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# **INNOVATION FOR PRO-POOR GROWTH: FROM REDISTRIBUTION WITH GROWTH TO REDISTRIBUTION THROUGH GROWTH**

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## SUMMARY

Despite an accelerating pace of growth over the past decade, outside of China most low and middle income economies have seen an increase in the number of people living below \$1.25 per day. The development agenda therefore necessarily has to engage with the trajectory of growth. One important determinant of the structure of growth is the path of innovation. The locus of global innovation in the twentieth century meant that the bulk of innovation was inappropriate for meeting the needs of the poor. However, a series of disruptive factors are nudging the innovation trajectory in new potentially pro-poor directions, such that Appropriate Technologies will increasingly be driven by the market rather than (as in the past) by non-profit organisations. This has resonance with the Redistribution from/with/through Growth debate in which Richard Jolly was a prime mover in the 1970s. It also has implications for policies which might speed-up the diffusion of new efficient appropriate technologies, hence contributing the adoption of pro-poor growth strategies in low and middle income economies.

### Keywords

Economic Growth

Pro-poor growth

Inclusive Growth

Appropriate Technology

Innovation

Table 1: GDP Growth Rates and Numbers Living Below MDG1, 1990-2008

	GDP growth p.a (%)		Living below \$1.25 per day (MDG1) (\$2005PPP)	
	1990-2000	2000-2008	1988-90	2007-2008
World	2.9	3.1	1,668	1,329
China	9.9	10.4	724	208
India	5.5	7.0	414	456
SSA	2.2	4.9	224	355

Source: Poverty numbers from Chen and Ravallion (2008) and Sumner (2010). Growth rates from WDI, accessed October 2011

## 1. INTRODUCTION

It is perhaps unusual to begin a paper with a table. But the data in Table 1 tells a compelling story. The first decade of the twenty-first century witnessed an acceleration of growth in many low and middle income countries. These rates were high by comparison with the last decade of the twentieth century (and even more so in comparison to the lost development decades of the 1980s), and by comparison with global average growth rates in the same periods. Rapid and accelerating growth was most pronounced in China and India, but was also evidenced in middle income countries as a whole, as well as in SSA. At the same time, the numbers living globally below the MDG1 \$1.25pd benchmark (hereafter referred to as MDG1) fell by 339m between 1998-1999 and 2007-2008. This is often taken to indicate progress in global poverty reduction. Yet, the decline in the poverty number in China (516m) exceeded the global total (339m), which means that outside of China, the number living globally below MDG1 increased by 177m. In SSA, a more than doubling of the annual average growth rate resulted in a 59 percent increase in absolute poverty numbers. In India, the recent growth miracle has been associated with a further 42m people living below MDG1.<sup>1</sup> Strikingly, despite rapid economic growth, there was a more than doubling of the number of the absolutely poor in middle income countries and currently, more than 70 percent of those living below MDG1 live in this rapidly growing group of economies.<sup>2</sup>

What these numbers point to is the *poverty-inducing* structural character of the dominant growth model. It is clear that in many countries, a significant proportion of the population is being excluded from the fruits of growth. This impoverished population is made up of two groups. The first are those living in Lewis's traditional sector, eking out a living in subsistence agriculture or in low-paid formal-sector employment. The second are the truly-marginalised, those living without access to land or formal-sector employment. Notably, for the first time in the world's history, more than half of the population lives in cities (UN-Habitat, 2010). As Davies points out, the global poor increasingly live in sprawling urban slums, where much of the landless population is unemployed (Davies, 2004). This bifurcated structure between the haves and the have-nots shows superficial similarities with Lewis' two-sector model. However, his "traditional sector" had means of subsistence (Lewis, 1954). To this we now need to add a rapidly growing "third sector" – that of the wholly excluded.

I believe that there are three primary and related reasons which explain this structural character of the current dominant global growth trajectory. The first is that it arises as a direct result of deepening globalisation (Kaplinsky, 2005).

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<sup>1</sup> As Adrian Wood succinctly observes, the real "miracle" of India's eight percent growth rate is that it has been achieved with only half of the population participating, whose incomes must have been growing at about 16 percent and the other half's incomes not growing at all.

<sup>2</sup> Care should be exercised in interpreting these data on middle income economies, since the list of countries incorporated in the middle income category changed between 1988-1990 and 2007-08.

Globalisation allows high income earners who possess various forms of rent (such as natural resources, skills, entrepreneurship and patents) to valorise these rents over a larger market. At the same time it exposes those with low incomes and without rents to intensified competition. For example in the case of unskilled labour, the global labour pool has doubled in the past two decades, following the entry of China, India and the former Soviet Union into the global economy.<sup>3</sup>

The second factor explaining the distributional character of this global growth trajectory is the financialisation of the global economy (Lazonik, 2010). This has placed a growing emphasis on high-income yielding arbitrage rather than production, with this arbitrage being a function confined largely to the high-income economies and to the capital cities of a selected few middle income countries. It has led to change in the terms of trade between producers of goods and non-financial services, and the financial services, shifting distributional patterns in favour of the financial sector. It has also led to, and is likely to continue to lead to growing volatility of incomes throughout the global economy. For example, the financial crisis of 2008 temporarily pushed almost 100 million Indonesians into absolute poverty.

The third factor which explains why enhanced growth co-exists with, and indeed causes absolute poverty arises from the dominant trajectory of innovation. Its capital-intensive nature,<sup>4</sup> its scale intensity, its dependence on high-quality networked infrastructure, its reliance on skilled labour and its product portfolio (producing products which meet the needs of the rich) all have the effect of disadvantaging the poor, both as consumers and producers. Moreover, much contemporary technology is also destructive of the environment, not least in relation to its energy-intensity, and this has disproportionately negative impacts on the global poor. Whilst innovation is only a partial contributor to the persistence of global poverty it is an important one, and one which is largely neglected in the theorisation of innovation (Cozzens and Kaplinsky, 2009).

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<sup>3</sup> China's success in reducing absolute poverty in the context of its rapid outward oriented growth and deepening participation in the global economy is often used to argue that the dominant growth model is indeed poverty-reducing. However, this focus on the success of China ignores the impact of its growth on other economies. Chinese competitiveness in third-country markets places pricing pressures on the exports of other economies (Kaplinsky and Santos-Paulino, 2006; Fu, Kaplinsky and Zhang, 2009; Wood and Meyer 2011) and displaces low income economy exports from these markets (Kaplinsky, McCormick and Morris, 2010). Its exports also undermine domestically oriented manufacturing in other low income economies. Generalising from China's experience thus suffers from the familiar fallacy of composition argument.

<sup>4</sup> This is not the place to engage in a critique of mainstream economics. However, the assumption in this mainstream literature of a clearing labour-market (which supports the logic of specialisation in comparative advantage) is critical to the win-win outcome of globalisation. Once this assumption of full employment (albeit with frictional unemployment) is removed and it is acknowledged that the global economy may be characterised by a structural reserve army of labour, then the rosy globalisation scenario falls away. The spectre of a large pool of structural unemployment is central to Marx's analysis of the rising "organic composition of capital", that is a systemic trend towards labour-saving technical progress.

It is this third factor explaining the persistence and growth of poverty in the context of rapid growth which is the subject matter of this paper. I will seek to explain why and how the historic trajectory of innovation has led to poverty and to the exclusion of much of the global population from the fruits of growth (Sections 2 and 3). I will then describe the emergence of a new innovation trajectory, and in particular the significance of innovations which have a southern origin (Section 4). This is likely to dampen the poverty-inducing character of growth in low and middle income economies. Then, in Section 6 I will consider the implications of this new trajectory of innovation in the light of the discussion on Redistribution with Growth in which Richard was a central actor during the 1970s and 1980s. The paper concludes with a short discussion of policy implications

## **2. IN WHAT WAY HAS INNOVATION CONTRIBUTED TO EXCLUSIVE GROWTH?**

Schumpeter defined entrepreneurship as the act of innovation, that is the application of a new idea to meet the needs of consumers. His primary focus was on the search by entrepreneurs for new combinations which would enable them to escape – at least temporarily – from competition and thereby to earn higher profits (“entrepreneurial rents”).

With a view to developing pro-poor innovation policies, three lessons can be drawn from this Schumpeterian perspective. First, whilst a profit-driven agenda explains the bulk of innovation in the global economy, there is no intrinsic reason why innovation should always occur as a commercial activity. Social innovation – for example by national health services – is an important realm of technological change. Second, the Schumpeterian perspective highlights the role of social actors in the innovation cycle. Amongst other things, this helps us to understand that technologies are predominantly shaped by their social context rather than a result of unfolding “natural laws”. Third, as a consequence of the social context of innovation, it highlights the limits to interventions which are confined to physical technologies without addressing the social and economic context of innovation. As we will see below, these three insights have important implications for the trajectory of innovation and for pro-poor innovation policies.

Value chain theory augments our understanding of innovation by adding two further forms of integration to the product and process innovation which has long preoccupied innovation theory (Humphrey and Schmitz, 2000). Functional innovation reflects repositioning within the chain (for example moving from production to design), and chain integration reflects movement to a different chain of activity.

Working with these two theoretical frameworks we can observe the dominant trajectory of global innovation over the past century. As a general rule the consumers whose needs have historically been targeted by the global innovation system (product innovation) have been those of the higher-income

consumers located in the relatively rapidly-growing northern economies. The physical “embodied” technologies which have been developed (process innovation) have in general been increasingly large scale and have depended on reliable, high-quality and network-driven infrastructure (such as electricity grids, fixed telecoms, integrated water and sanitation systems). They have also generally been labour-saving (and within this have been increasingly reliant on skilled-labour) and capital using. And the widespread availability of relatively cheap energy sources has meant that they have been energy intensive, and often also heavily polluting in nature. The organisation of value chains, which have become increasingly fragmented and global (functional innovation) has led to the clustering of producers in low-income economies in highly competitive niches of the value chains, often confined to simple labour-intensive assembly and subject to intense wage-competition. Moreover, meeting the needs of high income consumers in high income northern economies has also led to a situation in which value chains are increasingly standards-intensive (Kaplinsky, 2011), thereby placing barriers to entry to small-scale informal and often illiterate producers. Finally, moving to new lines of activity (chain upgrading) in an increasingly knowledge-driven economy has required a range of complex capabilities which are beyond the reach of poor producers and low income economies.

Putting these trends together we can see how the historical path of innovation has acted to exclude poor producers from production, particularly for production in global value chains, and how the needs of poor consumers have been poorly met.

### **3. WHY HAS INNOVATION BEEN EXCLUSIVE?**

The theory of induced innovation provides a framework for understanding how this exclusive technological trajectory has evolved. It identifies three factors which determine the nature and trajectory of technological progress (Ruttan, 2001). The first is the nature of demand, with innovators responding to the effective demand of consumers with disposable cash incomes. The large and growing markets in the post-war era were of high-income consumers in developed economies rather than low income consumers in developing economies.<sup>5</sup> The second is factor prices and the quality, nature and price of infrastructure. Innovation occurring in high income economies reflects these operating conditions and has been capital intensive, large in scale and dependent on reliable, widely-diffused and centralised infrastructure. The third factor identified by Ruttan, based on insights from institutional economics (Dosi, 1982), reflects the path-dependencies of innovating firms. Their bounded rationality means that northern-based firms innovated in areas closely related to their past success, reinforcing a trajectory of innovation which was largely focused on meeting the needs of high-income consumers and operating conditions in high-income economies. We can add to Ruttan’s

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<sup>5</sup> It is striking that Ruttan’s core text on technical change devotes less than one page to demand as an inducement to innovation. The development literature, by contrast, has given much greater consideration to the important role played by demand and the interaction between product and process innovation (Stewart, 1976 and 1979, Langdon, 1981).

three-fold induced innovation framework the role of regulatory systems. An increasingly tight and enduring systems of global intellectual property rights has created major barriers to the entry to new innovators. The under-pricing of the real cost of energy and environmental externalities (a reflection of regulatory systems) has led to the development of energy-intensive and polluting innovation streams.

In reflecting this innovation trajectory we need bear in mind that until very recently the overwhelming proportion of resources which go into innovation have been in the high income economies. The Sussex Manifesto of 1970 (Singer et al, 1970) estimated that around 98% of global R&D expenditure occurred in high income economies, and much of 2% which took place in the developing world was focused on the needs of high income consumers and the formal sector. But R&D is only one source of technological change and, although unrecorded, a very large proportion of the incremental change which occurred during the process of production was similarly located in high income economies. Where incremental innovation has occurred in low income economies, much of this has been in TNCs originating in the high income economies and has been geared to meeting the routines of their global operations.

#### **4. A RESPONSE TO MARGINALISATION: THE RISE (AND FALL) OF THE AT MOVEMENT**

It is not surprising, therefore, that the dominant global innovation path has, until recently, contributed in important ways to the persistence of global poverty and to a widespread increase in global inequality. One response to this northern-focused innovation trajectory - which produced products for high income consumers and technologies which saved on labour, were large in scale and which depended on reliable and centralised infrastructural networks - was the development of the Appropriate Technology (AT) movement. This comprise a growing spread of NGOs, often with a global reach, such as the Intermediate Technology Development Group in the UK (ITDG, now Practical Action). In spirit many of these AT NGOs drew their inspiration from the values of Ghandi's Swadeshi Movement in India and promoted globally by Schumacher (Schumacher, 1973). They promoted the development of new ATs, often comprising a blending of traditional and new technologies (Bhalla, 1984) and the diffusion of existing ATs both within and across national boundaries.

Thus, in principle, the development of AT offers the prospect of providing the underpinnings of a more inclusive and less environmentally damaging growth path. But three problems have beset the AT movement. First, empirical enquiry showed that the problem with the ATs which they disseminated, was that most were "economically inefficient" (that is, making greater use of both capital and labour per unit of output), a critique widely-recognised in the literature (Eckaus, 1955 and 1987; Stewart, 1979; Bhalla, 1975; Emmanuel, 1982). Second, "appropriateness" is inherently contextual, and involves trade-offs between objectives (Kaplinsky, 1990). Many labour-intensive and small-scale technologies are relatively energy-intensive. The AT movement often

failed to recognise these trade-offs and was guilty of “over-promise”, undermining the credibility of the technologies it was promoting. And, third, the social context of innovation was not conducive to their diffusion. The dominant innovators in the global economy were located in northern economies and had little or no interest in meeting the needs of the income-less global poor, or of incorporating the poor in global value chains.

As a consequence of these factors, the diffusion of ATs has generally been undertaken by not-for-profit NGOs. They have been widely scorned in many low income countries, particularly by the urban elites who have modelled their consumption patterns and life trajectories on their peers in high income countries. The AT movement may have grown rapidly in the 1970s and early 1980s, but it was a truncated growth and it was consigned to the margins of economic growth.

## **5. THE WORLD IS CHANGING: FORCES OF DISRUPTION**

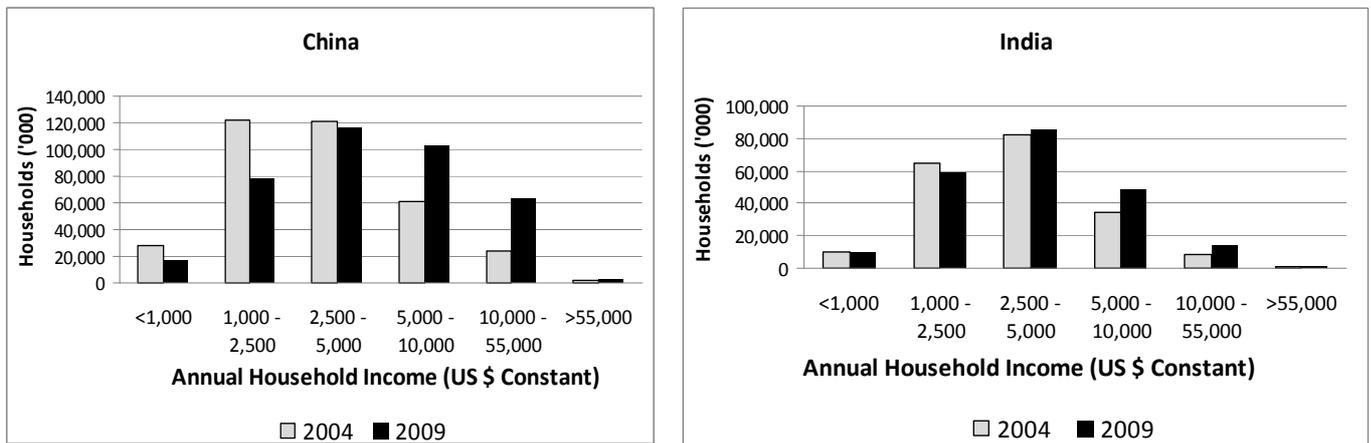
We are now witnessing the emergence of a series of disruptive trends which threaten to disrupt the dominance of a global innovation system which target the needs of high-income consumers by utilising capital-, scale- and standards-intensive technologies which are sensitive to the quality, reliability and ubiquity of infrastructure. They offer the potential to provide ATs which are efficient and which provide opportunities for profit-seeking innovation. We will consider four of these emerging disruptive factors – the dynamism of low income markets, the availability of new radical technologies, the global diffusion of innovative capabilities, and the emergence of new innovation actors.

### The character and dynamism of low income markets

Despite the revival of economic growth in the USA and other northern economies after the financial crisis of 2008, most of the high income markets continue to experience two structural deficits. The first is with regard to debt, where despite a narrowing of deficits in the private sector, sovereign debt remains high and continues to grow. The second, less widely recognised but equally germane to our discussion, is the level and persistence of balance of payments deficits. The structural rebalancing required to meet both of these deficits will necessarily lead to a decline in demand in high income markets, whether resulting from orderly or disorderly process of adjustment (Kaplinsky and Farooki, 2011). Increasingly, and with some irony, observers refer to the likelihood of a “lost decade” in the US and parts of Europe, mirroring the experience of Latin America and Africa in the 1980s and of Japan in the 1990s. By contrast, China, India, Brazil and other emerging economies seem unlikely to suffer from the same growth trauma, and growth in these low income economies is likely to remain high and robust, at least by comparison with the northern economies. The Africa-Asia-Central Europe head of Unilever estimated in 2010 for example that, by 2020, nearly 80 percent of incremental consumption growth will come from emerging economies.

These growing low income economy markets are distinctive. On the one hand, they reflect a rapid growth in demand by an urban middle class which is not very different from most consumer markets in the north, searching for globally-branded, differentiated and high-quality positional goods. For example, in 2010 the most rapidly-growing market for Mercedes Benz and Rolls Royce cars was in China. But on the other hand, there is a rapidly-expanding and very large market of poor consumers. In particular, in both China and India, there is a clustering of households with total household incomes of less than \$5,000 in 2009. In 2009 they comprised 56 percent of all households in China, and 71 percent in India (Figure 1). According to McKinsey calculations, the number of Indian households with an annual income between \$7,000 and \$10,000 will catapult from 14m to 200m between 2010 and 2015 (Financial Times, 5<sup>th</sup> January 2011). Critically, incomes in this category of income recipients is growing rapidly.

**Figure 1: Number of households, by disposable income, China and India, 2004 and 2009**



Source: Compiled from <http://www.portal.euromonitor.com> accessed July 2010

In all probability, or at least by hypothesis (drawing on Ruttan's induced innovation framework), the driving of consumption by low income households will induce a different set of products compared to high-income earners in northern economies. These product innovations are likely to be differentiated to meet the environments in which they are developed. As McKinsey advises its clients, these innovations will be distinctively different from those produced for high income global consumers, somewhere between the positional goods of high income consumers and the basic functions and low acquisition cost goods of the very low income defined by Prahalad (2005) as those at the "bottom of the pyramid". It is this "bottom of the pyramid" market which has begun to draw the attention of many of the world's largest TNCs, particularly those selling final consumer goods such as Unilever, Proctor and Gamble and Nestles. Low income consumers may prefer "high quality" branded goods, but they lack the incomes required to both acquire and then consume these more expensive goods. In these circumstances they will make do with what they can afford, rather than what they would prefer to consume.

A further important reflection of the changing geography of global consumption has been the shift of final market in many sectors from high income countries to low income countries. This has had important implications for the role of standards in global value chains. Products destined for high income consumers and countries have tended to involve the extensive use of both product and process standards. There is considerable evidence that these standards have acted to exclude low income producers from global value chains. By comparison, products destined for low income markets have been relatively devoid of standards (Kaplinsky, Terheggen and Tijaja, 2011), removing some of the barriers to entry for small scale producers. However, insofar as these standards have protected the environment and the exploitation of vulnerable labour, there has been some trade-off between the various consequences of production processes and products which affect poor producers and consumers.

Beyond low income households as sources of consumption is their role as providers of wage labour. The incomes which they earn reflect wage rates which are far lower than those in high income economies. Despite rapid rises in wages in China, for example, even in the coastal regions where wage rates have risen dramatically, most factory workers earn less than \$2 per hour. Beyond China is regional Asian labour forces where wages are even lower. These low wage rates reduce the incentive for entrepreneurs to develop and commercialise capital-intensive technologies.

#### The emergence of new radical technologies

The literature on long-wave cycles and innovation distinguishes a spectrum between incremental changes on the shopfloor and farm and the revolutionary heartland technologies which sweep across sectors rapidly in disruptive waves of creative destruction (Freeman and Perez, 1988). Somewhere in between these extremes are a series of radical technologies which provide the opportunity for new, higher quality and multi-functional products produced with different technologies and delivered through new business-models. And which are applicable across a range of sectors. Historically, plastics and nuclear power have emerged as examples of this form of radical technical progress.

In the current era, we can witness the emergence of four new technological families, each of which has widespread potential significance for producing products for poor consumers and/or for including poor producers in efficient production processes. The first of these is the rapid growth and diffusion of information and communication technologies. Perhaps the most pro-poor innovation relevant outcome has been the benefits provided by mobile telecommunications for low-cost and distributed information diffusion. Whilst most attention has been placed on their contribution to consumer welfare, it may well be that the capacity which mobile telephony provides as a capital good is of greater historical significance. Farmers and distributed producers in other sectors have greater access to market information and increasingly also to knowledge-intensive extension and business services. The second relevant emerging technology are the new forms of energy production, renewables

such as solar and wind power, and biomass. Again, as in the case of mobile telephony, these new technologies both enhance consumer welfare and provide the potential for low-cost and distributed energy supply. The distributed character of both mobile telephony and renewable energy is particularly relevant for poor consumers who were previously prevented from benefitting from these services because with previous technologies, access followed from large and capital-intensive investments in network-intensive infrastructure. By contrast, the new technologies allow access to small scale consumers and producers, particularly those living in non-urban areas. The final two sets of emerging pro-poor relevant technologies are nanotechnology and biotechnology (Singer and Daar, 2001). Both of these provide the scope for radically new technologies which have important potential applications in meeting the needs of poor people, and, small scale applications through, for example, new diagnostic kits and new water purification systems.

Each of these cases of radical technological development provide the possibility for shaping technological progress in particular directions. For example, there is no necessary reason why renewable energy should provide for distributed production. In the northern economies, the feed-in tariffs designed to promote the adoption of solar PV and other renewable forms of energy supply have led to a system in which the generated energy is fed into the national energy grid, and new energy producers do not consume the energy they produce. However, equally, these new sources of energy-production can be consumed directly at-source by producers, allowing for distributed production and use.

#### The global diffusion of innovative capabilities

Recent decades have seen a substantial increase in the share of global manufacturing value added in low income countries in general, and in China in particular. The global diffusion of manufacturing value added has been associated with a pervasive increase in capabilities in many low-income economies. These capabilities have been built on a number of strands of activity. The first has been the relatively passive processes of learning-by-doing, and the more active processes of “learning by adaptation” and “learning by capacity expansion” (Katz, 1987; Bell, 2007). These firm- and farm-level activities – generally associated with efforts to make maximum use of purchased, and often imported technologies – arise out of incremental changes undertaken in the operation of equipment. They are often also acquired through participation in global value chains (Kaplinsky and Morris, 2001; Gereffi, Humphrey and Sturgeon, 2005). Formally-constituted R&D is another important component of innovation (although often overestimated in importance). By 2000, more than one-fifth of global R&D was located in the developing world (Hollanders and Soete, 2010), an increase of major significance given the estimated share in 1970 of only 2% (Singer et al, 1970). An increasing share of this dispersed R&D occurs as a result of outsourcing by global TNCs, particularly to China and India (Bruche, 2009). This global diffusion of capabilities to countries with large populations of low-income consumers provides the scope for a new source of innovation, potentially disruptive to the historic dominance of northern sourced technological change.

### Disruptive entrepreneurs

However, the existence of capabilities, the availability of radically new technologies and the growth of effective demand from poor people do not in themselves result in innovation. Instead, as Schumpeter highlighted, innovations arise as a consequence of purposive action by entrepreneurs developing and utilising inventions in product, process and organisation in the search for super-normal profit.

We can distinguish a number of different categories of entrepreneurs who might play a role in the innovation of pro-poor products and services and process technologies. One key set of actors are the established global TNCs seeking to capture the “fortune at the bottom of the pyramid”, particularly in the FMCG (fast-moving-consumer-goods) sectors, but also in medical instruments (where General Electric is increasingly using India and China as sources of low-cost innovation, Immelt et. al, 2009). Prahalad, was one of the first to spot the potential which the growth which these low income markets offered for profitable production and drew attention to the market potential of this new class of consumers (Prahalad and Hammond, 2002). He observed that there were four billion people living at per capita incomes below \$2,000 p.a.. He described their growing consumption power as comprising a “fortune at the bottom of the pyramid”. Crucially, and perhaps not surprisingly given that he worked in northern business schools, Prahalad believed that this provided a profitable market opportunity for transnational corporations (TNCs) rather than for the small-scale and locally-owned firms long identified in the appropriate technology and informal sector literature as being key providers for low income consumers. He argued that “[b]y stimulating commerce and development at the bottom of the economic pyramid, [northern-based] MNCs could radically improve the lives of billions of people... Achieving this goal does not require multinationals to spearhead global social development initiatives for charitable purposes. They need only act in their own self interest, for there are enormous business benefits to be gained by entering developing markets” (Prahalad and Hammond, 2002: 4).

But this belief that northern TNCs would be able to grasp this market is an untested assertion. As Christenson’s widely-cited work has pointed out, large firms which dominate industries are often extremely good at hearing the demands of their existing customers, but very poor at hearing those of new customers. His argument is essentially that these weakness arise directly as a consequence of their core strengths which is that they invested considerable resources in acutely understanding the needs of their core customers. Thus when a new technology arrives which fails to address these known needs effectively, the major innovating firms are dismissive. For example, IBM neglected the arrival of the 5<sup>1/4</sup> floppy disc since it was hopelessly inadequate for the needs of its corporate and defence-sector customers who required vast quantities of data-storage. IBM’s problem was that it knew its existing customer base too well, but it had no feel for a new generation of much less demanding customers. As Christenson observed the previously dominant industry leaders “.....were as well-run as one could expect a firm managed by mortals to be – but that there is something about the way decisions get made in successful organisations what sows the seeds of eventual failure”. They

failed precisely because they listened to their customers so well – “the logical, competent decisions of management that are critical to the success of their companies are also why they lose their positions of leadership“(Christenson, 1997: xiii).

If the leading northern-origin TNCs are unable to exploit this emerging low-income market effectively, there are a variety of domestic firms in low income economies which recognise the potential for profitability in targeting the needs of low income consumers, and addressing these needs through innovations of basic, labour-intensive technologies. A widely-cited example (which is not without its teething problems) is the Tata Nano in India, a basic car priced at less than \$2,500 and aimed at low income consumers moving up from a two-wheeled scooter. One conception of this car is also to produce it in kit form so that consumers can tailor the body to meet their needs (adding trailers, for example) so that the car becomes a capital good. In China, Haier (which is now the world’s second largest producer of white goods), discovered that some rural consumers used their washing machines both for clothes and to wash potatoes, so they redesigned their machines to make them more robust and to serve both consumer needs effectively.

Less visible, and below the radar, are a plethora of small and medium scale entrepreneurs in the south who are introducing small scale innovations without inputs of formal R&D, and with little attention being paid to intellectual property rights or product and process standards. For example, DMT Mobile Toilets is a commercial enterprise that produces, rents and maintains safe, sanitary portable toilets in West Africa. Lifeline Energy conducts extensive end-user research and then develops and distributes appropriate, clean energy products, including radios, a range of lights, solar panels and MP3-enabled Lifeplayers that allow pre-loaded educational content as well as internet access.

Another relatively new carrier of innovation are the public-private partnerships (PPPs) constructed by international organisations such as the Bill and Melinda Gates Foundation, the Global Alliance for Vaccines and Immunization (GAVI) and the International AIDS Vaccine Initiative (IAVI) to deal with global health problems. These involve building innovation consortia combining northern and southern research institutions, universities and firms. Unlike private sector entrepreneurs who seek to tap into growing bottom-of-the-pyramid cash-markets of private consumption, this PPP-entrepreneurship tends to focus on innovation in sectors where poor consumers either do not have the incomes to allow the private entrepreneurs to capture the fortune at the bottom of the pyramid, or where the public-good nature of the product and service does not allow private entrepreneurs to appropriate their innovations.

#### The combined impact of disruptive forces on the innovation trajectory

The single most important conclusion which emerges from the above analysis is that there has been a sea-change in the determinants of pro-poor innovation. In the past these were often inefficient in nature, were promoted by civil-society organisations and were scorned by both consumers and formal sector producers. By contrast, as a result of the disruptive factors

discussed above, ATs have moved from the margin of economic accumulation. Critically, their diffusion is driven by a profit-seeking Schumpeterian rather than a normatively-driven Schumacherian motor. There is widespread evidence that market-driven diffusion is occurring and that this has resulted in pro-poor outcomes. For example, in the Cameroons (Khan and Baye, 2011). Chinese motorcycles are less durable than Japanese motorcycles and require more repairs. However they cost one-third of the cost of the higher quality products and this has provided the opportunity for low income school-leavers to enter the market as taxi-drivers and logistics-providers. Similarly, Chinese-produced batteries have half the operating-life of northern-branded products, but cost only one-third as much. In both cases, the Chinese products both lower the entry-costs for purchases and reduce the unit-costs of consumption.

Similarly, as a recent article in the Economist documents, there is also a rapid development and diffusion of a range of pro-poor innovations in South Africa, and through South African firms, in SSA:

*“South Africa is being shaken up by the rise of the emerging world, as its champions invade South Africa and South African champions return the compliment. The Industrial and Commercial Bank of China brought 20% of Standard Bank in 2007, in what was the country’s biggest foreign investment. Indian conglomerates such as Tata and drugs firms such as Ranbaxy are hyperactive in South Africa. South Africa’s FirstRand is bringing its banking skills to India. SABMiller has bought one of Colombia’s largest brewers, Bavaria. This growing “south-south” trade is forcing South African companies to think about costs as never before: Tata’s trucks, which use parts made in India, are 15-20% cheaper than other locally assembled models. South Africa is littered with Chinese wholesalers selling cheap Chinese brands. And it is opening minds to the huge opportunities that lie in the emerging world.*

*“South African companies are paying much more attention to the rest of the continent, which some once made a habit of ignoring. MTN controls half of the Nigerian telecoms market, which is doubling in size every year. Shoprite is Africa’s largest food retailer, operating in 18 African countries. South African companies are also discovering the “bottom of the pyramid” in their own country. Several companies have pioneered the art of using cell phones to map the distribution of informal shops (spaza) and truck stops. Blue Label Telecoms, which sells pre-paid tokens, has blazed a trail in forming relationships with tribal chiefs and popular gospel singers to help sell its products. Knowledge of the bottom of the pyramid is now being used to expand in emerging markets. SABMiller produces beer for Uganda using cheap local ingredients rather than expensive imported malt. MTN provides solar-powered phones to fishermen”*

*The Economist, 10<sup>th</sup> September, 2011.*

## 6. PRO-POOR INNOVATION, REDISTRIBUTION AND GROWTH

How, then, do these developments in the trajectory of innovation relate to the debate on redistribution and growth in which Richard was a core participant during the 1970s and 1980s?<sup>6</sup> In considering these issues we need to preface the discussion by recognising a series of framing issues. The first concerns the blurring of both the categories and the inter-relationship of categories used in this debate. On the one hand we have “redistribution”, on the other hand, growth. Then we have the prepositions – “and”, “from” and “with”. There is the further complication of whether the linking words begin with growth (“growth-preposition-redistribution”) or with redistribution (“redistribution-preposition-growth”); the ordering is suggestive of causal explanations and the ranking of normative objectives. A second framing issue is that insofar as we are concerned with global poverty, we need to keep in mind that (as Peter Townsend observed some decades ago, Townsend, 1979), poverty has two dimensions – an absolute one (the MDG1 target) and a relative one (equity). It might seem that these are unrelated concerns, but there is now growing recognition that equity has a bearing on the absolute incidence of poverty (Wilkinson and Pickert, 2009).<sup>7</sup>

To lay my cards on the table, I observe two overlapping perspectives on the link between growth and distribution, notwithstanding the above-mentioned confusion of nomenclature and the blurring of categories. The first is a set of explanations which see poverty reduction (in both its absolute and relative sense) as arising as an outcome of an ex-post redistribution of the gains arising from growth. This fits under the “Redistribution and/with Growth” headings. The second is an analysis in which redistribution – or, perhaps, a more equitable pattern of distribution – arises endogenously as a core component of the growth-path itself. This fits under the Redistribution through Growth heading. The developments which I have addressed in the foregoing discussion are very much centred on the second of these perspectives, that is, that we are witnessing the emergence of disruptive forces which will contribute to a growth trajectory in low income economies which is characterised by less unequalising patterns of growth.

With these caveats in mind we can now consider the overlaps between the putative new trajectory of innovation discussed in previous sections and the “redistribution/growth and/from/with growth/distribution” debate. Here it is possible to identify four issues common to both – redistribution as a positive or normative phenomenon; the articulation between different categories of consumers and producers, the character of of technology; and the role played by south-south trade in technology.

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<sup>6</sup> In addressing this debate I draw on the references cited in Jolly’s recent note for UNESCO (Jolly, 2011), namely the ILO Kenya Report (ILO, 1972), the various contributions in Chenery et al (1974), the contributions in Cairncross and Puri (1976), the IDS Bulletin (1975) and the World Development Report of 2006 (World Bank, 2006).

<sup>7</sup> Wilkinson and Pickerts’ analysis is based on data from the higher income group of countries. It is impossible that the conclusions do not apply in the low income group of economies.

### Normative and positive determinants of distribution

The central thrust of the ILO Kenya Report (ILO, 1972) was to identify a set of policies which would provide for a win-win outcome in which all incomes would expand as a consequence of economic growth, but those at the bottom of the pile would grow more rapidly. The Report was explicitly normative in nature. That is, it sought to persuade the rich that it was in their interest to raise the living standards of the poor and that this could be achieved through the introduction of a package of policies to be implemented by the state, but with the acquiescence of the private sector.

Colin Leys is widely recognised as the prime critic of the Kenya Report (Leys, 1975a and 1975b). Leys, who unlike most of the participants in the Kenya Report was a political scientist rather than an economist, argued that this normative policy drive lacked analytical content, and in particular that it failed to recognise the political significance of class. In so doing, it provided for no politically coherent category of actors who had meaningful common objectives other than those of improving their living standards – “The condition of the masses in the Third World is not purely a matter of material want, but also of subordination, oppression, exploitation and disregard” (Leys, 1975a: 8). This analytical failure, he argued, meant that policy prescriptions would have little traction in the real world. With the benefit of hindsight, there can be little doubt that Leys’ critique was spot-on. The four decades since the ILO Report was published have seen a systematic deepening of inequality and a growth in absolute poverty in Kenya. The political structures which have emerged show conclusively that whatever the rhetoric – and Kenya’s politics are replete with commitments to poverty-reduction – there has been a systematic and steady increase in inequality, both within high- and low-growth periods. (As Jolly shows, the apparent fall in the gini-coefficient between 1990 and 1995 was almost certainly a statistical aberration - Jolly, 2011). According to the World Development Indicators, the incidence of sub-MDG1 poverty in Kenya was 19 percent in both 1988 and 2005, suggesting an increase in the absolute numbers living below \$1pd from 5.7m to 7.02m).

By contrast, the developments which I have sketched out in previous sections are of a “positive” rather than a “normative” nature. It is my belief that whilst the diffusion of efficient ATs can be speeded up through policy (see below),, their diffusion will occur without this policy support. The new breed of efficient ATs will be driven by the market. Unlike the era in which the Kenya Report and *Redistribution with Growth* were written, their adoption will be fuelled by the capitalist motor.

### Issues of articulation

In his seminal book *Underdevelopment in Kenya*, Leys took on the ILO Report’s championing of the informal sector. The Report had argued that it was not meaningful to separate out the income shortfalls of the unemployed and the working poor and went on to argue if the entrepreneurial potential of the informal sector could be unleashed from regulation and discrimination, there was significant scope for raising the incomes of the poor. In this sense, the Kenya Report departed from the normative realm to argue that there were

also “positive” reasons why there might be more equal outcomes from economic growth. In other words, an informal sector driven growth policy would endogenise more equitable patterns of income distribution.

In opposing this approach, Leys argued that it was erroneous to view the informal sector as a separate, standalone sector. His view was that the informal and the formal sectors were tied with an umbilical chord. The informal sector used the detritus of the formal sector, and provided cheap wage goods for the formal sector, hence reducing the costs of labour reproduction in the formal sector. Moreover, there was a steady stream of people moving from one sector to the other. Therefore a growth strategy dependent on the informal sector as its driving motor would no longer be able to be cross-subsidised by the formal sector (and vice versa, of course).

An analogous story can be told with regard to the distributional consequences of pro-poor innovation. Many of the absolutely poor – that is the 1.3bn people living below the \$1/25 per day MDG target – live in close proximity with the additional 1.2bn people living at more than \$1.25 per day but less than \$2.5 per day. We can refer to these two groups as BOP1 and BOP2 respectively. BOP1 has little cash income and is likely to offer a limited market for private sector actors, even those using pro-poor innovations. By contrast, the BOP2 group does have cash incomes - albeit low incomes - and it will be the primary market inducing profit-seeking pro-poor innovation..

These innovations aimed at the BOP2 market will have spillovers to the BOP1 population, and to a much greater extent than the (weak) spillovers between the BOP1 population and the high income consumers who previously have driven the trajectory of growth and innovation. This is because as in the articulation between formal and informal sectors, there is an articulation between BOP1 and BOP2. Some examples are as follows: (i) BOP1 provides cheap wage goods and services for BOP2 workers with cash-incomes, hence not only contributing to welfare in BOP2, but also keeping down wage rates and fostering growth (ii) BOP1 characteristically uses the detritus discarded by the BOP2 sector (iii) BOP2 income recipients often provide transfers to BOP1 relatives (iv) there will be externalities in network-intensive sectors where the costs of the network are covered by meeting the needs of BOP2 and the benefits spill-over to BOP1 (v) there is extensive evidence that because BOP2 people live above the subsistence level, they are more open to adopting riskier and innovative entrepreneurial behaviour than are their BOP1 peers, providing important role models for those in the BOP1 category (Sonne, 2010).

#### Embodied technology, and products for the poor

In part because of the lineage of the ILO Report, in part because unemployment was increasingly recognised as a major developmental challenge in the 1970s and in part because of the make-up of the ILO Team (which included Ajit Bhalla, Charles Cooper and Hans Singer), issues of technology and the choice of technique were a central component of its analysis, and this spilled over into the *Redistribution with Growth Report*. The particular focus adopted towards technology was heavily influenced by Sen’s

seminal book, *Choice of Techniques* which had been published a few years before the Kenya Mission (Sen, 1968), and was preceded (and subsequently complimented in the ILO World Employment Programme) by a series of empirical studies on the choice of techniques. In all of this material, technology was almost exclusively seen as a set of physical embodied artefacts, and was largely confined to process technology. There were exceptions - for example, Lancaster (1966), Langdon (1981) and Stewart (1976 and 1979) all focused on products as an important category of technological change - but "engineering man" dominated the discourse. As we saw in earlier discussion, this emphasis on process rather than product technology is echoed in much of the contemporary literature on innovation and technical change (Ruttan, 2001).

Yet, the distinctive feature of much of the recent pro-poor innovation is that it centres on business models as much as embodied technologies, and on product innovation as much as process innovation. For example, Prahalad's treatise identifying the "fortune at the bottom of the pyramid" is replete with examples of new forms of organisation, including eye-care and the marketing of soap and shampoo in India, and banking in Mexico (Prahalad, 2005). Perhaps an even better-known example of pro-poor innovation which reflects changes in business-models is the explosion in micro-finance. The product - "money" - is constant, but the business model involved in delivering the product is very different. In other cases - particularly when TNCs - are involved, the core feature of pro-poor innovation lies in the product-offering. Examples of this include the stripping-out of costly functions which make the original product attractive to rich consumers (but unaffordable to the poor), or dual-purpose products such as Haier's washing machines (washing clothes and potatoes), or the low-cost medical imaging technology developed by GE in India (Immelt, et al, 2009). Increasingly there is also a combination of new technologies and business models in pro-poor innovation as in diffusion of Mpesa telecoms in Kenya. In all these cases, there appears to be a distinctive difference in the character of technical change compared to that envisaged in the Redistribution from/and/with/through Growth schools.

#### South-south trade in technology

As we have seen in earlier discussion, perhaps the single most important disruptive feature of the new technological trajectory is its southern origin. I have argued that by virtue of four factors intrinsic to southern economies - low-income consumers, factor prices and infrastructure, the build-up of capabilities, and new and distinctive entrepreneurship - the character of emerging southern technology will differ from that originating in northern economies. This is of course not true for all southern-origin technology, since there are many cases of Chinese firms (Huawei), Indian firms (Tata Consulting), Brazilian firms (Embraer) and South African firms (Sasol) competing at the global frontier and in northern markets. But it is true for much of southern technology, particularly that emerging "below the radar" from small and medium-sized firms, often with their origins in the rural sector (such as Chinese Township and Village Enterprises, TVEs) or in provincial towns.

This is a relatively new phenomenon, but it is not something which was unanticipated in the earlier literature. For example, Stewart concluded in 1976 that “To get technological change responsive to the conditions in the LDCs the change must originate in the LDCs” (Stewart, 1976: 133). It was also central to some of the discussion in *Redistribution with Growth*. Thus, Ahluwalia concluded “...closely related to the problem of technical choice is the problem of capital-goods production... It is unlikely that the capital-goods-producing sectors of developed countries will respond to demand for such goods in underdeveloped countries. Capital goods-producing industries in the more advanced of the underdeveloped countries will have to take a lead in producing the appropriate capital goods and indeed exporting them to other underdeveloped economies” (Ahluwalia, 1974: 89). The difference between then and now, is that in 1974 this was a normative objective; today it is a positive fact.

## 7. CONCLUSION

In the preceding discussion I have presented a story which suggests that unlike earlier decades when AT was diffused through non-profit organisations, in the current era AT is likely to be diffused by the market. Whilst this will not in itself eliminate global poverty, I believe that it has the potential to make a significant impact in poverty-alleviation by contributing to a new growth-path. The more this redirection of technological utilisation in low income economies is allied to changes in the macro-context of growth,<sup>8</sup> the greater the prospects for the emergence of a more equal global economy, and with a reduction in the numbers living in absolute poverty.

So far, my argument has been a positive one, seeking to show how the Schumpeterian motor of entrepreneurial rent-seeking will be associated with the generation and adoption of technologies more appropriate to the operating conditions of low income economies, and producing products of greater relevance to the needs of the global poor. I can visualise Richard’s response to this – “that’s all very interesting, but *surely* [his emphasis] you don’t really mean that there is nothing we can do to influence these developments?”. So, I have to respond to this, and here are some suggestions for a normative response to these “positive” developments.

### Removing market imperfections

The task is to identify those market imperfections which are intrinsic to pro-poor innovation. Perhaps the most widely cited imperfection in the literature on AT is that which relates to factor prices, where it is widely considered that the wages of the organised sector’s working class in low income countries are higher than their opportunity cost, that the cost of capital is lower than its opportunity cost and that environmental and social externalities are either not represented in the price system or the prices at which they are represented do not reflect their true environmental cost. Clearly, factor pricing is an important

<sup>8</sup> For example, a reduction in the degree of globalisation which, I have argued above, is inherently unequalising, and by marginalising large numbers of people, is also a source of impoverishment for much of the world’s population.

issue with regard to the diffusion of ATs, but the policy conclusions are not always as clear-cut as they seem. For one thing, in many low income economies high formal sector wages support a large number of people and are consumed as extended family household incomes rather than as personal incomes. For another thing, investment in ATs will undoubtedly be furthered by low cost capital; the trick is to direct this low-cost capital to investors in ATs, and this may involve innovations in the delivery of investment (as in the case of micro-credit) which is in itself a form of appropriate technology. The point is not that different factor prices will not make a difference, but rather that they will only make a limited difference.

Second, since poor producers and consumers are often illiterate and/or lack access to the internet and print-media they are particularly prone to knowledge-imperfections. For example, users of innovations will characteristically lack knowledge of the nature and extent of relevant innovations. Mirroring this are producers of innovations who lack knowledge of final markets, particularly those which are not geographically proximate. These knowledge imperfections are especially problematic in the case of pro-poor innovations since, by their nature, many are produced by SMEs in rural areas, unconnected to high-quality infrastructure and are “below the radar”. A mechanism needs to be established to fill these knowledge gaps within countries and in trade between countries. Unlike the existing policy trajectory which seeks to connect poor producers to rich consumers, the task is now to connect poor producers to poor consumers, particularly those outside of their region.

Third, a systematic sweep is required of the regulatory structure to determine the extent to which these may adversely affect poor producers and poor consumers. This is not to suggest that regulations be abolished. Many regulations exist to protect the public interest. But it is important to determine whether the regulations which affect the development and diffusion of innovations are unevenly weighted against poor producers and consumers. For example, a regulation which specifies the minimum weight of a loaf of bread may either be determined by the weight of an average loaf (allowing for variable loaf-size with manual, labour intensive manufacturing) or the minimum weight of an individual loaf (favouring mechanised mixing and dividing)

#### Reorienting national, regional and sectoral innovation systems

Optimising the flow of pro-poor technologies requires an alignment of the relevant actors in the innovation system. This recommendation slips off the tongue easily, but is a more daunting task than is often recognised. Connecting private sector firms in the innovation value chain is relatively easy and is generally supported as an outcome of market forces. But getting the supportive institutions aligned to meet the needs of poor producers and to develop products and services for poor consumers is more difficult, since the price-system plays only a marginal role. Often “quality” standards and curricula - let alone the direction of research - reflect connections in the system of innovation with the global community of peers rather than with the needs and capabilities of the marginalised domestic populations. This

misalignment is evident in the CGIAR system where the selection of problems for investigation often ignores the needs of poor and marginalised producers.<sup>9</sup> For example, drawing on the successful development of Green Revolution seeds, for more than twenty years ILRAD sought to find a “high science” vaccine for trypanosomiasis. This failed, but in the interim a low-tech approach to vector control was largely ignored, and veterinary services were wound down, with severe consequences for poor livestock farmers (Clark and Smith, 2010)

#### Strengthening the role of non-market actors

In the case of public goods, the market is unlikely to be able to serve the needs of poor consumers and poor producers. This is classically the case in the provision of health services, which are particularly important in meeting the needs of the poor. Related to this are network problems where capital costs are high and where unit costs decline sharply with large scales of provision. This tends to occur in the case of infrastructure. It not only limits the development of networks, but creates particular difficulties when users are dispersed and have low incomes. In these cases, there will be pervasive market failure and pro-poor innovations are unlikely to emerge without the active participation of non-market actors.

This does not necessarily mean that market-actors will be excluded from participating in the development of these pro-poor innovations. As we saw above, there are a number of cases of new innovation actors entering the innovation cycle in collaboration with private sector firms. They have played a particularly positive role in the provision of innovative public goods in the health sector targeting neglected diseases or diseases which disproportionately affect the poor. But there has been a less active presence of non-market actors in the development and diffusion of pro-poor innovations with regard to infrastructure. The positive impact of infrastructure on poor producers is often underestimated.

#### Redistributing income

As we have seen, the character of the market is a major factor inducing and biasing the trajectory of innovation. Historically, the needs being met by the global innovation system have been those of high income consumers. However, in recent years, we have seen a critically important change in this inducing factor, one in which the growing market power of low income consumers has led to the development of a growing number of products and services designed to make profit out of poor consumers, and production technologies aimed at poor producers. It stand to reason, therefore, that the faster this market of poor consumers grows, and the larger this market is, the greater will be the inducement for pro-poor innovation. We can therefore anticipate a self-reinforcing virtuous circle in which pro-poor growth stimulates pro-poor innovation which, in turn, reinforces pro-poor growth.<sup>10</sup>

<sup>9</sup> I am grateful to Norman Clark for alerting me to this issues

<sup>10</sup> The outcomes of redistribution may not always be as obvious as they seem. For example, in the 1970s a PhD at IDS (Roger Berry) explored the employment consequences of income distribution in India and estimated that there would be no net positive impact since at the margin, the rich consumed (labour-intensive)

It is probable that this is the single most important factor underlying the development of a pro-poor growth path. This is not just because of the income-technical choice effect, but the political environment in which income redistribution occurs is likely to favour a number of complementary developments which reinforce other elements of the pro-poor growth agenda. It is thus abundantly clear that whilst pro-poor innovation provides the scope for more equalising patterns of growth, is merely one factor – albeit an important and largely neglected one – leading to a development strategy which rapidly erodes absolute (and perhaps also relative) poverty in the global economy.

## REFERENCES

- Ahluwalia, M. S. (1974), "The Scope for Policy Intervention". in Chenery, H., M. S. Ahluwalia, C. L. G. Bell, J. H. Duloy and R. Jolly, Redistribution with Growth, Washington DC: The World Bank.
- Bell, R. M. (2007), "Technological learning and the development of productive and innovative capacities in the industry and infrastructure sectors of the Least Developed Countries: What's roles for ODA?", Paper prepared for UNCTAD Division for Africa, Least Developed Countries Specialised Programme, Brighton, Science Policy research.
- Bhalla, A. S. (ed.) (1975), Technology and Employment in Industry, Geneva, ILO.
- Bhalla A. S (ed.) (1984), Blending of new and traditional technologies: Case studies, Dublin, Tycooly.
- Bruche, G. (2009), "A new geography of innovation - China and India rising", Columbia FDI Perspectives, No. 4, April 29.
- Cairncross, A. and M. Puri (1976), Employment, Income Distribution and Development Strategy: Problems of the Developing Countries, Essays in Honour of H. W. Singer
- Chen, S. and Ravallion, (2007) Absolute Poverty Measures for the Developing World, 1981–2004, Washington, D.C.: World Bank
- Chenery, H., M. S. Ahluwalia, C. L. G. Bell, J. H. Duloy and R. Jolly (1974), Redistribution with Growth, Washington DC: The World Bank
- Christenson, C. (1997), The Innovator's Dilemma, Cambridge, Mass: Harvard Business School Press.
- Clark, N. and J. Smith (2010), The CG system as a innovative programme: Implications for climate change policy for developing countries, Cambridge: Climate Change Secretariat.
- Cozzens, S. E, and R. Kaplinsky (2009), "Innovation, Poverty and Inequality: Cause, Coincidence, or Co-evolution?", in Lundvall, B-A; J K Joseph, C. Chaminade and J. Vang (Eds.), Handbook of Innovation Systems and Developing Countries. Building Domestic Capabilities in a Global Context, Cheltenham: Edward Elgar.
- Davis, M. (2004), "Planet of Slums: Urban Involution and the Informal Proletariat", New Left Review, 26, pp. 5-34.
- Dosi, G. (1982). "Technological Paradigms and Technological Trajectories", Research Policy, Vol. 11, No. 3,
- Eckaus R S, (1955), "The Factor Proportions Problem in Underdeveloped Areas", American Economic Review, Vol. 45, No. 4, pp. 539-565.
- Eckaus R S, (1987), "Appropriate technology: The Movement Has Only A Few Clothes On", Issues in Science and Technology, Winter, pp 62-71
- Emmanuel A (1982), Appropriate Technology and Underdevelopment, J Wiley, Chichester.
- Freeman C. and C. Perez (1988), "Structural Crises of Adjustment", in Dosi Giovanni et al (eds), Technical Change and Economic Theory, London, Frances Pinter.
- Fu, X., R. Kaplinsky and J. Zhang (2009), "The Impact of China's Exports on Global Manufactures Prices", Sanjaya Lall Programme for Technology and Management for Development, Working Paper 32, Queen Elizabeth House, Oxford: Oxford University.

- Hollanders, H. and L. Soete (2010), “The growing role of knowledge in the global economy”, A World of Science, Vol. 8, No. 4, October-December, pp 2-10.
- Humphrey J. and H. Schmitz (2000), Global Governance and Upgrading: Linking Industrial Cluster and Global Value Chain Research, IDS Working Paper 120, Brighton: Institute of Development Studies
- IDS Bulletin (1975), Redistribution with Growth, Vol. 7. No. 2.
- ILO (1972), Employment, incomes and equality, Geneva, ILO.
- Immelt, J., V. Govindarajan and C. Trimble (2009), “How GE is Disrupting Itself”, Harvard Business Review, October, pp. 56-65.
- Jolly, R. (1975), “Redistribution with Growth - A Reply”, IDS Bulletin, Vol. 7, No. 2.
- Jolly, R. (2011), “Kenya- Actions towards Equity – The Reduction of Inequality in Kenya”, Note prepared for UNICEF, mimeo, Brighton: Institute of Development Studies
- Kaplinsky R (1990), The Economies of Small: Appropriate Technology in a Changing World, London: Intermediate Technology Press.
- Kaplinsky, R. (2005), Globalisation, Poverty and Inequality: Between a Rock and a Hard Place, London, Polity.
- Kaplinsky, R. (2010), The Role of Standards in Global Value Chains and their Impact on Economic and Social Upgrading, Policy Research Working Paper 5396, Washington: World Bank.
- Kaplinsky, R. (2011), “Bottom of the Pyramid Innovation and Pro-Poor Growth”, Paper prepared for PRMED Division, World Bank, Milton Keynes: The Open University,
- Kaplinsky, R. and M. Morris (2001), A Handbook for Value Chain Research, [http://asiandrivers.open.ac.uk/documents/Value chain Handbook RK MM Nov 2001.pdf](http://asiandrivers.open.ac.uk/documents/Value%20chain%20Handbook%20RK%20MM%20Nov%202001.pdf)
- Kaplinsky, R. and A. Santos-Paulino (2006), “A disaggregated analysis of EU imports: Implications for the study of patterns of trade and technology”, Cambridge Journal of Economics , Vol. 30, No. 4, pp. 587-612.
- Kaplinsky, R., D. McCormick and M. Morris (2010), “Impacts and challenges of a growing relationship between China and sub-Saharan Africa” in V. Padayachee (ed.), The Political Economy of Africa, Abingdon: Routledge (with D. McCormick and M. Morris).
- Kaplinsky, R. and M. Z. Farooki (2011), ” What are the implications for global value chains when the market shifts from the north to the south?”, International Journal of Technological Learning, Innovation and Development, Vol. 4, Nos. 1/2/3, 2011, pp 13-38.
- Kaplinsky, R., A. Terheggen and J. P. Tijaja (2011), “China as a Final Market: The Gabon Timber and Thai Cassava Value Chains”, World Development, Vol. 39, No. 7, pp. 1177-1190.
- Katz, J. M. (1987), “Domestic Technological Generation in LDCs: A Review of Research Findings”, in J. M. Katz (ed.) (1987), Technology Generation in Latin American Manufacturing Industries, London: Macmillan.
- Khan, S. A. and R. M. Baye (2011), “China-Africa Economic Relations: The Case of Cameroon”, Report Submitted to the African Economic Research Consortium, Dept. of Economics and Management, University of Yaounde II.
- Lancaster K. J. (1966), "Change and Innovation in the Technology of

- Consumption", American Economic Review, Vol. 56, No. 1/2, pp. 14-23.
- Langdon, S. (1981), Multinational Corporations in the Political Economy of Kenya, London, Macmillan.
- Lazonick, W. (2010), "the Fragility of the US Economy: the Financialized Corporation and the Disappearing Middle Class", <http://www.theairnet.org/files/research/lazonick/Lazonick%20FUSE%2020101003.pdf>
- Lewis, W. A. (1954), "Economic development with unlimited supplies of labour", Manchester School of Economics and Social Studies, 22, pp. 139-191.
- Leys, C. (1975a). "The Politics of Redistribution with Growth", IDS Bulletin, Vol. 7, No. 2.
- Leys C (1975b), Underdevelopment in Kenya: The Political Economy of neo-Colonialism, London, Heinemann.
- 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.
- Prahalad, C. K., and A. Hammond (2002, "Serving the World's Poor Profitably", Harvard Business Review, September, pp. 4-11.
- Ruttan, V. W. (2001), Technology, growth and development: An induced innovation perspective, N. York: Oxford University Press.
- Schumacher, F. (1973), Small is Beautiful, London, Blond and Briggs.
- Sen A. K. (1968), The Choice of Techniques, Oxford: Blackwell , 3rd Edition.
- Singer, H., C. Cooper, R. C. Desai, C. Freeman, O. Gish, S. Hall and G. Oldham (1970), The Sussex Manifesto: Science and technology for Developing Countries during the Second Development Decade, IDS Reprints No. 101, Brighton: Institute of Development Studies.
- Singer, P. and Daar, A. (2001) "Harnessing Genomics and Biotechnology to Improve Global Health Equity" Science 5 October 2001 Vol. 294(5540) 87-89
- Sonne, Lina, 2010, Financing pro-poor entrepreneur-based innovation: A review of existing literature, UNU-MERIT Working Paper 2010-038
- Stewart, F. (1976), "Capital Goods for Developing Countries", in A. Cairncross and M. Puri (eds.), Employment, Income Distribution and Development Strategy: Problems of the Developing Countries, Essays in Honour of H. W. Singer, London: Macmillan.
- Stewart, F. (1979), Technology and Underdevelopment, London, Macmillan, 2nd edition.
- Sumner, A. (2010), "Global Poverty and the New Bottom Billion: What if Three-Quarters of the World's Poor Live in Middle Income Countries?", mimeo, Brighton: Institute of Development Studies.
- Townsend, P. (1979), Poverty in the United Kingdom: A survey of household resources and standards of living, Harmondsworth: Penguin Books.
- UN-Habitat (2010), State of the World's Cities 2008/2009, UN-Habitat.
- Wilkinson, R. and K. Pickett (2009), The Spirit Level: Why more equal societies almost always do better, London: Allen Lane.
- Wood, A. and J. Mayer (2011), "Has China de-industrialised other developing countries?" Review of World Economics, Vol. 147, No. 2, pp. 325-350,

World Bank (2006), Equity and Development: World Development Report, 2006, Washington D.C.; World Bank