
Market Reforms in India and the Quality of Economic Growth

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I believe, as a practical proposition, that it is better to have a second rate thing made in our country, than a first rate thing that one has to import.

—Jawaharlal Nehru (qtd. in Forbes and Wield 2002, 5)

India experienced a growth spurt during the 1980s. This decade witnessed an annual increase in real per capita gross domestic product (GDP) of 3.9 percent, a rate far higher than the rather placid rate of 1.7 percent recorded for the three previous decades between 1950 and 1980. This robust growth continued in the 1990s and increased further to nearly 6 percent during the 2000s.

The fact that the spurt in growth occurred during the 1980s, a full decade before the advent of liberalization in the early 1990s, has generated much debate among economists analyzing the Indian growth experience. Dani Rodrik and Arvind Subramaniam (2005), for instance, used this high rate of growth as proof of the success of large-scale import substitution. This assertion in turn elicited responses from T. N. Srinivasan (2005) and Arvind Panagariya (2004, 2008). The former argued that the growth in the 1980s, in contrast to that of the 1990s and beyond, was built on the sandy foundations of large-scale external debt, whereas the latter claimed that the growth of the 1980s was itself caused by a “liberalization by stealth” that took place through this decade—scattered and unsystematic moves toward the market in a few sectors that nevertheless explain the high growth rates recorded.

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The Independent Review, v. 18, n. 2, Fall 2013, ISSN 1086-1653, Copyright © 2013, pp. 241-262.

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 annual rate of increase in per capita real GDP over the past decade—say, 5 and 7 percent, 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 to acquire them. Those produced in B, in contrast, embody the latest technology, seldom break down, offer consumers 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 has been far greater in B. 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 attention solely on the rate of GDP growth.

This paper investigates whether significant qualitative differences exist in consumer goods produced pre- and postliberalization in India by focusing on the changes in the quality of three goods in particular—telephone services, televisions, and watches. It thus attempts to fill the gap in the literature on India’s growth experience; that is, it investigates if differing improvements in economic well-being were hidden behind the high growth rates recorded during the two periods.

The paper focuses on several key characteristics of goods that together serve as a proxy for quality. Using primary as well as secondary 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).

Warren Nutter analyzes the high growth rates recorded under central planning in the erstwhile Soviet Union. He examines disaggregated primary data in government documents across several consumer and capital goods 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 after 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” (1962, 80).

Michael Cox and Richard Alm (1998, 1999) conduct a similar exercise for the United States during the 1980s and 1990s and find marked qualitative improvements in consumer goods over the two decades. In particular, they find that there was 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.

This paper explains why I chose telephones, televisions, and wristwatches for further analysis; gives a brief overview of the changes that have occurred in the policy frameworks for the three goods; provides details on the qualitative changes that have taken place; and, finally, draws conclusions from these findings.

Why Telephone Service, Televisions, and Wristwatches Are Worth Examining

In this paper, I examine the qualitative changes over a thirty-year period (1980–2010) spanning the pre- and postmarket reform eras for three goods: telephone service, televisions, and wristwatches. The focus on these three goods is justified because each was heavily influenced by regulation in the 1980s as well as by the market reforms beginning in the late 1980s and early 1990s. 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, in contrast, witnessed the delicensing and 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, studying these sectors has great relevance to the “great Indian growth debate.”

Second, all three goods witnessed high rates of growth in both the pre- and postliberalization years; they all grew at rates equal to or greater than the real GDP growth rates for these periods.¹ Thus, the number of telephone connections (fixed and wireless) grew at an annual rate of 9 percent in the 1980s before increasing to 19 percent in the 1990s and 40 percent during the 2000s.² The production of televisions rose by 29 percent per year between 1980 and 1990 and by 8 percent during each of the following two decades.³ Meanwhile, the watch and clock sector grew at a rate of 12 percent between 1981 and 1988, and the manufacture of wristwatches increased at a rate of 10 percent during the following ten years from 1988 to 1998.⁴ The fact that

1. The average real GDP growth rate for the 1980s and 1990s was 5.5 percent, for the 2000s it was 7.5 percent (calculated using figures from the World Bank’s online databank). Available at: <http://databank.worldbank.org/data/home.aspx>.

2. Growth rates for telephones are compound annual growth rates calculated from data available in Desai 2006, 42, and Mani 2011, 9. They reflect total (not per capita) growth rates.

3. Compound annual growth rates calculated from data in Joseph 1997, 102; Indian MIT 2005, 8, and 2012, 9.

4. Annual average growth rates come from Kelkar and Kumar 1990, 213, and G. Srinivasan 2004.

these goods experienced high and quantitatively significant growth rates makes them pertinent to the question at hand.

Also, these three goods have higher average ownership rates when compared to some of the other consumer goods that were also affected by liberalization. Higher ownership means that these consumer goods were owned by a greater percentage of households, thus making them relatively better predictors of standards of living. In the case of televisions and wristwatches, this is true for both the pre- and postreform periods, whereas for telephones it holds true only for the latter period.⁵ Thus, the average penetration rate of televisions was 17 percent as of 1990 and 64 percent in 2005, whereas that of wristwatches was 75 percent (mechanical) and 22 percent (quartz) in 1990 and 82 percent in 2005 (Rao and Natarajan 1996; Shukla 2010). The corresponding figure for telephones was less than 1 percent in 1990, 9 percent in 2005, and 66 percent in 2010 (Mani 2011). These figures stand in contrast, for example, to the average penetration rates of cars, air conditioners, and microwaves—among the other goods that were deregulated beginning in the 1990s.⁶

Overview of India's Policy Framework

Telecommunications

Under the Industry Policy Resolutions of 1948 and 1956, the production of telecommunications equipment was deemed to be of national importance and was reserved for state enterprises.⁷ Indian Telephone Industries (ITI) was established in 1948 to manufacture telephone switches, transmission cables, and telephone instruments; Hindustan Cables Limited was set up in 1952 to manufacture a range of transmission cables; and Hindustan Tele-printers Limited was established in 1956 to produce terminal equipment such as modems and teleprinters. 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 postindependence India.

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

5. Especially the period between 2005 and 2010, a period that witnessed meteoric growth in the number of telephone connections.

6. The penetration rate of cars was 9 percent in 2005 and far lower in the 1980s. Barely one percent of households owned air conditioners in India in 1990, and the number had gone up only to 5 percent in 2010. Microwaves were not available in India in the 1980s, and as of 2010 only 5 percent of households owned one.

7. This section is based on information provided in Mani 1989, 1992, 2000; Desai 2006; Noll and Wallsten 2011; and Subramaniam 2011.

This arrangement remained in place until 1984, when the New Telecom Policy allowed domestic private firms to manufacture selected terminal equipment meant for subscriber premises, such as electronic push-button phones, cordless phones, pay phones, and electronic private-branch exchanges. The policy also allowed the private sector into the production of small exchanges with a capacity of 2,000 switches or less. Although these private firms were now allowed to enter these sectors, they were still subject to the domestic industrial licensing system; that is, they were required to obtain a license from the government before commencing production and could not produce more than the license permitted. 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, 1985, 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, and the Videsh Sanchar Nigam Limited 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 percent of equity or less. Import policies were also relaxed, except for some selected items such as 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 percent.

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 situation and threw open wire-line and wireless fixed services and wireless mobile services to the private sector. Although some private operators entered the four largest cities in 1995 and many other metropolitan areas by 1997, the private sector's reaction to the 1994 policy was tepid at best, largely because of the onerous conditions imposed by the DOT on those private operators who did enter the telecom services sector. These operators were, for instance, forced to connect all calls through the DOT and MTNL and to pay high fees for doing so; they 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 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 and telecom services—were well and truly open to the private sector.

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 enterprises⁸ and two larger enterprises—were given the first licenses to produce black-and-white televisions (Guhathakurta 1994, 847; Joseph 1997, 101). Foreign technical collaborations were not allowed, and the firms were forced to use indigenous technology developed by Central Engineering and Economics Research Institute (Guhathakurta 1994, 847). In due time, the two larger private-sector firms stopped production, and henceforth, largely due to government policy, television production was dominated by small-scale 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 approximately 77 percent of the firms licensed to manufacture televisions were small-scale enterprises, whereas the rest were public-sector units (Guhathakurta 1994, 847).

These domestic television manufacturers in the small-scale and public sectors were shielded from domestic competition via the industrial 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 such as color televisions. The sector was also shielded from international competition because 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, broadbanding was also introduced, implying that the issued licenses were given a broader definition, thereby allowing some more flexibility in making production decisions (Joseph 1997, 106).

Furthermore, some of the regulations placed on the import of essential components in television production were eased. A number of components that were not produced indigenously or were available only in limited quantities in India were now placed in the Open General License category, which meant they could now be imported without a license by actual users but were subject to high tariff rates, usually in the 75 to 150 percent (CIF) range (Guhathakurta 1994, 850). However, the

8. The small-scale sector in India is defined to include enterprises that invest less than a certain specified limit in plant and machinery. This limit is periodically revised upward, primarily to account for inflation.

imports of certain essential components, such as 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 manufactured television sets, which were completely banned except as personal baggage, in which case they were subject to a duty of 240 percent (Guhathakurta 1994, 850).

The 1980s also witnessed the approval of technology imports, which were, however, subject to a phased manufacturing program that would ensure rapid indigenization of the imported technology in quick time (Guhathakurta 1994, 849). It was under the aegis of this program 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 until 1985 and then banned, after which the government “began a policy of inducing firms to indigenize production” (Joseph 1997, 107).

The 1990s brought major changes to the sector, with the delicensing of television production in 1996–97, thereby ending the sector’s subjection 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, nontariff 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 percent in 1993–94 to 35 percent by 2000–2001. It was lowered further to 20 percent by 2003–2004 and as of 2010 stood at 10 percent (Ministry of Communications and Information Technology [MCIT] 2011, 7; Majumdar 2010, 73). In fact, tariff rates on selected electronic components had reached zero percent in 2005 when India signed the Information Technology Agreement of the World Trade Organization (Indian MIT 2011, 7). Furthermore, the customs duty on certain specified raw materials and capital goods used in the production of electronic components and goods was reduced to zero percent (Indian MIT 2011, 8). The import of televisions, however, continued to be banned until 2001, when India was forced to end all nontariff barriers on consumer goods imports at the World Trade Organization’s behest.

As far as television broadcasting is concerned, until 1991 there was only one broadcaster in the nation—the government. In the early 1990s, however, this monopoly was broken when “a number of broadcasters began telecasting their programs directly into Indian homes from foreign locations,” making use of satellite transponders to beam these signals into the country. In India, “enterprising cable operators receive[d] these signals via dish antennas and distribute[d] them to individual households for a small fee” (Manchanda 1998, 138).

Wristwatch Industry

During the preliberalization era, the production of wristwatches 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 wristwatches, and they had to seek government permission prior to making any essential decision, such as expanding production or changing the technique of production. As a result of this licensing policy, the wristwatch industry was dominated by a public-sector enterprise, Hindustan Machine Tools (HMT), which began the production of watches in 1961. The only competition HMT faced was from another public-sector enterprise, Hyderabad Allwyn Limited, and from a variety of small-scale enterprises, which were poor competition given the severely restricted amounts of investment they could make (Ramachandran and Lavanya 2001, 156–57). These domestic producers were also shielded from foreign competition by a ban on the import of watches.

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 enterprises, thereby barring any firm in the organized sector from entering production, and the production of electronic circuit blocks was reserved for Semiconductor Complex Limited, 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, 158–59).

The second half of the 1980s witnessed the first notable change in policy when in 1985 licenses for watch production began to be 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 did not occur until the early 1990s, when the production of watches was delicensed. Moreover, although the production and import of components were also delicensed, the import of fully assembled watches continued to face quantitative restrictions. These restrictions were finally removed in 2001, when India got rid of quantitative restrictions on the import of all consumer goods.

Quality of Goods

Telephone Services

The years between independence and the late 1980s—that is, the years of complete state monopoly over the telecommunications sector—were marked by equipment that was increasingly obsolete and by service that was of poor 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 manual switches (10 percent of total switching

capacity), 1.99 million Strowger switches (50 percent of total capacity), 1.14 million Crossbar switches (29 percent), and 429,000 digital electronic switches (11 percent) (Mani 1989, 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, 181). It follows that nearly 60 percent 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 with electronic switches—first analog and then digital—by the mid- to late 1970s (Mani 1989, 181).

Table 1 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 percent, lagged well behind not only the developed countries, but also a number of developing countries. In Thailand, for example, 51 percent of all switches were electronic, and the corresponding figures for Malaysia, South Korea, Chile, and Morocco were 64, 70, 46, and 50 percent, respectively. Thus, at the end the 1980s, there existed a wide technology gap between the telephone switches installed in India and those installed in many parts of the developed and developing world.

The telephones themselves did not fare much better. As of the mid-1980s, when private firms were allowed to produce telephones, ITI was producing rotary-dial telephones, which were being replaced with push-button phones the world over by the 1970s. Rotary dials were fitted both on the model number 671 telephone that ITI manufactured through the 1970s as well as on its replacement, the model 677 (Mani 1992, 134), which was introduced in 1980 and which soon “equipped most

Table 1
Share of Electronic Switching Capacity per Country, 1987

Country	Electronic Switches (% of all switches)	Country	Electronic Switches (% of all switches)
India	11	Thailand	51
Peru	41	Malaysia	64
Chile	46	South Korea	70
United Kingdom	48	United States	76
Morocco	50	Norway	100

Source: Antonelli 1991, 49.

of the national network” (Subramanian 2011, 192). It was only in the second half of the 1980s that 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” multiline rotary phones between 1986 and 1989 (Subramanian 2011, 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 per year before the reforms of the early 1990s.⁹

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” until the early 1990s—that is, until the advent of competition. Both telephone and switch production were characterized by very high rejection rates, well higher than the norm of 2.5 percent recommended by the DOT. Thus, in 1980–81, 13 percent of telephones and 29 percent of Strowger switches were rejected in ITI’s Bangalore plant (Subramanian 2011, 191). The situation did not improve through the 1980s, with the rejection rate for telephones reaching a high of 18 percent between April and October 1987 (Subramanian 2011, 192). Despite these rejections, it seems a number of faulty telephones made their way through to the consumers. Thus, a World Bank study 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, 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” (Subramanian 2011, 191–93). The national average call-completion rate for local calls stood at a low 40 percent in 1984–85, and the corresponding figure for long-distance calls stood at 20 percent in 1985–86. This meant that a subscriber had to make, on average, two and a half attempts to make a successful local call and five attempts for a long-distance one.

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, an annual growth rate of 9 percent. 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, and in 1990 he was forced to wait 48.9 months (Desai 2006, 42).

With the advent of private entrants in the second half of the 1980s, the quality of telephone instruments improved, and their prices began to decline. ITI, the erstwhile monopolist of telephone instruments, was ranked in the lowest category in a new

9. Throughout the 1980s, there were inordinate delays first in the commencement and then in the expansion of electronic switch production. For more on this topic, see Subramanian 2011, 100–15.

three-tier quality-rating system introduced by the DOT in 1991 to evaluate telephone manufacturers (Subramanian 2011, 193). Thus, the new private entrants into telephone production, numbering thirty-three as of 1994 (Subramanian 2011, 215), delivered a product of superior quality relative to that of ITI.

The replacement of the outdated manual, Strowger, and Crossbar switches with the modern digital electronic switches proceeded at a brisk pace through the 1990s as a number of reputable international firms such as AT&T, Alcatel, Ericsson, Fujitsu, and Siemens entered the production of digital switches after the reform measures of 1991 (Mani 2000, 195). 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, 30).

Thus, through 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 percent in 1986 to 93.6 percent in 1996–97, and its long-distance call-completion rate increased from 26 to 88 percent during the same period. At the all-India level, average local call-completion rates increased from 40 percent in 1984–85 to 58.71 percent during October to December 2005 (Telecom Regulatory Authority of India [TRAI] 2005, 69–72). 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 awareness of competition resulted in their 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, 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 percent of fixed telephone connections. 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, 50).

The most significant development in the Indian telecommunications industry after liberalization 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 percent. Given that the number of fixed-phone line subscribers reached a high of 49 million in 2005 and then declined to 35.09 million in 2010, the total number of phone subscribers in India went up from 14.88 million in 1997 to 787.28 million in 2010, an annual average growth rate of 45 percent (Mani 2011, 9). This huge increase in the number of telecom subscribers has seen the teledensity (the number of phones per 100 people) in India rise from a modest 1.56

in 1997 to 66.16 as of 2010 (Mani 2011, 9). Furthermore, although 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 1,636 in 2006 to 474 in 2010 (Mani 2011, 18).

It is especially important to note that this phenomenal growth in mobile telephony has consisted of high-quality services. Table 2 provides data on the average call-setup success rate, 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 cover two time periods—October to December 2005 and July to September 2011.

As can be seen from table 2, mobile service providers in India have performed very well on all three counts. The average call-setup success rate is 98 percent or higher for all the regions covered, and the call-drop rate is well lower than 2 percent and in a number of cases less than 1 percent. Similarly, the figure for the average number of connections with good voice quality for all the regions stands higher than 96 percent. Furthermore, these high figures are sustained across both time periods covered, and thus there was 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, third-generation (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 smart-phone models were introduced, and

Table 2
Quality of Service Data for Mobile Telephone Services, India,
2005 and 2011

City or State	Call-Setup Success Rate (% of total calls)		Call-Drop Rate (% of total calls)		Connections with Good Voice Quality (% of total calls)	
	2005	2011	2005	2011	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
Andhra Pradesh	99.16	98.83	0.78	0.77	98.50	98.73

Source: Calculated using figures from TRAI 2005, 73–78, and 2012, 113–19.

250 3G mobile handset models were shipped in India, with world-market leaders such as Nokia, Samsung, and RIM featuring among the top handset providers.¹⁰

Televisions

From its inception in the late 1960s until 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, 102). The 1980s witnessed the production level of televisions increase from 369,000 in 1980 to 4.8 million units in 1990, an annual growth rate of 29 percent. The production of black-and-white TVs increased from 369,000 in 1980 to 3.6 million units by the end of the decade, and the production of color televisions increased from zero units in 1980 to 1.2 million in 1990 (Joseph 1997, 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 still stood at 75 percent.

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 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, 110), implying that as of 1995 the share of black-and-white TVs in overall television production had increased marginally to 76 percent, despite the fact that the production of color televisions had commenced in India a full thirteen years earlier.

Black-and-white technology, however, had become obsolete by the late 1970s and had been replaced the world over by broadcasts in color and color televisions.¹¹ The continued production of a technologically outmoded good such as the black-and-white television and its sustained domination of the television-manufacturing industry in India 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 toward 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 (Indian Department of Scientific and Industrial Research 1993, 6). Given that the domestic demand for picture tubes

10. The information here is taken from a summary of a market report conducted by Cyber Media Research, available at <http://www.cmrintia.com>.

11. Broadcasts in color became widespread in the United States between 1963 and 1967; the United Kingdom introduced color broadcasts in 1969. And by 1977, 75 percent of television homes in America owned a color television (“A Chronological History” n.d.).

depended on the number of licenses given out for the production of televisions, it is clear that the 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 gave out 106 approvals for the production of black-and-white picture tubes, but only 39 for the production of color picture tubes (Indian Department of Scientific and Cultural Research 1993, 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 was the phased manufacturing program that the government had forced upon the television manufacturers in order to reduce the import content in the production of a television. Indian firms had to make increasingly greater use of locally produced electronic components in place of imported ones. Thus, although noting that the import content in domestic television production has "declined substantially" over time, K. J. Joseph notes that the import content in a black-and-white television as of 1991 was a low 6.7 percent of the cost of production and 17.6 percent in the case of a color television (1997, 122). Furthermore, the Indian Bureau of Industrial Costs and Prices noted in a 1987 report on the Indian electronics sector that "India is about 75 percent self-sufficient in components for consumer electronics" (93).

Locally produced components were, however, not just more expensive than those available on the world market, but almost always also of much poorer quality. It was "well accepted," according to the Bureau of Industrial Costs and Prices, "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 (1987, 97).

Once the production of televisions was delicensed 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 2001–2002, the former had reached close to 6.25 million units, whereas the latter had declined to 3.75 million, so the share of black-and-white televisions had decreased to 37.5 percent of overall television production. This share declined further to 23 percent by 2003–2004, when color TV production stood at 8.9 million units and black-and-white TV production at 2.5 million units (Indian MIT 2005, 8), and went down to negligible proportions by 2011, by which time the production of color televisions shot up to 16.5 million units (Indian MIT 2012, 9). This significant shakeup in the product mix of the Indian television industry is further proof of the fact that government policy, not consumer preferences, 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 industry's focus 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 those available in 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 Seema Gupta notes, “the entrenched position” of the market leaders of color televisions prior to liberalization—namely, Indian firms such as Videocon, Onida, and British Physical Laboratories—“has been challenged by [multinational corporations] 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.” These features included “colored cabinets, cordless headphones, 3-D 360 sound technology, email TV, plasma TV and golden eye technology” (2006, 195, 207).

Furthermore, soon after the delicensing 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 flat-screen TVs soon increased rapidly, from 2.7 percent in 2001–2002 to 47 percent in 2005–2006 (Gupta 2006, 216). Following quickly on the heels of these TVs were the slim and superslim color televisions that started appearing in the middle years of the 2000s.

The second half of the 2000s also witnessed the arrival of liquid-crystal display (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 television. On the world market, the production of LCD televisions began to outstrip the production of color televisions (which were based on cathode ray tube technology) in the fourth quarter of 2007¹² and has continued to rise (Patel 2011), whereas the production of cathode ray tube color televisions has declined. As a result, LCD televisions now dominate the world television market. Unlike the 1980s and the first half of the 1990s when the Indian television market 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 market is not far behind the technology curve. In fact, according to predictions made by industry experts, the cathode ray tube television is set to disappear from store shelves in India by 2014 (Mukherjee and Magmain 2010).

The delicensing of the electronic components sector as well as the gradual reduction in the level of customs duty on imported components have led to a significant improvement in the quality of components used in manufacturing televisions in India. Whereas in the late 1980s nearly 75 percent 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 percent of the domestic requirement for electronic components (in value terms) was being met via imports,

12. On LCD TVs, see Hachman 2008 and McGlaun 2008.

the bulk of which were being shipped in from Southeast Asia—the source of the majority of electronic components used worldwide. Thus, by 2010 many television producers in India, be they domestic firms or multinational corporations, were using components comparable in both quality and price to those utilized in the rest of the world.

Even as there has been significant improvement in the quality of televisions available after liberalization, there have also been huge qualitative improvements in television broadcasting. The number of television broadcasters increased from one (the government) in 1991 to twenty-four by the end of 2011. The number of channels available to watch also showed a huge increase during this period, increasing from just the one state-owned channel to 161 pay channels beamed by the increased number of broadcasters (TRAI 2012, 80–82). The growing list of available channels—featuring prominent international channels such as ESPN, CNN, BBC, HBO, TLC, and VH1, as well as a host of Bollywood movie channels and news and entertainment channels in Hindi and many regional languages—catered to many different groups of consumers (TRAI 2012, 127–42).¹³

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, a survey conducted in the city of Hyderabad reported that 90 percent of the survey respondents were “thoroughly dissatisfied” with programs on Doordarshan, citing this dissatisfaction as the reason for their switch to cable TV, and 62 percent felt that Doordarshan was “wasting public money on ‘unimaginative,’ ‘absurd’ and ‘silly’ programs” and claimed that “at times there is ‘lightweight nonsense’ and ‘downright rubbish’ on Doordarshan’s educational television programs” (Rahim 1994, 17). Moreover, three out of five respondents said that programs on STAR TV/BBC were better than those on Doordarshan (Rahim 1994, 17). Similarly, 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, 155).

Wristwatches

For the next two and a half decades after 1961, when HMT commenced watch production, it “dominated the Indian watch industry like a colossus,” and the

13. Two points should be noted regarding these statistics on TV channels. First, although many of the 161 pay channels were available nationwide, some of them were broadcast only regionally. Second, the total number of channels (free and pay) registered with the Ministry of Information and Broadcasting was as high 762 as of December 2011. There is, however, no information provided in TRAI 2012 regarding how many of these channels were actually being broadcast.

Table 3
HMT Wristwatch Production

Year	Mechanical Watches (in millions)	Quartz Watches (in millions)
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, 185.

“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, 152). Throughout this period, however, mechanical watches dominated the company’s production portfolio. Although it had commenced production in 1961 with a complete focus on mechanical watches, even by the late 1980s the situation had witnessed little change. Thus, as shown in table 3, in 1985–86 HMT’s total watch production stood at 4.53 million, of which mechanical watches made up 96 percent, but quartz watches numbered a mere 160,000, or 4 percent of total production. The figures for 1988–89 tell a similar story—total production reached 5.83 million, with mechanical watches contributing 92.4 percent of that total (Ramachandran and Lavanya 2001, 185).¹⁴

Thus, the company that virtually monopolized the Indian wristwatch market produced barely 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, 31 percent in 1985, fell to 17 percent in 1989, whereas the combined shares of electronic watches rose from 69 percent to 83 percent 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 fueled by two new entrants into the watch-manufacturing

14. These figures show a minor but insignificant change if the production figures of Hyderabad Allwyn Limited, 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 fifty-fifty, the total watch production (HMT plus Allwyn plus Titan) for 1987–88 stood at 6.1 million. Of this total, mechanical watches composed 5.22 million units, or 86 percent, with quartz watches accounting for the remaining 14 percent (Ramachandran and Lavanya 2001, 185–86).

Table 4
Trends in World Watch Production (1985–1989)

Type of Watch	1985	1986	1987	1988	1989
Mechanical (%)	30.8	23.8	21.9	18.8	16.8
Quartz (%)	37.2	35.8	38.8	46.3	50.4
Digital (%)	32.0	40.3	39.3	34.9	32.9

Source: Ramachandran and Lavanya 2001, 184.

business—the Indian firm Titan and the American firm Timex. Titan entered the industry in the late 1980s, commencing production in 1987–88.¹⁵ It focused solely on quartz watches and did not even bother with producing the mechanical variety. Timex entered the industry in 1992 and produced both quartz and digital watches. With the delicensing of the sector, both Titan and Timex could make their own production decisions.

The proportion of mechanical to electronic watches was swiftly reversed soon after liberalization. Thus, Titan's market share, which was a low 9.6 percent in 1988–89, surged to 44 percent by 1993–94. Timex's market share in 1993–94 stood at 15 percent. Thus, by 1993–94 electronic watches accounted for 59 percent of the Indian watch market, whereas the market share of HMT, the sole producer of mechanical watches, had fallen sharply to 38 percent. This rapid change in the entire production profile of the Indian watch market, away from mechanical and toward electronic watches, is a 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 percent by 2001–2002. 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 2001–2002 HMT accounted for 94 percent of the mechanical watch market, but only 8 percent of the quartz watch market.¹⁶

Not only has the technological gap between the Indian and world watch industries been reduced significantly since liberalization, but the quality of watches produced has also shown a sharp improvement. This improvement was largely a result of

15. 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.

16. Data for 2001–2002 is from G. Srinivasan 2004.

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, 158). The electronic circuit blocks were constantly in short supply because the number of them supplied by Semiconductor Complex Limited was erratic, and each block’s price was exorbitant, nearly three times the world price (Ramachandran and Lavanya 2001, 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 straps, and started producing electronic circuit blocks. Both steps greatly improved the quality of the components used in watch production. Similarly, in a sign of the alignment of the Indian watch market with the world watch market, Timex introduced to the Indian and international markets in the same year its award-winning “Indiglo” range of watches, described “as the most amazing technological innovation in watches since the quartz” (Ramachandran and Lavanya 2001, 172).

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 has been shown that the technology gap between the goods produced in India and those produced abroad narrowed greatly after the advent of market reforms. Moreover, there was also a marked improvement in other areas: a reduction in the extent of defective and unreliable goods produced due to the greater freedom in sourcing and purchasing components; 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 of import substitution based on the high growth rates India recorded in the 1980s. This paper, however, finds significant differences in the quality of consumer goods produced under the policy regimes of import substitution and liberalization in favor of the latter. This finding 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 such as motorcycles, cars, refrigerators, and air conditioners as well as of capital goods such as steel and cement during these two periods is bound to be fruitful.

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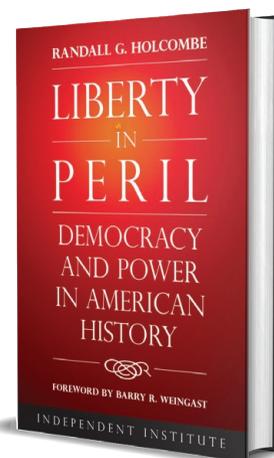
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