**Qualitative Differences in Economic Growth Pre and Post Market Reforms in India**

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**Abstract:** This paper studies the quality of growth in three consumer goods industries in India during the period between 1980 and 2010. This period witnessed a radical change in policy from the “license raj” to the liberalization era. While recorded GDP growth was high throughout this period, this paper finds significant improvements in the quality of goods produced after the structural break in policy. Specifically, it finds a reduction in the technology gap between Indian and world production, an increase in product differentiation, and a reduction in the prevalence of defects in production in the case of all three goods. It then draws the implications of this finding for the “great Indian growth debate.”

**I. INTRODUCTION**

India experienced a growth spurt during the decade of the 1980s with an increase in real per capita GDP of 3.9 per cent after recording a rather placid real per capita GDP growth rate of 1.7 per cent for the three decades between 1950 and 1980. This robust growth continued in the 1990s and increased further to nearly 6 per cent during the 2000s.

 The fact that the spurt in growth occurred during the 1980s, a full decade before the advent of liberalization, has generated much debate among economists analyzing the Indian growth experience. Rodrik and Subramaniam (2005), for instance, use this high rate of growth as proof for the success of large scale import substitution. This elicited responses from T.N. Srinivasan (Srinivasan 2005), who argues that the growth in the 80s, in contrast to that of the 90s and beyond, was built on the sandy foundations of large scale external debt, and from Arvind Panagariaya (Panagariya 2004, 2008), who claims that the growth of the 80s was itself caused by a “liberalization by stealth” that took place through this decade – scattered and unsystematic moves towards the market in a few sectors that nevertheless explain the high growth rates recorded.

 This “great Indian growth debate” revolves around finding the sources of high growth recorded during the 1980s and after liberalization. In doing so, the participants have focused their attention on the quantitative aspect of GDP growth and have implicitly assumed no important differences in the underlying nature of this growth across these two periods. However, differences in the quality of goods, especially consumer goods, produced during these two periods would imply very different improvements in living standards despite the quantitatively similar increases in output. This qualitative aspect has been ignored in the debate thus far.

Imagine two economies – A and B – both of which have recorded a high rate of increase in per capita real GDP over the last decade, say 5 and 7 per cent respectively. More investigation, however, reveals that the consumer goods produced in A embody obsolete technology, are often defective, are more or less homogenous with minimal product differentiation and are in perpetual shortage with long waiting lists. Those produced in B, on the other hand, embody the latest technology, seldom break down, offer consumers a lot of variety and are available off the shelf. It follows that despite the similar quantitative increase in per capita real GDP in A and B over the course of the decade, the improvement in economic well being and living standards have been far greater in the case of B.[[1]](#footnote-1) Yet, this aspect of the growth process of an economy would be completely missed by an economist who ignores the qualitative differences and instead focuses his attention solely on the rate of GDP growth.

This paper investigates whether significant qualitative differences exist in consumer goods produced pre and post liberalization in India by focusing on the changes in the quality of three goods, namely, telephone services, televisions and watches. It thus attempts to fill the gap in the literature on India’s growth experience mentioned above, i.e., it investigates if there were differing improvements in economic well being hidden behind the high growth rates recorded during the two periods.

In the paper I focus on several key characteristics of goods that together serve as a proxy for quality. Using primary data I study the technology gap between goods in India and the world market at that time, the prevalence of defects or faults in the goods produced, the waiting time required to obtain a good and the extent of product differentiation and variety. Similar work can be found in Balassa (1959), Nutter (1962), Krueger (1975) and Cox and Alm (1998, 1999).

Nutter (1962) is an analysis of the high growth rates recorded under central planning in the erstwhile Soviet Union. Nutter examines disaggregated primary data in government documents across several consumer and capital good industries and finds a marked deterioration in the quality of goods under the planned regime. For example, he finds that “the spectacular growth of detergents in the United States…has no counterpart in the Soviet Union” where almost all the soap was produced in bar form even post World War II, that the variety in cotton textiles in the Soviet Union was far below that found in America and that the “dyeing and finishing of Soviet fabrics fall far below Western standards” as a result of the predominance of “cheap sulfur dyes (Nutter 1962, p. 80).”

Cox and Alm (1998, 1999) conduct a similar exercise for the United States during the 1980s and 90s and find marked qualitative improvements in consumer goods over the two decades. In particular, they find that there has been a sharp increase in product differentiation and in the variety of goods such as cars, houses, computers and televisions as well as significant advance in the technology embodied in these goods.

 The paper is structured as follows: section II provides an explanation as to why telephones, televisions and wrist watches were chosen for further analysis, section III gives a brief overview of the changes that have occurred in the policy frameworks for the three goods, section IV provides the details on the qualitative changes that have taken place and section V concludes.

**II. MOTIVATION**

In this paper I examine the qualitative changes over a thirty year period (1980 – 2010) spanning the pre and post market reform eras for three goods – telephone services, televisions and wrist watches. The focus on these three goods is justified since each of them was heavily influenced by regulation in the 1980s as well as by the market reforms beginning in the late 1980s and early 1990s. For example, for most of the 1980s the production of all three goods and their components was subject to the industrial and foreign exchange licensing system. The 1990s, on the other hand, witnessed the de-licensing and the opening up of these sectors to the forces of competition. Thus, one is able to compare various characteristics of these goods across the structural break in policy. If it can be shown that there are significant differences in these characteristics across the policy regimes, it makes it relevant to the “great Indian growth debate.”

 Secondly, all three goods witnessed high rates of growth in both the pre and post liberalization years; they all grew at rates equal to or above the real GDP growth rates for these periods.[[2]](#footnote-2) Thus, the number of telephone connections (fixed and wireless) grew at a rate of 9 per cent in the 1980s before increasing to 19 per cent in the 1990s and 40 per cent during the 2000s.[[3]](#footnote-3) The production of televisions rose by 29 per cent between 1980 and 1990 and by 8 per cent during each of the following two decades.[[4]](#footnote-4) Meanwhile, the watches and clocks sector grew at a rate of 12 per cent between 1981 and 1988 and the manufacture of wrist watches increased at a rate of 10 per cent during the following ten years from 1988 to 1998.[[5]](#footnote-5) The fact that these goods experienced high and quantitatively significant growth rates makes them pertinent to the question at hand.

 Also, these three goods have higher average penetration rates when compared to other consumer goods that were also affected by liberalization. Higher penetration implies that these consumer goods were used by a greater number of people, thus making them relatively better predictors of standards of living. In the case of televisions and wrist watches, this is the case in both the pre and post reform periods whereas for telephones it holds true only for the latter period. Thus, the average penetration rate of televisions was 17 per cent as of 1990 and 64 per cent in 2005 whereas that of wrist watches was 75 per cent (mechanical) and 22 per cent (quartz) in 1990 and 82 per cent in 2005 (Rao and Natarajan 1996; Shukla 2010). The corresponding figure for telephones was less than 1 per cent in 1990, and 66 per cent in 2010 (Mani 2011). These figures stand in contrast, for example, to the average penetration rates of refrigerators, cars, air conditioners and microwaves - other goods that were de-regulated beginning in the 1990s.[[6]](#footnote-6)

**III. OVERVIEW OF THE POLICY FRAMEWORK**

**1. Telecommunications[[7]](#footnote-7)**

 Under the Industry Policy Resolutions of 1948 and 1956, telecommunications equipment

was deemed to be of national importance and was therefore exclusively reserved for state enterprises. The Indian Telephone Industries (ITI) was established in 1948 to manufacture telephone switches, transmission cables and telephone instruments, whereas Hindustan Cables Limited (HCL) was set up in 1952 to manufacture a range of transmission cables and Hindustan Tele-printers Limited (HTL) was established in 1956 to produce terminal equipment like modems, tele-printers, etc. All three of these public sector enterprises sold their produce to the Department of Post and Telegraph (P&T), the sole provider of telecommunications services in post-independence India.

 Both the telecom equipment manufacturers as well as the P&T were shielded from competition – domestic and foreign. Indian private firms were barred entry into equipment production or service provision by the IPRs of 1948 and 1956. Meanwhile, imports of telecom equipment were subject to import licensing as well as high tariff barriers.

 The above arrangement remained in place until 1984, when the New Telecom Policy of that year allowed domestic private firms to manufacture selected terminal equipment meant for subscriber premises such as electronic push button phones, cordless phones, pay phones, electronic private branch exchanges, etc. The policy also allowed the private sector into the production of small exchanges with a capacity of 2,000 switches or less. These private firms, while now allowed to enter these sectors, were still subject to the domestic industrial licensing system, i.e., they were required to obtain a license from the government before commencing production, could not produce more than the license permitted, etc. The rest of the telecom sector, however, remained undisturbed including the manufacture of large public exchanges, which remained under the domain of ITI.

 In the following year the P&T was bifurcated and a new Department of Telecommunications (DOT) was established. Further, two new state owned corporations were created. The Mahanagar Nigam Telephone Limited (MTNL) was to handle the distribution of telecommunications services in Delhi and Mumbai, while the Videsh Sanchar Nigam Limited (VSNL) was handed sole control over the provision of international telecom services.

 Further changes more radical in nature ensued in 1991. As part of the wave of pro-market reforms that swept through the Indian economy, all telecommunications equipment was opened up to private sector participation. Any domestic firm was now free to enter or exit the manufacture of any piece of telecom equipment without the hassles and burdens of the domestic licensing system. Foreign firms were welcomed into the sector, albeit in partnership with domestic firms, with automatic approval guaranteed for foreign direct investment to the tune of 49% or less. Import policies were also relaxed except for some selected items like cordless phones, answering machines and electronic push button phones, the import of which still required licenses and were subject to a customs duty of 30%.

 One area of the telecom sector, namely the provision of telecom services was untouched by these changes initiated in 1991 and still remained a monopoly of the state. The New Telecom Policy of 1994 tried to change this and threw open wire-line and wireless fixed services and wireless mobile services to the private sector. While there were some private operators who entered the four largest cities in 1995 and many other metropolitan areas by 1997, the reaction of the private sector to the policy of 1994 was tepid at best. This was largely because of the onerous conditions imposed by the DOT on those private operators who did enter the telecom services sector. These operators were, instance, forced to connect all calls through the DOT and MTNL and pay high fees for doing so and were also stopped from raising their call rates beyond an imposed price ceiling.

 These shortcomings were rectified by the New Telecom Policy of 1999 which allowed private operators to interconnect freely with each other and also removed the price ceilings imposed on them. These changes attracted a host of private firms into the sector, especially into the provision of wireless mobile services. Thus, it was only in 1999 that all areas of the telecom sector – both telecom equipment as well as telecom services were well and truly open to the private sector.

**2.** **Television Industry**

 The production of televisions in India commenced in the late 1960s and, like all other

 industrial activity in India at the time was subject to the industrial licensing system. Four private firms – two small scale enterprises and two larger enterprises that were part of the organized sector – were given the first licenses to produce black and white televisions (Guhathakurta 1994, p. 847; Joseph 1997, p. 101). Foreign technical collaborations were disallowed and the firms were forced to use indigenous technology developed by Central Engineering and Economics Research Institute (Guhathakurta 1994, p. 847). In due time, the two organized sector firms stopped production and henceforth, largely due to government policy, television production was dominated by small scale sector and public sector units. Thus, in the next round of license approvals in the early 1970s, almost all the licenses were handed to small scale enterprises and by 1972-73 77 per cent of the firms licensed to manufacture televisions were small scale enterprises, whereas the rest were public sector units (Guhathakurta 1994, p. 847).

 Domestic television manufacturers in India were shielded from domestic competition

the licensing system. No firm could begin the production of televisions without first acquiring a license. Thus, incumbent firms were shielded from potential competitors producing not only black and white televisions but also other superior competing products like color televisions. The sector was also shielded from international competition since the import of television sets was banned.

 The early 1980s witnessed some policy changes. Larger private sector firms in the organized sector were encouraged to enter the industry and were offered licenses to commence production. Whereas the licenses issued in the 1970s usually had a capacity limit of 20,000 units, this limit was now increased for the licenses approved for the new private sector entrants. In the second half of the 1980s, broad banding was also introduced, implying that the issued licenses were given a broader definition, thereby allowing some more flexibility in making production decisions (Joseph 1997, p. 106).

 Furthermore, some of the regulations placed on the import of essential components in

television production were eased. A number of components which were not produced indigenously or were available only in limited quantities in India were now placed under the open General License (OGL) category; they could now be imported without a license by actual users but were subject to high tariff rates, usually in the 75 to 150 per cent (c.i.f) range (Guhathakurta 1994, p. 850). However, the imports of components like black and white picture tubes for which the government felt that there was adequate indigenous capacity were still subject to import licensing, as were the imports of television sets, which were completely banned except as personal baggage in which case they were subject to a duty of 240 per cent (Guhathakurta 1994, p. 850).

The decade of the 1980s also witnessed the approval of technology imports subject, however, to a phased manufacturing program (PMP) that would ensure rapid indigenization of the imported technology in quick time (Guhathakurta 1994, p. 849). It was under the aegis of the PMP that Indians got their first taste of color televisions. Given that the 1982 Asian Games held in Delhi were to be broadcast in color, the Indian government allowed domestic firms to assemble color televisions from imported kits in order to meet the urgent demand for them. The kit imports were allowed till 1985 and then banned, after which the government “began a policy of inducing firms to indigenize production (Joseph 1997, p. 107).

The 1990s brought major changes to the sector, with the de-licensing of television production occurring in 1996-97, thereby ending the subjection of the sector to the restraints of the industrial licensing system. Domestic firms were free to enter and exit the production of both black and white and color televisions and soon so were foreign manufacturers, with the decade witnessing the entry into the Indian market of electronic giants such as LG, Samsung and Sony.

Sweeping changes were also made to the import licensing regime, with the removal of

quantitative, non tariff trade barriers on the imports of components for television production. There was also a gradual reduction in the tariff rates that these imports were subject to. Thus, the peak basic customs tariff rate for the electronics sector decreased from 85 per cent in 1993-94 to 35 per cent by 2000-01. It was lowered further to 20 per cent by 2003-04 and as of 2010 stood at 10 per cent (Majumdar 2012, p. 73; Ministry of Information and Technology (MIT) 2011, p. 7). In fact, tariff rates on selected electronic components had reached zero per cent with effect from 2005 given that India was one of the signatories to the Information Technology Agreement of the WTO (MIT 2011, p. 7). Furthermore, the customs duty on certain specified raw materials and capital goods used in the production of electronic components and goods had been reduced to zero per cent (MIT 2011, p. 8). The import of televisions, however, continued to be banned until 2001 when India was forced to end all non-tariff barriers on consumer goods imports at the behest of the WTO.

 As far as television broadcasting is concerned, until 1991 there was only one broadcaster in the nation, i.e., the government. In the early 1990, however, this monopoly was broken when

“a number of broadcasters began telecasting their programs directly

 into Indian homes from foreign locations. These broadcasters use

 satellite transponders to send their signals into the country, while

 enterprising cable operators receive these signals via dish antennas

 and distribute them to individual households for a small fee.”

 (Manchanda 1996, p. 138).

**3. Wrist Watch Industry**

During the pre-liberalization era the production of wrist watches in India was subject to a host of government regulations. To begin with, all aspects of the manufacture of watches were controlled by the licensing system. Only licensed firms could produce wrist watches and they had to seek government permission prior to making any of the essential production decisions such as expanding production, changing the technique of production, etc. As a result of this licensing policy, the wrist watch industry was dominated by a public sector enterprise – Hindustan Machine Tools (HMT), which began the production of watches in 1961. The only competition that HMT faced was from another public sector enterprise, namely, Hyderabad Allwyn Limited (Allwyn) and from a variety of small scale enterprises, which were poor competition given the severely restricted amounts of investment that they could make (Ramachandran and Lavanya 2001, p. 156-57). These domestic producers were also shielded from foreign competition given that the import of watches was banned.

 The web of government regulations also encompassed the production of essential watch components. The manufacture of watch straps, for instance, was reserved for small scale sector enterprises, thereby barring any firm in the organized sector from entering production, whereas the production of electronic circuit blocks (ECBs) was reserved for Semiconductor Complex Limited (SCL), a public sector enterprise. Furthermore, the import of components required for watch production was subject to quantitative restrictions and therefore required an import license (Ramachandran and Lavanya 2001, p. 158-59).

 The second half of the 1980s witnessed the first notable change in policy, with the introduction of broad-banding in 1985. Licenses for watch production were now given out for the broad category of watches, implying that a firm could decide on what proportion of mechanical and electronic watches to produce; a decision that previously would have required a license. However, all the other regulations remained intact and further changes only occurred in the early 1990s, when the production of watches was de-licensed. Moreover, the production and the import of components were also de-licensed, but the import of fully assembled watches continued to face quantitative restrictions. These restrictions were finally removed in 2001, when India removed quantitative restrictions on the import of all consumer goods.

**IV. QUALITY OF GOODS**

**1. Telephone Services**

The years between independence and the late 1980s, i.e., the years of complete state

monopoly over the telecommunications sector, were marked by equipment that was increasingly obsolete and by service that was poor in quality. Take, for instance, the case of telephone switches. As of March 1987, the 3.98 million phone lines in India consisted of 416,000 (10 per cent) manual switches, 1.99 million (50 per cent) Strowger switches, 1.14 million (20 per cent) Crossbar switches and 429,000 (11 per cent) digital electronic switches (Mani 1989, p. 181).

Manual switches constituted antique technology; telephone exchanges had manual switches in the late nineteenth and early twentieth centuries when phone services were first being introduced. Strowger switches, meanwhile, were what began replacing manual switches in the first half of the twentieth century (Mani 1989, p. 181). It follows that nearly 60 per cent of telephone lines in India in the late 1980s had switches that embodied technology from the early to mid twentieth century. Crossbar switches too were quite obsolete, given that they began replacing Strowger switches in the developed world soon after World War II. Most telecom service providers, in fact, had begun replacing both the Crossbar and the remaining Strowger switches by the mid to late 1970s with electronic switches – first analog and then digital (Mani 1989, p. 181).

Table 1 in the appendix provides data on the share of electronic switching capacity as of 1987 in selected developed and developing countries. As can be seen from the figures, India, with an electronic switching capacity share of 11 per cent, lagged well behind not only the developed but also a number of developing countries. In Thailand, for example, 51 per cent of all switches were electronic, whereas the corresponding figures for Malaysia, South Korea, Chile and Morocco were 64, 70, 46 and 50 per cent respectively. Thus, at the end the 1980s, there existed a wide technology gap between the telephone switches installed in India and those in many parts of the developed and developing world.

 Telephone instruments did not fare much better. As of the mid-1980s, when private firms were allowed to produce telephones, ITI was producing rotary dial telephones – phones that were being replaced with push button phones the world over by the 1970s. Both the model number 671 telephone that ITI manufactured through the 1970s as well as its replacement, the model 677 which was introduced in 1980 and which soon “equipped most of the national network (Subramanian 2011, p. 192),” were fitted with rotary dials (Mani 1992, p. 134). It was only in the second half of the 1980s that the Indians first experienced push button technology, courtesy of the new private entrants. Production of rotary dial phones, however, continued well into the 1980s, with ITI receiving orders from the DOT for “technologically outdated” multi-line rotary phones between 1986 and 1989 (Subramanian 2011, p. 218). Moreover, the demand for the electronic push button phones was small, given that these phones could only work with electronic switches. The number of electronic switches produced, however, did not exceed 500,000 before the reforms of the early 1990s.[[8]](#footnote-8)

The switches and instruments produced by ITI not only embodied obsolete technology but were also of very poor quality. In fact, ITI had no “well defined and documented quality assurance program” till the early 1990s, i.e., until the advent of competition. Both telephone and switch production were characterized by very high rejection rates, well above the norm of 2.5 % recommended by the DOT. Thus, in 1980-81, 13 per cent of telephones and 29 per cent of Strowger switches were rejected in ITI’s Bangalore plant (Subramanian 2011, p. 191). The situation did not improve through the 1980s, with the rejection rate of telephones reaching a high of 18 per cent between April and October 1987 (Subramanian 2011, p. 192). Despite these rejections, it seems a number of faulty telephones made their way through to the consumers. Thus a World Bank report conducted in 1981-82 found that “it was not unusual for new subscribers to call in P&T repairmen three times within the first six months of getting a connection to attend to faulty instruments (Subramanian 2011, p. 191).”

The obsolete equipment and poor quality of production resulted in an “abysmal quality of services,” often characterized by “erratic connections, disconnections and mishandled calls (Subramaniam 2011, p. 191-93).” The national average call completion rate for local calls stood at a low 40 per cent in 1984-85, whereas the corresponding figure for automatic long distance calls stood at 20 per cent in 1985-86. This meant that a subscriber had to make, on average, 2.5 attempts to make a successful local call and 5 attempts for a long distance one. Furthermore, as of 1984-85, there were 33.2 faults per month per 100 subscribers with the average duration of the faults being 9.5 hours.[[9]](#footnote-9)

To add insult to injury, prospective customers had to wait for years to obtain a telephone connection. The number of telephone connections in operation increased from 2.30 million in 1982 to 4.59 million in 1990, at a CAGR of 9 per cent. But the waiting time for a new connection increased during the same period. In 1982, the prospective customer had to wait, on average, 47.2 months or nearly four years to get a new connection, whereas in 1990 he was forced to wait 48.9 months (Desai 2006, p. 42).

With the advent of private entrants in the second half of the 1980s, the quality of telephone instruments improved and their price started a steady decline. ITI, the erstwhile monopolist of telephone instruments, was ranked in the lowest category in a new three tier quality rating system introduced by the DOT in 1991 to evaluate telephone manufacturers (Subramanian 2011, p. 193). Thus, the new private entrants into telephone production, who numbered 33 as of 1994 (Subramanian 2011, p. 215), delivered a product of superior quality relative to that of ITI.

The replacement of the outdated manual, Strowger and Crossbar switches by the modern digital electronic switches proceeded at a brisk pace through the 1990s as a number of reputed international firms like AT&T, Alcatel, Ericsson, Fujitsu and Siemens entered the production of digital switches after the reform measures of 1991 (Mani 2000, p.195). Thus, by April 1997, 91 per cent of MTNL’s 1.885 million telephone lines were linked to electronic exchanges (India Telecom 1997, p.6). Furthermore, as of 2003, there were eight different types of switching technologies in use in India’s telecom sector, all of them being digital electronic switches (Mani 2003, p. 30).

Thus through the decade of the 1990s there was a significant reduction in the technology gap between the phones and switches manufactured in India and those produced on the world market. This improvement in the quality of switches and telephones led to an improvement in the quality of telephone services. MTNL’s local call completion rate, for instance, increased from 86.8 per cent in 1986 to 93.6 per cent in 1996-97 and its long distance call completion rate increased from 26 to 88 per cent during the same period. MTNL’s faults per 100 subscribers per month also decreased from 26.6 per cent to 19.8 per cent during the same period (India Telecom 1997, p.6). At the all-India level, average local call completion rates increased from 40 per cent in 1984-85 (as noted above) to 58.71 during October to December 2005 (Telecom Regulatory Authority of India (TRAI) 2005, p. 69-72), whereas the faults per 100 subscribers per month decreased from the erstwhile figure of 33.2 in 1985-86 to a significantly lower 6.37 as of October to December 2005 (TRAI 2005, p. 69-72).[[10]](#footnote-10)

The provision of telephone services remained a virtual government monopoly during the 1990s. Nevertheless, despite its many attendant problems, the New Telecom Policy had allowed private players to enter this area of the telecom industry, indicating that the incumbent public sector enterprises were constantly looking over their shoulder at possible private entrants. This resulted in them increasing the number of fixed line telephone connections at a brisk pace – from 5.07 million in 1991 to 21.59 million in 1999 (Mani 2011, p. 9). This number further increased to 45 million in 2004, with the period between 1999 and 2004 witnessing a significant increase in private participation. As of 2004, private operators accounted for 10 per cent of fixed telephone connections, i.e., 4.5 million. This increase in the number of fixed telephone connections also resulted in reductions in the waiting time for prospective customers, from 48.9 months in 1989-90 to 13 months in 1995-96 (Desai 2006, p. 50).

The most significant development in the Indian telecommunications industry post-liberalization, however, was the phenomenal growth in mobile telephone connections beginning in 1997. The number of mobile phone subscribers grew from 0.34 million in 1997 to 76 million in 2005 and from there to 752.19 million by 2010, an annual average growth rate of 89.28 per cent. Given that the number of fixed phone line subscribers reached a high of 49 million in 2005 and has since declined to 35.09 million in 2010, the total number of phone subscribers in India has gone up from 14.88 million in 1997 to 787.28 million in 2010, an annual average growth rate of 45.17 per cent (Mani 2011, p. 9). This huge increase in the number of telecom subscribers has seen the teledensity in India rise from a modest 1.56 in 1997 to 66.16 as of 2010 (Mani 2011, p. 9). Furthermore, while the teledensity in urban areas has increased much faster than in the rural areas, the urban rural divide index has recently started a steady decline from a high of 1636 in 2006 to 474 in 2010 (Mani 2011, p. 18).

What is especially important to note is that this phenomenal growth in mobile telephony has consisted of services of high quality. Table 2 in the appendix provides data on the average call set up success, average call drop rate and average number of connections with good voice quality for the four traditional metropolitan cities of India and for four states, one each from the north, south, east and west of the country. The data covers two time periods – October to December 2005 and July to September 2011.

As can be seen from table, mobile service providers in India have performed very well on all three counts. The average call set up success rate is 98 per cent or above for all the regions covered whereas the call drop rate is well below 2 and in a number of cases below 1. Similarly, the figure for the average number of connections with good voice quality for all the regions stands above 96 per cent. Furthermore, these high figures are sustained across both time periods and thus there has been no significant drop in the high standards of quality between 2005 and 2011.

 Furthermore, the mobile telephone industry provides services that are technologically current. For instance, 3G services are widely available in India and 4G services have recently been launched. The same can be said about mobile handsets. During 2011, 150 new smartphone models were introduced and 250 3G mobile handset models were shipped in India, with world market leaders like Nokia, Samsung and RIM featuring among the top handset providers.[[11]](#footnote-11)

**2. Televisions**

From its inception in the late 1960s till the mid-1990s, the Indian television industry

manufactured far more black and white televisions than color televisions. During the 1970s, the production of black and white TVs increased from 14,406 units in 1970 to 311,000 units in 1979, with no color TVs being produced (Joseph 1997, p. 102). The 1980s witnessed the production levels of televisions increase from 369,000 in 1980 to 4.8 million units in 1990, at a CAGR of 29 per cent. The production of black and white TVs increased from 369,000 in 1980 to 3.6 million units by the end of the decade, whereas the production of color televisions increased from 0 units in 1980 to 1.2 million in 1990 (Joseph 1997, p. 110). Thus, at the end of the decade, despite the commencement of color TV production, the share of black and white TVs in overall production stood at 75 per cent.

 This trend continued during the first half of the 1990s, when the production of black and white televisions increased from 4.8 million units in 1990 to touch an all time high of 5.9 million units in 1995. The corresponding figures for color television production were 1.2 million and 1.85 million (Joseph 1997, p. 110), implying that, as of 1995, the share of black and white TVs in overall television production had increased marginally to 76 per cent; and this despite the fact that the production of color television had commenced a full thirteen years ago.

 Black and white technology, however, had become technologically obsolete by the late 1970s and had been replaced the world over by broadcasts in color and color televisions.[[12]](#footnote-12) The continued production of a technologically outmoded good such as the black and white television and its sustained domination of the television manufacturing industry was a direct result, not of consumer preferences, but of government policy. Thus, during the 1970s the Indian government disallowed the production of color televisions by not handing out any licenses to do so. During the 1980s and the first half of the 1990s, its licensing policy was consistently biased towards the promotion of black and white TVs. For the years 1992 to 1996, for instance, the government projected the domestic demand for black and white picture tubes to be in the 4.1 million to 4.6 million range whereas the demand for color picture tubes was estimated to lie between 1.3 and 1.6 million units (Department of Scientific and Industrial Research (DSIR) 1993, p. 6). Given that the domestic demand for picture tubes depended on the number of licenses given out for the production of televisions, it is clear that the Indian government was giving out more licenses for the production of black and white TVs as compared to color TVs. Similarly, as of 1990, the government had given out 106 approvals for the production of black and white picture tubes but only 39 for that of color picture tubes (DSIR 1993, p. 6).

In fact, not only was the Indian television industry focusing the lion’s share of its energy on producing an obsolete product, but it was doing so in a highly inefficient manner. The chief source of this relative inefficiency lay in the phased manufacturing program forced upon the television manufacturers by the government in order to reduce the import content in the production of a television. This forced Indian firms to make increasingly greater use of locally produced electronic components in place of imported ones. Thus, while noting that the import content in domestic television production has “declined substantially” over time, Joseph notes that the import content in a black and white television as of 1991 was a low 6.7 per cent of the cost of production and was 17.6 per cent in the case of a color television (Joseph 1997, p. 122). Furthermore, the Bureau of Industrial Costs and Prices (BICP) in a 1987 report on the Indian electronics sector noted that “India is about 75 per cent self sufficient in components for consumer electronics (BICP 1987, p. 93).

Locally produced components were, however, not just more expensive than those available on the world market but almost always were also of much poorer quality. It was, according to the BICP, “well accepted that the quality of Indian (electronic) components and final products is well below international standards,” the blame for which was pinned on outmoded process technologies, the lack of incentives for maintaining quality standards due to the high levels of protection accorded domestic manufacturers and the high cost of test and quality control equipment (BICP 1987, p. 97).

 Once the production of televisions was de-licensed in 1996-97, the entire complexion of the industry changed. The production of color TVs accelerated at a sharp pace and soon outstripped the production of black and white TVs, which began a sharp decline. By 2001-02 the former had reached close to 6.25 million units, whereas the latter had declined to 3.75 million and thus the share of black and white televisions had decreased to 37.5 per cent of overall television production. This share had declined further to 23 per cent by 2003-04, when color TV production stood at 8.9 million units and black and white TV production was at 2.5 million units (MIT 2005, p. 8) and had gone down to negligible proportions by 2011, by which time the production of color televisions had shot up to 16.5 million units (MIT 2012, p. 9). This significant shake-up in the product mix of the Indian television industry is further proof of the fact that it was government policy and not consumer preferences that was responsible for the continued production of obsolete black and white TVs in India.

The liberalized television manufacturing industry has been characterized by incessant technological dynamism. To begin with, the focus of the industry had turned from producing the obsolete black and white TVs to the technologically contemporary color televisions. This in itself greatly reduced the technology gap between the televisions available in India versus the rest of the world. Liberalization also increased the extent of competition in the sector, which led to constant technological innovation and product differentiation.

As noted by Gupta (2006, p. 195), “the entrenched position” of the market leaders of color televisions prior to liberalization, namely, Indian firms such as Videocon, Onida and British Physical Laboratories (BPL), “has been challenged by MNCs such as LG, Samsung, Sony, Phillips…Panasonic, Sansui and Sharp.” This increased competition has resulted in “all the players, whether domestic or international…introducing technologically advanced and feature rich products (Gupta 2006, p. 207).” Some of these features were “colored cabinets, cordless headphones, 3-D 360 sound technology, email TV, plasma TV and golden eye technology (Gupta 2006, p. 207).”

Furthermore, soon after the de-licensing of television production, flat screen color televisions made their appearance on the scene, providing consumers with an alternative to the conventional color televisions. The market share of the former soon increased rapidly, 2.7 per cent in 2001-02 to 47 per cent in 2005-06, with the share of the latter sinking from nearly 100 per cent to 53 per cent during the same period (Gupta 2006, p. 216). Following quick on the heels of the flat screen TVs were the slim and super slim color televisions that started appearing in the middle years of the 2000s.

The second half of the previous decade also witnessed the arrival of LCD televisions into the Indian market. In fact, the case of the diffusion of LCD technology in India presents a sharp contrast to the diffusion of the earlier major advance in television technology – color televisions. On the world market, the production of LCD televisions began to outstrip the production of color televisions (based on the cathode ray tube (CRT) technology) in the fourth quarter of 2007[[13]](#footnote-13) and have continued to rise since whereas the production of color (CRT) televisions has since declined. As a result, LCD televisions now dominate the world television market. Unlike the 1980s and the first half of the 90s when it continued to produce the obsolete black and white televisions despite the onset and diffusion of color televisions on the world market, this time the liberalized Indian television market is not far behind the technology curve. In fact, shipments of new LCD televisions in India are set to outstrip the shipments of CRT based color televisions in 2012. Furthermore, by 2015 the market share of LCD televisions is projected to rise to 80 per cent.[[14]](#footnote-14)

The de-licensing of the electronic components sector as well as the gradual reduction in the level of customs duty on imported components has led a significant improvement in the quality of components used in manufacturing televisions in India. Whereas in the late 1980s nearly 75 per cent of the components utilized in the production of consumer electronics were produced locally in India, by 2010 this situation had changed dramatically. As of 2010, nearly 60 per cent of the domestic requirement for electronic components (in value terms) was being met via imports, the bulk of which were being shipped in from South East Asia – the source of the majority of electronic components used worldwide. Thus, by 2010 many television producers in India be they domestic firms or MNCs, were using components both comparable in quality and price to those utilized in the rest of the world. The competition generated by the easier imports has also led domestic component producers to invest in measures designed to ensure improved quality. For instance, the leading domestic color picture tube producers, namely, Samtel Ltd and Videocon, have both acquired ISO certifications. This presents a stark contrast to the situation that prevailed prior to liberalization, with domestic manufacturers forced to make use of locally produced components of poor quality.

While there has been significant improvement in the quality of televisions available after liberalization, there have also been huge qualitative improvements in the realm of television broadcasting. The number of channels available to watch, for instance, had increased from just the 1 in 1991 to 163 by the end of 2011 (TRAI 2012, p. 78). The growing list of channels catered to a many different groups of consumers, featuring prominent international channels like ESPN, CNN, BBC, HBO, TLC, VH1 etc. as well as a host of Bollywood movie channels, and news and entertainment channels in Hindi and in many regional languages (TRAI 2012, p. 127-142).

Moreover, this significant increase in choices available to the consumer has been accompanied by improving quality. This is evident from consumer surveys conducted soon after the advent of cable television in India in which consumers were asked about the quality of the government channel (Doordarshan) vis-à-vis the new cable channels. For instance, Rahim (1994), in a survey conducted in the city of Hyderabad, reported that 90 per cent of the survey respondents were “thoroughly dissatisfied” with programs on Doordarshan, citing this as the reason for their switch over to cable TV, whereas 62 per cent felt that it was “wasting public money on ‘unimaginative’, ‘absurd’ and ‘silly’ programs” and went on to claim that “at times there is ‘lightweight nonsense’ and ‘downright rubbish’ on Doordarshan’s educational television programs (Rahim 1994, p. 17).” Moreover, three out of five respondents said that programs on STAR TV/BBC were better than those on Doordarshan (Rahim 1994, p. 17). Similarly, Manchanda (1998), in a survey conducted in Delhi and Bombay found that the majority of the respondents considered programs on Doordarshan “government oriented” and felt that the programs on the other channels provided “more variety and entertainment (Manchanda 1998, p. 155).”

**3. Wrist Watches**

For the next two and a half decades after 1961, when it commenced watch production, HMT “dominated the Indian watch industry like a colossus,” while the “HMT brand became synonymous with watches in the country, lending credence to the company’s claim of being (the) ‘Timekeepers of the nation’ (Ramachandran and Lavanya 2001, p. 152).” Throughout this period, however, mechanical watches dominated the company’s production portfolio. While it commenced production in 1961 with a complete focus on mechanical watches, even in the late 1980s the situation had witnessed little change. Thus, as shown in table 3 in the appendix, in 1985-86 HMT’s total watch production stood at 4.53 million, of which mechanical watches made up 4.37 million or 96.4 per cent, whereas quartz watches numbered a mere 160,000 or 3.6 per cent of total production. The figures for 1988-89 tell a similar story – total production stood at 5.83 million, with mechanical watches contributing 92.4 per cent or 5.39 million units and quartz watches making up the rest, namely, 440,000 units or 7.6 per cent (Ramachandran and Lavanya 2001, p. 185).[[15]](#footnote-15)

 Thus the company that virtually monopolized the Indian wrist watch market barely produced any electronic watches and focused almost solely on mechanical watches. On the world market, however, mechanical watches were becoming increasingly obsolete and were being replaced at a rapid rate by electronic watches – both quartz and digital. Table 4 provides data on the shares of mechanical, quartz and digital watches in world watch production between 1985 and 1989. As can be seen, the share of mechanical watches, which stood at 30.75 per cent in 1985, fell to 16.79 per cent in 1989, whereas the combined shares of electronic watches rose from 69.25 per cent to 83.21 per cent during the same period. These figures stand in sharp contrast to the figures for the Indian watch industry. In fact, the proportion of mechanical to electronic watches on the world market is almost diametrically opposite to that which prevailed on the Indian market.

 The advent of liberalization, however, changed the face of the Indian watch industry and moved it much closer to the prevailing trends on the world market. These changes were largely fuelled by two new entrants into the watch manufacturing business, namely, Titan, an Indian firm and the American firm Timex. Titan entered the industry in the late 1980s, commencing production in 1987-88.[[16]](#footnote-16) It focused solely on quartz watches and did not even bother with producing the mechanical variety. Timex entered the industry in 1992 and focused on the production of both quartz and digital watches. With the de-licensing of the sector, both Titan and Timex could make their own production decisions, without being shackled by the system of licensing.

 The proportion of mechanical to electronic watches was swiftly reversed soon after liberalization. Thus, Titan’s market share, which was a low 9.6 per cent in 1988-89, surged to 43.69 per cent by 1993-94. Timex’s market share during the year of 1993-94 stood at 15.5 per cent. Thus, by 1993-94, electronic watches accounted for 59 per cent of the Indian watch market, whereas the market share of HMT, the sole producer of mechanical watches, had fallen sharply to 38.4 per cent. This rapid change in the entire production profile of the Indian watch market, away from mechanical and towards electronic watches, is clear indication of the fact that the earlier focus on the obsolete mechanical watches was not a result of consumer preferences but of restrictive government policy. As soon as the manufacture of watches was freed from the restraints of the licensing system, the production profile of the Indian watch industry moved much closer to the profile of the world watch market. Moreover, this trend continued and accelerated through the rest of the 1990s, with HMT’s market share plummeting to 14 per cent by 2001-02. Although detailed data for the proportion of mechanical versus electronic watches are unavailable for this year, the fact that the latter had increased their dominance over the market is evidenced by the fact that in 2001-02 HMT accounted for 94 per cent of the mechanical watch market but only 8 per cent of the quartz watch market.[[17]](#footnote-17)

 Not only has the technological gap between the Indian and world watch industries reduced significantly after liberalization, the quality of watches produced also showed a sharp improvement. This was largely a result of the removal of the restrictions on the production of watch components. Thus, as long as the production of watch straps was reserved for the small scale enterprises, “consumers routinely complained about the poor quality of the straps (Ramachandran and Lavanya 2001, p. 158).” The ECBs, on the other hand, were in constant short supply as the amount supplied by the SCL was erratic and its price was exorbitant, nearly three times the world price (Ramachandran and Lavanya 2001, p. 159). With the advent of market reforms, Titan set up its own leather strap production unit with the assistance of Hirsch of Austria, a world leader in the production of the same, and also started producing ECBs. Both these steps greatly improved the quality of the components used in watch production. Similarly, in a sign of the alignment of the quality of the Indian with the world watch market, Timex introduced its award winning “Indiglo” range of watches, described “as the most amazing technological innovation in watches since the quartz” in the very same year that it did so in the international market (Ramachandran and Lavanya 2001, p. 172).

**V. CONCLUSION**

 This paper presents evidence from three consumer goods industries in support of the claim that quality differences in goods are hidden from pure quantitative analysis of growth numbers. For each of the three goods it was shown that the technology gap between the goods produced in India and those produced abroad has narrowed greatly after the advent of market reforms. Moreover, there was also a marked improvement in other areas – there was a reduction in the extent of defective and unreliable goods produced due to the greater freedom in sourcing and purchasing components as well as a greater incentive to invest in quality control due to the pressures of competition, an improvement in the extent of product differentiation and the choices available to consumers and an elimination of waiting lists for acquiring goods.

 Rodrik and Subramaniam (2005) have argued in favor import substitution based on the high growth rates recorded in the 1980s. This paper finds significant differences in the quality of consumer goods across the policy regimes of import substitution and liberalization, in favor of the latter. This undermines Rodrik and Subramaniam as well as others who argue in favor of import substitution based solely on the quantity of GDP growth generated. Further research investigating the quality of other consumer goods like motorcycles, cars, refrigerators, air conditioners, etc. as well capital goods like steel and cement during these two periods is bound to be fruitful.

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**Appendix:**

**Table 1: Share of Electronic Switching Capacity in 1987**

|  |  |  |  |
| --- | --- | --- | --- |
| Country | Electronic Lines (%) | Country | Electronic Lines (%) |
| Canada | 56 | Malaysia | 64 |
| USA | 76 | South Korea | 70 |
| Norway | 100 | Chile | 46 |
| United Kingdom | 48 | Peru | 41 |
| Thailand | 51 | Morocco | 50 |

*Source: Antonelli (1991), p. 49.*

**Table 2: Quality of Service Data for Mobile Telephone Services (2005 and 2011)**

|  |  |  |  |
| --- | --- | --- | --- |
| City/State | Call Set-up Success Rate (percentage) 2005 2011  | Call Drop Rate2005 2011  | Connections With Good Voice Quality (percentage) 2005 2011 |
| Delhi |  98.17 99.00 | 0.97 0.97  |  96.83 98.20  |
| Chennai |  98.83 98.83 | 0.76 0.62  |  98.00 98.60 |
| Mumbai |  99.17 98.73 | 1.21 1.07 |  97.83 98.27 |
| Kolkata |  98.50 99.09 | 1.07 1.00  |  97.50 98.18 |
| Bihar |  98.60 98.07 | 1.69 1.21  |  96.20 97.60 |
| Haryana |  98.67 98.90 | 1.43 0.87 |  98.00 97.55 |
| Gujarat |  98.33 98.67  | 1.17 1.10  |  97.83 98.83 |
| AndhraPradesh |  99.16 98.83 | 0.78 0.77 |  98.50 98.73 |

*Source: Calculated using figures from TRAI 2005(p. 73-78) and 2011 (p.113-119)*

**Table 3: HMT Wrist Watch Production**

|  |  |  |
| --- | --- | --- |
| Year | Mechanical Watches (million)  | Quartz Watches (million) |
| 1985-86 | 4.37 | 0.16 |
| 1986-87 | 4.80 | 0.20 |
| 1987-88 | 4.64 | 0.31 |
| 1988-89 | 5.39 | 0.44 |

*Source: Ramachandran and Lavanya 2001, p. 185*

**Table 4: Trends in World Watch Production (1985-1989)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Type of Watch | 1985 | 1986 | 1987 | 1988 | 1989 |
| Mechanical (per cent) | 30.75 | 23.84 | 21.88 | 18.84 | 16.79 |
| Quartz (per cent) | 37.20 | 35.84 | 38.80 | 46.25 | 50.36 |
| Digital (per cent) | 32.04 | 40.32 | 39.32 | 34.92 | 32.85 |

 *Source: Ramachandran and Lavanya 2001, p. 184*

1. This assumes that cars which embody modern technology are better goods than those that are obsolete and that individuals in A and B prefer better to worse goods. It also assumes that individuals prefer more reliable goods with fewer defects to less reliable, more defective goods, that they prefer more variety to less variety and that they see a disutility in waiting to obtain a good. All of these are reasonable assumptions to make. [↑](#footnote-ref-1)
2. The average real GDP growth rate for the 1980s and 1990s was 5.5 per cent, whereas that for the 2000s was 7.5 per cent. (Calculated using figures from the World Bank’s online data bank.) [↑](#footnote-ref-2)
3. Growth rates for telephones are compound annual growth rates calculated from data available in Desai (2006, p. 42) and Mani (2011, p. 9). [↑](#footnote-ref-3)
4. Compound annual growth rates calculated from data in Joseph (1997, p. 102), Ministry of Information and Technology (MIT) (2005, p. 8) and MIT (2012, p. 9). [↑](#footnote-ref-4)
5. Annual average growth rates from Kelkar and Kumar (1991, p. 213) and from an article by G. Srinivasan titled “CAG Flays HMT Move to Outsource Appearance Parts From Foreign Firm” that appeared in the Hindu Business Line on March 10th, 2004. The article is available online at:

<http://www.thehindubusinessline.in/2004/03/10/stories/2004031001560400.htm>. [↑](#footnote-ref-5)
6. The penetration rate of refrigerators was 5 per cent in 1990 and 26 per cent in 2005 while that of cars was 9 per cent in 2005 and far lower in the 1980s. Barely 1 per cent of households owned air conditioners in India in 1990 and the number had gone up only to 5 per cent in 2010, whereas microwaves were not available in India in the 1980s and as of 2010 only 5 per cent of households owned one. [↑](#footnote-ref-6)
7. This section is based on information provided in Desai (2006), Mani (1989, 1992, 2000), Noll and Wallsten (2011) and Subramaniam (2011). [↑](#footnote-ref-7)
8. Throughout the 1980s there were inordinate delays, first in the commencement and then in the expansion of electronic switch production. For more on this see Subramaniam (2011, p. 100-115). [↑](#footnote-ref-8)
9. All the data in this paragraph are drawn from Subramanian 2011, p. 188. [↑](#footnote-ref-9)
10. Calculated using figures from the TRAI report referenced. [↑](#footnote-ref-10)
11. Information taken from a summary of a market report conducted by Cyber Media Research. The summary is available online at www.cmrindia.com. [↑](#footnote-ref-11)
12. Broadcasts in color became widespread in the United States between 1963 and 1967, UK introduced color broadcasts in 1969. And by 1977, 75 percent of television homes in America owned a color television. (Source: <http://members.tripod.com/jonchew_producer/History_of_Television.htm>) [↑](#footnote-ref-12)
13. On this see the articles in dailytech and pcmag – available online at [http://www.dailytech.com/Report+Shipments+of+LCD+TVs+Surpass+CRT+TVs/article10775.htm](http://www.dailytech.com/Report%2BShipments%2Bof%2BLCD%2BTVs%2BSurpass%2BCRT%2BTVs/article10775.htm) and [http://www.pcmag.com/article2/0,2817,2265683,00.asp](http://www.pcmag.com/article2/0%2C2817%2C2265683%2C00.asp) [↑](#footnote-ref-13)
14. Figures and projections are from the following article available online: <http://www.isuppli.com/Display-Materials-and-Systems/MarketWatch/Pages/LCD-TVs-to-Take-Over-in-India-by-2012-with-Close-to-10-Million-Units.aspx> [↑](#footnote-ref-14)
15. The above figures show a minor but insignificant change if the production figures of Allwyn, which commenced production in 1981, are added in. Allwyn, which had a much smaller market share than HMT, produced a mix of quartz and mechanical watches. Data for the proportion of the two in the company’s production portfolio are, however, unavailable. Assuming a proportion of 50:50, the total watch production (HMT + Allwyn + Titan) for 1987-88 stood at 6.1 million. Of this, mechanical watches comprised 5.22 million units, or 86 per cent, with quartz watches accounting for the remaining 14 per cent (Ramachandran and Lavanya 2001, p. 185-86). [↑](#footnote-ref-15)
16. Titan’s entry into the production of watches was itself delayed by the vagaries of the licensing system. The company applied for a license to commence production in 1981, but did not receive one for three years. After it received the license in 1984, it took two years to start production, producing 80,000 watches in 1986-87. [↑](#footnote-ref-16)
17. Data for 2001-02 is from an article by G. Srinivasan titled “CAG Flays HMT Move to Outsource Appearance Parts From Foreign Firm” that appeared in the Hindu Business Line on March 10th, 2004. The article is available online at:

<http://www.thehindubusinessline.in/2004/03/10/stories/2004031001560400.htm> [↑](#footnote-ref-17)