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Comparative Advantage and Sustainable Economic Growth in India after 1991

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1. Introduction

This paper is concerned with the idea of sustainable economic growth. The concept is used widely if in a limited fashion. It has obvious environmental connotations. Less obviously but more influentially there is a distinct Neo-classical approach to sustainability which says 'unless there are large budget and fiscal deficits growth in a free market is automatically sustainable'. It is this peculiar anaemia at the heart of Neo-classical theorising that leads to what could be called 'the pathology of listing'. Neo-classical 'analysis' of liberalising reforms more often than not is simply comprised of a list of liberalisation measures with a passing mention as to whether trade and budget deficits have been sufficiently reduced. The successful outcome of reform and the degree of implementation of liberalisation are considered synonymous. Neo-classical analysis focuses near exclusively on the depth, pace and implementation of reforms.

This paper looks more closely at the idea of sustainable growth, defining it here as 'a high road of growth'. It is argued that sustainable growth is comprised of three elements, rapid growth, linkages and upgrading. This paper uses the theory of comparative advantage as a theoretical framework, and two case studies (software and textiles) in which to explore this question. The context is that of India during the 'era of liberalisation'. The question asked is 'to what extent did trade liberalisation lead to sustainable economic in India after 1991?'.

Section 2 outlines the theory of comparative advantage and section 3 the meaning of sustainable economic growth. Section 4 looks at the experience of India after 1991, the trade liberalisation implemented and whether the subsequent evolution of India's economy reflected the predictions of comparative advantage. Section 5 evaluates the impact of liberalisation asking whether it has generated sustainable economic growth, looking briefly at the aggregate economy then in more detail at the software and textiles sectors. Section 6 concludes by comparing two contrasting implications for suggested policy reform.

2. Comparative Advantage

Deraniyagala and Fine (1999) examine the theoretical and empirical case for free trade and find, "there is no rationale for accepting the general case in favour of trade liberalisation, and the merits of trade policy need to be examined at a detailed and specific level." (p 821). This paper follows this lead and examines the impact of trade policy at both a detailed and specific level. The question this paper seeks to answer is 'to what extent trade liberalisation after 1991 in India has generated conditions for sustainable economic growth'.

There are numerous theories of what drives trade, each with consequent welfare implications. These include product differentiation, intra-industry trade, geography, economies of scale and various political economy perspectives (Krugman 1991; Gallup and Sachs 1999; Krugman and Obstfeld 2000:119-155, 218-249). Economic policy is also found to have a significant influence on trade outcomes (Williamson 1997; Elbadawi 1999; Teal 1999; Milner et al 2000; Zuefack 2002). This paper uses comparative advantage as a theoretical framework in which to answer this question. The theory of comparative advantage firstly explains and derives the gains to be made from free trade and secondly, is a theory of the determinants of the pattern of international trade. According to the theory of comparative advantage when all countries export the goods or services in which they have a comparative advantage, all countries will gain (Krugman and Obstfeld 2000:19). Under the conditions of free international trade profit-seeking entrepreneurs will produce for export those goods in which a country has a comparative advantage, that they can produce at lowest relative cost. The clearest implication is that 'country's will export those goods which are intensive in their abundant factor, and import those goods which are intensive in their scarce factor'. The first point examining the gains from free trade will take up the bulk of this paper, which focuses on the implications for (sustainable) growth in India. On the second point there is good evidence for comparative advantage being an important determinant of trade outcomes, both generally and in the case of India.

The basic model of comparative advantage takes the pattern of trade to be determined by relative endowments of capital and labour. Wood in various papers omits capital, arguing that capital, though a vital input to production is highly mobile and so "cannot plausibly be regarded as a resource of which a large fixed 'endowment' gives some countries a comparative advantage in the production of capital-intensive goods. If a country has a comparative advantage in a good because of the abundance of a resource such as copper ore or educated labour, then it can usually obtain the capital needed to develop this resource, either from domestic savings or from abroad." (Wood and Mayer 2000:4). With domestic and international capital markets being ever more closely linked the cost of capital is similar in most countries, so differences in capital intensity do not cause differences in comparative advantage in countries. Labour is mobile but less so, though for some countries labour mobility is important and remittance incomes comprise an important export. Mayer and Wood find empirical support for the theory of comparative advantage among a broad cross-section of countries, "differences among countries and regions in the broad features of their export structure are the result mainly of differences in their supplies of human and natural resources" (Mayer and Wood 2000:3).

India has one square kilometre of land per 100 workers which is similar to other South and East Asian countries and significantly less than Latin America or Africa. This low ratio gives India a theorised comparative advantage in manufactured rather than primary exports. In 1990 a low level of schooling (average of four years compared to over eight years in developed countries) caused this comparative advantage in the manufacturing sector to be specifically in low-skill-labour-intensive items (Wood and Mayer, 2000). Using a measure of predicted export structure for most Asian countries they find the actual share of manufactures is quite close to the predicted share. Differences in export structure are fairly well explained by differences in endowments. Where countries differ they add other 'policy' based variables / proxies to their regressions, such as restrictive trade policies, obstacles to FDI and levels of perceived risk. None they find provides a 'simple, single explanation' for the pattern of discrepancies (Wood and Mayer, 2000). Comparative advantage is found to have a high explanatory power. Three-fifths of the variation in the composition of exports is explained by resource variables (Wood and Bege, 1997).

3. Sustainable Economic Growth

This section explains the meaning of sustainable growth and its theoretical links to trade policy.

There is a very limited view in the literature about what exactly makes growth sustainable. The most common is that of environmental sustainability (Morriss 2002). In the context of India there has also been concern with the implied political sustainability of growth that is leading to growing inequality between states in a federal political system (Weiner 1999). The dominant notion of sustainable growth is that propagated, often only implicitly by proponents of Neo-classical economics. Its proponents consider that the decisions made by profit maximising entrepreneurs in a free market without excessive trade or government fiscal deficits are necessarily sustainable. Government intervention creates distortions, and budget / trade deficits will lead to ultimate macroeconomic crisis. The successful outcome of reform and the degree of implementation of liberalisation are considered synonymous. This is demonstrated clearly in Neo-Classical analysis with its peculiarly anaemic quality and tendency to focus nearly exclusively on the depth, pace and implementation of reforms. There are many examples from the Indian context in the era of reform. Ahluwalia claims, "we consider the cumulative outcome of ten years of gradualism to assess whether the reforms have created an environment that can support 8 percent GDP growth" (2002:69). In practise Ahluwalia considers first whether growth is sustainable in a narrow financial sense, examining trends in the fiscal and current account deficits and foreign exchange reserves. Then simply catalogues to what extent liberalisation has been implemented - tariff reductions, degree of integration with the world economy, removal of price controls, deregulation. There are numerous other very similar examples (Bajpai 2002; Kalirajan 2003; Virmani 2003; Srinivasan 2004).

Trade liberalisation and increased market competition could lead to two very different outcomes, both would be judged 'efficient' and 'sustainable' according to neo-classical economics but will have very different implications for long-run development. These two are the low and high roads of economic development.

Firstly, India could react to intensified competition in a freer international market by trying to enhance it price competitiveness within its existing labour-intensive niche by extending hours, reducing overheads (subcontracting) and intensifying work conditions (a low road of competition). Secondly, a high road of competition could consist of remaining in an existing labour-intensive production niche and raising the productivity of labour (learning), or upgrading to a less (price) competitive market niche to capture rents. Sustainable economic growth in this paper is defined as achieving a 'high road to competitiveness'. There are three elements to a high-road. These are rapid growth of output, the spread of economic linkages, and upgrading.

3.1. Rapid Growth and Extensive Growth

The first component of 'sustainable economic growth' is growth itself. Working in the context of the theory of comparative advantage for a typical developing country this then begs the question, is there a potential for rapid growth of output in primary goods or labour-intensive manufactured goods. There are several reasons why this may not be the case.

There is a clear positive link between the degree of technological complexity of a good / service and the rate at which world markets are growing over time (Lall 1999; Tendulkar 2000). For example between 1990 and 1995 the average annual rate of growth of world trade in resource based products was 6.4%, low-technology products 6.9%, medium technology products 7.7%, and high-technology products 13% (Lall 1999:1775). The fallacy of composition argues that generalising the experience of the small NICs to a broader range of very large developing countries would imply impossible levels of import penetration in developed countries and generate an inevitable protectionist response (Cline 1982). There is evidence of a declining terms of trade for primary products over recent history (Thirlwall and Bergevin 1985; Sapsford and Balasubramanyam 1999). Concern has extended from the primary-secondary division to different types of manufactured goods. Labour intensive goods have also suffered declining terms of trade (UNCTAD 2002). This trend has been exacerbated by the entry of China into world markets. There is likely to be further erosion of profit margins on labour/ low-technology intensive manufactured goods (Kaplinsky 2001). The roots of the 1997 East Asian crisis are also held to originate in a 'growth trajectory in which specialisation in factor and product markets associated with low barriers to entry led to high rates of competition, falling terms of trade and persistent currency realignments' (Kaplinksy 1999). There are broader problems with a dependence on primary commodity exports. Developing countries with such dependence will be more exposed to price shocks and unstable government finances. There have been problems with governance as government finance becomes dependent on commodity rents and detached from broad-based taxation and associated need for representing the interests of a broad cross-section of tax payers. Such dependence is also associated with a greater risk of conflict, the rents from primary commodities can be looted to make rebel organisations financially viable (Collier 2002). Primary commodity prices also tend to be systematically more volatile than those of manufactured goods (Lutz 1994).

The potential for sustainable growth increases with the level of technological complexity in the structure of output/ exports.

3.2. Linkages and Sustainable Growth

Expansion in one sector may generate more widespread economic growth. Output growth in one industry/ sector that develops forward, backward and vertical linkages is more likely to lead to a generalised high road of economic growth than a sector that operates as a highly integrated unit.

Rodriquez-Clare (1996) shows that when both backward and forward linkages materialise the economy can end up producing complex final goods, a large variety of specialised inputs and have high wages. Output growth in one sector may be beneficial to firms in others through supplying inputs to customer firms (forward linkages) or increasing demand from supplier industries (backward linkages). Crucial linkage effects operate through positive technological externalities (knowledge spillovers or demonstration effects). Domestic firms may adopt technology from one sector through imitation or perhaps reverse engineering, (the demonstration effect). Workers trained in one sector may transfer knowledge to other firms, or start their own firms (the labour turnover effect). Rhee (1990) found initial investment and training by the Korean firm Daewoo to a single textile firm in Bangladesh led to a massive transfer of skills and learning to other textile firms by the movement of workers from the pioneer firm. Rhee calls this 'the catalyst model of economic development'. Firms may transfer technology to other firms that are potential suppliers of intermediate goods or buyers of their output (a vertical linkages effect).

Empirical work finds linkages to depend on local endowments of skills and technology, the capability of local educational and research institutions, local market size, technological capability of local firms and policy factors (Pantibala and Pedersen, 2002). Higher end technologies such as R+D investment generate more spillovers than low-end operations of such as data-feeding and coding operations (Pantibala and Pedersen, 2002). Enforcing an export obligation on FDI is important to maximise linkages. FDI attracted by high domestic tariffs to produce for the domestic market in an LDC can lead to negative spillovers (Brecher and Diaz-Alejandro, 1977). If the main motivation of FDI is to avoid trade barriers rather than being based on manufacturing cost and efficiency, limiting production to simple assembly operations may be the most cost-effective response so protection may reduce vertical linkages in manufacturing (Delderbos et al, 2001). South Korea and Taiwan enforced local content requirements that increased domestic linkages from FDI.

The potential for a high road of growth through developing widespread linkages in the domestic economy increases with the level of technological complexity in the structure of output/ exports and can be influenced by government policy.

3.3. Sustainable Growth and Upgrading

Globalisation has sharply increased the number of global producers able to produce and export certain manufactured goods. Barriers to international exchange have steadily declined through trade liberalisation and technological change. A consequence of this has been a decline in the relevant terms of trade. As section 4.1

showed this decline has gone beyond primary products identified in the Prebisch-Singer model to encompass manufactured goods. These market conditions can apply both to product markets (textiles) and to factor markets (unskilled labour).

The ability to appropriate rents is crucial for sustaining economic growth. In the context of a competitive environment these rents can only be appropriated through a strategy which sustains upgrading at a higher pace than competitor economies." (Kaplinsky 1999:77). There is a high road whereby firms/ industries/ countries upgrade production to capture rents, create barriers to entry, and escape the competitive pressures. There is also a low road where firms/ industries/ countries compete on the basis of lower prices and/or a depreciating exchange rate to maintain market shares.

The concept of upgrading is making better products, making them more efficiently and moving into more skilled activities[1]. Upgrading is decisively related to innovation and/ or learning. There are four key types of upgrading. Process upgrading is the transformation of inputs into outputs more efficiently by reorganising the production system or introducing superior technology. Product upgrading is moving into more sophisticated product lines in terms of increased unit values. Functional upgrading is the acquisition of new/ superior functions in production such as design or marketing or abandoning existing low value added functions to focus on higher value added activities and finally full package manufacturing. Intersectoral upgrading is the application of competence learned in one particular function to move into a new sector.

4. Experience of India after 1991

This section reviews the external liberalisation measures implemented in India after 1991 and finds the theory of comparative advantage is a useful one in explaining the evolution of India's economy.

The external sector in India was substantially liberalised during the 1990s. India experienced an exchange rate depreciation between 1990 and 1993 of 60% (Sen 2003). Since 1993 the real exchange rate between the dollar and rupee has been approximately constant when measured in terms of consumer prices and slightly depreciating when measured in wholesale prices. The import-weighted average economy-wide tariff fell from 87% in 1990/91 to about 30.2% in 1999/00. In agriculture from 70 to 17.7% in consumer goods from 164 to 32.4%, in intermediate goods from 117 to 31.9% and in capital goods from 97% to 32.2%. The weighted-average coverage ratio for economy-wide Non-Tariff Barriers on Indian imports fell from over 95% in 1988/89 to less than 25% in 1999/00 (Pandey 2004). The opening of the economy to international trade raised the share of trade in GDP. Imports as a share of GDP increased from 8.57% to 10.65 and exports from 5.54% to 9.08% between the 1980s and 90s (Sivasubramonian 2004:261).

The mutual effects of trade liberalisation and greater trade exposure after 1991 generate two strong predictions according to the theory of comparative advantage. We

[1] This discussion of upgrading is largely taken from Giuliani et al (2005)

should observe a shift in the structure of exports to manufactured goods and an increase in the labour-intensity of exports. The opposite pattern should occur in the structure of imports. There are three main pieces of evidence that support these theoretical predictions in India after 1991. The first refers to the evolution of the structure of trade, the second to the structure of production, and the third to the labour-intensity of given sectors.

Between 1978/9 and 1989/90 India's manufacturing export basket contained nearly 50% of intermediate and capital goods. The structure of *exports* subsequently shifted towards one dominated by (labour-intensive) consumer goods. The share of consumer goods in India's manufacturing exports increased from 50.6% in 1989/90 to 72.5% 1996/97, over the same period the share of intermediate goods declined from 38.5% to 12.6%. The share of labour-intensive exports in total manufactured exports increased from 13% 1991/2 to 34% 1996/7. The share of high-tech exports increased from 13% in 1978/79 to 31% in 1991/92 and declined to 25% in 1996/97. The share of resource-intensive exports in total manufacturing exports declined from 68% in 1978/9 to 37% in 1996/7[2]. The proportion of capital goods in total manufacturing *imports* increased from 36.6% in 1978/9 to a high of 62% in 1996/7. The share of high-tech imports increased from 26 to 61% between 1978/79 and 1996/97 (Nambiar et al 1999). Between 1987-90 and 1993/96 labour and scale-intensive exports from India increased their share of total exports, while the share of differentiated and science based exports declined (Tendulkar 2000:39-40).

Secondly, the pattern of growth within the manufacturing sector is broadly in accordance with that predicted by the theory of comparative advantage. Nambiar et al (1999) find a long-term structural shift (from the late-1970s to the mid-1990s) away from the production of skill-intensive to low-skill-intensive products[3], or alternatively from capital and intermediate to consumer goods in terms of both value added and employment. There has been a corresponding fall in the shares of both medium and high-skill-intensive sectors. Within the manufacturing sector the growth fell most sharply in the capital goods sector relative to earlier periods. Between 1960 and 1965/66 25.63% of the growth of net value added by the registered manufacturing sector was contributed by capital goods and 5% by consumer durables. This was an obvious consequence of the initial planning strategy. Between 1990/91 and 1997/98 more than 50% of manufacturing growth was accounted for by consumer goods, and capital goods only a little over 10%. There has been a significant relative increase in employment in the labour-intensive consumer goods sector between 1988 and 1997, relative to 1980 to 1989 (Pandey 2004:36).

Thirdly, techniques of production in Indian industry have generally become more labour-intensive. The textile mills in Ahmedabad and Gujarat shed hundreds of thousands of jobs in the 1980s (Hensman 2001). Textile production has been transferred to the decentralised powerloom sector where almost all employment is informal. This is also true in engineering and pharmaceuticals. Large firms such as Maruti Udyog, BPL, Johnson and Johnson, TELCO, and Hindustan Lever

[2] An exception is the increase in the share of the high-tech due to software exports, this is analysed separately in a later section.

[3] Nambiar et al (1999) use ASI data on 'total persons engaged', their proxy for skilled workers is found by subtracting workers from total persons engaged to obtain the managerial and technical staff employed by industry.

increasingly outsourced work to home-based workers. Subcontracting and casual work have spread widely during the era of liberalisation (Deshpande and Deshpande 1998; Shah and Gandhi 1998; Jhabvala and Sinha 2003). Within the Tiruppur knitwear cluster 96% of workers are now employed as casual, the bulk of women employed are done so as very 'flexible' seasonal workers, 92% of women surveyed were paid piece rates (Neetha 2002).

5. An Evaluation of Growth in India after 1991

Some scholars have argued an evolving structure of trade and production based on India's existing comparative advantage is a viable strategy for sustainable economic growth. "For the next two or three decades at least, out analysis suggests that such an expansion of exports would and should be concentrated on labour intensive manufactures." (Mayer and Wood 2000:34). This section will show that are concerns about whether the Indian economy is taking a high road to growth, first briefly at the aggregate level then will look more closely at two case studies – the 'detailed and specific' analysis of trade policy urged by Deraniyagala and Fine (1999).

5.1. The Indian Economy After 1991: Growth, Linkages and Upgrading

The impact of reforms after 1991 on growth was disappointing. There is no clear evidence of a change in the growth rate of GDP after 1991, growth continued at 5.7% from c1980 to c2000 (Nagaraj 2002; Virmani 2004). The rate of growth of exports did increase in the era of reforms, from 8.3% p.a. between 1981 and 1990 to 9.9% between 1991 and 2000, but remained significantly below the 1970s when exports expanded by 15.6% p.a. (Chandrasekhar and Ghosh, 2002:114). There is evidence this growth in volumes was undermined by a declining terms of trade. The weighted average unit price of India's imports rose during 1995/96 to a peak in the first quarter of 1997/98 and declined thereafter by 33%. Falling prices were especially sharp for food, beverages, tobacco, animal and vegetable oils, machinery and transport equipment (Chandrasekhar and Ghosh, 2002:Ch10). Full implementation of the quota and tariff reductions as part of China's accession to the WTO after 2005 is forecast to lead to a fall in India's terms of trade, in particular for clothing (Cerra et al 2005; Anathakrishnan and Jain-Chandra, 2005).

There are few studies looking at linkages in the economy and how they have changed over time. Service sector growth was having an increasingly positive influence on promoting manufacturing growth over the 1990s (Banga and Goldar, 2004). The percentage of purchased to total inputs (proxy for demand for industrial inputs in agriculture) doubled from 16.4% in 1970/71 to 35.6% in 1983/84 (Thamarajakshi 1990). More generally it has been found that FDI into India over the 1990s has not generated many linkages with the Indian economy. FDI firms are conducting minimal R+D within India (Aggarwal 2002; Pantibala 2002). Between 1997-9 nearly 40% of FDI inflows into India have taken the form of Mergers ands Acquisition (M and A) of existing Indian enterprises (Kumar 1998). FDI in M and A are poorer than greenfield investment in terms of spillover benefits. Greenfield FDI brings with it new production, organisation and management know-how.

Between 1985 and 1996 India's export structure the structure remained static. Resource-based and low-technology products accounting for 86% of total manufactured exports in 1985 and 83% in 1996 (world averages 43 and 35% respectively) (Lall 1999). The share of labour-intensive exports in India's total exports remained high, little changed and much greater than comparable Asian countries between the early 1980s and mid 1990s. The share of science based and differentiated exports actually declined (Tendulkar 2000:39). The perception that India's economy shows little sign of dynamism during the 1990s is borne out by studies of productivity. There is a broad agreement that TFP growth has declined during the 1990s relative to the 1980s (Balakrishnan et al, 2000; Rodrik and Subramanian, 2004; Goldar 2004; Pandey 2004).

5.2. Case Studies

5.2.1. Software

The software sector has been experiencing rapid extensive growth, there remain concerns with linkages and upgrading and hence about whether this will generate a high road to growth. As per section 4, growth is evaluated in terms of the rate of growth, linkages and upgrading.

i) Rapid Growth and Extensive Growth

The growth of the software has been crucially influenced by India's comparative advantage in English speaking technically educated graduates. There has clearly been rapid extensive growth in the software sector. In 1990 India's software exports were estimated at $131m, by 2001/02 they had risen to $7.8bn, growth exceeded 30% in most years. Currently such exports comprise 16.3% of total exports (D'Costa 2003:211) and 65% of total IT exports are software related. The IT industry as a whole represents 2.87% of GDP. Employment estimates for the IT sector vary widely, 200,000 in 1999 (Saxenian 2001), 410,000 in 2000 (Arora and Athreye, 2000), and 650,000 in 2002/03 (Basant and Rani, 2004).

In specific areas there are concerns for the sustainability of extensive growth. Wages in the software sector have been rising by 30% p.a. from the late-90s eroding this competitive advantage (Athreye 2004). One of India's most dramatic successes has been in software-hardware embedded solutions. This incorporates some kind of embedded systems design and development in a combination of hardware and software dedicated to perform a specific task without human intervention such as in cell phones and. By 2003 there were 100 such dedicated firms. There is though limited scope for such growth, in 2003 the entire world market in this area was worth only $21bn. The sector also crucially depends on synergies with a hardware sector. Hardware revenues have been generally stagnant in India at slightly over $1bn since 1998/99 (Heeks 1995).

More generally there is enormous scope for continued extensive growth, in services such as IT enabled services and remote processing, medical transcription, insurance processing, payroll and human resource services, call centres, and customer interaction services. Revenue from IT-enabled services in India reached $800m in

2000/01 up 70% over the previous year (Singh 2002). India has as yet only a tiny fraction of a world software market worth in 1999/00 some $3-500bn (D'Costa 2003:211) and growing very rapidly (Lall 1999). Firms in the sector are still tiny by world standards, the largest Tata Consultancy Services in the early 2000s had annual sales of $352m, Microsoft of $23bn. The IT sector is likely to increase its share of GDP from 3% currently to 6-8% within ten years (Kapur 2002).

ii) Linkages and Sustainable Economic Growth

The software sector is not yet generating significant linkages with the rest of the Indian economy. Studies of FDI in other contexts have argued MNCs may provide spillovers to the domestic economy via demonstration effects to local firms and technological and informational externalities (Grossman and Helpman 1991; Kokko 1994; Aitken and Harrison 1999). Those optimistic about the software sector in India include Pantibandla (2002) who argues that MNC entry will do just this. This optimistic case is unlikely, the key characteristic of the Indian software industry is the segmentation of domestic and export markets (Ghemawat and Pantibandla, 1999). Between eighty and ninety percent of domestic output is exported. There are clear differences in the types/ levels of user need in US and domestic Indian markets. This has the implication that technological learning from exports is not of immediate use in the domestic market. TNCs in the software sector are thus less likely to develop backward and forward linkages in the Indian economy and are more likely to operate as highly integrated units.

The movement of skilled labour is an important mechanism by which skills and learning can be diffused. There has been some reverse immigration into India, especially since the end of the US Internet boom. The dominant migratory movement remains outward. There are about 250,000 Indian software developers in the US, 40-50,000 are travelling to Europe/ US every year. In 1999 55,000 Indians applied to work in the US on the highly skilled foreign persons visa initiative. According to estimates in Fortune 500 Bay Area Indian immigrants had created companies worth $325bn by 2000 (D'Costa 2003). Far from disseminating skills to the rest of the economy the Indian software sector has facilitated skilled migration from an economy where 70% of the population are still engaged in agriculture. The inability to retain labour had a severe impact on successful project management in the IT sector (Tschang 2001).

iii) Sustainable Growth and Upgrading

There is a debate about whether the software sector in India is acquiring 'technological capability' and is entering a high road of accumulation (D'Costa 2003). Some have argued that India's specialisation in low-end services would limit learning (D'Costa 2003). India provides a range of services, including programming, conversions, testing, debugging, installing, and maintaining while specialists in industrialised countries continued to write core software (Ghemawat and Pantibandla, 1999). This led to concerns that the Indian software industry despite its apparent successes has returned to the production pattern of the 1960s. Foreign tie-ups, foreign brand names and access to the latest imported technology were once again the most

important considerations and most so-called Indian computer companies actually just produce software for integration with imported hardware (Heeks 1995). This argues Evans (1995) is a reversion to an earlier colonial trading pattern. India is exporting inexpensive lines of code and importing expensive foreign software whilst trapped at the low end of the division of labour. It is true that the effects of import dependence are striking. The textiles sector is 98.5% self-sufficient on local inputs average net export earnings of the software sector were -$1bn on average between 1998/99 and 2002/03 (Banga 2005).

These views are too pessimistic, there is some evidence of learning having occurred in the software sector. A growing number of MNC's followed the pioneers (Texas Instruments and Hewlett-Packard) in setting up offshore development centres in India in the 1990s. These now include Motorola, IBM, Microsoft, Philips and BT. Hewlett Packard has developed a strong linkage with the Indian Institute of Science in Bangalore for its R+D activities, and also with a significant number of small and medium sized Indian firms (Pantibala and Petersen, 2002). Texas Instruments and Intel have invested in universities and research institutes to develop general purpose skills. Oracle expanded its local R+D personnel to several thousand in the early 1990s. Motorola in the early 2000s had 1,300, three quarters of them working in software development and chip designing, mostly in the telecom sector. Anecdotal evidence suggests they have begun to take on more sophisticated design and programming projects jointly or independently and often as equal to their parent organisations (Saxenian 2001:11; Pantibala and Petersen, 2002). In 1990 onsite sourcing (sending teams of labour overseas to service clients software needs and known as body-shopping) constituted 90% of revenue in the software sector. This figure had fallen to 38.9% in 2002/03. In contrast offshore (contracting of work from MNCs to specialised Indian firms) increased from 5% in 1990/91 to 57.9% 2002/03. Such turnkey projects are likely to entail more design and systems integration and place greater demand on skills (D'Costa 2003). Tata Consultancy Services was formed at the end of the 1980s when 75% of its work was customising software abroad for foreign clients. Within twenty years the firm was project managing for overseas clients. By 2005 companies such as Wipro and Infosys have a track record that enables them to win consulting contracts often on a turnkey basis. More direct evidence of learning is demonstrated by the fact that 32 Indian firms received the prestigious SEI-CMM certification by the late 1990s. The certification is based on an assessment (by the Engineering Institute at the Carnegie Mellon University) for controlling, managing and improving software development projects. The sector, particularly in Bangalore is taking on many of the features of an industrial cluster such as technical expertise, diverse capabilities, and high interaction among firms. In 2001 about 40% India's software exports came from Bangalore (Pantibala and Petersen (2002). Elsewhere industrial clusters have assisted firms in responding collectively to external shocks (Nadvi 1999), upgrading production (Kennedy 1999), and diffusing learning (Morosini 2004). As the industry has expanded in terms of employment, revenue per employer (a proxy for labour productivity) has been increasing, from $6198.5 in 1993/94 to $15,600 in 1998/99 (Arora and Athreye 2000:262). This may reflect the assimilation of more advanced and productive technology or even ongoing learning, but it certainly illustrates that growth is more than simply extensive in nature.

Despite these positive signs there is good evidence of learning problems in the software sector. Despite signs of learning and productivity growth India remains at the very low-end of the market where competitive strength is based on low wages rather than productive dynamism. Productivity remains very low by world comparisons (Table 1). India does have something of a comparative advantage in software production. This could be considered as much to do with continued disappointing performance in the industrial sector as it is a service sector miracle[4].

Table 1: Comparisons of Productivity in manufacturing and software (1995)

Country	Value Added Per Employee in Manufacturing ($'000)	Software Revenue Per Employee ($'000)	Comparative Advantage (3)/(2)
Israel	38.30	100.00	2.61
Ireland	117.10	142.24	1.22
India	4.10	8.93	2.18
France	77.43	161.32	2.09
Finland	76.16	83.46	1.10
USA	98.20	126.02	1.28

Source: (Arora and Athreye, 2000:260).

5.2.2. The Garment Industry

The garment industry has experienced a rapid and extensive pattern of economic growth for two decades. There are few signs this is leading to a high road to growth. There are concerns this will be undermined by declining terms of trade. There is little evidence of upgrading. The sector does though generate significant linkages with the rest of the economy.

i) Rapid Growth and Extensive Growth

The growth of the garment sector is driven by India's comparative advantage in low-skill intensive labour. A leading tier of competitive domestic firms were able to restructure themselves after the mid-1980s, build links with buyers and suppliers at home and abroad and increase exports rapidly. The Ludhiana kintwear cluster for example suffered a 21% fall in knitwear exports in 1991/92 due to the collapse of the USSR, its erstwhile largest market. Exports then revived very quickly expanding on average by 70% p.a. for the rest of the decade (Tewari 1999). By 2003 India exported $13.5bn in textiles and apparel, from under $6bn ten years earlier. Textiles comprised 23% of India's total exports and 14% of value added in manufacturing. With an import intensity of only 1.5% this made the sector the largest net foreign exchange earner (Verma 2002).

Export growth increased rapidly after reforms to domestic textile policy in 1985. This was a pattern of extensive growth based on gaining greater market share in simple'

[4] Service sector growth in the 1990s was actually higher in China (9.1%) than in India (7.5%). What made the difference were the very rapid rates of industrial growth in China (13.6%) relative to disappointing rates in India (5.8%).

low-cost cotton based products. By 2000 India had large shares of the market in the EU and EC in a few simple products. For woven shirts for example the size of India's MFA quota was already close to the size of the entire US market. By 1997 exports of items restrained by the MFA accounted for 81% of total apparel exports to the US and 71% to the EU (Uchikawa 1999; Ghemawat and Pantibala 1999).

Such extensive growth began to reach limits. Export growth showed a secular decline over the twenty-year period. Apparel exports grew by 19.3% between 1985 and 1990, 7.8% 1991 to 1995, 5.9% 1996 to 2000 and 5.2% 2001 to 2003 (Tewari 2005:17). The abolition of the MFA at the beginning of 2005 generated opportunities for renewed extensive growth. In cotton shirts for example about 43% of the US market was opened to foreign competition on January 1st 2005. Such renewed extensive growth was evident throughout 2005. Between January and August 2005 apparel exports to the US increased by 61% from China and 33% from India (Anathakrishnan and Jain-Chandra 2005). It is forecast that India will rise from a 4 to 15% share of the US apparel market, someway behind China's 50% share (Tewari 2005:2).

There are concerns about the sustainability of such a pattern of extensive growth. Full implementation of quota and tariff reductions as China's accedes to the WTO after 2005 are likely to generate a decline in India's terms of trade, especially for clothing (Cerra et al, 2005; Anathakrishnan and Jain-Chandra, 2005). There are clear signs this is already happening. Prices of apparel imports fell by 8% in first six months of 2005, wool product prices by 30%, prices of cotton coats, dresses, knit shirts declining by more than 60%, cotton trousers, skirts and sweaters by almost 50%. Japan never imposed quotas on textile and clothing imports under the MFA. Some have argued the market share in Japan is indicative of a post-quota world. China has 50% and 80% of Japans textile and clothing imports in 2003. Recently Japanese imports from India, South Korea, Taiwan and Hong Kong have fallen. India now has a negligible share of the Japanese market. There are recent signs of a weakening in the Indian share of the EU market (Anathakrishnan and Jain-Chandra, 2005).

ii) Linkages

The growth of the textiles sector has not generated dynamic linkages with the rest of the economy, but occurred in spite of inefficient linkages. The textiles sector is 98.5% self-sufficient on local inputs, its net contribution to the balance of payments is easily the largest of any sector in India. India like only a very few other LDC's (Egypt and Pakistan) is nearly self-sufficient across the whole value chain. This advantage in terms of resource endowments has not been translated into a competitive strength. The performance of cotton yarn, man-made textiles and garments in terms of unit cost growth has been poor, increasing material prices being the largest contributor to rising unit costs (Hashim 2004). The unit cost of cotton grew by 13% p.a. and garments 10.6% p.a. between 1989 and 1997. The price of polyester yarn in India (1998/99) was Rs 70 per kg compared to Rs 43 per kg on the international market (Hashim 2004). A poor productivity performance in the textiles sector through forward linkages undermines the prospects of the garments industry. Between 1989 and 1997 average annual growth of TFP was –1.92% in cotton yarn and only 0.56% in man-made fabrics (Hashim 2004:29). A proxy measure of the efficiency and reliability of the domestic supply chain are the defect rates on final products, in India these run

somewhere between double and five times higher than those in China (Tewari 2005:48).

iii) Sustainable Growth and Upgrading

To sustain export growth over the longer-term a shift to a more intensive growth path will be necessary. In East Asia the key to success in buyer driven chains was the move from the assembly of imported inputs to more domestically integrated and higher value added exporting such as full-package supply or original equipment manufacturing (Gereffi 1999). This requires industrial upgrading to a higher road of competition, emphasising quality, productivity, variety, and timely delivery rather than just the low prices consistent with a low road of competition. There are key advantages to such a shift, such as the easier availability and protection of rents and less vulnerability to declining terms of trade (Kaplinsky 1999). In India for example 57% of the value added in man's cotton shirts and 61% of the value added in men's' khaki trousers s is added at the global retail stage (Tewari 2005). Delivery times are longer from India than competitors. Minimum delivery to the US are 24 days from India, 18 from Thailand, 15 from China, 12 from Hong Kong and 3 from Mexico. The mean delay in customs processing is 10.3 days in India, and only 7 days in South Korea (Anathakrishnan and Jain-Chandra, 2005).

There have been some signs of upgrading. There has been significant forward integration by yarn-makers and spinning mills into garments. Arvind Mills is the largest producer of blends and denim in India and has long been a large supplier of denim to major producers such as Gap and Levis. In early 2000 the firm invested $35m to integrate into jeans and T-shirts and set up a number of joint ventures to produce branded labels for the domestic market. Tewari (2005) argues that design is becoming a significant source of competitive advantage in Indian apparel exports. This she argues is due to the important legacy of industrial organisation. The historically small scale of operation of the Indian apparel sector has created the conditions for the preservation of generalist skills, of the master tailor. Such general purpose skills allow complexity to be handled cost effectively and flexibly, the rigidities of a very narrow division of labour are absent. A good example is Himmatsingka Seide Limited (HSL) which was incorporated in 1985. It has become a top line exporter of high quality silk fabrics and home furnishings and is exhibiting high road dynamics even though it remains a smallish producer with sales of $34m in 2003. For a decade the firm has sustained profit margins of 40-46%. The firm is the largest silk manufacturing facility in India with 115 computerised looms. Despite its integrated facilities the company focuses on design and rapid delivery of small batches of highly customised home-furnishing fabric. The company has a high-tech design capacity and its 650 employees have developed a portfolio of 20,000 products, and add 2,000 new products each year. Despite labour costing between 2 and 4 times higher than industry norm the companies flexible production structure and high position in value chain overwhelms production costs (Tewari 2005).

There is however little sign of any generalised upgrading in the textile/ garment sector. The level of technology in weaving is particularly low (Hashim 2004). Of the 1.6 million powerlooms installed less than 1% are shuttleless. Even in the organised mills sector only 5.8% of the total are shuttleless compared to 80% in the US, Taiwan

and Korea. New shuttle and shuttleless looms installed in India between 1989-98 accounted for only 1.6% of installed capacity in 1997 compared to 41% in Mexico. Between 1987 and 1996 China invested in 68,000 shuttleless looms India in only 8,000. Special and processing machines that can add significant value account for a very small part of the total number of machines in India unlike other Asian countries such as Hong Kong and China. In India most investments are in sewing machines. In India only 6% of manufacturers operated with more than 50 machines in 1998. The average firm in India has 119 machines, there are 698 in Hong Kong and 605 in China (Hashim 2004). India does have extremely low wages but these are largely offset by extremely low levels of productivity (Tewari 2005:27-28).

Tirrupur has been one of India's most successful clusters seeing dramatic increase in indicators of turnover, sales, employment since the 1970s. The cluster accounts for about 85% of cotton knitwear exports from India. There has been substantial development of backward and forward linkages within the sector. This growth though has been based on an intensification of work, through long hours and piece rates, from skilled to unskilled, male to female and adult to child labour (Neetha 2002). Females have entered sectors such as stitching, checking, ironing, folding and packing in large numbers, displacing male employees. Women are typically from backward castes (though almost 100% are literate), a large number of them are migrants, and the vast majority are employed on a casual/ temporary basis, 92% of women are employed on a piece rate basis. Tiruppur is the classic example of feminisation and segmentation of the labour market brought about through the system of subcontracting (Neetha 2002).

A low road of competition is compensating for the need to improve productivity (Cawthorne 1995). There is evidence this path is generally being pursued in the Indian textile industry. The fragmentation, ruralisation and casualisation consistent with a low road of competition has already had a profound impact in India. Large urban cotton mills have declined and the industry has become ruralised in smaller industrial units. Between 1985 and 1995 the percentage of cloth produced in the composite mill sector fell from 22 to 7.6%, in the (informal) powerloom sector from 46 to 59.2% and in the (informal) handloom sector from 24 to 20.6% (Kambhampati and Howell, 1998).

All this means that exports from India remain at the low-end niche of the international market and are dominated by simple cotton products. By the late 1990s within total textile exports 44.3% of exports were accounted for by cotton fabrics and 26.9% by cotton yarn and within garments 69.7% of exports were accounted for by cotton fabric. Between 1995 and 2003 there was no sustained increase in the average value realised on units exported. In T-shirts (constant dollars per unit) this declined from 3.1 to 2.9, in women's cotton woven blouses and shirts from 4.2 to 3.5, in women's knitted cotton blouses and shirts from 3.1 to 2.5. Men's knitted cotton shirts rose slightly from 3.3 to 3.4, men's woven cotton shirts increased sharply from 3 to 4.5. Women's knitted nightdresses remained at 2.5, women's woven trousers increased from 3.2 to 4.1. Between them these products accounted for around 60% of India's total apparel exports (Tewari 2005:31).

6. Conclusions

A lot of academic policy advice has focused on making Indian exports more price competitive. Such advice has included reducing the high rates of excise duty on polyester and cotton (Hashim 2004), or noting that the price of power for industrial consumers is higher in India than Mexico, Taiwan, South Korea and Bangladesh (Hashim 2004, Anathakrishnan and Jain-Chandra, 2005). This is rooted in a neo-classical perspective that suggests India simply needs more of the same, more trade liberalisation and more integration with the global economy and more domestic liberalisation to underpin a continued expansion of labour-intensive exports. India should according to this view continue to compete on the basis of its existing comparative advantage, low cost labour. "For the next two or three decades at least, out analysis suggests that such an expansion of exports would and should be concentrated on labour-intensive manufactures." (Wood and Mayer 2000:34).

This paper has shown in general terms (section 4) and case studies of the software and textiles sectors that there are inherent problems with this strategy. In both sectors there are overwhelming incentives for continued extensive growth, in the software sector there is an abundant supply of low cost English speaking graduates, for the textile sector local input supplies and a large semi-skilled and experienced labour force. Such a low wage/ low price strategy is the antithesis of the high road to international competition and accumulation.

The theory of comparative advantage assumes that technology is freely available to all countries and firms which operate on the same production function[5]. Countries will settle on the appropriate capital/ labour ratio in accordance with their factor price ratios determined by relative endowments of labour and capital, shifting effortlessly along the production function as these ratio's change. There is assumed to be no problem in assimilating technology from developed countries, no adaptations are required and alternatives are available for all factor price combinations. All firms remain equally efficient and firm specific learning is unnecessary. Such traditional approaches to technology assume that innovation (movements of the production frontier rather than along it) is a completely distinct activity from mastering technology or adapting it to different conditions (the only admissible country differences are capital/ labour ratios).

In practise with imperfect knowledge productivity may differ among firms in the same industry. Technological knowledge is not easily transferred between firms. Technologies are tacit so require learning, firms will not be operating on the same production function. Simply 'getting prices right' may be insufficient for countries to compete internationally[6]. Neo-classical economics assumes innovation takes place in advanced countries and learning in LDC's is no more difficult than selecting the most appropriate among them (Lall 1992; Amsden 1997). There is actually less difference between innovation in developed countries and industrialisation based on learning already commercialised technology. "The First Industrial Revolution in Britain, toward the end of the eighteenth century, and the Second Industrial Revolution in

[5] This section draws on Lall (1992).

[6] It could be that the price of labour needs to be negative in order for a country to have a comparative advantage in labour-using industries.

Germany and the United States, approximately 100 years later, shared the distinction of generating new products and processes. By contrast, economies that did not begin industrialisation until about the twentieth century tended to generate neither, their products and processes being based on older technology. Economies commencing industrialisation in the twentieth century transformed their productive structures and raised their incomes per capita on the basis of borrowed technology." (Amsden 1989:3).

Much technology is tacit and to effectively master it extensive experience in use is necessary. Learning-by-doing may imply a lengthy and unpredictable period of losses as firms learn and adapt technology to make it more appropriate to developing country conditions. In theory private capital markets could fund firms through the period of learning. In practise uncertainty, risk and illiquidity mean private capital will be reluctant. This is especially relevant when economies are industrialising and the economy is undergoing profound structural changes where past history is a poor guide to the future in evaluating investment and lending decisions. Investment in learning by one entrepreneur in discovering a commercial niche that can be profitably exploited is likely to lead to rapid imitation[7]. Learning is an investment, the returns to which cannot be fully appropriated, entrepreneurs in LDC's face similar problems to innovators in developed countries. While neo-classical economics subscribes to the need for patent protection to generate an incentive for innovation it advocates complete freedom of market entry in all other scenarios. Learning is likely then to be under-supplied so profits/ rents that reward and motivate learning may lead to a more dynamically efficient economy even if they are a sign of resource mis-allocation according to considerations of static/ allocative efficiency.

These various market failures may generate a need for intervention in both factor and product markets to direct resources to particular activities and prompt the economy up a high road to competition. By so allocating resources the state creates rents that both induce and facilitate learning by private actors. Policy needs to increase the expected payoff to learning, hence it is important to distinguish firms that are engaged in costly learning and those who simply imitate the results of others learning. Temporary trade protection may increase profits from learning but only for firms producing for the domestic market (Hausman and Rodrik, 2003). Trade protection or export subsidies do not discriminate between innovators and imitators. Export subsidies could be good at discriminating between successful and unsuccessful performers ex-post. Providing subsidies or government credit contingent on exporting can allow policy makers to discriminate between firms.

There is a good chance learning rents will fail to generate growth. The failure of infant industries protected from international competition to become dynamic and resting instead in pleasant lethargy on guaranteed profits is an oft-cited example. There are important pre-conditions for rents to promote learning. Rents must be allocated in a contingent manner, withdrawn from those firms failing to learn, export or reduce costs. The bureaucracy must be competent enough to allocate rent ex-ante to potentially dynamic capitalists or ex-post strong enough to withdraw them from failing capitalists. The relation of the state to various classes is important. To the

[7] Rhee (1990) notes that the number of export-orientated RMG factories in Bangladesh exploded after the single firm Desh proved it was a profitable proposition at the end of the 1970s, by 1985 there were 700 such firms.

capitalist class in order to enforce discipline, and ensure rents are contingent on the states desired performance criteria. The relation of the state to other non-capitalist classes must be such that they don't mobilise and dissipate efficient rents towards non-productive areas (Khan 2000).

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