's Share of Global Consumption of Base Metals and Meat

	1990	2000	2007
Base Metals (% Share of World Demand)[1]			
Aluminium	5	13	33
Zinc	8	15	31
Lead	7	10	31
Iron Ore	4	16	48
Copper	7	12	26
Food Products (% Share of World Consumption)[2]			
Poultry	9	18	17
Pork	35	47	46
Beef	2	10	12
Soybeans			40

Source:1 Macquarie Commodities Research (2008)
2 Conceição and Mendoza (2008)

3.2. The Nature of Import Demand

Thus, we have observed that Chinese growth has led to a sharp rise in its share of global demand for commodities and perhaps also for a structural upward shift in the relative global price of commodities. But there is more that we can observe about China's demand for commodities which is of relevance to global commodity value chains feeding into the Chinese economy. The key relevant factors are the demand-preferences of low income consumers, the consequent relative insignificance of standards in value chains, and the preference for the importation of relatively unprocessed products

3.2.1. The Demand Preferences of Low Income Consumers

The median income of individual consumers in the US in 2007 was $26,625[3]. The figure representing the poverty threshold in the UK (defined as 60 percent of average (median) annual incomes in 2007 was $35,432[4]. There is no gainsaying the existence of poverty in all of the high income economies, particularly when poverty is defined as a relative income[5]. There are undoubtedly also cases of significant absolute poverty in the north, for example, fuel poverty amongst the aged. However, whatever the degrees of inequality and deprivation are in the north, the incomes involved are in almost all cases way beyond those earned in low income economies such as China. Figure 5 shows the dispersion of incomes in the BRIC economies (Brazil, Russia, India and China) in 2007. From this it is evident that more than 270m

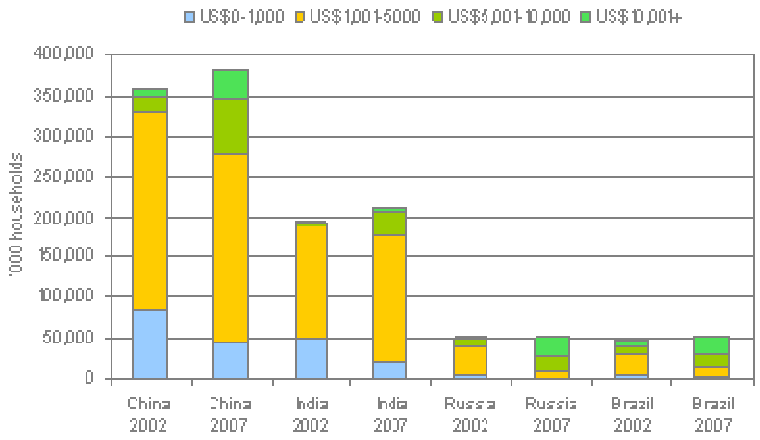
[3] Source: US Census Bureau

[4] Source: The Median Income before tax in 2007 was £ 17,700 (HM Revenue and Customs)

[5] As Wilkinson and Pickett (2009) show, most indicators of welfare are more affected by relative than by absolute poverty levels. However, in this discussion we are not focusing on the welfare implications of income levels, but on their translation into the demand characteristics of consumption, so it is absolute income levels which draw out attention.

households in China and more than 170m households in India had total annual incomes of less than $5,000. By contrast, the median household income in 2007 was $50,233 in the US and $49,800 in the UK.

Figure 5: Households According to Disposable Income Bracket in China, India, Brazil and Russia '000 households (2002/2007)



Source: Euromonitor International from national statistics, cited in Media Eghbal (2008),

In many cases, these households lived above the minimum $1 per day MDG threshold, particularly in China. But the point of significance is that most of these households in all of these BRIC economies were cash consumers, that is, they bought in a range of products, consumer, intermediate and capital goods. For these consumers, price is an overwhelming consideration in consumption. That is not to say that they do not care about quality and variety (the two key drivers of consumer demand in northern economies in recent decades – see Section 1 above), but that these preferences play a minor role in their consumption choices. Product differentiation (variety and quality) gives way to product "commodification" (standardisation in order to achieve low prices). To the best of our knowledge, this assertion is not evidenceable although the idea that low income markets provide scope for profitable production through the sale of low-value items is now widely acknowledged under the banner of the "fortune at the bottom of the pyramid" (Prahalad, 2005).

3.3.2. Imported-inputs are not standards-intensive

Following on from the preferences of low income consumers, there will be derived implications for the role which standards play in value chains. In Section 1 (see Figure 1) we distinguished between process and product. We observed that there was a growing tendency for the standards intensity in value chains to grow, reflecting a combination of factors – firm specific concerns with standards (such as Q-C-D) to meet consumer needs for product diversity and product quality, government-standards to protect consumers, and civil-society-induced standards reflecting growing concerns with the ethics of productions systems and their environmental impact. In the

context of the dominance of (very) low consumer incomes in countries such as China and India, each of these drivers of standards is likely to be of very diminished significance (Figure 6). In general, firms are less concerned with product variety, so that the imperatives to achieve flexibility through just-in-time production (and hence Q-C-D standards) are weak. Governments may either have poorly developed safety standards, or fail to implement them effectively. Recent cases in both China (baby milk) and India (pesticide in soft drinks) provide striking evidence of this[6]. Finally, the NGOs which have driven public opinion on issues such as FairTrade, labour standards and the environment are muted in low income countries and are likely to have little significance with regard to the incorporation of ethical and environmental standards in value chains. Indeed, particularly in China, NGOs often have a tenuous identity.

Figure 6: How Important are Standards Likely to be in Value Chains Feeding into China and India?
(An Elaboration of Figure 1 above)

		Firm Driven Standards	Government Driven Standards	Civil Society Driven Standards
Product	***High Income Countries***	Quality standards such as permitted parts per million defects	Food hygiene standards; Lead content in toys	Organic products
	China, India	Low emphasis and weak enforcement	Low emphasis and weak enforcement	None, or very weak
Process	***High Income Countries***	Quality control procedures – such as ISO9000 Frequency of on-time delivery	Hygiene standards – such as Hazard Analysis and Critical Control Point conformance (HACCP) Traceability of pesticide content	Sustainability standards – such as FSC (Forest Stewardship Council) (timber) Child labour standards
	China, India	Low emphasis and weak enforcement	None, or very weak	Low emphasis and weak enforcement

3.2.3. The growth in imports of relatively unprocessed products

A key objective of economic and industrial policy in most low income countries is to add value to natural resources: in South Africa, for example, the call is for the "beneficiation" of the country's extensive mineral and agricultural products. Although there are dangers to this policy agenda (beneficiation, particularly of hard commodities, is often very capital and technology-intensive) there is a natural logic to this in many cases. Many commodities degrade rapidly and/or involve significant weight loss in processing. There are also evidenced cases of economies which have utilised their natural resources to drive forward their

[6] http://www.businessweek.com/globalbiz/content/aug2006/gb20060810_826414.htm

industrialisation (Wright and Czelusta, 2004). And, particularly in the processing of soft commodities, this is often a labour-intensive process and wage costs in low income exporting economies are generally a fraction of those in high income economies. Moreover, commodity processing is often very polluting.

This logic of processing at source (rather than in the importing economy) applies easily – or relatively easily- when low income economies export commodities to high income economies. The high income economies are happy to see the pollution and energy intensive production processes located in low income countries; their high-technology, skill-intensive, high-wage and safe working environments in their producing sectors are generally more appropriate to the provision of capital and intermediate goods for resource-processing industries rather than for the direct processing of commodities. However, when low income resource economies trade with low income importing economies, many of these factors which promote a win-win division of labour do not apply (Figure 7). Low income economies care less about the polluting nature and energy intensity of processing. Their industrial structures are well-pitched in terms of technological and skill intensity to specialise in processing, and their low labour costs enable them to do so at similar cost-profiles to those operating in low income exporting economies.

Figure 7: High and Low Income Commodity Importing Economies – Complementarity and Competition with Low Income Commodity Exporting Economies

	High income importing economy	**Low income importing economy**
Pollution and energy intensity	High preference to outsource to exporting economy	Indifferent to location
Complementary or competitive industrial structures	Complementary –focus on technologies with high barriers to entry	Competitive – importers also have low technology industrial structures
Labour costs	High wages militate against labour intensive processing	Low wages facilitate labour-intensive processing
Labour standards	Working conditions are effectively protected by enforce legislation	Weak protective environment of working conditions

In the case of China and its imports of food products, there is an additional factor affecting the degree of processing involved in its imports. We have observed above, that the ratio of China's population to its arable land suggests that however effective its agricultural sector might become, it seems likely that it will have to draw on agricultural imports as its economy continues to grow, and as food tastes shift increasingly towards meat products. After a brief flirtation with the importation of food products, the experience of global shortages of key food crops in 2007 and the associated rise in political tension, in countries as diverse as Cameroon and Indonesia, has

concentrated the minds of Chinese policy makers. In fact, China has pursued a strong self-sufficiency policy in grains since 1995, with the objective of domestic production meeting 95 percent of its domestic demand (Anderson and Peng, 1998). As a consequence, agricultural production shifted towards grains and away from other crops such as cotton, sugar beet and soybeans (Fang and Beghin, 1999). Given the shortage of land, this has increasingly meant that China's agricultural imports have been concentrated in animal feeds (such as soya and palm oil) and products which compete with grains for land-use (such as inputs).

There is another policy-related factor which also affects China's growing importation of agricultural products. In the context of a growing perception of a future energy-crisis, China has (like other countries such as the US and the EU) begun to promote the production of bio-fuels. These need agricultural inputs, but given the primacy being given, for political reasons, to food self-sufficiency, China has increasingly sought to source the inputs for bio-fuels from abroad as bio-fuel crops are generally planted on land used for food crops[7]. As we will see in Section 4 below, this explains the rapid growth of cassava chip imports from Thailand.

4. HOW DOES THIS WORK IN PRACTICE: THE DYNAMICS OF TWO GLOBAL COMMODITY VALUE CHAINS

In Sections 1-3 we have sketched a general picture of the likely evolution of southern based value chains as their markets shift from high income markets in the north to low income markets in the south in general, and to China in particular. Since these are general trends, they will be evidenced to a greater or lesser extent in particular sectors. Few sectors will evidence all of these emerging determinants in the structure of global value chains, but each is likely to be affected materially by one or more of these underlying trends.

To illustrate the significance of this impact on global value chains in the south, we can observe the trajectories of two commodity global value chains – cassava in Thailand, and timber in Gabon.

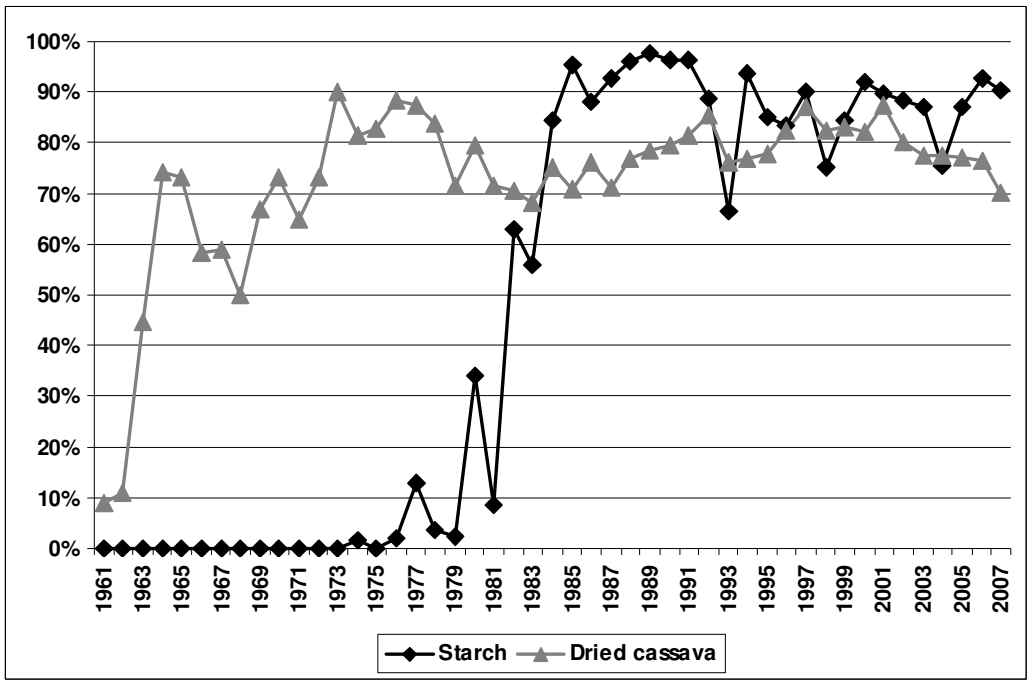
4.1. The Thai Cassava Value Chain

Cassava is a widely grown crop globally. The major reason for this ubiquity is that it grows on relatively poor quality land and is relatively drought-resistant, thus serving as a food-crop-of-last-resort in many countries. But it is also an important intermediate product, feeding into the animal-feed, bioethanol and the starch markets. Since raw cassava is poisonous to human beings, bulky and perishable, the trade in cassava necessarily occurs in processed form. In 2008, global trade in cassava products was $1.124bn, and although the largest producers were Brazil and Nigeria, Thailand was the world's largest cassava exporter (Figure 8), accounting for around 80 percent of global trade

[7] Von Braun (2007) estimates if current bio-fuel and investment plans were to carry on, the world price by 2020, for major food crops could rise by 11% for cassava, 26% for maize, 18% for oilseeds, about 12% for sugar and 8% for wheat

in both major product families ($910m) (http://comtrade.un.org/, accessed 26 November 2009)

Figure 8: Thailand's Share in World Cassava Exports (1961-2007)



Source: FAOstatistics, http://faostat.fao.org/ accessed 13 Nov 2009

Cassava plays an important role in the Thai economy. In 2007, it was the second most important crop after rice in terms of value and the third after sugarcane and rice in terms of volume. At $948m in 2007, combined dried cassava and cassava starch exports were its third biggest agricultural export after rubber and rice (Source: FAOstat accessed 13 Nov 2009). Unlike other major producers of cassava, there is little domestic direct consumption of cassava as a food product in Thailand, where almost all output is used as an intermediate product in other sectors. In 2008, an estimated 66 percent of all Thai cassavas was exported, 26 percent was utilised domestically and the rest was kept as stock (Office of Agricultural Economics as quoted by TTSA in http://tapiocathai.org, accessed 14 Dec 09).This represents a somewhat unusual story of an "alien" food crop being introduced into a low income economy (in this case, dating back to the 1950s) and initially thriving solely as an exported intermediate product used in the food industry in other economies[8].

[8] Thailand's rapid expansion of cassava exports reflected two factors. The first was the well-developed external marketing capabilities of its Chinese trading community. The second was the heavy investment in infrastructure in the north-eastern region during the 1960s and 1970s, designed to counter the political influence of communist insurgents. The north-east has become the major cassava growing region in the country.

4.1.1. The Cassava Value Chain

There are essentially two families of products in the Thai cassava sector (Figure 9). These are the dried cassava value chain and the starch value chain.

The dried cassava value chain, in turn, comprises two product segments – dried chips and cassava pellets.

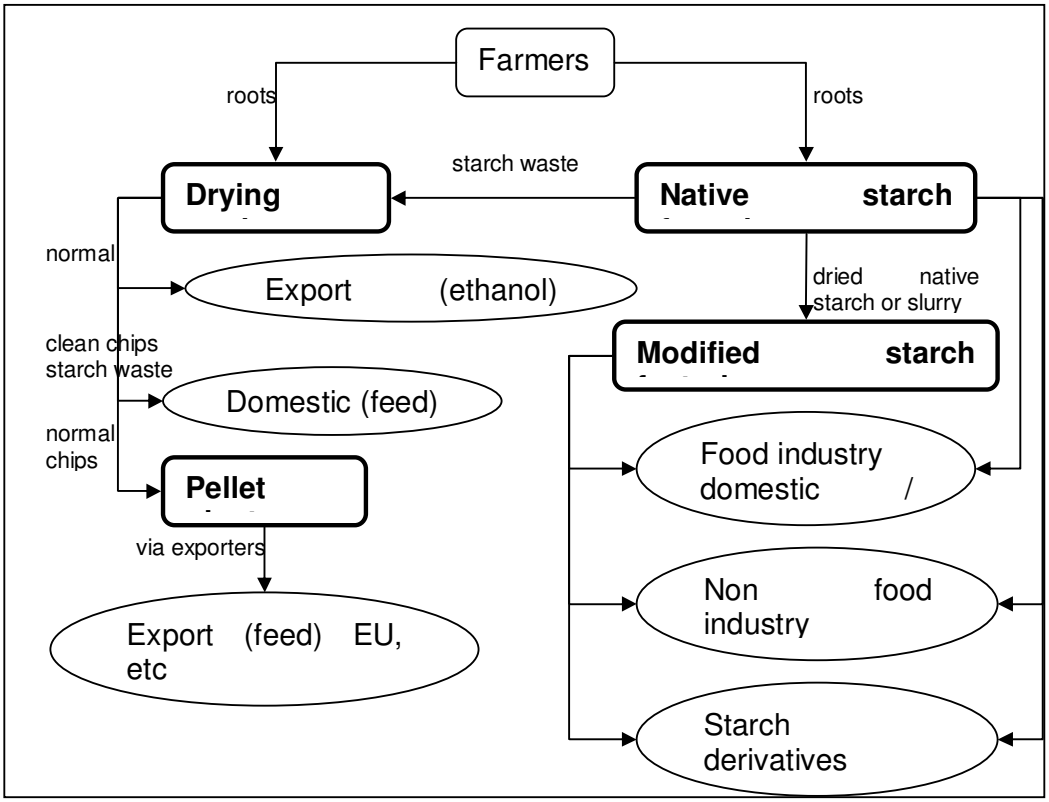
- Cassava chips are inputs into both the animal feeds and bio-fuels industries, and involves the sorting of root tubers which are then crudely cut and dried in open-air drying yards. Lower-grade "normal chips" are fed into the cassava pellet and bio-fuels industries. The higher-grade "clean chips" are used directly as domestic animal feed, but require the peeling and cleaning of tubers, necessitating rudimentary forms of mechanisation (using rotating drums or a screen filter), and an additional day of drying. They have a lower sand and fibre content than "normal" chips

- Cassava pellets process "normal chips" and/or low grade wastage from the starch industry. These inputs are ground and steamed, perhaps mixed with starch residue, and then moulded into pellets. The manufacturing process embodies some limited scale economies,[9] and more skilled labour and capital than is required in the production of either clean or normal chips.

The starch value chain also comprises two sub-products - "native" and "modified" starch (although a small quantity of sago is also produced). These starches have industrial uses, with modified starch feeding into more technologically-intensive value chains. Modified starch involves a further step of processing after the production of native starch, reflected in the fact that while roots constitute 70-75 percent of total production cost for native starch, they only account for around 46 percent of the costs of modified starch (fieldwork interviews; Titapiwatanakun, 1994). In addition to being used in other industrial sectors, some of the native starch waste is sold to the pellet plants which combine this with "normal" cassava chips to produce animal feed. The typical starch factory operates at around 850 root-tonnes per day.

[9] Typically, an average pellet plant processes around 575 root-tonnes a day, compared to an average of 70 root-tonnes in the drying yards.

Figure 9: The Thai Cassava Value Chains



4.1.2. Market Requirements for Cassava-Based Products

There are two established and one emerging export markets for Thailand's dried cassava (chips and pellets)– the EU and China, and in recent years Korea. Each of these markets has particular trajectories and requirements. The smaller starch export market is more diversified.

The EU

The origin of Thailand's dried cassava industry can be traced back to the EU's Common Agricultural Policy (CAP). Demand for Thai cassava pellets expanded rapidly after the introduction of the CAP in 1962, where the resulting high domestic cereal price triggered the search by EU feed manufacturers for cheaper alternative feed ingredients. Exports of cassava to the EU expanded rapidly, reaching a peak of almost nine million tonnes in 1989. Initially these involved exports of cassava chips, but for a series of reasons, pellets became the dominant and then the exclusive cassava product exported to the EU. Since dried cassava was used in compound-feed production, cleanliness and uniformity of shape and size were important to ease the large scale mechanised mixing of dried cassava with other feed ingredients. In addition, the distance between EU and Thailand required less bulky products, favouring pellets over chips. Moreover, the transportation of chips is dusty, and in 1978 EU environmental regulation mandated the introduction of a less dusty form of dried cassava, again favouring pellets over chips. Finally, as cassava pellets are used in feed production, imports are

governed by the EU farm-to-fork policy, which requires traceability. HACCP and GMP certification became a mandatory requirement for entry into the EU, and pellet production lent itself more favourably to this form of certification (Box 3).

Box 3: Standards Governing Production in the Thai Dried Cassava Value Chain

Minimum export standards required by the Thai Ministry of Commerce

For both pellets and chips, there are a number of technical export standards required by the Thai Ministry of Commerce (MoC), based on Notification of MoC B.E.2545 (2002) for sale into the domestic animal-feed market. The main ones are minimum starch content of 65 percent, maximum crude fibre of five percent, maximum moisture of 14 percent, maximum sand of three percent, and free from foreign materials. However, despite these export standards, some exports (including residue exports to Korea) are shipped to a lower starch content (see below).

Standards governing product entry into the EU

EU 'farm to fork' policy, introduced in 2000 requires the traceability of products used in food and feed production. Compliance for traceability and hygiene requirements is obtained through HACCP and GMP certifications on the pellet plants.

- HACCP ("Hazard Analysis Critical Control Point") certification is required as cassava pellets are part of the animal feed-food chain.

- GMP ("Good Manufacturing Practice") relates to the sanitary and processing requirements necessary to ensure the production of wholesome food.

The requirement for HACCP is based on European Council Directive 89/397/EEC of 14 June 1989 on the official control of foodstuffs, and Council Directive 93/43/EEC of 14 June 1993 on the hygiene of foodstuffs. The HACCP system has to be implemented in relation to products and production processes.

Standards governing product entry into China

No official standards govern product entry into China. However, since cassava chips are used as a bio-fuels feedstock, Chinese buyers customarily specify a 67 percent starch content compared to the 65 percent level required to meet Thai Ministry of Commerce export standards. This also tends to be higher than the starch levels required by EU and Korean buyers where cassava exports are sold to the animal-feed market.

Standards governing product entry into Korea

No distinct standard certification is required for entry into the Korean market, but there are technical standards specified by buyers (notably a 55 percent starch content).

However this attractiveness of Thai cassava as an animal-feed input for EU livestock producers was undermined by a series of trade restrictions introduced in the 1980s and early 1990s, and then particularly by the 1992 reform of the CAP. EU domestic cereals became increasingly competitive with cassava pellets. By 2005, pellets export to the EU had collapsed to 250,000 tonnes, compared to a peak of over nine million tonnes in 1989 (UN-COMTRADE, http://comtrade.un.org, accessed 26 November 2009; TTTA, 2009) and price pressure grew. In 2008, pellets exports to the EU had regrown to 989,000 tonnes, still only 10 percent of the 1989 peak (UN-COMTRADE, http://comtrade.un.org, accessed 03 December 2009).

China

The demand for imported cassava chips into China reflects the related desire by the Chinese government for food self-sufficiency, the growth in the demand for meat by consumers, and the development of its bio-fuels sector. As we saw above, Chinese policy privileges the production of food grains for domestic consumers, which means that the requirements for animal feed and feedstock for bio-fuels have increasingly had to be met via imports. This has led to the growing importation of soya products from Latin America and cassava from Thailand. Alternative feed stocks into bio-fuels such as molasses have been discouraged due to environmental concerns (OAE, 2006).

The bulk of Thailand's cassava exports to China occurs in the form of dried cassava (cassava chips rather than pellets), and is used as an input in the production of bio-fuels (Table 10). These imports began at a small scale in the mid 1990s, but grew rapidly in the 2000s, following a wheat harvest failure in 2001 and the liberalisation of trade barriers in agricultural products under the China ASEAN Free Trade Agreement in 2003. This rapid growth in part reflected the removal of a six percent tariff previously imposed by China on Thai cassava products.

Table 10: Thai Cassava Exports to China (US $ Millions)

	2002	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**
Total ($m)	109.02	137.44	236.74	329.87	474.81	417.62	288.30
Of which (%)							
Dried cassava	94.10	94.66	90.04	89.44	87.61	83.26	72.57
Cassava starch	5.90	5.34	9.96	10.56	12.39	16.74	27.43

Source: UN-COMTRADE, http://comtrade.un.org, accessed 26 November 2009

China's demand for starch as an intermediate input into non-food industries has increased rapidly in recent years and the share of starches in cassava imports from Thailand grew from only six percent in 1998 to 27 percent in 2008.

Korea

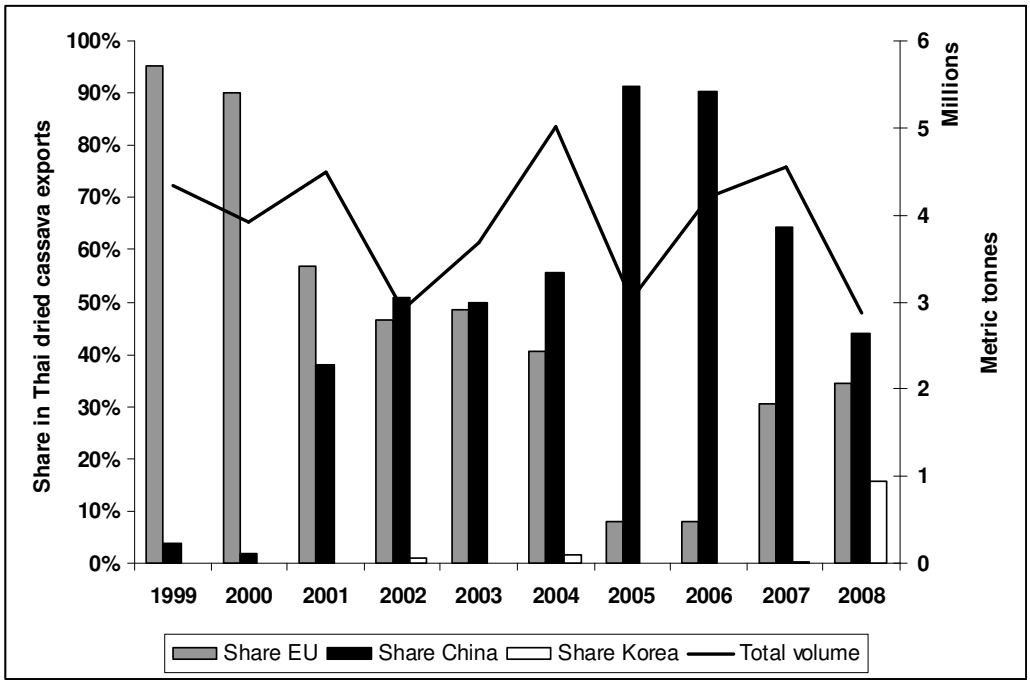
South Korea mostly imports residue pellets made out of starch waste with a low starch content of 55 percent, compared to the pellets imported by the EU, which are made mostly (70% to 80%) from chips and which has 65 percent

starch content. Korea is a very new entrant into the Thai export market, importing virtually nothing until 2007, and then taking 16 percent of dried cassava imports (mostly low-grade pellets) in 2008.

4.1.3 Changes in Market Destination and Product Composition

Two major changes can be observed in the export composition of Thai cassava products. The first is the change in destination. The Thai dried cassava industry– essentially a "creation" of the EU CAP after 1962 - was potentially devastated after the reforms to EU agricultural policy in the early 1990s. This reform of the cereal price support system reduced the price competitiveness of cassava pellets imports as an animal-feed. Fortuitously for the Thai industry, the Chinese market began to grow rapidly, soon after the EU market was falling. This changing balance in export destination is shown in Figure 10. Total export volume hovered around 4m metric tonnes during the 1990s, but the share of the EU fell from almost 95 percent in 1999, to less than 10 percent in 2005, subsequently reviving somewhat to around 30 percent in 2008. The share of dried cassava (pellets) exports to Korea grew rapidly from merely two percent in 2004 to 16 percent in 2008 (UN-COMTRADE. http://comtrade.un.org, accessed 03 Dec 2009, TTTA, 2004 and 2009).

Figure 10: Thai Dried Cassava Export: the Shift in Destinations

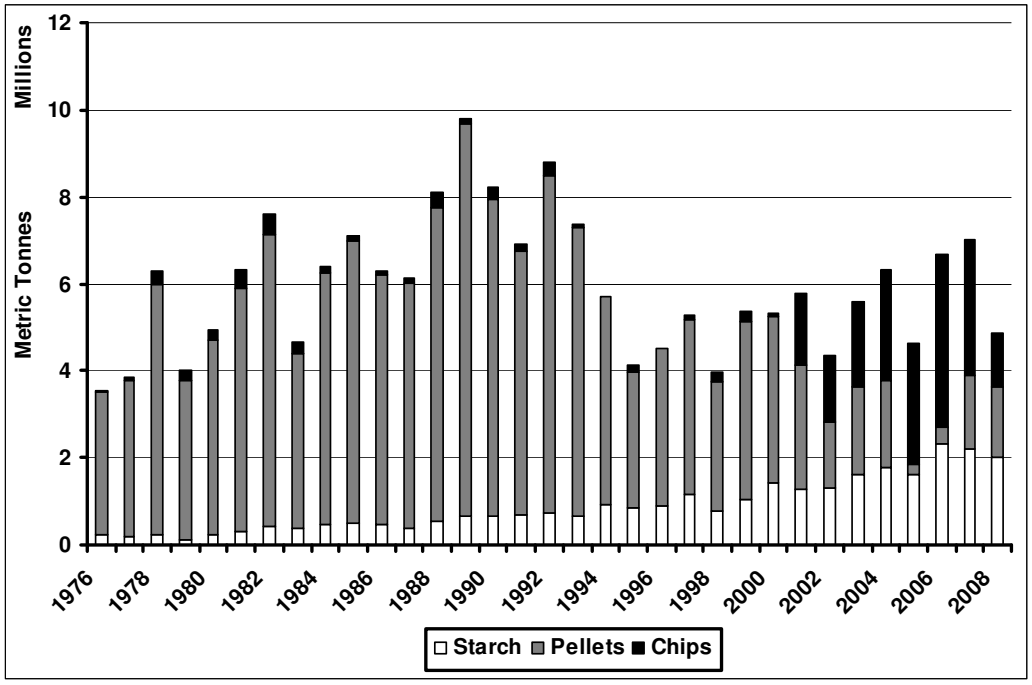


Source: UN-COMTRADE. http://comtrade.un.org, accessed 03 Dec 2009, TTTA, 2004 and 2009

Given different demand patterns in the EU and China, this shift in export destination saw associated changes in the product composition of Thai cassava exports (Figure 11). The major change has been from pellet to cassava chip exports. But an important subsidiary change in Thai cassava export has been the growth of starch exports to China. This grew from six

percent of Thailand's cassava exports to China in 2002 to 27 percent in 2008. However, within starch exports to China, there has been a marked shift from modified to native starches (Figure 12).

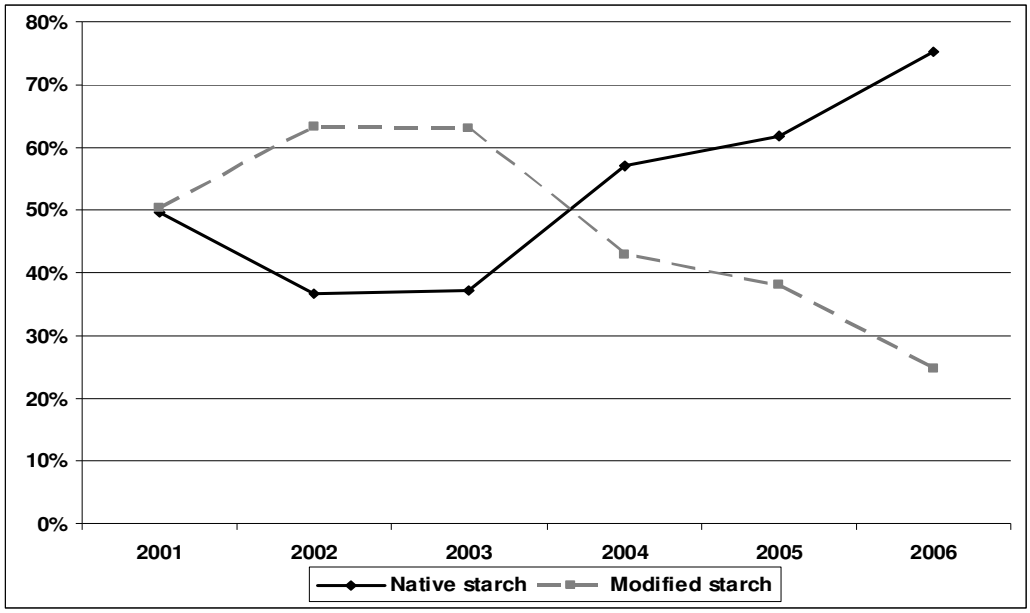
Figure 11[10]: Thai Cassava Export Composition Volume- Final Products (1975-2008)



Source: TTTA (2004, 2009)

[10] There are major differences in the data on production and trade provided by the TTTA and COMTRADE. To facilitate a comparative analysis of Thai export trade we have used COMTRADE as a data source on exports. But since COMTRADE data does not distinguish between pellets and chips, TTTA is used a the source of the product composition of dried cassava trade.

Figure 12: Shares in Thai Cassava Starch Export to China (2001-2006)



Source: TTSA (2008)

4.1.4. Consequences

What have been the consequences of these shifts in the related market and product composition of Thai cassava exports over the past decade? Here it is helpful to distinguish between dried cassava exports and starch exports.

Dried cassava exports

The transition from pellets to chips has essentially knocked out a stage of processing. Chip production is a labour-intensive operation occurring in open-air drying yards – the raw cassava is cut, sorted, placed in the sun to dry and then aggregated and exported in bulk containers. Pellet production builds on cassava chip production, adding value by steaming and moulding the semi-processed cassava chips in a factory. It is an inherently more technologically complex operation, involving greater operational and managerial skills, not as a substitute to chip production, but as a complement to chip production. This change in product therefore represents a move down the technological chain, and at the margin pushes Thai producers backwards into agricultural rather than manufacturing comparative advantage.

This has implications for factor utilisation. Table 11 simulates the employment and capital costs which would result if all of Thailand's cassava production in 2008/2009 (29 million tonnes of cassava roots) were to be exported as either chips, or pellets or starches (as reflected in the current mix of exports). It shows that the additional stage of pellet production over chip production would lead to an additional 9,568 jobs (an increment of 52 percent in employment), but at a higher capital cost of $6m (increasing capital costs by 30 percent). The capital cost per job created in pellet production is only $627. It would also add an additional 168 production units, contributing to the

diversification of entrepreneurship and to the potential geographical diversification of production.

Table 11: Factor Utilisation and Number of Establishments if all Cassava were to be Produced as Chips, Pellets Or Starches*

	Chips	Pellets (incl. chips)	All starches
Employment	18,281	27,849[11] (of which 9,568 in pelletisation)	29,734
Capital cost $m)	19.97	25.96	44.73
Number of firms	1,373	168 pelletisation plants 1,373 drying yards	114

* Capital cost from Roonnaphai (2006); all other data from fieldwork

A further consequence of the transition from the EU-pellet market to the Chinese cassava market is a removal in the role of standards in production processes and in products. As we saw in Box 3 above, cassava chips exported to China are only required to have a minimum starch content. By comparison, pellet exports to the EU are required to satisfy demanding EU farm-to-fork GM and HACCP standards. Arguably, the achievement of these standards requires more sophisticated managerial processes and higher labour skills, contributing to the growth of capabilities in the Thai economy.

Finally, there are knock-on effects which can be broadly understood as value chain governance issues. Pellets exports to the EU occurs in bulk and in long-haul 50,000 tonne ships and are controlled by four northern-based commodity traders (including Cargill and Toepfer) who assemble consignments of 6,000-7,000t from individual Thai exporters[12]. These exports occur mostly through long-term forward contracts which provide a predictable income stream for producers and local aggregators. By contrast, in general chip exports to China are sold on a spot-price basis, and provide for far less predictability since when prices fell suddenly in 2008, many Chinese importers reneged on agreed prices. As a consequence, many Thai firms continue to supply to the EU, even though margins on this trade have fallen in recent years as the changing agricultural price support system in the EU has led to increasing price competition from other animal feeds.

Starch exports

If the transition from the EU pellets market to the Chinese chip market represents a downgrading of value addition and capability-building, the same results are not true when we compare Chinese demand for starches with EU demand for pellets.

[11] Assuming all pellets made out of chips. In reality many pellet factories also use starch residue as an input

[12] Thai 'exporters' to EU are actually just assemblers, they only handle paperwork on the Thai side, port handling and off and on loading from lighters (small boats) to big long haul vessels, which are normally organised by the 4 major EU agricultural traders.

Starch production is considerably more technologically intensive than are either chip or pellet production. This is particularly true in the case of modified starches – as we saw above, modified starch involves considerably greater processing than does native starch. Hence in this case, the transition from the EU to the Chinese market would be reflected in an increase in technological complexity and skill requirements, greater than that involved in the jump from cassava chip to pellet production. Moreover, it would lead to an increase in around seven percent in total employment, since the packaging stage in starch production is particularly labour-intensive, as well as a considerable increase in skills. This increase in employment would, however, come at a considerable capital cost, with a more than doubling of investment over chip production (123 percent, an additional $25m), a 72 percent increase ($18.8m) over pellet production and a capital cost per job on $2,162, still comparatively low by contemporary industrial production, but more than three times to cost per job in pellet production.

So, at one level, the transition from the EU pellet to the Chinese starch market might suggest an augmentation of capabilities. However, within starch production, there has been an important shift in recent years which mirrors the pellet versus starch story. That is, whereas Chinese starch imports from Thailand comprised around a 50:50 split between modified and native starches in 2001, the share of the more processed modified starches produced in more technologically complex production processes had fallen to only 25 percent in 2006 (TTSA, 2008). China's declining demand for modified starch might reflect the building of China's own starch modification capacity rather than a decline in demand. Modified starch (made from all starches, not just cassava) production in China has increased consistently from just 20,000t in 1991, to 60,000t in 1994, 330,000t in 2001 and to almost 650,000t in 2006 (Wang, 2002:34; Wang, 2007). If this trend continues, Thailand might be relegated to a supplier of native starch, with the more sophisticated modification taking place in China. The Thai industry *hopes* for a more complex future, with premium grade native starches and the most complex modified starches being produced in Thailand and intermediate grades of modified starches produced in China. On the basis of past trajectories, however, their ability to achieve this outcome must be in doubt.

4.2. Gabon's Timber Value Chain

We observed in Section 3 above that comparative historical analysis on the basis of historical experience suggests a "normal" pattern in which the early stages of growth are dominated by agricultural products, followed by the growing share of manufacturing, maturing into economies with a large service sector. The development of the timber and timber-related sectors tends to be one of the primary stages of industrial growth, partly because timber-products (such as furniture and housing) have high income elasticities of demand at low levels of income, partly because the timber related sectors are labour intensive (and hence encourage production at low wage levels), and partly because timber-processing is closely related to the agricultural sectors which dominate low income economies.

The trajectory of the timber sector mirrors this transition in macroeconomic structure as depicted in the "Forest Transition model (Grainger, 1995; Mather, 1992; Mather and Needle, 1998; Rudel et al., 2005), During the *pre-industrial phase*, forests in the now mature northern economies were predominantly used for grazing, the collection of fodder, fuelwood and non-wood forest products, as well as for timber (Farrella et al., 2000; Mather, 2001). Until the 18th century, European forests were a hybrid of agricultural and timber production. During the following *industrial phase* trees were 'mined'. But as forests were depleted, remaining forest areas increasingly required more management. This led to new forms of ownership, with privately owned enclosures replacing communal forests (Humphreys, 2006; Mather and Needle, 1999). For most of the 19th and 20th centuries forests in Europe and North America were "industrialised" and the timber was fed into related industries. As a result of timber shortages in Europe (and later its 'newly depleted' outposts in North America), colonies in Africa and Asia were drawn on to fill the domestic wood gaps. Colonies were often treated as so-called resource taps (Jorgenson, 2008).

After the 1950s, northern forestry industries moved into the *post-industrial phase.* Technological change in agriculture led to yield increases, making land available for forest expansion (Kauppi et al., 2006; Rudel et al., 2005; Victor and Ausubel, 2000). At the same time, societal perspectives on the functions of forests began to change, and an increasing affluent urban population exerted pressure on domestic forest management to cater to their needs of recreation and regeneration. They also focused on the need to avoid the loss of biodiversity in forests (Bazett, 2000; Nilsson, 1999), and in recent years have become increasingly concerned that deforestation will lead to the erosion of the carbon-sinks, which mitigate against climate change.

In southern economies, much of the tropical deforestation of the late 19th and the 20th centuries can be attributed to export-directed logging activities as wages in northern economies grew and as they ran out of sustainable forests. The overwhelming majority of logging took place through an expansion of the extensive margin, with little attention being placed on sustainable cultivation. Forests increasingly came under state authority with the primary objective of maximising timber extraction, and forest land was taken by new settlers for agricultural purposes, thereby replacing traditional communal stewardship and common property systems (Humphreys, 2006; White and Martin, 2002).

4.2.1. The Forest Value Chain in Gabon

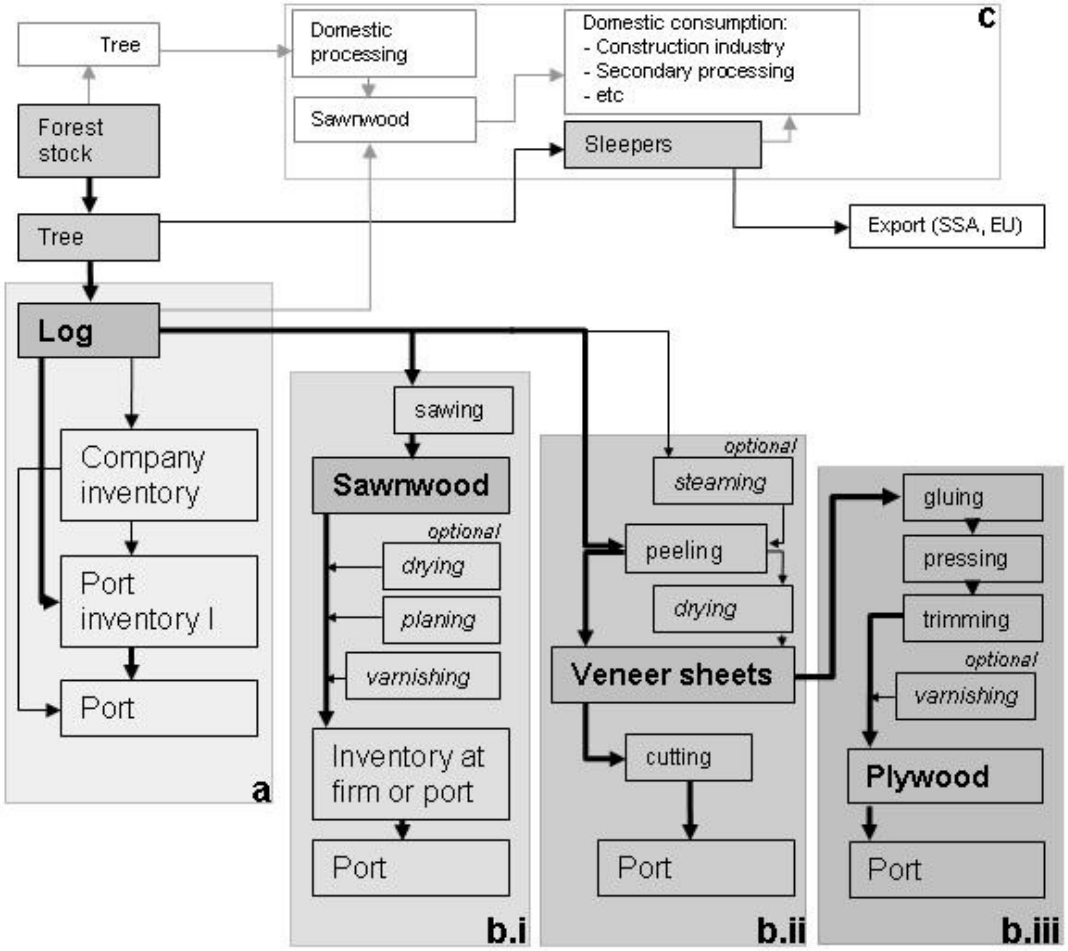
Situated on the West Coast of Africa, Gabon is a resource-rich economy with relatively high levels of per capita income, currently around four times the SSA average. It is a major exporter of oil, with a population of only 1.5m. Gabon possesses more than 200,000km^2 of forests, as well as extensive deposits of manganese and iron ore which are only just being opened up for exploitation. Rents derived from the oil-sector are substantial, and even though they are very unevenly spread, the contribution of non-oil sectors to GDP is small. The forest sector accounts for less than three percent of GDP (Melhado, 2007; OECD, 2009).

Gabon's forests are part of the second largest tropical ecosystem after the Amazon, namely the Congo Basin, which covers 1.8m square kilometres, stretching across six countries[13]. In Gabon, nearly 85 percent of its total land mass is covered with forests, making it the second most heavily forested country in Africa (FAO, 2005, 2007). Gabon is the seventh largest tropical log producer globally, and the third largest log exporter with a share of 14 percent of total exports in 2007 (FAOSTAT). While Gabon's forests are made up of between 300-400 species, one – Okoumé – dominates. Around 70-80 percent of its forests contain Okoumé, and this species only exists in comparatively smaller volumes in parts of Equatorial Guinea, Cameroon, and the Republic of the Congo (ITTO, 2006; UNEP and WCMC). Okoumé is particularly favoured due to its easy peeling quality, that is when fresh it can be peeled without prior steaming. Between 1987 and 1996, more than 70 percent of log exports were Okoumé (Collomb et al., 2000), but since then this proportion has fallen to around half of total exports (SEPBG, 2009).

Gabon's timber value chain is shown in Figure 13. A small proportion of harvested trees is converted into finished products which are consumed domestically (c). But the overwhelming bulk is exported either directly as logs (a), or as sawn-wood (b.i), veneer sheets (b.ii) or plywood (b.iii). A very small proportion of timber is used to manufacture railway sleepers both for domestic consumption and export.

[13] Cameroon, Central African Republic, Republic of the Congo, Democratic Republic of Congo, Equatorial Guinea, and Gabon.

Figure 13: Domestic Timber Value Chain in Gabon



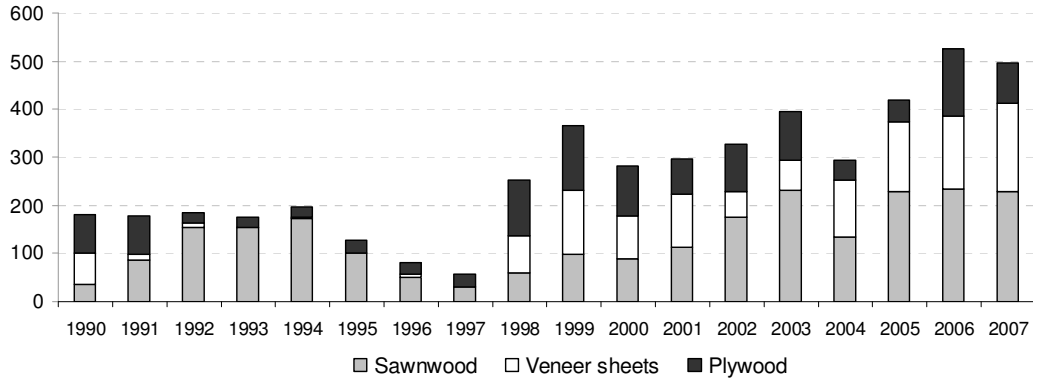
Note: Bold arrows symbolize major raw material and product flows

Until very recently, Gabon's timber sector was unregulated and out of the political focus. But with the growth of environmental concerns about climate change, the timber industry has become a subject of increasing regulation, both within and without Gabon. In the light of decreasing oil production and following pressure from external donors that Gabon regulate this key resource to use it as a primary driver of industrial diversification, the state introduced a sectoral programme for forests, fisheries, and the environment (Programme Sectoriel Forêt, Pêche et Environnement), involving major reforms of the forestry sector (Leigh and Olters, 2006; Söderling, 2006; Wunder, 2003). This included the abolition of the state-owned export monopoly (SNBG) and the introduction of a new legislative framework, the Forestry Code, in 2001. The overall focus shifted from raw material extraction towards the industrialisation of the forestry sector through increasing domestic processing of sustainably-managed forests (Methot and Ndongou, 2009). Inter alia, the Forestry Code involves:

- The re-design of the concessionary allocation system using a closed auction system to increase transparency
- The introduction of new types of concessions, with two types of commercial concessions each with a total maximum surface area and a minimum duration of exploitation
- The reform of the tax system to stimulate local processing capacities, and to promote resource transfers to rural populations
- The introduction of local processing requirements to stimulate the processing of at least 75 percent of wood before exporting by January 2012
- Production quotas are assigned to individual companies and tied to the type of concession.

The setting of explicit targets to deepen processing built on the trajectories of a few large European-owned companies, which had established processing plants to manufacture primary processed wood products during the 1990s. Complemented by the requirements of the 2001 Forestry Code to process logs domestically, this has led to a rapid increase in Gabon's production of sawn-wood, veneer sheets and plywood (Figure 14). Nevertheless, in 2007 the major share of Gabon's timber (87 percent) was exported as raw logs, and on current trends there is little hope of meeting the Forestry Code objective of 75 percent domestic raw material processing by 2012.

Figure 14: Production Volumes of Selected Wood Products in Gabon (in 1,000 m^3)



Source: Authors calculations based on FAO ForesSTAT data accessed November 2009 from http://faostat.fao.org

The external pressures on Gabon's timber industry explicitly targeted two related objectives. The first, exerted by external donors as a direct pressure on the Gabonese government, was designed to promote greater transparency in the management of the forestry sector in order to facilitate the sustainable management of this key global resource and to widen the distribution of benefits from the exploitation of the forests. The second set of pressures were indirect in that they were not aimed directly at Gabon. They involved a series of standards which global buyers set to ensure the sustainable management of the forests and the legality of wood products that they sourced. This, as we will see below, led to a combination of both private and public standards

governing the procurement of wood from Gabon and other sources of tropical hardwoods.

4.2.2. Market Requirements for Gabon's Timber Products

Two distinct export markets can be identified for Gabon's timber products – the EU, particularly France its prior colonial ruler, and China.

The EU

Gabon's timber exporting industry is a "creation" of French industry, reflecting the industrial phase in the Forest Transition trajectory in which northern firms – squeezed out of domestic sources of timber supply – indentified cheap sources of raw material supply in ex-colonies. Timber exports from Gabon to France (the major external market) started with colonial settlements during the 1850s-80s, and persisted after independence when French interests shifted towards mining activities (Wunder, 2003). Over time, total export volumes to France have risen from around 300,000 m^3 in 1989 (from when reliable records are available) to nearly 600,000 m^3 in the peak year of 2002. But, as processing capacities rose in Gabon, these log exports were complemented by exports of sawn-wood, veneers and plywood, jointly reaching a roundwood equivalent of 230,000m^3, exceeding the export of logs to France in 2006 (220,000m^3).

Figure 15: Gabon's Exports of Logs and Processed Wood Products to France (Round-wood Equivalent, in 1,000 m3)

Source: Elaborated from FAO Forestry Trade Flow data accessed November 2009 http://faostat.fao.org, and WRI (2000)

The EU market for timber products saw four important changes after the 1980s. First, the EU's long-term dominance of global wooden furniture exports was eroded, particularly by expanding exports from China. In 1992, Chinese furniture exports were only 14 percent of Italian and 19 percent of German exports (the two leading global furniture exporters). In 2008, Chinese furniture exports were 2.3 times those of Italy and 2.6 times those of Germany (calculated from UN Comtrade Database). Second, as wage levels rose in the EU, so the competitiveness of its wood processing industries fell in comparison to low income economies, who at the same time had developed their capabilities significantly in these processing sectors. This led to a

migration of wood processing activities out of high income economies as the timber furniture value chain extended. Third, governments became increasingly aware of health and safety, and regulations were instituted in many sectors to ensure higher levels of safety for consumers. Finally, the growth of per capita incomes led to greater consumer concerns with the environment and with ethical standards in value chains. In the timber sector, organisations such as the World Wildlife Fund and Friends of the Earth increasingly exerted pressure on producers to promote biodiversity and sustainability in forestry (Gulbrandsen and Humphreys, 2006; Stringer, 2006).

The growing prevalence of these standards in the EU market is reflected in Box 4 which summarises the major trends in Europe with regard to the preferences of buyers in their purchasing of timber and the standards governing access to EU markets.

Box 4: Standards Governing Access to EU and Other OECD Markets

Three sets of standards affect the entry of timber products into high income markets such as those in the EU.

The critical success factors of buyers
Importers acquire timber as a raw material or as an intermediate product for processing in other sectors. They trade-off a series of critical success factors, the most prominent of which for logs are price, volume, quality, species and environmental compliance. For processed wood, the dominant critical success factors are price, volume, quality, product specifications, and environmental considerations.

Industry-specific standards
Responding to concerns from civil society, two major sets of standards have emerged to protect forest ecosystems and the sustainability of forest resources. European, buyers increasingly require legality certification. In particular OLB (*Origine et Légalité des Bois*) certifies that the particular logging company is the legal owner of the concession and has the right to sell the specified logs. This includes verifying that the concession-holder has met its statutory obligations such as paying all relevant taxes. Legality certification is increasingly under the umbrella of the EU FLEGT programme (Forest Law Enforcement, Governance and Trade), whose primary main aim is to eradicate illegal timber trade.

Sustainability certification is designed to promote the sustainable use of forests. The primary standard here is the Forest Stewardship Council (FSC) scheme, which provides the systematic recording of sustainable production standards, and a chain of custody certificate tracing timber all the way through the value chain and has wide-ranging requirements including the protection of the rights of indigenous peoples. The ISO 14000 standards are also protective of the environmental impact of the timber value chain.

Public standards
Public standards are mandatory and affect health and safety concerns in the timber value chain. These technical features are, for example, covered by formaldehyde emissions arising from the adhesives used to produce plywood, chemicals used in the production of medium-density fibreboards or pollution from paint. Phytosanitary requirements ensure that "the producer has been capable of cleaning, sanitizing, sterilizing or by other means to render the offered commodity free from unwanted dirt, seeds, pests or germs" (Tissari, 2009:3). In case of sawnwoods, the cut edges are therefore treated with a special paint to prevent both infestation as well as decay. Other technical standards are building codes, and product testing requirements (Pro Forest, 2009; Sun et al, 2008).

Increasingly, where a government agency is the direct procurer of wood and wood products, EU countries have set Green Public Procurement Standards (GPP) for suppliers

China:
China is a relative wood-resource poor country with a low forest per capita density (0.13 ha relative to a world average of 0.65). Additionally, many of its forests reserves were depleted due to extensive logging beginning in the late 1950s (Démurger, Yuanzhao, and Weiyong, 2007). This has led to the

Chinese government imposing logging restrictions in an attempt to stop further deforestation and environmental degradation (Bowyer, Howe, Guillery, and Fernholz, 2004; White et al., 2006; Zhang and Gan, 2007). At the same time, Chinese industry was making increasing use of wood in its furniture and wood panel industries, as well as in its massive housing and infrastructure investments (Section 3.1 above). Chinese government officials reported an estimated gap of 140-150 million cubic meters in 2006 alone (Canby, Hewitt, Bailey, Katsigris, and Xiufang, 2008).

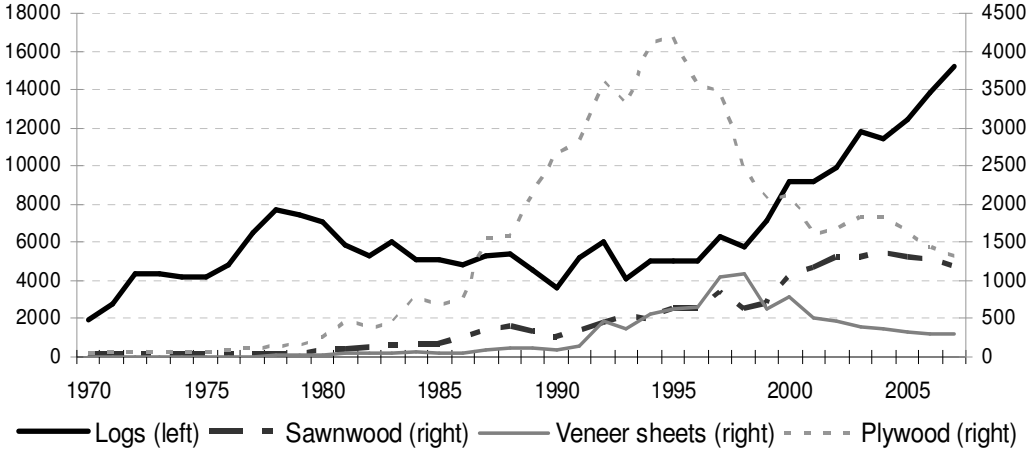
China's demand for wood has thus grown rapidly. But at the same time, its competences in wood using industries have also expanded (Table 12), so that the shortfall in supply translated into the imports of logs, as opposed to processed wood. This is evident from Figure 16 which whilst documenting a gradual increase in sawn-wood imports, is most remarkable for the decline in the volume of imports of both veneer sheets and plywood, and a very rapid increase in imports of raw, unprocessed logs. China used to import plywood in the past but became a net exporter after 2001 (Adams and Ma, 2002; Changjin et al., 2008; Kozak and Canby, 2007; White et al., 2006). However, though having developed rapidly over the past decade the Chinese wood processing industry is still not as advanced as their Northern counterparts. Consequently, whereas the North has the technology to process wood of smaller diameter and with differing wood fibre characteristics (for example, plantation wood grown in temperate climates), Chinese industries are believed to continue to demand large diameter logs from first/second growth natural forests (grown in sub-tropical and tropical climates) (Bowyer et al., 2004).

Table 12: China's Growing Share of Global Exports in Timber Processing Industries (1992/2008)

Product	1992	2008
Furniture	2.7	24.7
Veneer	0.7	0.1
Plywood	0.2	0.2
Fibreboard	0.5	11.4

Source: UN COMTRADE, accessed 17 December 2009

Figure 16: China's Imports of Logs and Selected Wood Products (1,000 m^3)



Source: FAO ForesSTAT data accessed November 2009 from http://faostat.fao.org

But whilst China's demand for timber products has grown, there has been little evidence of market access being governed by the sorts of standards affecting Gabon's exports of timber to the EU. Instead, given the large number of companies, low barriers to entry and exit, little product differentiation, competition in the Chinese wood processing value chain is intense often leading to an erosion of profit margins. Many processing mills are thought to survive only due to state subsidies such as value-added tax rebates (Changjin et al., 2008; TFT, 2007). With the exception of some large foreign enterprises or joint ventures, wood processing companies largely follow a low-cost/low-price competitive strategy with a focus on quantity rather than quality. For example, furniture and other wood products are usually of low-to-medium quality (Castaño, 2002; Changjin et al., 2008).

There are few signs that Chinese civil society is exerting the sorts of pressures evident in northern countries where NGOs actively lobby to ensure high environmental standards in the timber value chain. There is compelling evidence that a significant (but unknown[14]) share of Chinese log imports are "illegally sourced"[15], including from Gabon (Environmental Investigation Agency, 2005; ITTO, 2005; Stark and Cheung, 2006). It is widely argued that China is at the centre of illegal log trade and processing (Global Timber, 2009; Greenpeace, 2005; Katsigris et al., 2002; White et al., 2006)[16]. Insofar as the Chinese market shows any distinctive preferences for wood products, consumers appear to like dark wood characteristics, as do Indian consumers. Chinese producers favour Okoumé (a variety with which Gabon is particularly

[14] The share of illegally sourced logs of total log trade volumes is estimated to be around ten percent (Environmental Investigation Agency, 2005).

[15] Illegal logging occurs when timber is harvested, transported, bought or sold in contravention of national laws (EIA and Greenpeace retrieved from the world wide web, August 2009)

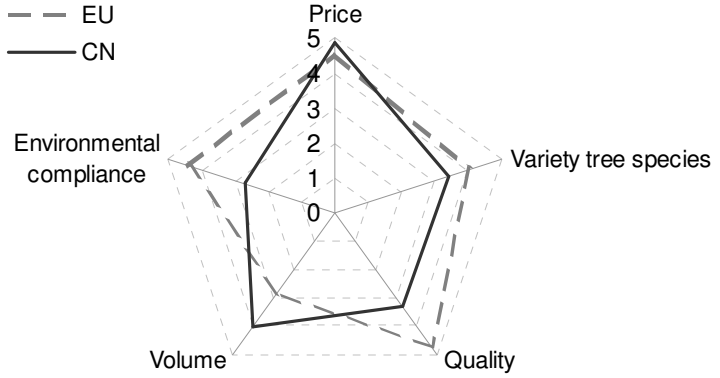
[16] "China's sources for hardwood log imports reads like a who's who of countries with problems with illegal logging" (EIA, 2005:3)

well-endowed and whose fibre characteristics make it ideal for peeling), and darker hardwoods. This contrasts with European preferences for lighter-coloured woods.

EU and China market comparison

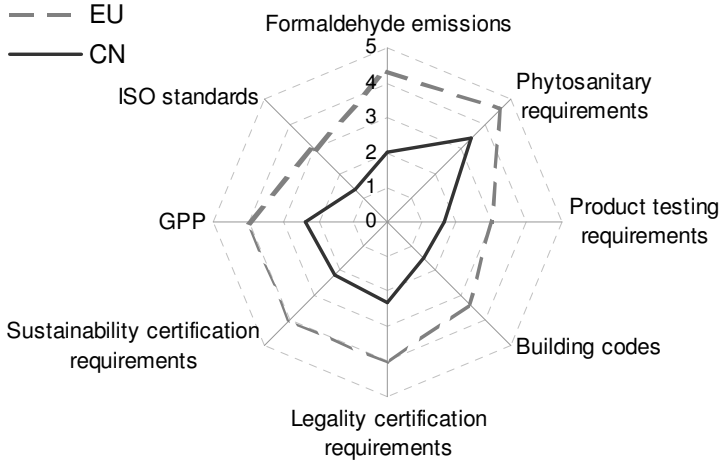
This contrast between the drivers of consumption and the determinants of market access in the EU and China surfaces in the preferences of global buyers operating in Gabon. Buyers from China tend to place a premium on low price and large volumes. They are generally less concerned with specific varieties than are the EU buyers, and also show particularly low preferences for environmental compliance and the quality of the logs, which they are purchasing (Figure 17). Specifically with respect to environmental standards, Chinese buyers make very few demands from Gabonese suppliers, particularly in comparison to EU buyers (Figure 18).

Figure 17: European and Chinese buyers' requirements – wood logs (1=not important; 5=very important)



Source: Interviews with producers and key industry informants in Gabon

Figure 18: EU and Chinese buyers' requirements –international regulations and standards (1=not important; 5=very important)*



Source: Interviews with producers and key industry informants in Gabon
Note: * See Box 4 for details of standards

Changes in market destination of Gabon's timber exports

From Gabon's perspective, the evolution of the EU and the Chinese markets has had major consequences for the direction and nature of its timber exports. Beginning with the direction of exports, China (and India) have now become the dominant global importers of tropical hardwoods as EU economies have moved to the imports of processed woods and have become increasingly concerned about the sustainability of global hardwood reserves. Between 1990 and 2007, China's share of global imports rose from 14 percent to 68 percent (and India from five percent to 17 percent), whilst the share of all OECD economies collapsed from 78 to 11 percent (Table 13). With 1990 as the base-year, in 2007 China's imports of tropical hardwood had more than quadrupled in volume terms; in the same period, EU and wider OECD imports had fallen by more than 90 percent.

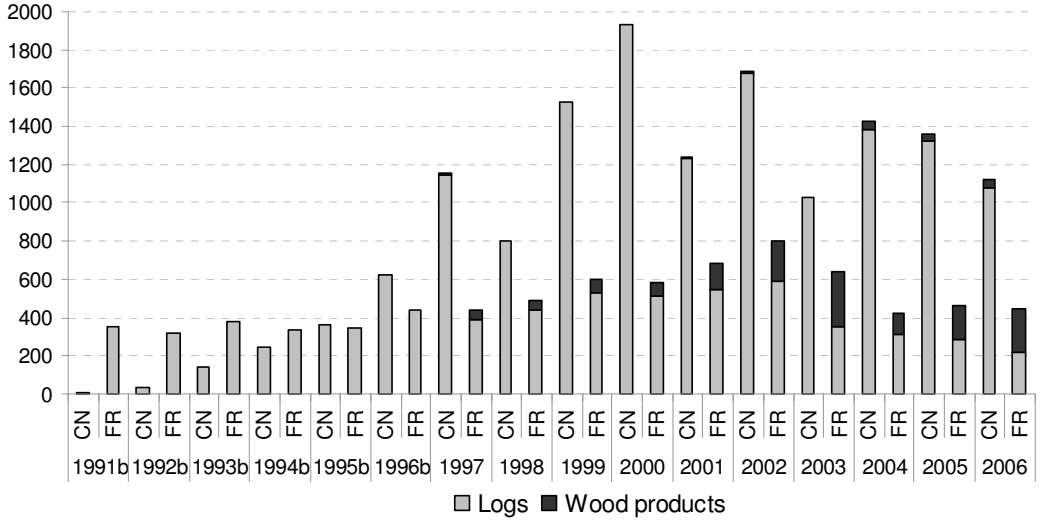
Table 13: Share of Global Tropical Log Importers for Selected Countries

1990		**1997**		**2007**	
Japan	39.5%	Japan	32.3%	**China**	**68.2%**
Korea, Rep.	16.1%	**China**	**29.2%**	India	17.2%
China	**13.9%**	Korea, Rep.	6.5%	Japan	3.8%
Thailand	8.1%	India	5.5%	France	2.1%
India	4.7%	Thailand	4.5%	Thailand	1.3%
France	3.6%	France	3.7%	Spain	0.9%
Italy	2.9%	Philippines	3.7%	Korea, Rep.	0.8%
Portugal	2.1%	Norway	2.2%	Italy	0.8%
Spain	2.0%	Pakistan	1.9%	Turkey	0.7%
Germany	1.4%	Portugal	1.8%	Portugal	0.6%
OECD	**78.29%**	**OECD**	**53.23%**	**OECD**	**10.99%**

Source: FAO ForesSTAT data accessed November 2009

This is reflected in the destination of Gabon's timber exports. China became a significant importer of Gabon's timber in the mid-1990s (Figure 19). In volume, Chinese imports of the round-wood equivalent of sawn-wood, veneers and plywood is currently more than three times those of French imports (Figure 19), but in value, China imports roughly the same value of timber products from Gabon. The difference between value and volume shares is accounted for by the fact that, as will be shown below, the Chinese market is almost exclusively a market for unprocessed logs, whereas an increasing (albeit still small) share of the EU market is serviced by processed timber products which has a higher unit value. Despite being the dominant importer of Gabon's timber by volume, China's dominance in Gabon's timber trade is a little atypical of the global picture where its share of imports is even higher. The high relative share of France in Gabon's exports reflects its close historical links with France and the long presence of French timber companies operating in Gabon.

Figure 19: Chinese and French Tropical Wood Product Import Structures from Gabon – Log and Wood Product Volumes (in 1,000 m^3 RWE)*



Source: FAO Forestry Trade Flow Data accessed October 2009, http://faostat.fao.org

* The calculation of the round-wood equivalent uses the following conversion factors, based on the responses of firms in Gabon. For EU: the sawn-wood ratio is 2.5:1, for, veneer sheets 1.82:1, and for plywood 2.3:1. For China: the sawn-wood ratio is 2.05:1 (reflecting lower quality requirements of buyers). Veneer sheets and plywood have the same conversion factor as in exports to the EU.

4.2.3. Consequences

What have been the consequences for Gabon of the shift in the market for its timber exports, and what are the implications for the trajectory of its timber industry? Two major developments can be noted - the nature and extent of standards imposed on producers, and the accretion of value added to harvested logs

Standards

Bluntly-speaking, the transition in market destination has led to a collapse in the standards required of producers (Figure 20). These standards have important implications for capability-building. Greater demands for quality require enhanced skills and the capacity to improve quality over time. Instead, Gabonese timber suppliers can basically sell any timber product to China, irrespective of the quality of cutting, sawing or finishing, as long as the price is low and volumes are large. Environmental standards which influence health and safety in the treatment of forest products are an important safeguard for the welfare of the workforce. Certification of logs helps to ensure that the sustainability of the forests are maintained, and environmental certification such as FSC accreditation helps to maintain biodiversity and to promote social cohesion. Virtually none of these standards apply to products exported to China; virtually all apply to products exported to the EU.

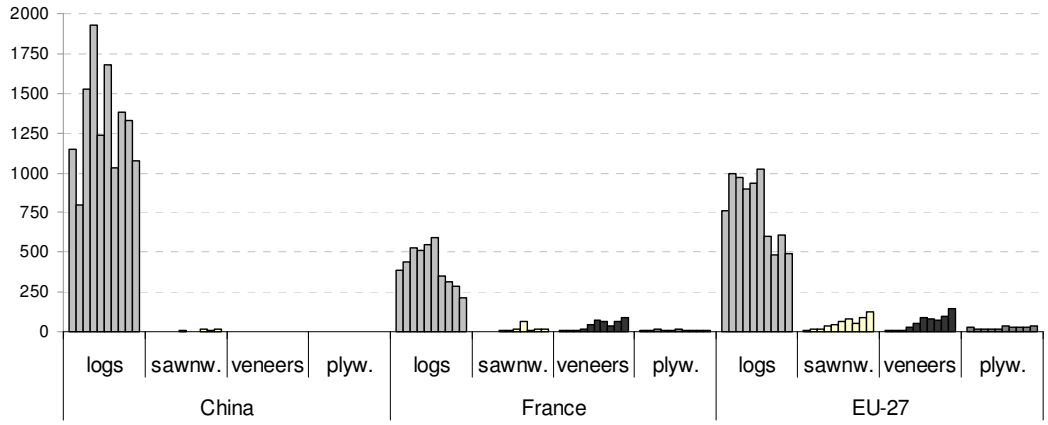
Figure 20: Summary of Preferences and Buyer Standards of Chinese and EU Buyers of Gabon Timber Products

	Chinese Buyers	EU Buyers
Critical Success Factors in Purchasing Decision		
Stage of processing	logs	logs and processed wood
Species variety	wide range, limited selection	narrow range, selective
Quality	medium	High
Volume	large	Small
Product specifications (eg cut specificity)	moderate importance	important, intricate
Price	critical	critical
Environmental compliance	minor importance	important
Industry-Specific and Public Standards		
Formaldehyde emissions	not important	important
Phytosanitary certificate	basic entrance criteria	important
Building codes	not important	moderate importance
Product testing requirements	not important	moderate importance
Labour standards	not important	moderate importance; few applications
Legality certification	not required	important, OLB dominates
Sustainability certification	not required	important, FSC dominates
green public purchasing	minor importance	important; few applications
ISO 14001	not required	moderate importance

Value added

A combination of factors, particularly the growth of its own wood processing industries have led to China almost exclusively importing raw logs, In addition, China's low wages and lax environmental regulations mean that it is a direct competitor to Gabon's processing industry in a way which is not true for the EU where high wages make for uncompetitive processing in labour intensive industries which are often also polluting. Whilst the bulk of Gabon's timber is still exported as raw logs, in recent years Gabonese producers have begun to export an increasing volume of sawn-wood, veneers and plywood. This can be seen from Figure 21 (which underestimates the value of this shift in export composition, since it reflects export volumes rather than export value, - the unit price of processed wood is higher than that of unprocessed logs) where it is evident that China shows little inclination to import either veneers or plywood.

Figure 21: Log and Wood Product Demand Distribution for China, France and EU-27 Countries - Volume in 1,000 m^3 (1997-2006)



Source: AT based on FAO Forest Trade Flows data accessed November 2009

The development impact: factor utilisation

Since one of the major consequences of a shift in the final market from the EU to China is that the degree of processing falls, what are the consequences of this for factor utilisation in the Gabonese economy? Table 14 simulates factor utilisation if the same quantity of wood is exported in the form of logs, sawn-wood, veneer sheets and plywood. It calculates the resultant earnings of foreign exchange, and the derived utilisation of labour and capital, taking into account processing loss in the conversion of logs, as well as the unit-prices in global markets in 2006. It is necessarily a crude exercise, but nevertheless, the exercise does throw some light on the developmental consequences of alternative uses of forest resources, as reflected in different destinations of final markets.

It is evident from this that there is a substantial gain in employment to be achieved by the downstream processing of logs into sawn-wood, veneer and plywood. Employment is more than doubled if the logs are converted into sawn-wood, trebled with the extension to producing veneer sheets, and quadrupled if these veneer sheets are then incorporated in the production of plywood. Foreign exchange earnings are also enhanced with further processing, by 25 percent in the case of veneer and 12 percent in the case of plywood. However, this is not the case with regard to sawn-wood. Here there is a value and foreign exchange loss in processing since the Gabon sawmill industry is inefficient and has low conversion rates. Veneer firms also lose money in processing. The reason why firms invested in sawmilling and veneer production is purely a function of the Forestry Code where firms who were unable to afford the high capital entry costs into the production of plywood and/or veneer, deepened value added in the expectation of meeting the 2012 Forestry Code target. These loss-making firms manage to stay in production, due to the profits earned through their log exports (Table 14). This augmentation of value, employment and foreign exchange earnings through processing come at a very considerable cost of capital, particularly in the production of plywood and veneer, and comprises a major obstacle for local firms in meeting the Forestry Code's 2012 target.

Table 14: Gabon Log Output Channelled into a Single Chain (at Gabon Wood Utilisation Rates), Assuming Input of 3,400,000m^3 logs[a]

	Logs	Sawn-wood	Veneer Sheets	Plywood
Output real ('000m^3)[b]	3,400	1,380	1,870	1,480
Foreign exchange[c]	1,188	758	1,480	1,329
Employment (incl employment in earlier stages of processing)[d]	6,299	16,967	19,389	34,951
Capital cost *($1,000)* [e]	39,500	43,800	455,000	754,000
Producer margins (fob value minus cost) (indexed to ex-forest cost of log)	107	-28	-23	23

Source:

Notes:
[a] Gabon log production volume rounded average for 2003-2007
[b] Converted using wood utilisation rates in meeting EU buyer requirements regarding species and product specifications, i.e. 2.5:1 (EU sawn-wood), 1.82:1 (veneer sheets) and 2.33:1 (plywood)
[3] Species weighted average using 2006 prices based on (UNCTAD) (Okoumé logs, sawn-wood, and plywood), (ITTO, 2009) (average hardwood log prices Central African species, own calculations), and (FAOSTAT) (veneer sheets export unit price, own calculations)
[4] Own calculations based on fieldwork data collected November 2008–March 2009
[5] Own calculations based on 2003 capital depreciation costs across chains as stated in (Odyssée Développement, 2005) converted into US$ using average 2003 exchange rate (http://data.un.org); excluding environmental costs such as consultancy and certification fees.

Equally concerning from a developmental perspective is the competitiveness of Gabonese producers at various points in the timber value chain. It is clear that Gabon possesses a significant resource rent in tropical hardwoods in general and Okoumé in particular. Table 14 shows that the fob price of a log is approximately double that of the cost of extraction, However, at current prices, and with current levels of processing efficiency the surplus generated in plywood manufacture is much smaller, both as an absolute sum and as a proportion of costs. And at current prices, all of the resource rents are dissipated – indeed more than dissipated – if logs are sawn or transformed and exported as veneer. Thus, the "retrograde" transition from processed to raw timber reflected in the shift from the European to the Chinese market may arguably be developmentally positive, at least in terms of static comparative advantage and at current prices.

But neither of these two conditions are a "given". With appropriate policy support and in competitive markets, it is possible that processing efficiency in Gabon's timber value adding sectors (especially in sawmills) could be improved. Moreover, it is also possible that Chinese producers will increasingly have to internalise some of the environmental costs which are currently not reflected in timber prices and the prices of processed wood products. This may lead to an increase in the relative price of sawn-wood,

veneer and timber which will enable Gabonese producers to appropriate a larger portion of its timber rents in the processing stages of the timber and wood products value chain.

5. IMPLICATIONS FOR POLICY

To briefly summarise the discussion in earlier sections, we began in Section 1 by observing that although supply imperatives and capability building are critical to the development agenda, less attention has been given to the role which demand plays in the evolution of capabilities, particularly in global value chains. These demand factors include not just the size and rate of growth of demand but also the characteristics of demand. In addition, how producers are inserted into different types of markets will also determine the nature and the extent of capabilities which are developed.

In Section 2 we reflected on the nature of the post 2008 financial and economic crisis and the likely trajectory of the global economy. Even without stagnation and falling growth rates in the north, the growth rates of the past two decades in China and India are likely to lead to an outcome in which , by virtue of their size, they increasingly come to dominate the global economy in the 21st century. However, there are persuasive reasons to believe that key large northern economies (notably the US, the UK and Spain) will reduce imports as they rebalance their global orientation, given their large structural trade and fiscal deficits. This will further accentuate the dominance of China, India and other low income economies in the growth of global demand in the coming decades.

This change in the drivers of global demand – from northern to southern economies – will, by hypothesis, have four major sets of implications for global value chains in the south (Section 3). This is because of the particular characteristics of demand in China and India. First, low levels of per capita incomes, coupled with rapid urbanisation and the growth of exchange as their economies become more diversified, will lead to a sustained growth in their demand for both hard and soft commodities, both as a source of food and as inputs into infrastructure. Second, low levels of per capita incomes mean that the nature of demand will be for cheap, undifferentiated goods with low acquisition cost, running against the major trends in demand in northern economies after 1970 which increasingly favoured differentiated, high quality positional products. Third, the standards-intensity of global value chains feeding into northern economies has grown significantly and has become much more complex and demanding in recent decades. By contrast, global value chains feeding southern markets are likely to have much levels of standards, both in relation to products and processes. And, fourthly, northern and southern economies are often complementary in terms of economic structures. Northern economies have much high wages costs and are very much more sensitive to the harmful externalities of polluting economic activities than are southern economies, and have increasingly outsourced processing to developing economies. By contrast, low income producing countries have similar economic structures and industrial trajectories to low

income economy consuming economies, with the prospect of greater competition in the division of labour in global value chains.

These hypotheses on the likely outcome for southern economies as the demand driver switches from the north to the south were evidenced with regard to two global commodity value chains in Section 4. The first of these hypotheses concerned the fact that Chinese (and increasingly Indian) demand would significantly augment the market for commodities. In both cases this is indeed what has happened. In the cassava sector, Chinese demand for food and energy has led to a derived demand for cassava, substitute for a rapidly declining EU market. In Gabon's case, northern demand for tropical logs has collapsed, whilst Chinese demand has mushroomed. The second of our general hypotheses is not as clearly reflected in the cassava sector, but is clearly the case in timber. Northern importers are focused on a narrow range of species, and buyers are much more demanding on log specifications, variety and quality than are Chinese buyers (who basically want large volumes at a low price).

The third of our hypotheses was that value chains feeding into a southern market are much less likely to be standards-intensive than those feeding into northern markets. This is very clearly evidenced in the timber sector, both in relation to government-imposed standards focusing on health and safety and for civil-society induced standards focusing on the environment. Cassava production is less standards-intensive but here, too, there is clear evidence that the move from a northern to a southern market leads to a significant reduction in the standards-intensity of value chains.

Finally, with regard to the move from a win-win north-south division of labour to a win-lose south-south division of labour, we observed similar trends in both Thailand's cassava value chain and Gabon's timber value chain. The change in final market from the EU to China effectively wiped out a key value added link in the Thai cassava value chain as Chinese demand for raw chips substituted for EU demand for processed pellets. On the other hand, China also increased its demand for starch imports from Thailand, starch having a higher level of value added than either cassava chips or pellets. However, within starch, Chinese firms are seeking to command the higher value added and more technologically demanding niches, relegating Thai firms to the production of simple native starches. A similar story can be told for Gabon, where the Chinese market only demands unprocessed logs, whereas exports to the EU have increasingly comprised logs processed into sawn-wood, veneers and plywood. This clearly evidences the competitive nature of industrial trajectories in southern trading economies which are more likely to have win-lose outcomes in specialisation than in the case of win-win trade with northern economies.

So what are the wider implications of these findings? First, the growth implications are mixed and somewhat analogous to those associated with declining barter terms of trade. That is, the unit value added/price of commodity exports to China may fall, but augmented demand may increase total export incomes. Similarly, the challenge facing commodity exporters

forced down the value added chain as Chinese demand grows is similar to that faced by developing country exporters in general who specialised in static dynamic comparative advantage. In this case, incomes may grow, but at the cost of falling capabilities. Chinese demand appears to force both the Thai cassava and the Gabon timber sector into low technology, low skill niches in their chains. This is reinforced by the lower requirement for standards in these value chains. Although standards also have their negative side – see below – they are promoting of managerial and skill competences in production. Another positive consequence of standards in production is that they most often reflect the need to compensate for non-price externalities arising in production (for example, the loss of biodiversity) rather than just embodying ethical concerns (for example, in relation to minimum wages or child labour).

A further negative consequence of trade with China, India and other southern economies is that insofar as it involves lower degrees of value added, there will be a loss in employment and, in some cases, in investment surpluses.

On the other hand, the substitution of a southern for a northern driver of demand has many advantages for low income countries and for participants in their value chains. Particularly in the context of sustained economic crisis in the north, it provides a dynamic and particularly rapid source of demand, allowing exporting economies and firms to reap scale economies and to reduce their costs. And, insofar as their previous trajectory may have been costly (as is arguably the case in Gabon's timber industry where industrial ambitions may be forcing the country to waste its resource rents in inefficient processing), being forced back into comparative advantage through trade with China and other southern economies may provide unintended benefits. Further,. It is not axiomatic that all standards are developmentally beneficial in the context oof low per capita incomes. The trade-offs in terms of lost employment and value added may be too high, for example, to justify the higher safety standards driving much legislation in the north or indeed to meet the ethical concerns of northern civil society. Finally, there will be complex and differentiated implications for different participants in southern value chains. For example, small firms and farmers who are currently largely excluded from participating in global value chains by the need to encompass high standards in their production for northern markets, may now find that these barriers to entry are removed.

…

REFERENCES

Adams, M., and H.O Ma, (2002). *ITTO Tropical Forest Update: China's plywood industry takes off*. Yokohama: International Tropical Timber Organization.

Anderson K. and C.Y. Peng (1998), 'Feeding and Fueling China in the 21st Century', World Development, Volume 26, Number 8, August 1998 , pp. 1413-1429.

Auty, R. (2008), 'Natural Resources and Development', in Amitava Krishna Dutt and Jamie Ros (eds.), *International Handbook of Development Economics* (1; Cheltenham UK: Edward Elgar).

Bazett, M. (2000), Long-Term Changes in the Location and Structure of Forest Industries, World Bank/WWF.

Bessant, J., R. Kaplinsky and R. Lamming (2003),"Putting supply chain learning into practice", International Journal of Production Management, Vol. 23, No. 2, pp167-184.

Bowyer, J. L., Howe, J., Guillery, P., and Fernholz, K. (2004), Trends In The Global Forest Sector and Implications for Forest Certification, Dovetail Partners, INC.

Canby, K., Hewitt, J., Bailey, L., Katsigris, E., and Xiufang, S. (2008), Forest Products Trade between China and Africa: An Analysis of Import and Export Statistics, Washington, DC: Forest Trends.

Canning, D. (1999), 'Infrastructure's Contribution to Aggregate Output ', World Bank Policy Research Working Paper, 2246, Washington: World Bank.

Castaño, J. (2002). The Booming Furniture Industry in China. Bois et Forêts des Tropiques,, *277*(3).

Changjin, S., C. Liqiao, C. Lijun, H. Lu, and S. Bass, S. (2008), Global Forest Product Chains - Identifying challenges and opportunities for China through a global commodity chain sustainability analysis, Manitoba: International Institute for Sustainable Development.

Chenery, H. and M. Syrquin (1975), Patterns of Development 1950 -1970, London: Oxford University Press.

Collomb, J.-G., J.-B. Mikissa, and S. Minnemeyer (2000), A First Look at Logging in Gabon, Washington, DC: World Resources Institute.

Conceição, P. and R. U. Mendoza (2009), 'Anatomy of the Global Food Crisis', Third World Quarterly, 30 (6), 1159 - 82

Conceição, P., R. U. Mendoza, and U. Ronald (2008), 'A Preliminary Anatomy of the Unfolding Global Food Crisis (Draft)', accessed October 2009.

Cusumano M. A. (1985), The Japanese Automobile Industry: Technology and Management at Nissan and Toyota, Cambridge, Mass.: Harvard University Press.

Démurger, S., H. Yuanzhao, and Y. Weiyong, (2007), Forest management policies and resource balance in China: an assessment of the current situation, Groupe d'Analyse et de Théorie Economique.

Environmental Investigation Agency. (2005), Chinese Involvement in African Illegal Logging and Timber Trade, Washington, DC: US House of Representatives, Committee on International Relations, Subcommittee on Africa, Global Human Rights and International Operations.

Fang, C. J. and Beghin (1999), 'Food Self-Sufficiency, Comparative Advantage, and Agricultural Trade: A Policy Analysis Matrix for Chinese Agriculture', Staff General Research Papers 1627, Iowa State University, Department of Economics.

FAO (2008), Food Outlook November 2008,

FAO (2007), State of the World's Forests 2007, Rome: Food and Agriculture Organization of the United Nations.

FAO (2005), Global Forest Resources Assessment 2005 - Progress towards sustainable forest management, Rome: Food and Agriculture Organization of the United Nations.

Farooki, M. Z. (2009), The Southern Engine of Growth and Hard Commodity Prices: Does China Lead to Disruptive Development?, PhD Dissertation, Development Policy and Practice, Milton Keynes: Open University.

Farrella, E. P., E. Führer, D. Ryana, F. Andersson, R. Hüttl, R., and P. Piussi, (2000), "European forest ecosystems: building the future on the legacy of the past", Forest Ecology and Management*, 132*, 5-20.

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

Gale, F. and K. Huang (2007), 'Demand for Food Quantity and Quality in China', Economic Research Services, United States Department of Agriculture.

Gereffi, G. (1994), "The Organization of Buyer-Driven Global Commodity Chains: How U. S. Retailers Shape Overseas Production Networks", in G. Gereffi and M. Korzeniewicz (eds.), Commodity Chains and Global Capitalism, London: Praeger.

Global Timber (2009). Info: China. Retrieved August, 2009, from http://www.globaltimber.org.uk

Goldman Sachs Global Economics Group (2001), BRICS and Beyond, http://www2.goldmansachs.com/ideas/brics/book/BRIC-Full.pdf

Grainger, A. (1995). The forest transition: an alternative approach. Area, 72(3), 242-251.

Gulbrandsen, L. H., and D. Humphreys (2006), International Initiatives to Address Tropical Timber Logging and Trade The Fridtjof Nansen Institute.

Holland, D., R. Barrell, T. Fic, I. Hurst, I. Liadze, A. Orazgani and R. Whitworth (2009), "Consumer Spending and the Financial Crisis." National Institute Economic Review 210, pp. 9 -15.

Humphrey, J. and H. Schmitz, (2001), "Governance in Global Value Chains", in G. Gereffi and R. Kaplinsky (eds.), IDS Bulletin Special Issue on The Value of Value Chains, Vol. 32, No. 3, pp. 19-29.

Humphreys, D. (2006), Logjam: Deforestation and the crisis of global governance, London: Earthscan Publications Ltd.

IMF (2009). Beyond 2010: How Will the Global Economy Rebalance? World Economic Outlook. Washington, IMF.

ITTO Tropical Forest Update (2002*): China's Plywood Industry Takes Off*. Yokohama: International Tropical Timber Organization.

ITTO (2005), ITTO Mission in support of the efforts by the Government of the Gabonese Republic to achieve the ITTO 2000 Objective and Sustainable Forest Management [Decision 2(XXIX)]. Yokohama: International Tropical Timber Organization.

ITTO (2006), Status of Tropical Forest Management 2005: Gabon country profile, Yokohama: International Tropical Timber Organization.

ITTO (2009), Annual Review and Assessment of the World Timber Situation 2008, Yokohama: International Tropical Timber Organization.

Jorgenson, A. K. (2008). Structural Integration and the Trees: An Analysis of Deforestation in Less-Developed Countries, 1990–2005, The Sociological Quarterly, 49*,* 503–527.

Kaplinsky, R. (1994), Easternisation: The Spread of Japanese Management Techniques to Developing Countries, London: Frank Cass.

Kaplinsky, R. (2005), Globalisation, Poverty and Inequality: Between a Rock and a Hard Place: Cambridge: Polity Press.

Kaplinsky, R. (2006), "Revisiting the Terms of Trade Revisited: Will China Make a Difference?", World Development, (Vol. 34, No. 6, pp. 981-995)

Kaplinsky, R. (2009), "China and the Terms of Trade: The Challenge to Development Strategy In SSA", in E. Paus, P. Prime and J. Western (eds), Global Giant: Is China Changing the Rules of the Game?, Palgrave Macmillan

Kaplinsky, R. and D. Messner (2008), "Introduction: The Impact of the Asian Drivers on the Developing World", World Development Special Issue on Asian Drivers and their Impact on Developing Countries, Vol. 36, No. 2., pp. 197-209.

Kaplinsky, R. and M. Morris (2001), A Handbook for Value Chain Research, http://asiandrivers.open.ac.uk/documents/Value_chain_Handbook_RKMM_Nov_2001.pdf

Kaplinsky, R., M. Morris and J. Readman (2002), "The Globalisation of Product Markets and Immiserising Growth: Lessons from the South African Furniture Industry", World Development, Vol. 30, No. 7, pp. 1159-1178

Katsigris, E., Bull, G., White, A., Barr, C., Barney, K., Bun, Y., et al. (2002), The China Forest Products Trade: Overview of Asia-Pacific Supplying Countries, Impacts, and Implications, Forest Trends.

Kauppi, P. E., Ausubel, J. H., Fang, J., Mather, A. S., Sedjo, R. A., and Waggoner, P. E. (2006), "Returning forests analyzed with the forest identity", PNAS, *103* (46), 17574–17579.

Kharas, H. (2009), "The Emerging Middle Class in Developing Countries", Working Paper, OECD Development Centre, Paris.

Kozak, R., and K. Canby, K. (2007), Why China Prefers Logs - Explaining the Prevalence of Unprocessed Wood in China's Timber Imports, Washington, DC: Forest Trends.

Krugman, P. (2009), "How Did Economists Get It So Wrong?", New York Times, http://www.nytimes.com/2009/09/06/magazine/06Economic-t.html

Kuznets, S., (1966), Modern Economic Growth, New Haven CT: Yale University Press.

Leigh, D., and J.-P. Olters, (2006), Natural-Resource Depletion, Habit Formation, and Sustainable Fiscal Policy: Lessons from Gabon, Washington, DC: International Monetary Fund.

Macquarie Commodities Research (September 2008), Overview of Commodities Outlook with focus on copper, zinc and coking coal, (Macquarie Capital Securities).

Mather, A. (1992), The forest transition, Area, *24*(4), 367-379.

Mather, A. (2001), "Forests of Consumption: Post-productivism, post-materialism, and the post-industrial forest", Environment and Planning C: Government and Policy, *19*(2), 249 – 268.

Mather, A., and C. Needle (1998). The forest transition: a theoretical basis. Area, *30* (2), 117-124.

Mather, A., and C. Needle (1999) Development, democracy and forest trends. Global Environmental Change, *9*, 105-118.

Media Eghbal (2008), 'BRICS Economies Withstand Global Financial Crisis', Euro-monitor International from National Statistics.

Melhado, O. (2007), Optimal Taxation in the Forestry Sector in the Congo Basin: The Case of Gabon, Washington, DC: International Monetary Fund.

Methot, P., and A. Ndongou (2009), Atlas Forestier Interactif du Gabon. Washington, DC: World Resources Institute. New York, Oxford University Press.

Nilsson, S. (1999), Do We Have Enough Forests?, International Union of Forestry Research Organizations.

Odyssée Développement. (2005), *Étude de la contribution du secteur forestier à l'économie gabonaise*, Agence Française de Développement.

OECD (2009), African Economic Outlook 2009: Country Profile Gabon. Paris: Organisation for Economic Co-operation and Development.

Office of Agricultural Economics (2006), A Study on the Export Potential of Thai Cassava Chips Export to China after Thailand-China Free Trade Agreement (translated from Thai), Agricultural Economic Research No. 114, Ministry of Agriculture and Cooperatives: Bangkok

Pine, J. B. (1993), Mass Customization: The New Frontier in Business Competition, Cambridge, Mass: Harvard Business School Press.

Piore M. J. and C. Sabel (1984), The Second Industrial Divide: Possibilities for Prosperity, N. York: Basic Books.

Prahalad, C. K. (2005), The Fortune at the Bottom of the Pyramid: Eradicating Poverty through Profits, Upper Saddle River, NJ: Pearson Education/Wharton School Publishing.

Pro Forest (2009). Guidance on effective ways to work with Chinese officials and suppliers. Oxford: ProForest

Roonnaphai, N. (2006), "Pathways out of Poverty through Cassava, Maize and Soybean in Thailand", CAPSA Working Paper No. 93, UNESCAP: Bangkok

Rudel, T. K., O.T. Coomes, E. Moran, F. Achard, A. Angelsen and J. Xu, J. (2005), "Forest transitions: towards a global understanding of land use change", Global Environmental Change Part A, 15(1), 23-31

SEPBG (2009) Evolution des volumes exportes de 2000 à 2008 par essence. Libreville Société d'Exploitation des Parcs à Bois du Gabon.

Söderling, L. (2006), "After the Oil: Challenges Ahead in Gabon", Journal of African Economies, 15(1), 117-148.

Solow, R. (1957) 'Technical Change and the Aggregate Production Function' in Review of Economics and Statistics, Vol 39. August, pp.312-20.

Stark, T., and S. P. Cheung (2006), Sharing the Blame: Global Consumption and China's Role in Ancient Forest Destruction, Greenpeace International and Greenpeace China.

Stringer, C. (2006), "Forest Certification and Changing Global Commodity Chains", Journal of Economic Geography, 6, 701–722.

Sun, C., Chen, L., Chen, L., Han, L., Bass, S. (2008). Global Forest Product Chains: Identifying challenges and opportunities for China through a global commodity chain sustainability analysis. Manitoba: International Institute for Sustainable Development (IISD).

Syrquin, M. (2008), "Structural Change and Development", in A. K. Dutt and J. Ros (eds.), International Handbook of Development Economics, Cheltenham: Edward Elgar).

TFT (2007), China Wood Products Supply Chain Analysis: Helping Chinese Wood Producers achieve market demands for legal and sustainable timber:,The Tropical Forest Trust.

Thai Tapioca Starch Association (2009) Thai Ethanol Industry: the Opportunities and the Challenges, http//tapiocathai.org, accessed 14 Dec 2009, TTSA: Bangkok

Thai Tapioca Trade Association (2009), Annual Report 2008, TTTA: Bangkok

Thai Tapioca Starch Association (2008), Annual Report 2007, TTSA: Bangkok

Thai Tapioca Trade Association (2004), Annual Report 2003, TTTA: Bangkok

The Rainforest Foundation UK. Gabon. Retrieved October, 2009, from http://www.rainforestfoundationuk.org/Gabon

Tissari, J (2009). Report on the Study of the Technical and Environmental Standards of Tropical Timber Products in International Markets. Yokohama: International Tropical Timber Council, International Tropical Timber Organization.

Titapiwatanakun, B. (1994), "Thai Cassava Starch Industry: Current and Future Utilization" Paper presented at the International Meeting on Cassava Flour and Starch, 11 -15 Jan, The International Center for Tropical Agriculture (CIAT): Cali, Colombia

UNEP and WCMC Species Programme, Retrieved October 2009, from http://www.unep-wcmc.org/

Victor, D. G., and J. H. Ausubel, (2000), "Restoring the Forests", Foreign Affairs, 79(6), 127-144.

Von Braun J.(2007) "The World Food Situation: New Driving Forces and Required Actions," Food Policy Reports 18, International Food Policy Research Institute (IFPRI).

Wade R. H. (1990), Governing the Market: Economic Theory and the Role of Government in East Asian Industrialization, Princeton: Princeton University Press.

Wang, W., (2002) Cassava Production for Industrial Utilisation in China: Present and Future Perspectives, I7th Cassava Regional Conference Proceeding, 28 October to 01 November 2002, Bangkok

Wang, X. H. (2007) China's Corn Processing Industry: Its Future Development and Implications for World Trade, Presentation, National Grain and Oils Information Centre, China

White, A., and Martin, A. (2002) Who Owns the World's Forests? Forest Tenure and Public Forests in Transition, Forest Trends.

White, A., Sun, X., Canby, K., Xu, J., Barr, C., Katsigris, E., et al. (2006), China and the Global Market for Forest Products; Transforming Trade to Benefit Forests and Livelihoods, Washington, DC: Forest Trends.

Wilkinson, R. and K. Pickett (2009), The Spirit Level: Why More Equal Societies Almost Always Do Better, London: Penguin.

Womack, J. P. and D. T. Jones (1996), Lean Thinking: Banish Waste and Create Wealth in Your Corporation, N. York: Simon & Schuster

World Bank (2009), Global Economic Prospects 2009: Commodities at the Crossroads, Washington D.C.

World Bank (March 2009), China Quarterly Update. Beijing, World Bank.

Wright, G. and J. Czelusta (2004), "The Myth of the Resource Curse", Challenge, Vol. 47, No. 2, pp. 6-38.

Wunder, S. (2003), *When the Dutch Disease met the French Connection: Oil, Macroeconomics and Forests in Gabon*, Bogor: Center for International Forestry Research.

Zhang, J., and J. Gan (2007), "Who will Meet China's Import Demand for Forest Products?", World Development, 35(12), 2150–2160.

Zhang, Y. and Zheng, C., (2008), "The Implications of China's Rapid Growth on Demand for Energy and Mining Products Imported from Australia.", Economic Papers 27 (1), 95-106.