African Review of Economics and Finance | ISSN 2042-1478 | Volume 8 | Issue 1 | June 2016

China and latecomer-industrialisation processes in Sub-Saharan Africa: Situating the role of (industrial) policy

Christina Wolf

Department of Economics, School of Oriental and African Studies (University of London), Thornhaugh Street/ Russell Square, London WC1H 0XG. Email: c_wolf@soas.ac.uk

Abstract

This paper examines how China's systemic impact on the world economy and growing presence in Sub-Sahara Africa (SSA) affects processes of structural change in SSA countries. It is argued that these effects depend both on their size and composition which varies across different SSA countries, as well as their mediation through domestic policy. This paper explores potential China-related effects on industrialisation processes in SSA as well as the role of (industrial) policy in mediating these effects. In particular, it is argued that capitalising on the full potential of domestic markets by strengthening intersectoral and final consumer demand becomes increasingly important in light of the more limited scope for export-led manufacturing sector growth stemming from China's systemic impact on the world economy. The paper further proposes a framework to separate empirically the differences in manufacturing sector growth that can be explained by differences in the size and composition of various China-related effects from those resulting from differences in country-specific factors.

Keywords: Industrialization; China-Africa, Industrial policy

1. Introduction

Given the unique growth dynamics inherent to the manufacturing sector in terms of productivity- and output growth, structural change is considered a necessary if not sufficient condition for catching-up with advanced economies in terms of material standards of living (Szirmai, 2012). Sub-Saharan African (SSA) countries lag behind other regions in this respect, the vast majority them being among the least industrialised countries in the world. On aggregate, there

has been little if any improvement over the last decade: in 2011, the manufacturing sector accounted for 8.6% of total value added in SSA countries' GDP[1], down from 9.4% in 2000. However, while the majority of SSA countries has experienced either a negligible rise or even a fall in manufacturing output, some SSA countries experienced relatively strong increases over the last decade with real manufacturing output per capita more than doubling in Angola, Equatorial Guinea, Liberia, Mozambique, Lesotho, and Gabon (comparing 2011 levels to a 1996-2000 average; calculations based on United Nations National Accounts Database).

Against this background, a much polarized debate on how China affects industrialisation in Sub-Saharan Africa has ensued. On the one hand, China is seen as blocking the stepladder to industrial development by outcompeting African manufactured goods (Kaplinsky, 2008). On the other hand, China is seen as a 'golden opportunity' for industrialisation in SSA as its own industrial upgrading frees up jobs in labour-intensive manufacturing, which – combined with an increasing number of Chinese investments and infrastructure projects in SSA – could ignite local industrialisation (Lin, 2012).

This paper aims to contribute to this debate not by providing a conclusive empirical answer on whether one or the other interpretation is correct. Instead, it asks: what is the role of policy in shaping China-related effects on manufacturing sector growth in SSA? Global trends such as China's rise in the world economy may act as important constraints or accelerators to industrial development – however, different potential China effects will affect individual countries differently and, on top of that, domestic policy plays an important role in shaping these effects.

However, this statement as such remains unsatisfactory because what constitutes appropriate policy is itself dependent on our understanding of the workings of the economy and society. Against the free-market orthodoxy pushed by the Washington institutions stand the policy lessons derived from the East Asian developmental states. Therefore, the paper takes a step back and grounds China-related effects on industrialisation in a wider theoretical framework of late-industrialisation. Crucially, this reveals that our understanding of the key issues of industrialisation – and hence our assessment of the potential impact of China and the role of policy - needs to be extended beyond questions of productivity growth and export promotion to include domestic market formation and domestic class-relations.

1 For the purposes on this paper Sub-Saharan Africa excludes South Africa due to its very different degree of economic development and Somalia due to a lack of reliable data.

The paper proceeds as follows: section 2 investigates the interplay between global and domestic factors influencing late-industrialisation, section 3 discusses how China changes the external context of industrialisation and identifies the most relevant "China effects" as well as the ensuing policy challenges. Section 4 provides a starting point for further comparative empirical analysis of policy responses, using cluster analysis to separate the differences in manufacturing sector growth that can be explained by differences in the size and composition of various China-related effects from those resulting from differences in domestic policy mediation. It finds differences in average manufacturing output growth *across* groups of countries with similar China-effects, but also *within* them.

2. Late-industrialisation – The developmental state and beyond

In order to determine how China shapes the global economic context for late-industrialisation in SSA and what can be considered critical policy challenges within this new setting, this first section will review which lessons regarding the role of the state and the global have been derived from successful late-industrialisers in East Asia. It is argued that those lessons remain highly relevant, especially when contrasted to the orthodoxy proposing a minimalist or at best piecemeal role for the state. However, while the literature on the East Asian developmental states established the growth and gradual upgrading of manufacturing exports as key successful late-industrialisation, it is argued that we need to extend our understanding of late-industrialisation to include the mechanisms supporting domestic market formation. In addition, the feasibility of industrial policy does not necessarily rest on good-governance but needs to be asserted within the wider social relations in individual SSA countries.

2.1. Supply-side constraints to industrial development – technological learning and economies of scale

What constitutes an appropriate role for the state in economic development remains a highly contentious topic. Letting the free market forces work, potentially correcting specific market failures in a piecemeal way if warranted by state-capacity prevails since the Washington- and later post-Washington Consensus. By contrast the critical accounts of successful late-industrialisers in East Asia show that these relied on highly interventionist states. A full review of this literature is beyond the scope of this article; the focus here lies on tracing its conceptual foundations.

Drawing on evolutionary growth theory, the seminal studies of Amsden (1989)

and Wade (1990) on South Korea and Taiwan, linked late industrialisation to technological learning and the conditions under which successful technology acquisition occurs. They maintain that in order to catch-up with advanced economies, developing economies need to master new technologies and close the gap in technological evolution. While late developers can, at least in theory, skip whole stages of technological development (and thus technological failure), successful assimilation of foreign technologies depends on more than just accessing relevant 'blueprints'. In particular, on top of *economy wide factors*, such as the quality of education and infrastructure,[2] firm-level productivity also depends on workers' *tacit knowledge* of how to operate machines effectively and tacit organisational capabilities of a firm (e.g. how to set up teams to ensure a smooth production). These tacit components of firm level productivity are the result of a process of learning-by-doing (Khan, 2013).

Importantly, this implies that production has to begin before firms have achieved competitiveness and hence some form of loss-financing is required as, by definition, competitiveness cannot be achieved for a considerable length of time (Khan, 2013). Therefore, all seminal accounts of East Asian late-industrialisation significantly depart from the free-market orthodoxy to stress that a significant level of state guidance in the form of measures such as subsidies on inputs, government investment to promote technical or economic linkages among industries, incentives to export or tariff protection were necessary to support technology acquisition and productivity increases (see for instance H-J Chang 2002; Wade 1990; Amsden 1989).

How to best design such measures depends on various domestic factors such as firm-size or ownership structures but also on global factors such as on the nature of global frontier technology. Furthermore, new constraints to technology transfer can arise over time, such as the current regulations on international property rights or the differentiation of production in global value chains. In practice, therefore, technology transfer requires substantial negotiation skills on the part of policy makers in developing countries to negotiate technology transfer with multinational corporations (H-J Chang, 1998).

While the literature on the 'East-Asian miracles' conceives late-industrialisation primarily as a problem of 'learning how to compete' (see Amsden 1989 or Amsden 1990), insights from classical development theory complement this understanding of the supply-side dynamics underlying industrial output growth

2 Or more broadly the national innovation system, i.e. the network of public and private institutions that build human resources, stimulate technological activity, finance technological investment and provide technological infrastructure.

in that they highlight that productivity increases are not merely a *function of knowledge* but also *of scale*.

In particular, the possibility of realising firm level economies of scale, which are the basis of productivity increases, is itself a function of the size of the market. Firm level economies of scale, arising for instance through division of labour and specialisation can translate into increasing returns to scale at industry/economy level through pecuniary externalities, i.e. externalities linked to monetary and price effects.[3] For example, more efficient production in one sector results in a reduction of output prices of that sector. Consequently, the expanding sector not only creates demand for its own inputs, but, through its cheaper outputs also reduces the input costs of other sectors. As a result, other sectors can also expand their output and realise further economies of scale. Their expansion, in turn, creates positive pecuniary externalities for others and so on triggering a positive feedback loop (cumulative causation) where productivity growth causes output growth and output growth causes productivity growth. This central theme of Adam Smith is picked up by authors like Young (1928) or Rosenstein-Rodan (1943). Crucially, their theories of cumulative causation rely on the assumption of Say's law, i.e. everything that is produced will also be consumed.[4]

2.2. The demand-side implications of increasing returns to scale and their systemic effects

The observation that manufacturing sector growth is dependent upon (and not only leading to) aggregate output growth, has far reaching implications once the assumption of Say's law is relaxed. Essentially, mass-production requires mass-consumption, which can become a binding constraint. The answer to the question how and under what conditions dynamically expanding levels of output can be absorbed by a corresponding rise in demand has a significant bearing on policy making, notably with respect to what kind of industries should be promoted, the role of labour compensation and inter-sectoral linkage formation.

Canonically, expanding and gradually upgrading exports is seen as a solution to potential demand-constraints to manufacturing output growth, with exports being both a critical component of aggregate demand and a constraint to late-industrialisers' capacity to import capital goods.[5] Indeed, setting export targets

3 See Scitovsky (1954) for a definition of technological and pecuniary externalities.

4 Even though Rosenstein-Rodan (1943) demonstrates that various coordination failures can impede the circle of cumulative causation to unfold.

5 Thirlwall's growth model illustrates why the volume and gradual upgrading of a country's exports is positively correlated to its (industrial) growth potential. The intuition is simple: export earnings have

was singled out as the quintessential feature that explains the East Asian success with industrial policy when compared to the experiences of Latin American and Sub-Saharan African countries (see for instance Amsden 2001; Shafaeddin 2012).

Against this stands the observation that there are global limits to such an expansion of export markets. First, there is a problem of simultaneity ('fallacy of composition') – while export-led manufacturing can work for one country it cannot become a strategy for all countries simultaneously because there are limits to the total expenditure of developed countries on manufactured goods (Onaran, 2011). Second, systemic effects manifest when developing countries engage in intense competition over highly substitutable manufacturing products through price competition and wage depression (Razmi and Blecker, 2008). The fallacy of this race to the bottom is that the concurrent attempt of each country to boost its competitiveness at the expense of domestic purchasing power causes an overall deflation in world demand capacity. At the same time it produces systemic price effects thereby transposing the problem of declining terms of trade and the balance of payments problems stemming from it to a different group of products, i.e. low value added manufactures (Bloch and Sapsford, 2000).

Amsden (1990) accepts the demand-side limits to exports of low-value added manufactures but maintains that this does not pose a problem as long as supply capacity is developed in higher value-added sectors and the export structure gradually upgraded. But again, while this can prove a convincing strategy for one country, it cannot become one for all countries because this flying-geese-type process must necessarily happen at unequal speed (and therefore systematically exclude some countries) for it otherwise reproduces the systemic price effects we currently observe for low-value added manufactures at an even higher level – unless there is a continuous rise in aggregate demand in the world economy as a whole.

More generally, this raises the question what determines expansion in demand (be it export or domestic) in the first place. Thirlwall introduces a demand constraint on (industrial) output growth, but this only stems from exogenous income growth. Nothing accounts endogenously for changes in the saving/investment behaviour of capitalists. Post-Keynesian theories on income distribution

to finance (capital goods) imports. However, generally income and price elasticities for exports from developing countries are lower than developing countries' income and price elasticities for (capital) imports. Therefore, the demand for (foreign capital) imports outpaces its export earnings. As no country can permanently run a deficit, (manufacturing sector) growth is balance of payments constrained (Thirlwall, 2013).

and growth provide an additional, albeit not binding, explanatory element. The intuition is simple: when the demand base is very narrow manufactured goods are only sold to the relatively few rich. Given their small numbers they cannot sustain demand for mass-production. Hence, in an economy, in which investment is determined by an anticipation of demand rather the availability of savings, a very unequal distribution of income between wages and profits can lead to a short-fall of demand for industrial output which, in turn, limits investment and decelerates manufacturing output growth (Dutt, 1984).

On a more practical level, the limitations to global demand capacity bring to the fore the role of domestic demand growth in sustaining late-industrialisation. One way to break away from the under-consumption and balance of payments constraints is by adapting and adopting imported technology for domestic market production (Lo, 2011). If demand growth depends on income distribution, then appropriate labour compensation and redistributive measures become an integral part of domestic market formation. The French regulation school does, indeed, argue that wage growth in line with productivity growth was one of the pillars that sustained the so-called 'Golden Age' in post-War Europe (Lipietz, 1982). In addition, output of other sectors of the economy (in particular agriculture and construction) will determine demand for manufacturing sector output, thereby limiting or accelerating manufacturing output growth. Bhaduri (2006) traces the complexities of managing intersectoral demand and productivity growth at the example of India and the Soviet Union.

This does not invalidate the importance of exports, which, as set out earlier, are crucial as they have to finance imports of capital goods. It does highlight, however, that (a) the type of exports matters (and this can change over time as a function of the global demand context) and that (b) industrial output growth is equally dependent on an expansion of domestic aggregate demand (which is both a function of income distribution and productivity increases in other sectors).

2.3. From developmental states to processes of accumulation: what is the state?

If policy has a role to play in sustaining industrial development, e.g. by providing support for technology acquisition or overcoming domestic under-consumption and balance of payments constraints, how we think about the state has a significant bearing on the type and extent of state-interventions necessary to foster structural change.

Although state and market are increasingly seen as potential complements,

the state-market dualism often remains the starting point for discussion. The concept of market failures provides the basis of analysis making the legitimacy of state-intervention dependent upon the state's capacity to improve on market outcomes. In essence, this requires a normative assessment to determine when this balance becomes positive and the costs of government intervention are worthwhile given the chance at success in correcting market failures (Latsch, 2008). Consequently, even where it is accepted as a potentially useful intervention the benefit of the doubt is given to the market questioning the practical feasibility of industrial policy – especially in SSA:

"Hence, the empirical relevance of these ideas remains to be demonstrated. In the absence of such a demonstration, government intervention to promote industrial diversification *must be judged a risky strategy*." (Rodrik, 1996)

Instead, industrial policy should be used with care favouring a "*pragmatic* and *limited* approach to interventions as a means of stimulating industrialization (…)." (Weiss, 2011)

Political science contributions have identified the characteristics of states, in which interventionist policies were successful emphasising in particular the need for "embedded autonomy" – i.e. a bureaucracy aloof from vested interests yet not self-serving but instead constrained by the society they represent. This also establishes 'good governance' as a prerequisite to successful industrial policy. For analytical purposes, the conceptualisation of the state which sees the state as the source of power-relations rather than the outcome thereof is problematic as it conceals how specific vested economic, political and ideological interests come about, what sustains them (materially and ideologically) and how they change over time (Fine, 2013).

The embedded autonomy framework remains too general in this respect. Khan (various years) argues that while good governance (such as transparency, the stable rule of law or low levels of corruption) is desirable in itself, the focus on such conditions diverts attention from other more important institutional arrangements needed for successful industrial policy. For subsidy schemes to work, the threat of removing the subsidy has to be credible as otherwise firms do not have the necessary incentives to put in the necessary amount of effort to actually become competitive and instead just cash-in the subsidy without any occurrence of learning by doing. In that sense, industrial policy is not so much about picking winners – and having the right information to do so – but about eliminating losers. The feasibility of this depends on the *nature* of patron-client networks not their absence. In other words, the success of industrial policy

hinges upon the fit between the institutional design and the type of political settlement (Khan, 2013).

At the same time, the embedded autonomy framework remains too narrow in the sense that it reduces the role of the state to state-business relations alone. However, structural transformation is also a process of social transformation. Understanding which (distributional) conflicts emerge during this process of rapid social change and how these are resolved through the state and through the market is indispensable to determine what is and what should be the role of the state (D. Chang, 2013).

3. Situating China specific effects and the role of (industrial) policy

The previous section showed that industrial development unfolds in a complex interaction between systemic factors rooted in the world economy (such as the dominant type of technologies or price and demand structures) and factors that are specific to individual economies (such as its absorptive capacity, its demand capacity and intersectoral linkages), which, in turn, are a function of policy and power-relations. The following sections will explore how and through which channels China's systemic impact on world markets and its growing interaction with Sub-Saharan African economies affects the prospects for industrialisation processes in SSA and what sorts of policy challenges this raises for SSA countries. Disentangling this nexus requires an understanding of how China helps or hinders SSA countries' technology acquisition but also how it affects their balance of payments and domestic demand constraints as well as how it interacts with the wider social relations and the political economy of SSA countries. Having concluded that late-industrialisation depends as much on building the domestic-demand side of the economy as it depends on supporting technology acquisition and export-capacity, the following section argues that this conclusion becomes all the more relevant in view of the systemic changes in global demand- and price structures ensuing from China's systemic impact on the world economy.

3.1. Reduced scope for export-led industrialisation

China exerts two contradictory effects on SSA countries' external demand constraint by, on the one hand, increasingly demanding raw materials and, on the other hand, by competing with local producers in the manufacturing sector.

For some countries the acceleration of Chinese demand for raw materials constitutes a substantial increase in export demand and thus has a positive

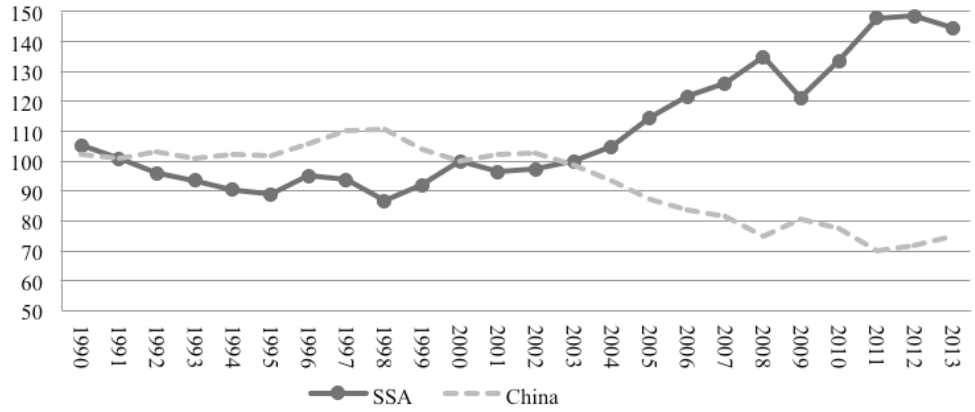
effect on their balance of payment position. Bagnai, Rieber, & Tran (2012), for instance, find that, on average, the balance of payment consistent growth rate of SSA countries has increased from 2.2% in the period 1990-99 to 5.4% in the period 2000-08. About a third of this relaxation was due to the expansion of export markets in "developing Asia" (mainly China; Bagnai et al., 2012).

Any positive effect on the balance of payments position can be (more than) off-set if Chinese manufactures out-compete African manufactures on world and domestic markets ('displacement-effect). China supplies 13% of total world exports, 34% of exports in textiles and clothing and 50% of world exports in footwear (calculations based on UN COMTRADE). This has implications for industrialisation of SSA countries because it blocks the stepladder to export-led industrialisation (Kaplinsky, 2008). Giovannetti & Sanfilippo (2009) for instance find that a 1% increase in Chinese exports is associated to a reduction of -0.07% in African exports on world markets of the same products. However, this displacement effect varies across sectors and is decreasing over time (see Geda & Meskel, 2010 and Villoria, 2009). African apparel producers survive in niche markets, often supported by Chinese investments itself (Tang, 2014) and Ethiopia even significantly increased its exports of apparel and footwear. Yet even for Ethiopia, export earnings generated from footwear ($ 27.4 million in 2014) remain tiny relative to total Ethiopian exports ($ 2.5 billion in 2014) and total world trade in footwear ($ 125 billion in 2014, of which $ 63 billion are Chinese exports; calculations based on UN COMTRADE).

These changes in demand structures are further amplified through price effects. For example, Kaplinsky & Farooki (2012) show that China's demand for raw materials has spurred world market prices for hard and energy commodities. At the same time, Chinese manufacturing also put downward pressure on world market prices for manufactures. As a result, SSA countries producing hard and energy commodities benefit – at least temporarily – from an improvement in their terms of trade. Figure 1, illustrates this broad trend: from the early 2000s onwards, on aggregate, terms of trade of SSA countries have improved.

Thus, the seemingly contradictory displacement and balance of payments effects are, in fact, two sides of the same coin, each reflecting the systemic impact of China's own economic transformation: while China's own demand structures coupled to the systemic price effects that ensue from there positively impact on the balance of payments position of individual countries, the nature of Chinese supply on world markets reinforces problems associated to the 'fallacy of composition'.

FIGURE 1: TERMS OF TRADE INDEX SUB-SAHARAN AFRICA AND CHINA 1990-2013 (2000=100)



Source: IMF WEO (for SSA) and WB WDI (for China)

How these effects work out in practice will depend both on the type of dominant effect and on policy mediation. The improvements in terms of trade and the acceleration of export demand make it easier for some resource-rich countries to finance capital goods imports. Thus even though Chinese demand is highly skewed towards mineral and energy commodities, this does not necessarily entail anti-developmental effects provided that the increased export-revenues are channelled into imports for the productive sectors (e.g. through tax breaks and tariff structures), in particular capital goods for manufacturing. If this is not the case, however, Chinese demand patterns can lock-in SSA countries in unfavourable production structures. The question therefore is what sorts of policies and societal forces can assure the former outcome. Similarly, where countries suffer from intense Chinese competition on home and world markets, policy can mitigate these adverse effects (see for instance the example of the Ethiopian footwear industry Gebre-Egziabher 2009; Brautigam 2009).

At a more general level, the changes in the world economic order analysed above also call for a reflection on shifting policy priorities in particular with regards to export-led manufacturing sector growth and flying geese patterns, established by the literature on the East Asian developmental states as key to late-industrialisation. Importantly, the lessons from East Asia should not be generalised beyond their context specificity, which was marked by rapidly expanding markets for consumer goods in OECD countries in the 1960s and increased access to international finance in the context of the Cold War (Wade, 1990). The global economic context that enabled export-led industrialisation has changed

significantly, in particular in terms of relative prices and demand structures, which can partly be linked to China's systemic impact on the world economy.

Some scholars maintain that as China upgrades its own industries, "nearly 100 million labour intensive jobs in manufacturing [will free up]" (Lin, 2012), some of these could move to Africa. It is still only speculative as to when these relocations might occur and if so whether any of them would go to SSA (see for instance Ozawa & Bellak, 2011). Tang (2014) finds that, with the exception of the China JD group in Tanzania, Chinese investments in apparel production in Africa remain, so far, small to medium in scale. The developmental effect would also depend on the nature of these potential relocations, which will be limited should they follow purely a logic of saving labour costs. Productivity increases are not fast enough to reach knowledge and research intensive activities if production focuses solely on profit realisation through cheap labour. Furthermore, incomes generated by this type of industrial activity are too low to sustain local industrialisation and trigger production for the home market (lipietz, 1982).

Either way, for the time being SSA countries are more restricted by limits in the expansion of export demand for low-value added manufactures than it has been the case for East Asian Newly Industrialised Countries (NICs).[6] Even for resource rich SSA countries whose capacity to import capital goods is (temporarily) decoupled from expanding manufacturing exports, the tendency for the prices of low-value added manufactures to fall reinforces the problems associated with the 'fallacy of composition' and makes an industrialisation path through a gradual upgrading of low-value added manufactures more difficult to realise. Therefore, harnessing the demand potential embodied in domestic markets (whether intersectoral or final consumer demand) will be even more relevant to build the backbone of a dynamically expanding manufacturing sector. Resource rich countries are also well-placed to do so because of their improving balance of payments position.

3.2 Increased opportunities for domestic market formation

If the above conclusion is correct and domestic market formation can be considered a core challenge for late-industrialisers today, then it is important to note that the nature of Chinese engagement with SSA countries has itself the potential to promote such domestic market formation if supported by appropriate policies.

6 The focus on export performance in explaining East-Asian industrialisation successes even understates the role that growth of domestic markets played in the East Asian NICs. Chenery & Syrquin (1975) for instance show that about half of industrial output growth in South Korea could be attributed to domestic demand expansion.

Supporting domestic market formation: Intersectoral demand growth and technology transfer through the operations of Chinese firms?

The first question is whether or not the rising volumes of Chinese Foreign Direct Investment (FDI) in SSA countries are conducive to technology transfer and skill formation, which are, as established above, key drivers of late-industrialisation. While, overall, Chinese FDI in SSA countries remains small when compared to FDI from OECD countries, in 2013, 31% of private-led Chinese investment projects in SSA countries have been undertaken in the manufacturing sector (Shen, 2015). Even in countries with comparatively low levels of Chinese FDI such as Rwanda (see Figure 2), these investments do generate spill-over effects at the micro-level in terms of employment generation and skill formation with Chinese firms, contrary to popular belief, engaging in training of local labour for reasons of cost efficiency (Shen, 2015).[7] In the telecommunications sector, the Rwandan government has also negotiated technological upgrading and transfer of expertise with ZTE and Huawei, as part of the broader government strategy to enhance the country's ICT sector (Gu and Carty, 2014). Brautigam (2008) also gives an example Chinese trading networks having spurred a small boom in the production of spare auto parts in the Nigerian town of Nnewi. All of these examples illustrate the potential for learning and technology spillover through the operations of Chinese firms – even if only at the micro-level.

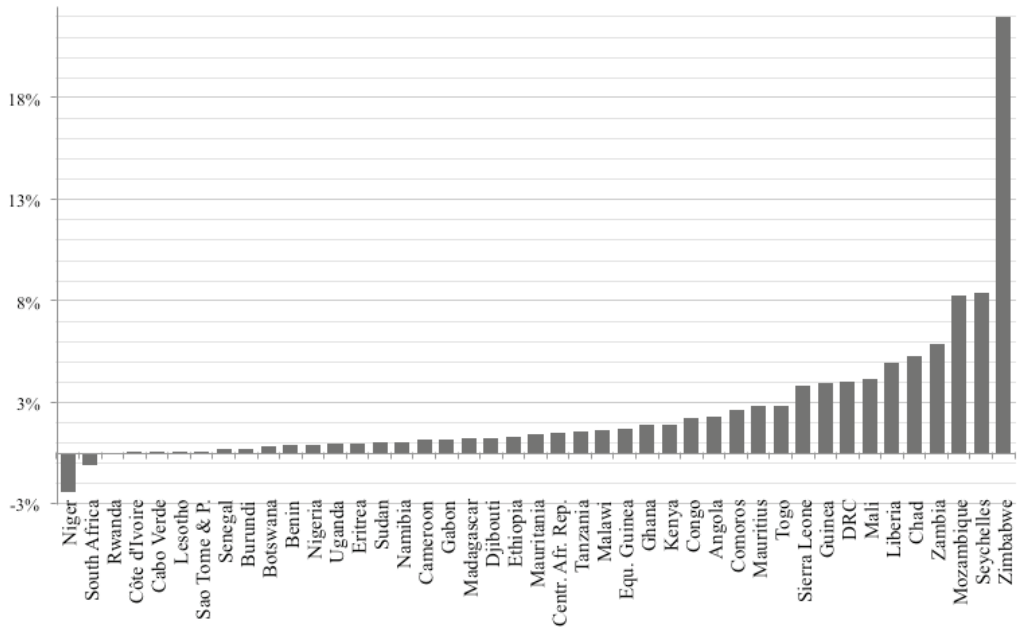
The answer to the question how to maximise learning and technology spillovers will need to be given on a case-by-case basis but the research findings on the East Asian developmental states provide a useful starting point, notably with respect to business models (i.e. firm size and ownership-structures), accessing technology (e.g. licenses or FDI) and human capital formation within the national system of innovation (i.e. formal education, subsidies for on the job training and more broadly the interaction between public research institutions, academic and applied research) (Lall, 2004).

Yet, policy challenges go beyond technology transfer and skill formation. Qualitative firm-level evidence suggests that more than half of private sector led Chinese FDI is attracted by the large domestic markets of African countries. In many cases, the investments follow a rise in import-tariffs on consumer goods making relocation a more profitable way to penetrate the local market than exporting (Shen, 2015). This evidence actually suggests not a 'flying geese'-type

7 Other research findings indicate that the tendency of Chinese firms to import inputs and labour from China reflects more a lack of comprehensive investment policies as well as remaining skill-mismatches than a reluctance of Chinese firms to source locally (Gu, 2011). Corkin (2011) finds that while Chinese firms operating in Angola engage in local labour training and set up local manufacturing subsidiaries to produce supplies for construction locally the longer they stay in the market, supply chain formation is primarily constrained by the quality and quantity of supplies in the host country.

pattern, driven by consecutive relocations of labour-intensive export-oriented industries to save labour costs, but one that is driven by domestic market formation. This, in turn, has important policy implications: if investments are attracted by an anticipation of growing consumer demand, then the policy challenge actually becomes to support lower-end domestic purchasing power through income redistribution and by ensuring appropriate labour compensation.

Figure 2. Chinese FDI as % of gross fixed capital formation three year average (2011-2013)



Source: 2013 Statistical Bulletin of Chinese Outward FDI and UN National Accounts

In addition, Chinese firms operating in light manufacturing processing industries such as textiles, tannery and wood processing have also indicated being attracted by the availability of agricultural raw materials (Shen, 2015). Policy challenges therefore extend to supporting agricultural output growth and strengthening supply chain formation. In Ethiopia for instance, supply chain formation between Chinese tannery firms and Chinese shoe manufacturers remains limited because leather suppliers would lose their tax benefits if products were sold domestically instead of being exported (Brautigam & Tang, 2014).

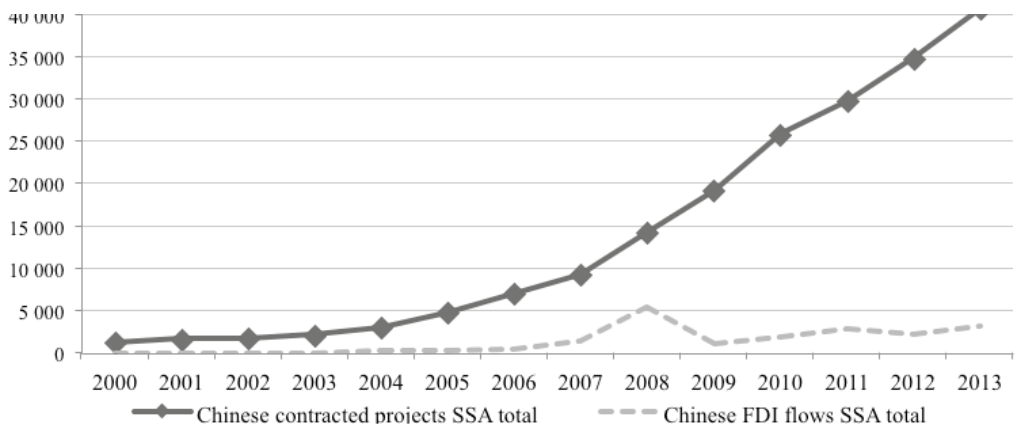
Indeed, accelerating linkage formation to other productive sectors of the economy is, as set out previously, an important aspect of late-industrialisation.

The commodities price boom and related reorganisation of production are relevant in this regard. In particular, the trend towards outsourcing of non-core activities in mineral and energy commodity value chains - such as the provision of non-core inputs such as food accommodation, logistics and security, opens possibilities for resource-based linkage formation. Once identified, policy can broaden and deepen this process by addressing context-specific hindrances (Kaplinsky, 2013). However, it is important to note that the operations of Chinese firms offer a significant potential for linkage formation over and beyond the mining sector.

Beyond FDI, Chinese firms also engage in a particular form of co-operation called "Chinese overseas contracted projects" (COP), i.e. construction projects carried out by Chinese firms in third countries financed through Chinese concessional and non-concessional finance (provided for instance by institutions like the China Development Bank or the Export-Import Bank of China (ExIm Bank) but also through bidding on projects financed by international organisations and local governments (China Statistical Yearbook, 2009). Not all of these have a concessional element and qualify as ODA (Brautigam, 2011), but they do involve activities of Chinese firms in the beneficiary countries.

In terms of magnitude, COPs are far more important than Chinese firms operating through FDI (see Figure 3), with USD 3.1 billion in FDI flows standing against a face-value of USD 40.6 billion of COPs in 2013.

Figure 3. Chinese Overseas Contracted Projects vs. Chinese FDI to SSA ($million)



Source: China Statistical Yearbook (various years) and 2013 Statistical Bulletin on Chinese Outward FDI

Macro-level effects on manufacturing sector development related to Chinese firms are therefore more likely to come through COPs than FDI. Other than addressing the well-documented infrastructure gap in SSA (see for instance Foster, Butterfield, Chen, & Pushak 2009), thereby contributing to providing the enabling environment for industrial development, COPs create a market for building materials. For instance, investment data, provided by the Angolan National Investment Authority (ANIP) for the years 2011 and 2012, reveal that the largest share of manufacturing sector investments in Angola are in the production of intermediate inputs, a category which includes in particular building materials such as cement/ lime/ plaster as well as iron and steel products (see Table 1).[8] Given the importance of COPs relative to Angolan GDP (see Figure 4), this suggests that Chinese construction related activities can contribute to linkage formation to manufacturing sector (see also Corkin, 2011).

Table 1. Manufacturing sector investments 2011 and 2012 by Broad Category (constant 2005 USD, thousands)

Broad category	Angola	HIC (excl. PRT)	Portugal	China	Tax Havens	LICs, LMIs, UMIs	Total
Food + Beverages	34,201	157,442	3,230	259	2,573	2,814	**200,520**
Intermediate Inputs	612,318	897	5,889	551	2,913	9,369	**631,937**
Machinery	29,481	2,225	173	5,766	0	0	**37,644**
Final consumption	3,963	144	288	3,270	17,551	0	**25,217**
Medical equipment	0	2,452	0	0	0	0	**2,452**
Recycling	0	0	0	0	2,305	2,205	**4,509**
Total	**679,963**	**163,160**	9,580	9,846	25,342	14,387	902,279

Source: Agência Nacional para o Investimento Privado

Taken together, these trends from agriculture, mining and construction suggest that other than the question of how to facilitate firm level technology and skill transfer through Chinese manufacturing firms, policy and research attention also has to focus on factors that constrain supply chain formation to the construction, agricultural and mining sectors.

8 Based on author's calculations from data provided by ANIP (*Agência Nacional para o Investimento Privado*). All data have been deflated to 2005 constant USD using the Angolan GDP deflator for the year of investment. The author counts as tax havens all countries defined as tax havens by (Hines and Rice, 1994). The broad categories have been aggregated from 4 digit data (ISIC rev. 4) as follows: 1511 to 1600 = **"Food and Beverages"**, 1711 to 1920 + 2211 to 2230 + 3210 to + 3410 to 3699 + 3330 + 2893 + 2930 = **"Final Consumption Goods"**, 2010 to 2109 + 2310 to 2899 + 3130+ 3420 + 3430 + 3210 + 1533 = **"Intermediate Inputs"**, 2911 to 3190 + 3313 + 3320 + 2813 = **"Machinery"**, 3311 to 3330 + 2423 = **"Medical Equipment"**

Below the radar innovation: alternative sources of demand

Kaplinsky (2013) explores the hypothesis that Chinese firms can induce 'below the radar innovations'. Chinese products are not necessarily designed for Northern markets but target distinctly new types of consumers based in low income countries. These so-called 'bottom of the billion' products (as exemplified by Chinese motorcycles or the Indian Tata Nano), induce innovation. The changing patterns of innovation and dominant technologies away from large-scale and capital-intensive technology prevailing in high income countries, calls, in turn, for a rethinking of policy priorities within national innovation systems. While the specificity of Chinese capital goods and the resulting firm level hindrances in their adoption are still under research, the transfer of bottom of the billion products is already observable in SSA countries. For instance, news media articles report that – supported by the China-Africa Fund – four Chinese car producers invested a total of USD 400 million into the production of cars and motor vehicles for the Sub-Saharan African market.[9]

The process of poor-poor innovation can be further promoted by directing low-cost capital, such as micro-credit, to small-scale entrepreneurs and investors in pro-poor technologies. In addition, the national innovation system has to lay the foundations not only for the adoption of global frontier technologies but also identify providers of bottom of the billion products and provide them with targeted support. In other words, the changes in the nature of consumer products and the technology used to produce them require a rethinking of appropriate policies in support of technology acquisition (Kaplinsky, 2013).

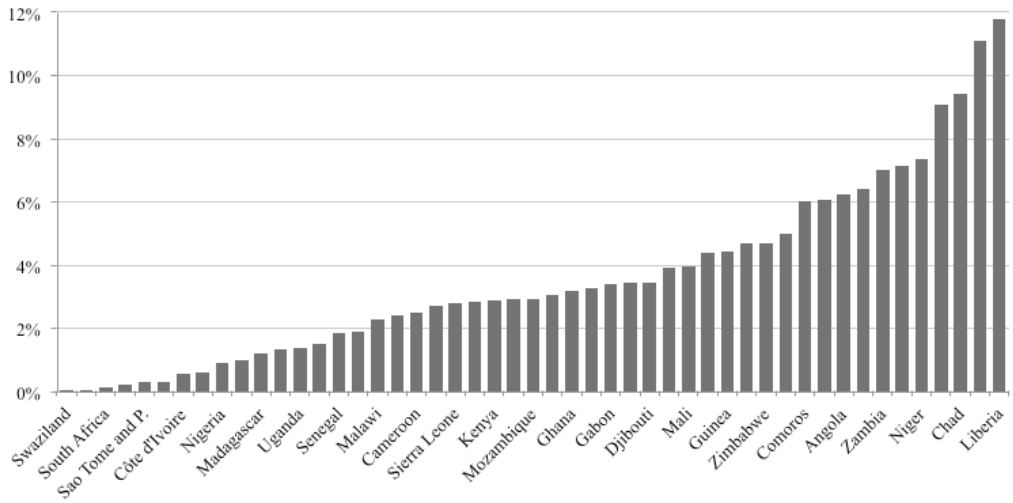
China's impact on the domestic demand constraint: Employment on Chinese contracted projects broadening the demand base?

Below the radar technology is, by definition, small-scale in nature limiting the possibilities of realising (dynamic) increasing returns to scale and productivity increases, which are crucial to sustain the self-reinforcing process of industrial development. The production of early labour intensive consumer products, such as processed food, beverages or furniture for domestic markets can be complementary in this respect. As set out above, mass-production for the domestic market can be constrained by the lack of wide-spread demand base. Therefore, beyond promoting supply capacity in these sectors, there is a role for labour market and re-distributive policies at the service of industrial development in order to improve household's available income and to set consumption incentives for domestic manufactures.

9 http://finance.people.com.cn/bank/n/2012/1212/c202331-19877629.html

The mode of Chinese engagement with SSA countries through COPs can further support this kind of demand generation. In some countries, COPs make up for a large part of GDP – e.g. up to 12% in Liberia (see Figure 4), making them a potentially important source of employment/ income generation, which broadens the demand base.

Figure 4. Chinese overseas contracted projects as % of GDP, avr. 2011-2013



Source: China Statistical Yearbook (various year) and UN National Accounts

Importantly, COPs do have local labour content: survey data from 32 Chinese companies in the construction sector reveal that 51% of the labour content is sourced locally (Corkin, 2011), while Tang (2010) estimates the share of Angolan labour in Chinese companies at 60% on average with variations across sectors.

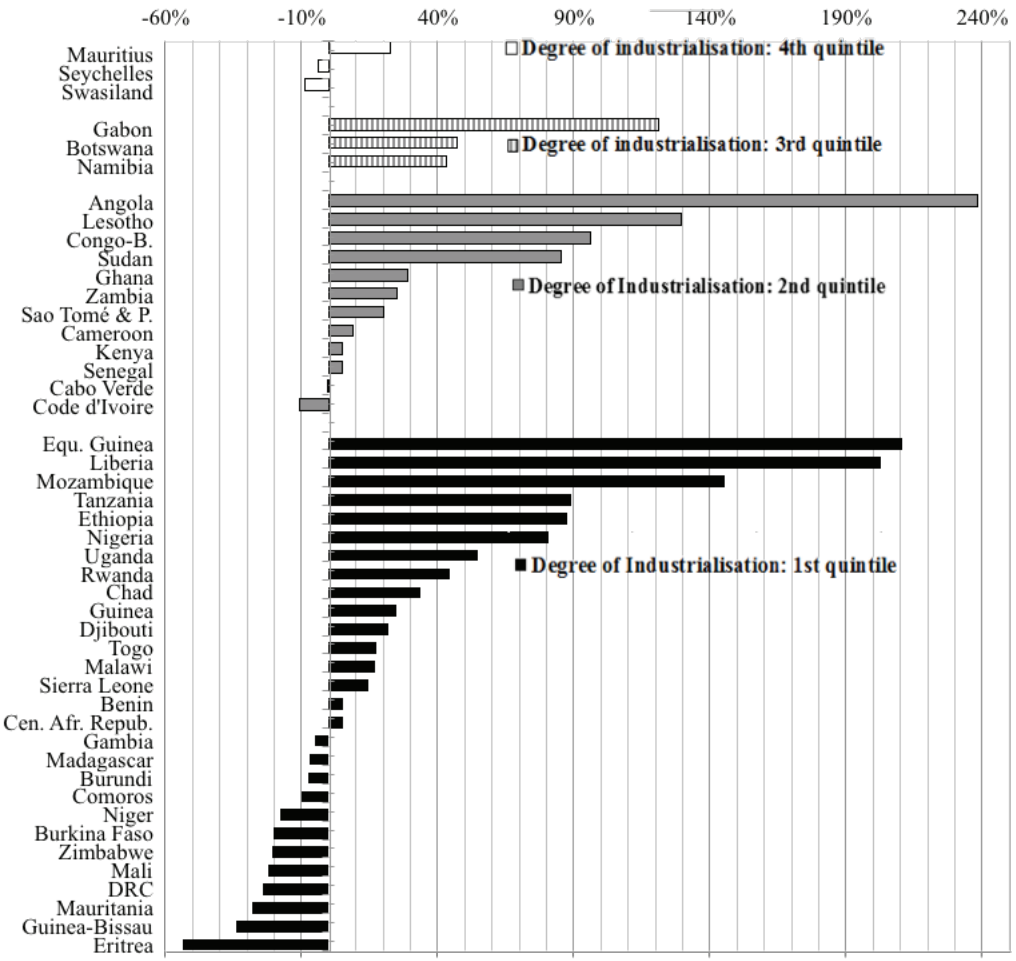
Overall, this suggests that, over and beyond their potential positive effect on the supply side, COPs could play a role in generating employment in SSA countries, thereby contributing to domestic market formation and creating the potential for positive demand feedback loops. But again, government policy has a role to play, e.g. by facilitating appropriate vocational training and skill formation alongside appropriate labour market and redistributive policies.

4. Comparing policy responses

What stands out empirically is that manufacturing sector growth has been highly unequal across different SSA countries over the past decade. Measuring the percent increase of the manufacturing value added per capita over the past

decade (2011 relative to a baseline given by the 1996-2000 average output), we find 15 SSA countries that experienced a decrease in their manufacturing output per capita, 19 countries recorded increases of less than 70% and 11 countries observed an increase of more than 70%, of which six experienced increases of more than 120% (Figure 5).[10] The question becomes whether those countries that experienced a decline in manufacturing output are also those experiencing predominantly negative China-effects and vice versa. The answer to this question is not straightforward because, as established above, how different China-effects work out in practice will also depend on policy mediation.

FIGURE 5. MANUFACTURING VALUE ADDED PER CAPITA, % INCREASE 2011 RELATIVE TO 1996 – 2000 AVERAGE

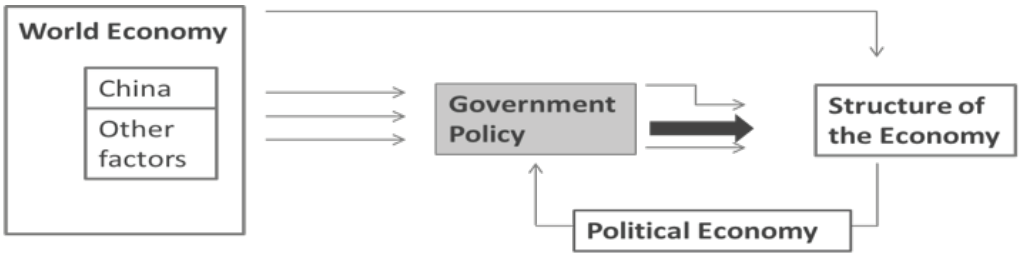


Source: Un National Accounts

10 To make these growth rates comparable, figure 5 groups SSA countries according to their degree of industrialisation relative to world quintiles.

Therefore, establishing whether any differences in manufacturing output growth observable across SSA countries can be linked to China, requires to separate effects linked to differences in the size and composition of the various China-effects from effects linked to differences in policy mediation and those effects that can be explained by differences in other factors that shape the global economy (see Figure 6).

Figure 6. Policy Responses



Late-industrialisation in SSA countries and China's impact thereon need to be understood as multi-dimensional, path-dependent and path-shaping processes. Gauging macro-level China-related effects by estimating correlations could be a useful starting point to get a sense of the magnitude of different effects. However, not everything can be parametrised appropriately and merely establishing correlations and average effect sizes makes it impossible to trace the relevant transmission mechanisms on any given variable. This is particularly relevant when, as set out above, many of the China-related effects will work out differently depending on each country's particular political economy, sets of policies as well as historical contingencies. Detailed country level case studies that combine the results of micro/firm-level fieldwork research with broader macro-level analysis of systemic and political economy factors have the advantage of producing this type of context-specific knowledge needed to trace the complexity of social systems. Yet, such studies face the problem of how to extrapolate from any specific case to other cases. This is relevant because the size and composition of China-related effects varies across countries.

Cluster analysis can provide a useful tool to bridge the two approaches. In practical terms, the aim of cluster analysis is to find groups of countries in the data that have a maximum degree of similarity within each group and significant differences across different groups. The purpose of the cluster is primarily to identify groups of countries with a similar set of China-related influences and thereby to help to situate case studies with respect to other cases.

Grouping countries into groups with different sets of China-related

influences also allows us to assess whether there are any systematic differences *across* these groups of countries with similar China effects – for instance, whether the group of countries with predominantly positive China-effects fares systematically better than other groups. However, the purpose is not to explain the overall change in manufacturing output across countries. This change is dependent on a range of non-China related effects and transmission mechanisms, including domestic policy, political economy and the overall growth potential of the country in question. As noted earlier, these factors are difficult to parameterise and causality is better explored in case studies.

To facilitate further case study comparison *within* groups of countries with similar China-related influences, it is worth considering some country specific characteristics. For instance, the potential for domestic consumption-led industrialisation depends on the size of the domestic market. This has policy implications. Larger, and already more wealthy, countries should have some advantage in promoting domestically oriented production with sufficient economies of scale. For countries that cannot rely on a large domestic market greater regional integration can be a way of increasing the size of the market.

Countries have been grouped on China-related and country specific characteristics as follows.[11]

The *kmeans* partition method is used on the three-year average (2009-2011) of the following variables, identified as being (potentially) correlated to changes in manufacturing output in the previous section. All countries are ranked either as low, medium and high on each of these four China-related variables:

1. **Chinese Contracted Projects as share of GDP**: to capture potential effects on the supply side (infrastructure development and linkage formation) and on the demand side (employment and income generation).
2. **Exports to China as % of GDP:** to capture possible effects of China's economic rise on the external demand constraint of SSA countries.
3. **Consumer goods imports from China as share of GDP:** to capture possible displacement effects on the domestic markets.
4. **TOT - Terms of Trade (index of export prices over import prices):** to capture the degree to which countries are affected (adversely or positively) by changes in relative price changes on world markets.

In addition, countries have been classified according to their

5. **Manufacturing base:** measured by SSA countries' manufacturing output per head relative to world quintiles, i.e. countries in the lowest quintile are among the 20% least industrialised countries.

11 For a detailed description of variables and data sources see Appendix

6. **Population size:** to approximate the size of the domestic market, with the grouping reflecting the quintile in which the country is found when compared to all countries globally, i.e. a "large" country is among the 20% largest countries of the world, in terms of population.

With some combinations not occurring, it becomes possible to identify five groups and four sub-groups of SSA countries with distinctly different potential China-effects:

- **Group A: Low impact group**. In this group all direct economic flows between them and China are minor. At the same time, consumer goods imports from China also only make up for a small part of GDP. Group A1 combines countries negative or mildly positive terms of trade improvements, and A2 countries which witnesses high increases in their terms of trade. In group A1, changes in manufacturing performance at the macro-level are least likely to be related to China's direct or indirect influence.
- **Group B: Negative impact group.** This group includes countries with low Chinese export demand, low Chinese project presence but contrary to the low impact group high shares of Chinese consumer goods imports relative to GDP. Countries in this group are more likely to suffer from displacement effects on their home markets while benefitting the least from interactions with China that could support domestic market formation.
- **Group C: Medium COP group.** This group includes countries with low Chinese consumer goods imports and medium shares of COPs to GDP. Two sub-groups are formed depending whether they have low (C1) or medium Chinese export demand (C2)
- **Group D. High COP, low export group**. A fourth group includes all countries with low Chinese consumer goods imports, high shares of COP but low Chinese export demand. In groups C and D, we would expect moderately positive China-effects.
- **Group E. High impact group.** Finally, group 5 ranks high in both Chinese export demand and Chinese projects but low in Chinese consumer goods imports relative to GDP. In this group we would expect the strongest positive China impact.

We can now compare and analyse changes in manufacturing sector growth over the past decade (%-increase of manufacturing output per capita in 2011 relative to a 1996-2000 average)[12] for countries within these clusters[13] and the group averages across clusters.

12 to account for any outlier years at the beginning of the period

13 Detailed tables are presented in APPENDIX, pg. 26ff

Table 2 presents the summary results of the *across* cluster analysis. It shows that, on average, the group of countries with high Chinese export market shares *and* strong Chinese contracted project presence have experienced the strongest growth in manufacturing output per capita (on average 129% relative to the 1996-2000 average). They are followed by the group of countries with little exports to China, but many Chinese projects (on average manufacturing growth per capital of 53% over the past 10 years). These two groups perform better than both the low impact and medium COP group (with 23% and 26% average manufacturing output growth per capita respectively). This indicates that the share of COP to GDP is positively correlated to manufacturing sector growth. Within the low impact group, countries with strong improvements in their terms of trade (A2) perform significantly better than the other low impact countries, indicating that indirect China-effects linked to price effects on world markets matter. The group of countries which performs worst the group where Chinese consumer goods imports make up for a large share of GDP (merely 10% of manufacturing output growth on average).

Table 2. Summary Statistics

Group		Group Mean	Group Median	Min	Max
A	**Low impact group**	**22.66**	11.79	-20.49	121.12
A1	*Little effects and no/ low ToT improvement*	11.47	9.06	-20.49	54.48
A2	*Little effects and strong ToT improvement*	63.69	80.51	-10.57	121.12
B	**Negative effect group**	**9.79**	11.39	-5.32	21.68
C	**Medium COP**	**25.79**	13.96	-53.57	145.23
C1	*Medium projects and low exports*	25.20	5.18	-53.57	145.23
C2	*Medium projects and medium exports*	28.76	24.83	-24	85.46
D	**High COP and low exports**	**53.14**	40.25	-34.06	202.65
E	**High COP and high exports**	**129.07**	153.27	-28.32	238.05

How these effects work out in practice and whether manufacturing sector growth can really be linked to these China-effects will have to be ascertained on a case by case basis. What is, worth noting is that we observe considerable variation *within* groups of countries with similar China effects (see appendix for detailed tables). For instance, in the medium impact group C, Lesotho, Mozambique and Tanzania perform considerably better than the other countries. In the high impact group E Angola is performing relatively better than Congo-Brazzaville despite very similar interaction with China and a similar initial degree of industrialisation. The two countries, however, differ in their market size (see details

in APPENDIX group E). Within cluster groups comparative analysis can be used to ascertain whether this factor has played a significant role in explaining the divergence between the two countries and how policy has addressed the challenges associated to China-related effects.

5. Conclusions

China impacts the prospects of industrial development through a multitude of channels. On the supply-side, Chinese firms (operating both through Chinese contracted projects and FDI) can promote knowledge and skill transfer. Chinese contracted projects can have a positive impact on the enabling environment for manufacturing sector development by improving upon basic infrastructure. Finally, Chinese capital goods are potentially more appropriate to serve domestic demand for bottom of the billion products. On the demand-side, increases in export demand and improvement of terms of trade can positively impact on a country's balance of payments position. This effect may be outweighed by displacement effects on world and domestic markets. Furthermore, Chinese contracted projects can contribute to employment and income generation thereby broadening the demand base for consumer durables. Finally, Chinese contracted projects can also induce demand for the production of building materials.

While Chinese engagement with African economies can, indeed, have positive impacts on industrialisation, these will largely depend on policy mediation. What constitutes 'appropriate' policy is itself dependent on our understanding of the workings of the economy and society. This paper has argued that domestic market formation can be considered a core challenge of late-industrialisation which becomes all the more relevant in view of the changes in global demand and price structures linked to China's systemic impact on the world economy. In particular, given China's role in world markets, export-led industrialisation has to be complemented by domestic market formation. In this respect, building up intersectoral supply capacity (in particular linkage formation to the construction, agricultural and mining sector), the strengthening of final consumer demand through labour market and redistributive policies, and the adaption of supply formation to new sources of domestic demand (bottom of the billion products) will be of particular importance.

Beyond the general conclusions reached on the role of domestic market formation, the specific policy challenges facing individual SSA countries will vary depending on the precise nature of their interaction with China. This paper has identified groups of SSA countries with similar patterns of interaction with Chi-

na to provide a starting point for further comparative analysis but also to test whether we do observe significant differences across groups with different predominant China-effects. Such across group variations are, indeed, observable, For instance, countries with high Chinese export demand and high Chinese project presence have had, on average, the highest manufacturing output growth over the last decade. At the same time, countries with more or less similar and indeed very large China effects have experienced very different outcomes in terms of manufacturing sector development. For instance, within the group of countries benefitting from high Chinese export demand and a large volume of Chinese contracted projects, Angola performed much better than for example, Congo-Brazzaville. This points to the need for further research analysing country specific factors, in particular the political settlement and industrial policies in greater detail.

Biographical note

Christina Wolf is a PhD candidate at the school of Oriental and African Studies (SOAS), University of London. Her research interests include late-industrialisation in Africa with special focus on demand-side dynamics as well as China's emerging role in the African construction sector.

Acknowledgements

The author would like to thank Dr Yoon Jung Park, Dr Ben Lampert and Winslow Robertson for their support with this paper as well as the anonymous reviewers for their useful and constructive comments.

References

Amsden A. H. (1989). Asia's next giant: South Korea and late industrialization. Oxford and New York: Oxford University Press.

Amsden A. H. (1990). Third World Industrialization: "Global Fordism" or a New Model? New Left Review 182: July-August. pp. 5–31.

Amsden A. H. (2001). The Rise of the 'Rest' - Challenges to the West from Late-Industrializing Economies. New York and Oxford: Oxford University Press.

Bagnai A., Rieber A., and Tran T. A.-D. (2012). Generalized Balance of Payments Constrained Growth and South-South Trade in Sub-Saharan Africa. In: E. Soukiazis and P. A. Cerqueira (Eds.), Models of Balance of Payments Constrained Growth - History, Theory and Empirical Evidence. Palgrave Macmillan, New York, pp. 113–143.

Bhaduri A. (2006). Strucural Change and Economic Development: On the relative Roles of Effective Demand and the Price Mechanism in a "Dual Economy." In: H.-J. Chang, Rethinking Development Economics. Anthem Press, London, pp. 219–233.

Bloch H., and Sapsford D. (2000). Whither the Terms of Trade? An Elaboration of the Prebisch-Singer Hypothesis. *Cambridge Journal of Economics* 24: 4. pp. 461–481.

Brautigam D. (2008). 'Flying Geese' or 'Hidden Dragon'? Chinese Business and African Industrial Development. In: C. Alden, D. Large, and R. Soares de Oliveira (Eds.), China returns to Africa - A Rising Power and a Continent Embrace. Hurst and Co Publishers, London, pp. 51–68.

Brautigam D.(2009). The Dragon's Gift: The Real Story of China in Africa. Oxford University Press.

Brautigam D. (2011). Aid 'with Chinese Characteristics': Chinese Foreign Aid and Development Finance Meet the OECD-DAC Aid Regime. *Journal of International Development* 23: 5. pp. 752–764.

Brautigam, D., & Tang, X. (2014). "Going Global in Groups": Structural Transformation and China's Special Economic Zones Overseas. *World Development*, 63, 78–91.

Chang D. (2013). Labour and the 'Developmental State': A Critique of the Developmental State Theory of Labour. In: B. Fine, J. Saraswati, and D. Travasci (Eds.), Beyond the Developmental State - Industrial Policy into the Twenty-First Century. Pluto Press, London, pp. 85–109.

Chang H.-J. (1998). Globalization, Transnational Corporations, and Economic Development: Can the Developing Countries Pursue Strategic Industrial Policy in a Globalizing World Economy? In: D. Baker, G. Epstein, and R. Pollin (Eds.), Globalization and Progressive Economic Policy. Cambridge University Press, London.

Chang H.-J. (2002). Kicking Away the Ladder: Development Strategy in Historical Perspective. London: Anthem Press.

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

China Statistical Yearbook. (2009). Foreign Trade and Economic Cooperation, Explanatory Notes on Main Statistical Indicators. 2009.

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

Dutt A.K. (1984). Stagnation, income distribution and monopoly power. *Cambridge Journal of Economics*. 8(1):pp 25-40.

Fine B. (2013). Beyond the Developmental State: An Introduction. In: B. Fine, D. Travasci, and J. Saraswati (Eds.), Beyond the Developmental State - Industrial Policy into the Twenty-First Century. Pluto Press, London, pp. 1–32.

Foster V., Butterfield W., Chen C., and Pushak N. (2009). Building Bridges: China's Growing Role as Infrastructure Financier for Sub-Saharan Africa. World Bank.

Gebre-Egziabher T. (2009). The Developmental Impact of Asian Drivers on Ethiopia with Emphasis on Small-Scale Footwear Producers. *World Economy* 32: 11. pp. 1613–1637.

Geda A., and Meskel A. G. (2010). China and India's Growth Surge: The Implications for African Manufactured Exports. In: F. Cheru and C. Obi (Eds.), The Rise of China and India in Africa: Challenges, Opportunities and Critical Interventions. London and New York: Zed Books, pp. 97–106.

Giovannetti G., and Sanfilippo M. (2009). Do Chinese Exports Crowd-out African Goods? An Econometric Analysis by Country and Sector. *European Journal of Development Research* 21: 4. pp. 506–530. http://doi.org/10.1057/ejdr.2009.20

Gu J. (2011). The Last Golden Land? Chinese Private Companies Go to Africa (IDS working paper No. 365). Brighton: Institute of Development Studies at the University of Sussex: 2011.

Gu J., and Carty A. (2014). China and African Development: Partnership not Mentoring. *IDS Bulletin* 45: 4. pp. 57–69.

Hines J. James R., and Rice E. M. (1994). Fiscal Paradise: Foreign Tax Havens and American Business. *Quarterly Journal of Economics* 109: 1. pp. 149–182.

Kaplinsky R. (2008). What Does the Rise of China Do for Industrialisation in Sub-Saharan Africa? *Review of African Political Economy* 35: 115. pp. 7–22.

Kaplinsky R. (2013). Walking (Stumbling?) on Two Legs: Meeting SSAs Industrialization Challenge. In: J. E. Stiglitz, J. Y. Lin, and E. Patel (Eds.), The Industrial Policy Revolution II - Africa in the 21st Century. Palgrave Macmillan, Basingstoke, pp. 173–197.

Kaplinsky R., and Farooki M. (2012). The Impact of China on Global Commodity Prices: The Disruption of the World's Resource Sector. London: Routledge.

Khan M. H. (2013). Political Settlements and the Design of Technology Policy. In: J. E. Stiglitz, J. Y. Lin, and E. Patel (Eds.), The Industrial Policy Revolution II - Africa in the 21st Century. Palgrave Macmillan, Basingstoke, pp. 243–280.

Lall S. (2004). Selective Industrial and Trade Policies in developing countries – theoretical and empirical issues. In: C. C. Soludo, M. O. Ogbu, and H.-J. Chang, Trade and Industrial Policy in Africa. Africa World Press, pp. 75–109.

Latsch W. (2008). The Possibility of Industrial Policy. Oxford Development Studies 36: 1. pp. 23–37.

Lin J. Y. (2012). From Flying Geese To Leading Dragons New Opportunities and Strategies for Structural Transformation in Developing Countries. *Global Policy* 3: 4. pp. 397–409.

Lipietz A. (1982). Towards Global Fordism? New Left Review 132: March-April. pp. 33–47.

Lo D.(2011). Alternatives to Neoliberal Globalization: Studies in the Political Economy of Institutions and Late Development. London: Palgrave Macmillan.

Onaran Ö. (2011). Globalisation, macroeconomic performance and distribution. In: E. Hein and E. Stockhammer (Eds.), A Modern Guide to Keynesian Macroeconomics and Economic Policies. Edward Elgar, Cheltenham (U.K.) and Northampton (Mass.), pp. 240–266.

Ozawa T., and Bellak C. (2011). Will the World Bank's Vision Materialize? Relocating China's Factories to Sub-Saharan Africa, Flying-Geese Style. *Global Economy Journal* 11: 3.

Razmi A., and Blecker R. A. (2008). Developing Country Exports of Manufactures: Moving Up the Ladder to Escape the Fallacy of Composition? *Journal of Development Studies* 44: 1. pp. 21–48.

Rodrik D. (1996). Coordination Failures and Government Policy: A Model with Applications to East Asia and Eastern Europe. *Journal of International Economics* 40: 1-2. pp. 1–22.

Rosenstein-Rodan P. N. (1943). Problems of Industrialisation of Eastern and South-Eastern Europe. *The Economic Journal* 53: 210/211. pp. 202–211.

Scitovsky T. (1954). Two Concepts of External Economies. *Journal of Political Economy* 62: 2. pp. 143–151.

Shafaeddin M. (2012). Industrial Policy Relevant in the 21st Century? *Journal of Development and Economic Policies* 14: 1. pp. 5–55.

Shen X. (2015). Private Chinese Investment in Africa: Myths and Realities. *Development Policy Review* 33: 1. pp. 83–106.

Szirmai A. (2012). Industrialisation as an Engine of Growth in Developing Countries, 1950-2005. *Structural Change and Economic Dynamics* 23: 4. pp. 406–420.

Tang X. (2010). Bulldozer or Locomotive? The Impact of Chinese Enterprises on the Local Employment in Angola and the DRC. *Journal of Asian and African Studies* 45: 3. pp. 350–368.

Tang, X. (2014). The Impact of Asian Investment on Africa's Textile Industries. Beijing: Carnegie-Tsinghua Center for Global Policy.

Thirlwall A. P. Economic Growth in an Open Developing Economy - The Role of Structure and Demand. Cheltenham (U.K.) and Northampton (Mass.): Edward Elgar: 2013.

Villoria N. B. (2009). China and the Manufacturing Terms-of-Trade of African Exporters. *Journal of African Economies* 18: 5. pp. 781–823. http://doi.org/10.1093/jae/ejp004

Wade R. (1990). Governing the Market: Economic Theory and the Role of Government in East Asian Industrialization (Second Paperback Edition 2004). Princeton: Princeton University Press.

Weiss J. (2011). Industrial Policy in the Twenty-First Century (Working Paper No. 2011/55) (pp. 20–20). UNU-WIDER: 2011.

Young A. A. (1928). Increasing Returns and Economic Progress. *The Economic Journal* 38: 152. pp. 527–542.

APPENDIX

Description of Key Variables:

1. Chinese Contracted Projects as share of GDP: 3 year average (2008-2010), data on COP is taken from the China Statistical Yearbook. For comparability, they were scaled by the recipient country's GDP.

On average, COPs account for 1.5% of GDP in the sample countries. Overall, there is an increasing trend in all sample countries, which reflects China's increasing engagement with SSA countries, but COPs remain nevertheless strongly focussed on individual countries. In 2010, 8 countries (Chad, Niger, Equatorial Guinea, Botswana, Congo Brazzaville, Angola and Mauritania) had a COP to GDP ratio of more than 5%, while 12 countries have COP share of GDP of less than 1% in 2010. The highest COP share of GDP is 5.58%, while the lowest is only 0.008%.

2. Exports to China as % of GDP: 3 year average (2008-2010), data on exports to China is taken from the UN COMTRADE data base (BEC, SITC, revision 2).

On average exports to China make up for 2.7% of GDP in the sample. The highest value is 25.5% in Congo-Brazzaville, the lowest value in average is 0.00014% in Cape Verde.

3. Consumer goods imports from China as share of GDP: 3 year average (2008-2010), data on consumer goods imports from China is taken from the UN COMTRADE data base (BEC, SITC, revision 2).

On average, consumer goods imports from China make up for 3.51% of GDP in the sample. The highest sample value can be found in Togo, where consumer goods imports from China account for more 29.05% of GDP. The lowest sample value can be found in Swaziland, where they account for 0.09% of GDP.

4. TOT - Terms of Trade (index of export prices over import prices): 3 year average (2008-2010), data are extracted from the World Bank WDI database.

The highest improvement in terms of trade can be found in Angola (155), the lowest average in Togo (34).

5. Degree of industrialisation: measured by SSA countries' manufacturing output per head relative to world quintiles, i.e. countries in the lowest quintile are among the 20% least industrialised countries. Calculations are based on UN National Accounts Main Aggregates Database.

We find 27 SSA countries in the lowest quintile, 12 in the second lowest quintile, three countries (Gabon, Botswana and Namibia) in third quintile, three countries (Mauritius, Seychelles and Swaziland) in the fourth quintile, none in the top quintile.

6. Country size: approximated by SSA countries' population size, with the grouping reflecting the quintile in which the country is found when compared to all countries globally, i.e. a "large" country is among the 20% largest countries of the world, in terms of population. Data are based on UN National Accounts Main Aggregates Data Base.

Detailed Cluster Tables

Using kmeans partition, 3 groups (low, medium and high) are calculated on all of the above variables. Based on this, countries are grouped into distinct impact groups as follows:

Group A: Low impact group

Country	Degree indus.	Country size	Population	Δmanf	COP % GDP	X_{china} % GDP	M_{cons} % GDP	ToT	Cluster COP	Cluster XCHN	Cluster MCGDP	Cluster ToT	Group
Burundi	1	Medium	8,575,172	-7.3	0.6	0.08	0.52	138	1	1	1	1	A1
Sierra Leone	1	Medium	5,997,486	14.52	1.26	0.36	2.39	68.5	1	1	1	2	A1
Burkina Faso	1	medium-large	16,967,845	-20.49	0.02	1.17	0.22	102	1	1	1	1	A1
Malawi	1	medium-large	15,380,888	17.08	1.12	0.1	1.12	88.5	1	1	1	2	A1
Uganda	1	Large	34,509,205	54.48	0.98	0.13	1.37	107	1	1	1	1	A1
Cape Verde	2	very small	500,585	-0.41	0.69	0	1.67	101	1	1	1	1	A1
Sao Tome and Princ.	2	very small	168,526	20.07	0.32	0.01	1.13	130	1	1	1	1	A1
Senegal	2	medium-large	12,767,556	4.77	1.26	0.25	1.78	97.6	1	1	1	1	A1
Cameroon	2	medium -large	20,030,362	9.06	0.45	1.9	1.33	137	1	1	1	1	A1
Namibia	3	Small	2,324,004	43.19	1.14	3.59	3.69	126	1	1	1	1	A1
Swaziland	4	Small	1,203,330	-8.82	0.06	0.31	0.09	107	1	1	1	1	A1
Nigeria	1	Large	162,500,000	80.51	1.09	0.41	1.44	186	1	1	1	3	A2
Côte d'Ivoire	2	medium-large	20,152,894	-10.57	0.12	0.35	1.14	150	1	1	1	3	A2
Gabon	3	Small	1,534,262	121.12	1	6.74	0.48	197	1	2	1	3	A2

Group B: Negative impact group

Country	Degree indus.	Country size	Population	Δmanf	COP % GDP	X_{china} % GDP	M_{cons} % GDP	ToT	Cluster COP	Cluster XCHN	Cluster MCG-DP	Cluster ToT	Group
Gambia	1	Small	1,776,103	-5.32	0.27	0.86	8.07	97.4	1	1	2	1	B
Djibouti	1	Small	905,564	21.68	3.57	0.08	23.28	82.6	2	1	3	2	B
Benin	1	Medium	9,099,922	5.21	0.38	1.67	26.06	92.4	1	1	3	1	B
Togo	1	Medium	6,154,813	17.57	1.44	1.36	29.05	31.5	1	1	3	2	B

Group C: Medium COP group

Country	Degree indus.	Country size	Population	Δmanf	COP % GDP	X_{china} % GDP	M_{cons} % GDP	ToT	Cluster COP	Cluster XCHN	Cluster MCGDP	Cluster ToT	Group
Comoros	1	Small	753,943	-9.87	2.2	0	0.71	67.2	2	1	1	2	C1
Eritrea	1	Medium	5,415,280	-53.57	2.2	0.08	0.66	75.7	2	1	1	2	C1
Central Afr. Republic	1	Medium	4,486,837	5.18	1.6	1.03	0.39	84	2	1	1	2	C1
Mali	1	medium-large	15,839,538	-22.2	3	0.63	0.94	137	2	1	1	1	C1
Zimbabwe	1	medium-large	12,754,378	-20.86	1.95	1.01	1.03	103	2	1	1	1	C1
Madagascar	1	medium-large	21,315,135	-6.91	1.82	0.81	2.75	74.5	2	1	1	2	C1
Guinea	1	medium-large	10,221,808	24.88	1.73	0.55	5.28	110	2	1	1	1	C1
Rwanda	1	medium-large	10,942,950	44.4	1.69	0.6	0.38	228	2	1	1	3	C1
Mozambique	1	medium-large	23,929,708	145.23	2.86	1.76	3.29	105	2	1	1	1	C1
Tanzania	1	Large	44,924,042	89.18	2.72	1.08	3.34	128	2	1	1	1	C1
Lesotho	2	Small	2,193,843	129.46	1.99	0.14	1.34	98.4	2	1	1	1	C1
Ghana	2	medium-large	24,965,816	29.21	1.87	0.33	4.62	167	2	1	1	3	C1
Kenya	2	Large	41,609,728	4.91	1.97	0.1	3.62	90	2	1	1	2	C1
Seychelles	4	very small	86,879	-3.8	4.33	0.13	0.95	72.9	2	1	1	2	C1
Mauritius	4	Small	1,306,593	22.74	1.51	0.08	2.15	76.8	2	1	1	2	C1
DR Congo	1	Large	67,757,577	-24	4.26	14.2	2.22	133	2	2	1	1	C2
Zambia	2	medium-large	13,474,959	24.83	2.28	9.61	0.34	173	2	2	1	3	C2
Sudan	2	Large	44,632,406	85.46	3.63	9.07	1.84	195	2	2	1	3	C2

Group D: High COP, low exports group

Country	Degree indus.	Country size	Population	∆manf	COP % GDP	X_{china} % GDP	M_{cons} % GDP	ToT	Cluster COP	Cluster XCHN	Cluster MCGDP	Cluster ToT	Group
Guinea-Bissau	1	Small	1,547,061	-34.06	5.16	0.27	0.69	80.5	3	1	1	2	D
Liberia	1	Small	4,128,572	202.65	7.51	1.04	6.63	126	3	1	1	1	D
Niger	1	medium-large	16,068,994	-17.63	7.45	0	0.6	150	3	1	1	3	D
Chad	1	medium-large	11,525,496	33.53	8	2.31	0.27	180	3	1	1	3	D
Ethiopia	1	Large	84,734,262	87.39	4.62	0.7	0.89	119	3	1	1	1	D
Botswana	3	Small	2,030,738	46.96	6.3	0.76	1.96	82.2	3	1	1	2	D

Group E: High impact group

Country	Degree indus.	Country size	Population	∆manf	COP % GDP	X_{china} % GDP	M_{cons} % GDP	ToT	Cluster COP	Cluster XCHN	Cluster MCGDP	Cluster ToT	Group
Mauritania	1	Small	3,541,540	-28.32	4.9	29.9	5.44	142	3	3	1	3	E
Equatorial Guinea	1	Small	720,213	210.48	10.96	10.0	0.62	207	2	3	1	3	E
Congo	2	Small	4,139,748	96.07	9.02	28.9	2.15	186	3	3	1	3	E
Angola	2	medium-large	19,618,432	238.05	5.55	24.5	1.53	211	3	3	1	3	E