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CHAPTER 1

INTRODUCTION

The textile and apparel manufacturing sectors have been a backbone of many of the world's economies from the earliest stages of industrial development. They are the largest source of industrial employment and the most global sectors of commerce in the world. The exportation of apparel and textiles has had a central role in the economic growth of many developing countries; for example, countries like China, Taiwan, South Korea, and Hong Kong have targeted textiles and apparel to be primary export sectors for their export-oriented economic development (Dickerson, 1999).

The textile sector comprises the production of yarns, fabrics, and finished goods such as bedding and carpets. As one of the oldest industrial sectors in the world, it has contributed importantly to meeting basic human needs and to economic growth. The apparel sector comprises the production of garments and certain other sewn end-use products like accessories. Compared to the textile sector, it is more labor intensive, fragmented, and easily entered. It requires limited capital and technical knowledge (Dickerson, 1999). .

Background

The textile and apparel manufacturing sectors have long experienced a high degree of global competition and pressure from shifting international comparative advantage (Cline, 1990). Experience has shown that any one country does not perpetually sustain a comparative advantage in producing any products including textiles and apparel, partly because of changes in its own and other countries' level of development. Countries that achieve high levels of industrialization and economic growth eventually lose their comparative advantage in textiles and apparel. Industrialized countries such as Germany, Italy, and Japan played a leading role as exporters of textiles from 1950s until the early 1980s, but lost their comparative advantage against newly industrialized countries (NICs) as the NICs increased their financial and technological capital (Cline). Similar changes have occurred in the apparel sector. Today, most apparel manufacturing has shifted to developing countries, largely because of these countries' well-suited factor endowments in the form of great abundance of labor relative to capital (Cline) and their resulting strong competitive advantage in such manufacturing over the NICs and industrialized countries.

The Heckscher-Ohlin theory in international economics explains the trade patterns of different countries in terms of differences in countries' relative endowments of factors of production. Based on this theory, Zhang and Dardis (1991) investigated the relationship between the textile export performance and the resource endowments of major textile exporting countries over the period 1970-1985. They analyzed the relationship between countries' export performance in textiles and each of several variables including countries' endowments of physical capital, technological capital, and human capital as well as the industry-related factors of unit labor costs and domestic apparel production. They found that the more the stock of physical capital and the higher the level of human capital, the more were the gross and net exports of textiles. and the more the domestic apparel production, the less were the gross and net exports of textiles.

The Problem

According to Haggard (1990), export patterns in textiles and apparel can vary widely among countries with similar endowments depending on the trade strategies pursued by the different countries. South Korea has outpaced India in terms of economic growth despite having many characteristics in common, such as direct government involvement in industrial development and the financial sector. In addition, these two countries initiated similar development strategies in the 1950s (Dua, Rashid, & Salvatore, 2000). South Korea's economic growth rate increased rapidly from 2.1 percent in 1962 to 9.2 percent in 2003 while India's growth rate increased from 2.7 percent in 1962 to around 5 percent in 2003. Bajpai and Sachs (1998) have attributed the poor performance of India, compared to the much better performance of South Korea and some other East Asian countries, to India's choice to follow an inward-looking strategy for many years, that is, from 1951 to 1991. India was historically involved in raw-material production and trade in textiles, unlike South Korea, but did not achieve the high growth rate in exports of textiles and apparel that South Korea did in the latter half of the 20th century.

Justification

Growth in the manufacturing and exportation of textiles and apparel has been an important source of economic growth for many NICs and developing countries (Singleton, 1997). The experiences of several East Asian countries suggest that growth of the textile and apparel sectors in a country can lead to the development of other industrial sectors and thus contribute to overall economic growth. Both India and South Korea have been major textile and apparel exporters for many years, but India has not achieved the same degree of textile and apparel export performance and economic growth as South Korea since the mid-20th century. It is of interest to look at reasons behind India's relatively poor performance compared to the outstanding performance of South Korea in the export of textiles and apparel. The present research is an analysis of the determinants of textile and apparel export performance of India and South Korea over 1974-2001. No previous study has compared the textile and apparel export performance of India and South Korea over this period. The year 2001 is most recent year that the data needed for this study are available, and the year 1974 is the year the Multi-Fiber

Arrangement (MFA) went into effect. The MFA had a large influence on textile and apparel trade patterns while it was in force from 1974 to 1995. Under its auspices, restrictions were placed on the textile and apparel exports destined for the U.S. and other industrialized countries from India, South Korea, and other developing and newly industrialized countries. The export restrictions established under the MFA were progressively dismantled during 1995-2004 (Nordas, 2004).

Zhang and Dardis (1991) analyzed the determinants of export performance in textiles, but not in apparel, over 1970-1985 for 27 countries. Although their study included India and South Korea, Zhang and Dardis did not focus on these two countries or any others in particular. A further difference between the present study and the study by Zhang and Dardis is that the present one examines the effects of domestic cotton-fiber production on exports of textiles and apparel. Shah (1994) comparatively analyzed the textile export patterns of India and South Korea for the period 1955-1985 in relation to these countries' development strategies. Not only did her analysis not cover the post-1985 period, but her approach and product coverage differed from those in the present study. Research on the determinants of the textile and apparel export performance of India and South Korea may suggest relevant lessons for the future of India, South Korea, and other countries that participate in the global market. The results of this study will be useful for policy analysts in India, South Korea, and other developed and developing countries and for businesses looking to invest in India and South Korea.

Research Objectives

The overall purpose of this research is to examine the textile and apparel export performance of India and South Korea over 1974-2001. This purpose is addressed through an econometric analysis of the determinants of the gross and net exports of textiles and apparel for

India and South Korea. The specific objectives of the research are: to examine the determinants of the gross and net exports of India and South Korea during 1974-2001 for

- The textile sector; and
- The apparel sector.

CHAPTER 2

LITERATURE REVIEW

The review of literature has six sections. The first two provide background on the economies and the textile and apparel industries of India and South Korea and an overview of policies followed by these two countries' governments that are relevant to textiles and apparel. The third section describes the Asian financial crisis and its effects on the exports of India and South Korea. The fourth section describes major trade policies that have affected world trade in textiles and apparel. The information in the first four sections is useful in interpreting the research results. The fifth section reviews various economic theories of international trade. The final section highlights empirical studies on the determinants of international trade. Those last two sections provide foundation for the theoretical framework and the econometric analysis.

Historical Background on the Economies and Textile and Apparel Industries of India and South Korea

India

India has a long history of trading textile products with other countries. Under the governance of the Moghal Empire, India was a major supplier of cotton textiles and silk piece goods to African, Southeast Asian, and Arab countries during the 1700s up to the middle of the century. Cotton and silk textiles constituted the bulk of India's exports. The trade suffered in the early 1750s, however, when the breakup of the Moghal Empire left no central authority to govern trade rules and regulations. The governance of India's trade with other countries passed to the British Empire after 1757. In 1757, Great Britain established the East India Company, which was one of the world's earliest multinational corporations (Basu, 2004). According to

Basu, the commercial interests of Great Britain merged with the political interests of India and gradually led to the control of India by the British Empire.

The industrial revolution in England that began around 1760 and the British rule of India that began in 1757 together resulted in the policy of the East India Company to discourage India's industries (Desai, 1968). Britain followed a mercantilist policy of converting India into a market for its manufactures and a supplier of raw materials to its factories (Desai). The Indian economy went through transition in the 19th century. Two major influences on this were British rule and the new transport systems that Britain introduced. The new transport systems, which included steamship routes between Britain and India as well as roads and railways within India, facilitated huge imports from British factories into India and the export of Indian raw materials to Britain.

In the early 19th century, factory products from Great Britain and other Western countries flooded the Indian market due to the improved transportation systems and the East India Company's policy to discourage Indian manufacturing and encourage the sale of British products in India. Britain levied a 70-percent tariff on Indian industrial products entering across its borders and allowed no duties on British products imported into India. One result was the decline of Indian urban handcrafts, which could not compete with Western products in price, quality, and demand in India's market (Desai, 1968). The chief urban handcraft industry of India was the textile industry, with cotton textiles being its most important products. Silk products were also part of the industry and were well reputed worldwide for their variety and quality. India's urban handcrafts also included woolens, woven carpet, and embroidery (Desai). The inability of the industry to compete with imported textiles in price and quality led to the closure of many indigenous textile factories.

British rule had spread over much of India by 1857, leading to an increased volume of India's foreign trade. Cotton and jute were cultivated for export from about 1830. From then until 1946, cotton and jute textiles were the dominant source of employment and industrial output in India. In 1947, India gained independence and was divided into India and Pakistan. The partitioning left India with more than 77 percent of the territory and 80 percent of the population of the formerly combined republic, along with the largest share of the manufacturing industries like jute and cotton textile mills. Pakistan received the major share of the production capacity for raw jute and cotton (Bhagwati & Desai, 1970).

Development strategies

India followed a development strategy in its early days of independence that was a mix of a Soviet-style planning system and capitalism. According to Basu (2004), India's development policy was born with a mixture of two contradictory visions. Although it followed a Soviet-style planning system, the state did not have monopoly control over the resources for production but made huge investments in basic industries while protecting several small-scale sectors (Basu). In 1950, India embarked on a path of planned economic development. The Indian Planning Commission was established in 1950 under the chairmanship of the first Prime Minister, Jawaharlal Nehru. The Planning Commission was responsible for formulating and implementing a series of Five-Year Plans.

The first Five-Year Plan was implemented in 1951. This plan gave high priority to the agricultural sector in order to enhance the potential of agriculture to provide a base for future industrial growth. The second and third Five-Year Plans gave high priority to the heavy-goods sector along with the agricultural sector. The annual growth rate of real GDP for the three decades from 1950 to 1980 was approximately 3.7 percent. The growth rate increased to 5.8

percent and to 6.0 percent, respectively, during the 1980s and 1990s (Srinivasan & Tendulkar, 2003).

Until 1991, India pursued a highly inward-oriented development strategy that was based on the objective of self-reliance and a staunch export pessimism. Export pessimism dominated the thinking and strategies of Indian policy makers. As a result, India's share of world merchandise exports declined steadily from about 2 percent in 1950 to 0.4 percent in 1989 (Ahluwalia, Mohan, & Goswami, 1996). Until 1991, India maintained a trade and investment policy distinguished by high tariffs and quantitative restrictions on imports, an overvalued exchange rate, and heavy limitations on foreign direct and portfolio investments (Ahluwalia, Mohan, & Goswami). An economic crisis in 1991, in which foreign reserves dropped to a supply adequate for less than three weeks, forced India to open its market to foreign investment and to reform its trade regime (Srinivasan & Tendulkar, 2003). India's post-1991 reforms stood in sharp contrast to its earlier policies and reflected major changes in the country's development strategy. The new policies were designed to systematically dismantle the existing inward-oriented policies and make Indian industry globally competitive. The new policies included provisions to promote exports, such as the authorization of export processing zones (EPZs), duty-free importation of capital inputs by large exporters under a special licensing scheme, and duty drawbacks on imported inputs for manufactured exports (Ahluwalia, Mohan, & Goswami).

Industrial policies

Industrialization has been a major emphasis in the economic development plans of India. A central feature of the industrial strategy in India's initial development plans was the prominent role assigned to the public sector to both foster development and shape the pattern of investments in the economy (Ahluwalia, 1991). The state regulated all investments in the industrial sector under the licensing framework of the Industries Development and Regulation Act (IDRA) of 1951. The IDRA controlled licensing for entry into an industry, capacity expansion and location, technology, and the output mix and import content of products (Ahluwalia). According to Ahluwalia, undue conservatism and administrative delays characterized the operations of the industrial licensing system and led to more regulation and a slowed rate of economic development.

Since the first Five-Year Plan was implemented, India has had a policy of encouraging small-scale industries and discriminating against large firms (Holmstrom, 1993). According to Holmstrom, small-scale industries (SSI) have been encouraged as they are labor intensive and generate much employment, make cheap goods which the masses can afford, reduce social conflict because of close personal relations between employers and workers, and disperse ownership, industries, and population geographically to small towns. The SSI sector has played an important role in the Indian economy since the 1980s. The number of small-scale units increased from .87 million in 1980 to 3.57 million in 2003. Exports by SSI units constituted 45 percent of India’s total manufacturing exports and 34 percent of its total exports in 2003 (Small Industries Development Organization, n.d.). The main products of the SSI sector are sporting goods, readymade garments, knitwear, plastic products, processed food, and leather products.

Until 1991, the government promoted public-sector enterprises and the development of the capital-goods sector and heavy industry. State financial institutions owned or largely financed almost half of private-sector industrial operations. The public sector’s share of GDP grew from 8 percent in fiscal year 1960-61 to about 26 percent by 1990-91. Public and private firms were sheltered from competition through government restrictions on imports, foreign investment, and new entry into industries (Ahluwalia, Mohan, & Goswami, 1996). The industrial policy of 1991 abolished the requirement of government approval for private investments in many sectors. Many areas that had been reserved for the public sector were opened to private entrepreneurs. By the end of 2003, only three industries were reserved for the public sector and only six industries required compulsory licensing, mainly due to environmental, safety, and strategic considerations (*Industrial Policy*, n.d.). The small-scale sector policy in effect since October 2001 requires that no firm that produces any of the 749 items reserved for the SSI sector may operate without a government-approved license and must export at least 50 percent of its annual production; however, licensing is not required for firms operating 100 percent under the government's export-promotion schemes, that is, the Export-oriented Undertakings Scheme and the EPZs, or Special Economic Zones, Scheme (*Industrial Policy*). The small-sector policy allows up to 24 percent of the equity of an eligible firm to be from foreign investment, but requires a government-issued license (Balasubramanyam, 2003).

Trade and macroeconomic policies

The pre-1991 trade regime protected domestic manufacturing industries through a restrictive import policy. In 1991, most of the quantitative restrictions (QRs) on intermediate and capital-goods imports were withdrawn. The removal of QRs on 714 import items was one of the significant trade policy reforms established in 2002 (Balasubramanyam, 2003). The peak tariff rate was reduced to 32.3 percent in 2002-03 from 355 percent in 1990 (Srinivasan & Tendulkar, 2003). Balasubramanyam noted that, even after reducing tariff rates, India's average tariff rates are much higher than those of most other emerging economies such as Indonesia (8.8 percent), Malaysia (10.2 percent), the Philippines (9.7 percent), and Thailand (17.1 percent).

Until 1991, India allowed foreign direct investment (FDI) in only certain industries and imposed strict conditions on joint-venture agreements regarding local- content requirements, export obligations, and local R&D promotion (Bajpai & Dasgupta, 2004). Reforms implemented starting in 1991 have permitted FDI in almost every sector of the economy (Ahluwalia, Mohan, & Goswami, 1996). Restrictions on foreign investment in certain private sectors have been relaxed from 40 percent of equity to up to 51 percent. FDI inflow increased to US$4.7 billion in 2003 from US$1.29 million in 1991-92. India's foreign exchange reserves grew from US$5.8 billion in 1991 to US$76.1 billion in 2003 (Reserve Bank of India, 2004).

According to a report of the Reserve Bank of India (n.d.), the financial sector of India was in a state of repression before reforms of the 1990s. The report points out that low levels of capitalization, lack of transparency and commercial considerations in credit planning, and the weak recovery culture of the financial sector had resulted in huge accumulation of non-performing loans. The new policies of the 1990s brought significant improvement in the financial sector. The net non-performing assets of the sector declined to 2.9 percent in 2003 from 8.1 percent in 1996-97. India's current account balance, which was in deficit by 3.1 percent of GDP in 1991, turned into a surplus of 0.7 percent in 2002-03 (Reserve Bank of India). The financial sector, which was dominated by state ownership for a number of years, has faced competition from new private banks that have emerged since enactment of reforms starting in 1991. The sector has adopted international capital-adequacy standards (Javalagi & Talluri, 1996). The Liquidity Adjustment Facility Act of 2000 introduced procedural changes to "transmit short-term liquidity and interest rate signals in a more flexible and bidirectional manner" (Basu, 2004, p. 66). The reforms have provided greater flexibility to banks to determine both the volume and terms of lending. The deregulated interest-rate regime adopted with the new reforms has allowed borrowers to obtain credit at lower interest rates than before the reforms. The lending rate declined from about 19 percent in 1991-92 to 10.5-11 percent in 2001-02 (Basu). The fiscal deficit rose to 5.7 percent of GDP in 2001-02 from 4.2 percent in 1995-96 (World Trade Organization, 2002). In order to redress the fiscal imbalance, a Fiscal Responsibility and Budget Management bill was passed into law in 2003 (Seshan, 2003) with the aim of reducing the fiscal deficit annually by at least 0.5 percent of GDP to achieve a deficit of not more than 2 percent of GDP by 2006 (World Trade Organization).

Exchange rate policies

According to Reddy (as cited in Srinivasan & Tendulakar, 2003, p. 14), the "nominal exchange rate policy in India has evolved from the rupee being pegged to the pound sterling until 1975, pegged to an undisclosed currency basket until 1992 and after a year's experience with a dual exchange rate system to a market-related system by 1993." According to Ahluwalia, Mohan, and Goswami (1996), high tariffs and quantitative restrictions resulted in an overvalued exchange rate in the 1980s. The overvalued exchange rate generated a bias against exports and an excess demand for imports (Srinivasan & Tendulkar). Exchange rate policy went through a series of changes from 1991 when the import licensing system was abandoned. In 1993, the Indian government abolished many controls contained in the Foreign Exchange Regulation Act of 1973. Abolishing the controls gave foreign joint ventures the freedom to sell and buy properties, set up branches and subsidiaries, and take over Indian firms without seeking government approval (Javalagi & Talluri, 1996). In 1993, the two-tier exchange rate system was eliminated and the rupee was made fully convertible on the trade account (Basu, 2004). The nominal exchange rate depreciated by 8.2 percent in 1995 and further depreciated by 9.0 percent in 1998 during the Asian financial crisis (Srinivasan & Tendulkar).

Textile and apparel sectors and policies

The textile and apparel industry is one of the leading industries in India, contributing 4 percent of the GDP, 37 percent of gross export earnings, and 20 percent of total industrial output in 2001. The industry employs more than 38 million people and is the country's second largest employer after agriculture. It currently accounts for more than one-fifth of India's total industrial production and for nearly one-third of the country's exports (*Industry Overview: Manufacturing*, n.d.). India's textile and apparel industry is predominantly cotton based with 70 percent of the raw materials consumed being cotton.

India is the world's second largest textile producer after China and produces a wide variety of textiles. It is also the world's fifth largest producer of polyester fibers and filament yarns and the third largest producer of regenerated cellulosic fibers (Shetty, 2001). The textile industry of India comprises three sectors: the mill sector, the handloom sector, and the powerloom sector. The organized mill sector consists of around 2,500 spinning mills, around 900 small-scale industry (SSI) units, and 285 medium- to large-sized composite mills that are vertically integrated and have spinning, weaving, and finishing operations. The handloom and powerloom sectors are decentralized and comprise small fabric-weaving units and dyeing and finishing units (Shetty) (see Table 1).

The government's policies of protecting SSI and discriminating against large-scale firms have had adverse effects on the textile and apparel industry. The policies have discouraged investments in new manufacturing technologies and have limited large-scale manufacturing and benefits of economies of scale. An important turning point in the textile industry was the Textile Policy of 1985, which relaxed some of the restrictive policies that had hampered the industry's growth. The main objective of the policy was to increase the production and quality of fabrics at

Table 1. **Structure of the Indian Textile Industry**

Item	Units	1998-99	1999-2000	2000-01	2001-02	2002-03	2003-04 (P)
Cotton/man-made fiber	Number	1824	1850	1846	1860	1875	1787
Spinning mills (non-SSI)	Number	1543	1565	1565	1579	1599	1564
Spinning mills (SSI)	Number	901	921	996	1046	1146	1135
Composite mills (non-SSI)	Number	281	285	281	281	276	223
Only-weaving mills (non-SSI)	Number	199	202	203	207	209	206
Powerloom mills (year end)	Number in lakhs	3.58	3.67	3.74	3.75	3.80	4.13
Capacity installed							
Spindles (SSI + non SSI)	Number in millions	36.67	37.08	37.91	38.33	39.03	37.03
Rotors (SSI + non SSI)	Number in lakhs	4.34	4.44	4.54	4.80	4.68	4.82
Looms (organized sector)	Number in lakhs	1.40	1.40	1.40	1.41	1.37	1.05
Powerlooms	Number in lakhs	15.99	16.3	16.62	16.66	16.93	18.37
Handlooms	Number in lakhs	38.91	38.91	38.91	38.91	38.91	38.91
Man-made staple fibers	Million kilograms	1064	1066	1081	1090	1096	1101
Man-made filament	Million kilograms	1033	1078	1128	1135	1191	1228
Worsted spindles	Number in thousands	575	585	598	598	604	604
Woolen spindles	Number in thousands	412	419	426	426	437	437
Fiber Production							
Raw cotton	Bales in lakhs	165	156	140	158	136	177
Man-made fiber	Million kilograms	782	835	904	834	914	953
Raw wool	Million kilograms	48.33	47.90	49.20	50.70	50.70	50.70
Raw silk	Million kilograms	15.54	15.21	15.86	17.35	16.32	15.74

(table continues)

Item	Units	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04 (P)
Yarn production							
Cotton yarn	Million kilograms	2022	2204	2267	2212	2177	2121
Other spun yarn	Million kilograms	786	842	893	889	904	931
Manmade filament yarn	Million kilograms	850	894	920	962	1100	1118
Fabric production							
Cotton	Million $meters^2$	17948	18989	19718	19769	19300	18040
Blended	Million $meters^2$	5700	5913	6351	6287	5876	6068
100 percent non-cotton	Million $meters^2$	12479	14306	14164	15978	16797	18275
Total		36127	39208	40233	42034	41973	42383
Fabric available	$Meters^2$	28.19	30.55	30.68	31.97	31.37	31.01
Textile machinery production	Million US $	270.32	256.70	286.90	225.64	243.48	297.17

Notes. The data source is the Government of India, Ministry of Textiles, 2005.

1 kilogram = 2.2 pounds; 1 lakh = 100,000; P = predicted.

reasonable prices to meet the needs of India’s growing population (Ministry of Textiles, n.d.). Since 1991, the government of India has implemented policies to help the textile and apparel industry thrive under the increasingly liberalized global trade regime. The new policies have de-licensed the industry, per the Statement of Industrial Policy of 1991 and the Textile Development and Regulation Order of 1992. Under the new policies, no prior government approval is necessary to set up textile mills (*Industry Overview: Manufacturing*, n.d.). According to Srinivasan and Tendulkar (2003), the new policies have helped increase aggregate exports of manufactured products. They indicated that the share of readymade garments, textile yarns, and fabrics increased from 25 percent of manufactured exports during 1988-1990 to 41 percent during 1998-2000.

In 1999, India's government implemented the Technology Upgradation Fund (TUF) to encourage investments and new technology in the textile and apparel sectors. Under the TUF scheme, eligible firms can receive loans at low interest rates to upgrade their technology. The scheme is designed to make Indian textile exports more competitive in international markets (Export-Import Bank of India, n.d.).

The National Textile Policy (NTP), which became effective in 2000, aims to enhance the competitiveness of Indian textiles in the international market and expand India's world export share of textiles from US$11 billion in 2000 to US$50 billion by 2010 (Ministry of Textiles, 2000). The NTP 2000 policy allows up to 100-percent foreign investment in the apparel sector without any export obligation (Shetty, 2001). One of the important targets of NTP 2000 was the de-reservation of the apparel industry from the SSI sector in order to increase investments in the industry and to gain the benefits of economies of scale (Shetty).

The Textile Export Quota Entitlement Policy for 2000-2004 was announced to boost exports and encourage investments in the textile and apparel industry. The policy was enacted during the period when quotas on textiles and apparel were being phased out under the Uruguay Round Agreement on Textiles and Clothing (discussed later). The main objective of the policy was to increase the quota shares assigned to units investing in new machinery and plants. Under this policy, the Textile Ministry allocated quota rights for the country's exports to the United States, the European Union, Canada, and Norway (Shetty, 2001). The policy was designed to encourage fast utilization of the quotas on India's textiles and apparel.

South Korea

South Korea had a closed agrarian economy before it opened up to the West in 1876. Prior to 1876, the isolationist policy of Korea's Choson dynasty (1392-1910) kept the country closed to the rest of the world except for trade and diplomatic relations with China (Das, 1992; Song, 2004). Largely for this reason, Korea was known as the “hermit kingdom.” Japan forced Korea to sign a commerce treaty in 1876, which resulted in opening Korea’s ports and land to Japan, the United States, and other countries. The opening of Korea’s ports led to gradual structural changes in its manufacturing, infrastructure, and banking and other service industries (Song). It also led to foreign ownership in extractive industries, power generation, and railroad construction. Japan subsequently emerged as an industrial power in the late 1800s and came to dominate foreign investment in Korea (Das). Korea experienced rapid economic growth and rising per-capita income between 1876 and 1910. The power wielded by Japan in East Asia eventually led to the fall of the Choson dynasty and to Japan’s colonization and control of Korea by 1910. According to Song, the total isolation from foreign ideas and lack of a world view on the part of the Choson dynasty leadership figured importantly in bringing about the control of Korea by Japan in 1910 and ultimately the Korean War which began in 1950.

Japan ruled Korea from 1910 to 1945. During the colonial regime, Japan controlled Korea’s trade and industrial activities. Japan used Korea as a place to settle its surplus population and as a market for its manufactures and a supplier of cheap rice (Das, 1992; Song, 2004). By the early 1930s, Korea had also become a base for Japan’s military training for invasions of China and Manchuria (Song). The Sino-Japan war of 1937 led to expanded manufacturing activity in Korea. The colonial government emphasized heavy and chemical industries to supply industrial goods to Japan (Das). Korea was liberated from colonial rule in 1945. Withdrawal of the colonial power created shortages of trained manpower in Korea. In addition, the Japanese and Manchurian markets were closed to Korea after 1945, resulting in sharp economic decline (Das).

At the end of World War II in 1953, Korea was partitioned into North and South. The partitioning split the former republic into two disorganized parts and caused havoc in each. During Japan's colonial rule of Korea, the best mines and most advanced heavy industry had been developed in the north whereas sectors like agriculture, textiles, and engineering were prominent in the south (Das, 1992). The partitioning of the Korean peninsula left South Korea with less than one-half of the peninsula's land area and more than two-thirds of its population. Compared to North Korea, South Korea had greater capability to produce light-industry and agricultural products (Song, 2004).

Development strategies

South Korea was one of the poorest countries in the world at the end of the Korean War in 1953 (Das, 1992). Under Rhee Syngman's leadership (1948-60), the country pursued an import-substitution strategy where the United States financed 70 percent of its total fixed capital. The import-substitution strategy emphasized the production of consumer goods, such as food and textiles, through an unfavorable exchange rate regime and strict government controls on foreign exchange, bank credit, import licenses, and heavy quantitative restrictions on imports (Harvie & Lee, 2003).

In 1961, Korea embarked on a path of planned economic development and launched a series of Five-Year Plans emphasizing an outward orientation. The first Five-Year Plan was implemented in 1962. The first and second Five-Year Plans focused on building self-sustaining growth and promoted efficient allocation of resources through agricultural, industrial, trade, and social-infrastructure policies (Song, 2004). The first two Five-Year Plans encouraged specialization in labor-intensive goods, such as apparel and shoes (Tcha, Lee, & Suh, 2003). From 1963, South Korea achieved rapid economic growth and became a newly industrialized country (NIC) by 1970. The third Five-Year Plan concentrated on developing heavy-chemical industries. Korea's GDP grew at an average rate of 9.5 percent annually during 1965-80 (Das, 1992). Starting in 1986, the Korean economy entered a new phase of economic independence.

In 1986, Korea's domestic savings exceeded its investment for the first time, and foreign debt declined rapidly. The annual inflation rate was 2.7 percent in 1986, a steep decline from the 25.6-percent rate in 1980. For three consecutive years beginning in 1986, the annual economic growth rate exceeded 12 percent and was the highest in the world before falling to 6.9 percent in 1989 (Song, 2004). Song attributed Korea's high economic growth rate to its outward-oriented policies and rapid growth of export industries. In 1995, Korea's per-capita GNP exceeded US$10,000 compared to US$80 in 1960 (Song). According to Tcha, Lee, and Suh (2003), the Korean economy had grown at an average annual growth of 9-10 percent from the late 1970s to the mid-1990s due to favorable economic conditions, such as low energy costs, low interest rates, and a strong Japanese yen; however, these conditions in the long run could not sustain Korea's huge private-sector debt and non-competitiveness in the financial sector, which contributed to a severe economic crisis in 1997 as part of the Asian financial crisis. South Korea received a US$57 billion emergency rescue package from the International Monetary Fund (IMF) in 1997 (Sharma, 2003). The Korean government has implemented many new reforms for economic revival since 1997. By 2001, Korea had completely repaid the debt it incurred from the IMF in 1997 (Song).

Industrial policies

The industrial structure in Korea reflects the country's poor resource endowment and outward-oriented development strategies (Song, 2004). The government's intervention in the industrial sector has enormously influenced the development and organization of industries and firms (Jwa, 2001). The government has initiated almost every major investment in the private sector. During 1962-1981, the government introduced many industrial incentives to promote exports (Das, 1992). The primary emphasis of South Korea’s industrial policy since the 1960s has been to promote exports. The government promoted light industries like textiles and footwear for export during the first two Five-Year Plans. In the 1970s, Korea’s industrial policy aggressively promoted heavy and chemical industries (HCI). Excessive expansion in HCI, combined with two oil shocks in 1973 and 1979, resulted in high inflation. The inflation rate shot up to more than 20 percent during the 1970s. The policies of the 1980s focused on controlling inflation and stabilizing prices. In addition to anti-inflationary policies, various other policies were undertaken that reduced the degree of government intervention in resource allocation in the 1980s and 1990s (Jwa). The industrial policies of the 1990s also emphasized deregulation. Under the policies during the past four decades, the industrial structure of Korea was transformed from being traditionally labor-intensive to capital-intensive to technology-intensive (Song).

Public enterprises (PEs) have played a crucial role in Korea’s economic development. With the expansion of HCI, investment in PEs accelerated from 1972 to 1981. The government’s PE policy in the 1960s and 1970s encouraged PEs in any area of industry considered essential for the export growth of Korea and deemed unable to be handled efficiently by private enterprise; however, PEs declined in importance with the implementation of the privatization policy in the fifth Five-Year Plan (1982-86). The government attempted to privatize as many PEs as possible in the 1980s (Song, 2004). As part of new reforms of the late 1990s, privatization of government-owned enterprises was emphasized. The main objectives of the privatization program have been to improve the efficiency of enterprises and attract foreign capital. Eight out of 24 major state-owned enterprises were privatized between 1998 and 2002 (Yang, 2004).

The government's policy of encouraging fast-growing firms through credit and tax benefits and the promotion of HCI in the 1970s resulted in increased industrial concentration and the growth of chaebol (or jaebol) (Song, 2004). Chaebol are large family-based industrial conglomerates. The government directed massive resources into the chaebol to carry out high-priority investment projects as they were regarded as companies that could achieve economies of scale and compete in international markets (Kwon & Suh, 2003). According to Jwa (2001), the growth and political power of the chaebol have influenced the majority of Korea's industrial policies since the 1970s. The intervention of the chaebol into industrial policies contributed to the aforementioned financial crisis in 1997. The Korean government controlled the country's financial system and directed resources to support chaebol firms, which ended up with high debt to equity ratios (Jwa). The average debt to equity ratio of the top 30 chaebol increased to 519 percent in 1997 from 347.5 percent in 1995 (Kwon & Suh). In 1998, the Korean government introduced the Five-Point Accord program to restructure the corporate sector. The reforms in this program involved improving corporate governance, reducing debt to equity ratios, empowering minority shareholders, and corporate downsizing (Emery, 2001). As of 2001, the top 30 chaebol comprised 624 companies and contributed 13 percent of Korea's GNP (Song).

Exchange rate policies

From 1964 to 1980, South Korea followed a single-currency peg system by pegging the won to the U.S. dollar. In 1980, Korea adopted a multiple-currency basket peg system with the effective exchange rate linked to a basket of currencies of South Korea's major trading partners – the U.S, Japan, Germany, and Canada. In 1990, South Korea considerably liberalized its exchange rate system and replaced the pegged exchange rate system with a market-average exchange rate system (Jwa, 2001). The Korean won continually depreciated against the U.S.

dollar in nominal terms during the early 1990s, increasing the competitiveness of Korean exports (Harvie & Lee, 2003); however, when the won appreciated against the U.S. dollar and the Japanese yen in the mid-1990s, Korea witnessed a reduction in export demand and loss of international competitiveness. With the onset of the financial crisis in 1997, the nominal value of the won relative to the U.S. dollar declined dramatically by 91 percent (Harvie & Lee). South Korea adopted a free-floating exchange rate system in 1997 in response to the financial crisis (Jwa).

Trade and macroeconomic policies

Prior to the implementation of the first Five-Year Plan in 1962, Korea's economic policies centered on import substitution supported by an overvalued exchange rate and heavy reliance on foreign assistance. Since the early 1960s, however, Korea has followed an outward-oriented growth strategy with strong promotion of exports (Song, 2004). The government of Korea has introduced many export incentives like tax deductions, wastage allowances, tariff exemptions, preferential loans, and automatic approval of loans by commercial banks to firms with export letters of credit (Lim, 2003). During 1961-1972, the government exempted exporting firms from indirect taxes, that is, taxes on income earned from export sales, and provided a 50-percent exemption from corporate and personal income tax on export earnings (Song). Those policies and others reflect South Korea's long-standing practice of formulating trade policies in a manner that supports its industries and corporations (Jwa, 2001). According to Jwa, the importing of foreign products into Korea is impossible if similar products are produced domestically; however, a firm may be exempted from this rule if it requires imported inputs for producing export goods.

The Ministry of Trade and Industry established general trading companies (GTCs) in 1975 to speed up export expansion. The original requirements for a company to be designated a GTC were that its paid-in capital was at least approximately US$2.1 million, its annual exports were at least US$50 million, it had at least 10 overseas branch offices, and it offered public stock. Since 1975, the Korean government has continuously pressured the GTCs to expand exports by regularly raising the minimum export value requirement. The annual export value criterion for GTC designation was raised from US$50 million in 1975 to 2 percent of total Korean exports by the 1990s. The government has provided the GTCs with various export incentives, including cash subsidies tied to export volumes (Song, 2004). Korean exports increased from US$55 million in the early 1960s to US$193.8 billion in 2003 (Export-Import Bank of Korea, 2005). Korean manufacturers rely heavily on imported raw materials and machinery. Korea’s imports increased to US$178.8 billion in 2003 from US$390 million in 1962 (Export-Import Bank of Korea).

South Korea has experienced changes in its political system over the past four decades, and with those changes, it has altered its policies on foreign direct investment (FDI) in several major ways. Korea allowed no FDI in the 1950s, but the policy changed in 1962 with the implementation of the Foreign Capital Inducement Act. Until the 1980s, South Korea relied heavily on foreign borrowing and maintained a restrictive policy on foreign investment. The FDI policies were eased in the mid-1980s by allowing foreign investment in many sectors (Yeo, Yoon, & Wong, 2004). The policies on foreign investment were further liberalized in the late 1990s in response to the financial crisis. By 2003, South Korea had opened almost all areas of the economy to foreign investment except national security and cultural sectors. The cumulative

FDI inflows for the period 1962-2002 stood at US$78 billion, of which US$53 billion entered Korea during 1998-2002 (Yeo, Yoon, & Wong)

Since the early 1960s, the Korean government has allocated financial resources strategically to select sectors or industries by controlling the financial sector, particularly banking. The government has attempted to liberalize the financial sector since the 1980s, but the intertwined internal structural problems of the government and the financial and corporate sectors made the economy fragile to external shocks and contributed to financial crisis in 1997. In response to the financial crisis of the late 1990s, many new reforms were adopted to strengthen the financial system. The new reforms have required any financial institution whose assets exceeded a certain level to set up a compliance officer and audit committee to help improve transparency in its financial system. As part of the new reforms, the Financial Supervisory Service (FSS) was established in 1999. The main purpose of the FSS is to supervise and examine the whole financial sector, including the banking and security, insurance, and other non-banking industries. By the end of 2000, major creditor banks and business groups had reached an agreement to reduce their debt to equity ratios below a 200-percent ceiling as part of their capital-structure improvement. In 2001, a Continuous Assessment System of Corporate Credit Risk was introduced. Under this system, the main creditor bank selects companies semi-annually to assess their credit risk for symptoms of insolvency (Oh, 2004). The restructuring of the financial sector as part of the new reforms resulted in a large fiscal deficit of 4.2 percent of GDP in 1998. As a result of the government's tight fiscal policy, combined with high tax revenues in 2000 and reduced payments to unemployed workers as the employment rate rose, the fiscal deficit fell to 1.3 percent of GDP in 2000.

Textile and apparel sectors and related policies

The textile and apparel industry is a leading industry in South Korea, contributing 14 percent of industrial employment in 2001 (Hoon, 2002). During the first and second Five-Year Plans, this industry emerged as one of the main manufacturing industries experiencing growth and was considered a growth engine for the whole economy. In the early 1960s, government policies provided this industry with export incentives, such as free access to imported inputs, concessions on tariffs and indirect taxes, and credit preferences (Westphal, 1979). In the 1970s, textile and apparel exports accounted for 30 percent of Korea's total exports (Kim, 1992); however, the share of these products in total exports fell to less than 20 percent by 2002 with the shift in manufacturing emphasis to electronics and technology production (Kim, 2004). Today, the most significant textile exports of South Korea are fabrics, finished goods, raw materials, and yarns. The major textile imports are finished products, raw materials, yarns, and fabrics (Stylios, Kindness, Stephenson, Burek, Emden, & McCarthy, 2004).

The Korean government has promoted and encouraged foreign investment in the synthetic fiber and fabric industries since the 1960s. The synthetic fiber and fabric industries have been supported through the chaebol. Between 1970 and 1980, South Korea went from dependence on synthetic-fiber imports to self-sufficiency and exportation of these fibers. By 1980, South Korea had become the world's third largest supplier of synthetic fibers (Kim, 1980).

According to Hoon (2004), Korea's production and exportation of textiles and apparel have been in decline since the late 1980s due to a rapid increase in wages, a shortage of skilled labor, labor-management disputes, and competition from other countries. MacDonald and Vollrath (2005) attributed the decline in apparel production to the country's high wages; a shift in production to lower-wage countries due to triangular relationships with other Asian countries and changes in comparative advantage; and the increased productivity of lower-income countries. The production share of the textile and apparel industry in overall manufacturing dropped from 15.5 percent in 1985 to 7.0 percent in 2000. In addition, the share of textiles and apparel in South Korea’s manufactured exports declined from 6.6 percent in 1990 to 3.5 percent in 2003 (Hoon).

In the early 1990s, the Korean apparel industry was dominated by mass production of low-priced goods for export markets using an assembly-line system. Large conglomerates operated separate factories with one or two products being produced in each factory, and small firms often operated in the basements of four- or five-story buildings near industrial areas (Lee & Song, 1994). Until the 1990s, local manufacturers dominated the apparel sector of South Korea; however, since the 1990s a significant increase in relatively cheap imported fashion goods has contributed to a decline in domestic apparel manufacturing (Stylios et al., 2004).

The Asian Financial Crisis

The Crisis and its Causes

A phenomenon that came to be known as the Asian financial crisis erupted in mid-1997. The crisis affected many countries in East Asia and elsewhere. The countries in East Asia that were hit hardest were South Korea, Malaysia, Thailand, the Philippines, and Indonesia. These countries experienced sharp declines in their currency values and stock markets. The crisis spread to each of these countries’ financial systems and led to severe economic downturns and drastically lower economic growth rates.

Analysts have identified many factors that caused or contributed to the Asian crisis. According to an International Monetary Fund (IMF) report (2000), a major cause of the rapid contagion effect of the crisis through several Asian countries was market “sentiment” or “panic.” The panic led to a vicious cycle of currency depreciation and capital outflows in the region that was difficult to stop. The region-wide panic first struck Thailand before spreading to Malaysia, the Philippines, Indonesia, and eventually South Korea. According to Sharma (2003), when financial crisis hit Southeast Asia following the devaluation of the Thai baht on July 2, 1997, the South Korean economy was sound and well-managed. An IMF report (1999) indicated that the crisis stemmed from weak financial systems in the five hard-hit countries, characterized by inadequate supervision of the financial sector, poor assessment and management of financial risk, and maintenance of fixed exchange rates which led to huge inflows of foreign capital that were used for poor-quality investments. Rangarajan (2000) divided the factors that led to the financial crisis into four broad categories: domestic versus external economic factors, weakness in the financial sector, and changes in the external environment.

Domestic macroeconomic factors

Rational criteria did not guide the allocation of resources in the five Asian countries that were most severely and directly affected by the crisis. Excessive investments were made in unproductive activities and luxury constructions. Rangarajan (2000) indicated that some economists attribute the pre-crisis high growth rate in these economies to the high level of inputs rather than efficiency in using capital.

Financial sector weakness

The banking system in the five crisis countries lacked proper regulation and supervision. Financial reporting and disclosure norms lacked transparency. This coupled with poor governance and lack of internal controls to result in excessive foreign borrowing that was directed to poor-quality investments. In addition, heavy lending against real estate threw several banks into losses when land prices fell during the crisis.

External macroeconomic factors

The five crisis countries had run high current account deficits before the crisis hit, sometimes more than 5 percent of GDP. These high deficits caused vulnerability to external shocks. South Korea’s current account deficit between 1990 and 1995 averaged 1.9 percent of GDP and increased to 4.9 percent of GDP in 1996 (Sharma, 2003). Khan (2004) contended that the high current account deficit of South Korea was due to a drastic fall in international prices for Korea’s major exports, such as semiconductors, steel, and petrochemical products. Sharma indicated that the Korean government had greatly eased controls and provided incentives to financial institutions for short-term borrowing while maintaining restrictions on medium- and long-term borrowing between February 1993 and February 1998. As a result, Korean corporations borrowed money from foreign institutions on a short-term basis to fund long-term investments. Short-term debt constituted 67 percent of South Korea’s external debt by mid-1997. High levels of short-term debt made Korea and the other crisis countries vulnerable to financial crisis when investors, suddenly seized with panic, demanded immediate payment and refused to roll over short-term debt (Radelet & Sachs, 1998).

Changes in the external environment

Changes in Asian countries that were competitors or major markets for the exports of the five crisis countries contributed to deepening the financial crisis once it was under way. Of particular importance was the devaluation of the Chinese yuan in 1994 because it reduced the export competitiveness of many East Asian countries. In addition, Japan’s sluggish economic growth in the mid-1990s reduced its demand for the exports of its Asian neighbors. These external environmental factors in isolation did not directly cause the crisis, but the combined effect was to exacerbate the crisis.

According to Jackson (1999), excess production in some of the crisis countries in the late-1990s also contributed to the financial crisis. Jackson noted, for example, that in 1997 Thailand's automobile output exceeded demand by 192 percent, while its oversupply of petrochemicals stood at 195 percent and of steel bars at 150 percent above demand. Although these industries were not major exporters, Thailand's industrial oversupply in 1997 was estimated to be at the brink of collapse. Jackson discussed several factors that helped induce the oversupply in the crisis countries: (a) heavy capital flow into these countries from Western Europe, North America, and Japan to produce export goods; (b) investors' belief that export markets could absorb an infinite supply of manufactured products from these countries; and (c) investors' assumption that inter-Asian trade would continue to boost exports for the foreseeable future.

Effects of the Financial Crisis on South Korea and India

South Korea

South Korea enjoyed continuous economic growth between 1960 and 1997, with the exception of a short recession in 1979-80. In 1996, it was the world's eleventh largest and East Asia's second largest economy. South Korea's economy had an 8.4-percent average annual growth rate between 1970 and 1996 (Rangarajan, 2000). During the early 1990s, its economy grew at an impressive rate. Inflation has remained relatively low since 1993, fluctuating between 4 and 5 percent (Sharma, 2003). Between 1993 and 1996, the real exchange rate of its currency with the U.S. dollar was nearly constant with no significant overvaluation. South Korea's fiscal deficit of about 2.5 percent of GDP in the early 1980s turned into surplus by 1993 (Sharma). Between 1990 and mid-1997, its current account deficit averaged 1.9 per cent of GDP. In 1996, its debt to GNP ratio was 22 percent, which was well below the critical level of 48 percent specified by the World Bank.

The Asian crisis had disastrous effects on the Korean economy. The South Korean won was the last currency to fall in the Asian contagion. The won was valued at 870 per U.S. dollar on 1 July 1997 and depreciated to 1,138 to the dollar by the end of November 1997 and to 1,500 by the end of December 1997. The process of depreciation continued into 1998, and by 14 August 1998, the won had depreciated in value by 35 percent from its level in July 1997 (Rangarajan, 2000). Table 2 shows the export and import growth rates for South Korea from 1991 to 1999. The export growth rate fell from 30.3 percent in 1995 to -2.8 percent in 1998. The import growth rate fell from 32 percent in 1995 to -35.5 percent in 1998. The growth rates of both imports and exports revived in 1999, with imports growing at a pace not far below that in 1995 but with export growth much below the rate in 1995.

Table 2. **South Korea's Export and Import Growth Rates (percent), 1991-1999**

	1991	1992	1993	1994	1995	1996	1997	1998	1999
Export growth	10.5	6.6	7.3	16.8	30.3	3.7	5.0	-2.8	8.6
Import growth	16.7	0.3	2.5	22.1	32.0	11.3	-3.8	-35.5	28.4

Note. Calculated by the author based on data from the Korean Ministry of Finance, *Monthly Economic Indicators*, December 2002.

India

The Asian financial crisis had much less direct impact on India than on South Korea. Bhalla (1999) indicated that India escaped most of the contagion effect of the currency crisis, but was not left untouched. He noted that the Asian crisis mildly affected the Indian stock market in November 1997 and contributed to the rupee's depreciation by 10 percent by the end of

December 1997. According to Bhalla, the 10-percent depreciation of the rupee was insignificant compared to the much larger depreciations in East Asia where the currency and stock values declined close to 50 percent.

India's closed economy and heavily controlled exchange rate are said to have helped India largely escape the contagion effect of the Asian financial crisis (Bhalla, 1999). In the 1990s, India's central bank completely controlled all movements in the rupee's exchange rate and allowed no speculation by foreign-exchange dealers. India's short-term loans from foreign lenders in the 1990s were never more than 30 percent of external debt, unlike in the East Asian crisis countries where they often exceeded 100 percent (Sikdar, 2003). In addition, capital outflows for foreign investments were not allowed, and external corporate borrowing was controlled by the Ministry of Finance. Bhalla stated that India's sound economic fundamentals were another reason that it avoided the contagion effect of the financial crisis. At the time the crisis started in Thailand in early July 1997, India's economy had had a steady annual growth rate of above 7 percent in each of the previous three years. Inflation had declined to the 4-6 percent range, and exports had grown at an average rate of more than 15 percent per annum during 1993-96.

Table 3 shows the export and import growth rates of India from 1991 to 1999. The export growth rate fell from 20.8 percent in 1995 to -5.1 percent in 1998, and the import growth rate fell from 28.0 percent in 1995 to 2.2 percent in 1998. According to Klien and Palanivel (2001), the aftermath of the Asian crisis, economic sanctions imposed by the United States on India in 1998 for testing its nuclear capacity, and a significant recession in international markets contributed to the reduced trade during 1997-98.

Table 3. **India's Export and Import Growth Rates (percent), 1991-1999**

	1991	1992	1993	1994	1995	1996	1997	1998	1999
Export growth	-1.5	3.7	20.0	18.4	20.8	5.3	4.6	-5.1	10.8
Import growth	-19.4	12.7	6.5	22.9	28.0	6.7	6.0	2.2	17.2

Note. Calculated by the author based on data from the Government of India – Ministry of Commerce and Industry, *Indian Trade Statistics*, March 2004.

Trade Policies

Multi-Fiber Arrangement (1974-1995)

The textile and apparel sectors in the United States and Europe have a long history of protection. The prime protection instrument in recent history was the quantitative restriction of exports from other countries under the Multi-Fiber Arrangement (MFA), which was in effect from 1974 through 1994; however, well before the MFA went into effect, other international agreements had governed textile and apparel trade. In the 1950s, for example, Japan, Hong Kong, China, India, and Pakistan agreed to voluntary export restraints (VERs) on cotton textile products shipped to the United States (Nordas, 2004). Following these were the Short-Term Arrangement (STA) on trade in cotton textiles, which went into effect in 1961, and then the Long-Term Arrangement (LTA) which superceded the STA in 1962. Like the STA, the LTA was a multilateral agreement that was signed under the auspices of the General Agreement of Trade and Tariff (GATT) and allowed VERs on cotton textile products (World Trade Organization, 2005). The LTA remained in effect through 1973 after having been re-negotiated several times, and in 1974 was replaced by the MFA which covered a much broader range of clothing and textile products than its predecessor agreements. The MFA was re-negotiated three times between 1974 and 1994.

The aim of the MFA was to open developed countries' markets to less-developed economies in an orderly manner to avoid "market disruption" in the developed countries (Nordas, 2004). The MFA was implemented through bilaterally negotiated agreements, mainly between developed and developing countries, which restricted developing countries' exports to the developed ones through VERs based on quantity.

The MFA originally extended the product coverage from what it had been under the STA and LTA to include not only products made of cotton but also wool and man-made fibers. By the end of the MFA's life span, it also covered products made of vegetable fibers and silk blends. The first renewal of the MFA in 1978 focused on clothing, as this was the segment where the developed countries felt the most competition from developing countries. The second renewal of the MFA in 1986 allowed stringent limits on the export growth of major Asian suppliers to the U.S. and European markets (Chatterjee & Mohan, 1993). This led to the U.S. reduction, from 6 percent to 1 percent, of the annual import growth rate of some clothing categories from the top three Asian exporters, Hong Kong, South Korea, and Taiwan (Cline, 1990). The quota allotments were more liberal for smaller exporters like India and countries of the Association of Southeast Asian Nations (ASEAN). In response to increasingly restrictive MFA quotas, Hong Kong, South Korea, and Taiwan upgraded to higher-value products and also explored new markets that were not restricted by quotas (Chatterjee & Mohan). The quantitative restrictions under the MFA enabled rapid industrial growth in some developing countries, in part because of those countries' guaranteed quota access to the developed countries' markets for certain product categories. In the

1980s, in spite of binding MFA restrictions, South Korea's textile and clothing production doubled and its exports of textiles and apparel tripled in volume.

Agreement on Textiles and Clothing (1995-2004)

Under an agreement negotiated in the Uruguay Round of GATT trade talks which concluded in 1995, the MFA was replaced by the Agreement on Textiles and Clothing (ATC). Among other things, the Uruguay Round also resulted in establishing the World Trade Organization (WTO) to administer GATT trade rules. The purpose of the ATC was to completely integrate textile and clothing trade into the multilateral system of GATT by progressively eliminating all quantitative restrictions on such products among GATT/WTO members. The integration took place in four stages over 10 years, with full integration accomplished by 1 January, 2005 (Nordas, 2004) (see Table 4).

Table 4. **Integration of Textiles and Clothing into GATT**

Stage	Date	Minimum volume integrated (percent)	Accumulated volume integrated (percent)
Stage I	01.01.1995	16	16
Stage II	01.01.1998	17	33
Stage III	01.01.2002	18	51
Stage IV	01.01.2005	49	100

Source: Nordas (2004).

North American Free Trade Agreement

The North American Free Trade Agreement (NAFTA) went into effect on 1 January 1994 and is the most important free-trade agreement to date among the U.S., Canada, and Mexico. The main provision of NAFTA relating to textiles and apparel is the elimination of tariffs and quotas on imports and exports among the NAFTA partner countries as long as the traded products meet the rules of origin stipulated in NAFTA. The rules of origin require the yarns and fabrics used in the final traded products to be made in the NAFTA partner countries and the fabrics used in apparel traded among those countries to be cut in one of them.

According to Kose, Meridith, and Towe (2004), Mexico's exports to the U.S. and Canada tripled in dollar terms between 1993 and 2002. Approximately 90 percent of the total exports of Mexico went to the U.S. and Canada in 2002. Mexico's trade as a percent of its GDP increased from 27 per cent in 1980 to about 65 percent in 2003 (Kose, Meridth, & Towe). Mexico-U.S. textile and apparel trade increased from US$9.2 billion in 1994 to US$13.8 billion in 2001 (Oh & Suh, 2003). Total U.S. trade with Mexico in textiles and apparel increased by more than 250 percent between 1993 and 2001 (Villarreal, 2003). After the implementation of the agreement on January 1, 1994, North American trade boomed from $297 billion in 1993 to $622 billion in 2001 (U.S. International Trade Administration, 2005)

China's Accession to the WTO

In 2001, China became a member of the WTO after its long struggle to gain membership. With its accession to the WTO, China became eligible to take part in the elimination of quotas on textiles and clothing under the ATC. Although most quotas on textile and clothing exports were eliminated as of 1 January 2005, a special safeguard mechanism that will be in place until the end of 2008 allows WTO importing countries to restrict imports from China or other countries when the imports result in or threaten market disruption (Walmsley & Hertel, 2000).

According to Hufbauer and Wong (2004), China has become the United States' third largest trading partner and sixth largest export market since its accession to the WTO. U.S. imports from China increased from $100 billion in 2000 to $152 billion in 2003 (Hufbauer & Wong). The U.S. imports from China of textile and apparel products that were integrated into the GATT regime in 1998 or 2002 rose from slightly less than 1.0 billion square meter equivalents

(SMEs) in 2001 to 3.6 billion SMEs in 2002 (U.S. International Trade Commission, 2004). According to Adhikari and Yang (2002), newly industrialized countries (e.g., South Korea) will benefit most from China's accession to the WTO owing to their heavy investments in China to take advantage of its low labor costs.

Economic Theories of International Trade

Adam Smith was one of the earliest proponents of the advantages of international trade. He proposed a theory in the 1700s to explain why nations can benefit from trading with each other. The fundamental idea behind his theory is that nations have different costs in producing goods, which leads to specialization and an international division of labor. Each nation specializes in the production of those goods in which it has an input-cost advantage. David Ricardo refined Adam Smith's theory in the early 19th century by developing the concept of comparative advantage. Ricardo contended that the basis for trade between countries was international differences in labor productivity, given his assumption that labor was the only factor of production (Krugman & Obstfeld, 2000). Ricardo hypothesized that each country exports the commodities that it can produce at lower average labor costs, thus more productively, than it can produce other commodities. Differences in labor productivity between countries result in a price difference for the same good in different countries. This price difference is the reason that countries can gain from engaging in trade. The classical comparative advantage theory proposed by Ricardo demonstrates the gains from trade through a static model based on the restrictive assumption of one variable factor (labor) and the notion of complete specialization by each trade partner (Todaro, 1989).

In the 20th century, international trade theorists attempted to extend trade theory beyond just explaining why nations trade to explaining why nations trade certain commodities; thus, the new theories focused on the determinants of the commodity composition of trade, or as Kreinin (2002, p. 50) said, the “factors that determine which country exports what commodity.” Several theories have been proposed to explain the commodity composition of trade. Major theories in this stream are discussed in the sections that follow.

Factor Proportions Theory

Eli Hecksher and Bertil Ohlin proposed the factor proportions (or factor endowment) theory. Hecksher and Ohlin modified Ricardo’s model to include the effects of differences in countries’ supply of factors like land, labor, and capital on international trade. According to the Heckscher-Ohlin factor endowment theory, international trade compensates for uneven international distribution of geographic and production resources (Leamer, 1995). The Hecksher-Ohlin (H-O) model assumes that some factors of production are immobile between countries and “these factors are used in different combinations to produce different goods” (Leamer, 1984, p. 1). Although different products utilize productive factors in different proportions, certain products will always be relatively more labor intensive and others will always be relatively more capital intensive, irrespective of where they are produced.

According to the H-O model, the basis for trade is the difference in factor supplies between countries (Nurkse, 1962). Countries with an abundance of labor relative to capital will have a relative cost and price advantage in manufacturing labor-intensive commodities, compared to countries where capital is the more abundant factor. To benefit from trade, labor-abundant countries should specialize in the production of labor-intensive goods and export their surplus of those goods in return for imports of capital-intensive goods. Similarly, countries with abundant capital will have cost and price advantages in manufacturing capital-intensive goods and should specialize in and export these goods in return for imports of labor-intensive goods

(Leamer, 1984). In the words of Krugman and Obstfeld (2000, p. 74) “an economy will tend to be relatively effective at producing goods that are intensive in the factors with which the country is relatively well-endowed.” The central assumptions of the H-O model are immobility of some factors of production between countries, identical technology in all countries, production functions with constant returns to scale, difference in endowments of factors of production in countries, and identical preferences in all countries (Leamer).

Kreinin (2002) stated that the H-O model cannot completely explain the complex phenomenon of trade of all goods. International trade theorists have proposed alternative theories to explain the phenomenon.

Human Skills Theory

The human skills theory, which emphasizes differences in the quality of the labor force in different countries, can be used to help explain the commodity composition of trade (Katrak, 1973). The H-O model regards labor as a homogeneous factor, but in the real world, the labor force of each country represents a continuum from unskilled to highly skilled labor. Countries differ not only in physical capital, but also in the training and education of the labor force; for example, developed countries are endowed with a large number of scientists, engineers, and technicians whereas developing countries tend to have few. The productivity of labor varies depending on the skill of the labor (Mitcher, 1968). Accordingly, the commodities produced in a country are closely related to the skill and education of the labor force of the country.

Keesing (1965) noted that different products embody different amounts of human skill; for example, computers embody more knowledge, training, and education of the workers in their production than does apparel. According to the human skills theory, the human-skill characteristics embodied in goods are nonreversible, meaning that some goods are skill intensive and others are not. This, in turn, influences the direction of trade flows, or the commodity composition of trade. Countries that are relatively well endowed with highly trained labor will specialize in and export skill-intensive goods. Conversely, countries with relatively abundant unskilled labor will mostly export commodities embodying unskilled labor, as they have a comparative advantage in these goods.

Technological Gap Theory

The technological gap theory explains trade patterns in terms of the different stages of technical progress of different countries. This theory, which was proposed by Posner (1961), relies on assuming no difference in factor endowments and factor prices among countries. Under this assumption, product innovation drives trade between countries. For trade to occur, a country X discovers a new innovative product which is first consumed domestically but is later exported to another country Y for consumption. The new product competes with existing products in country Y, posing a threat to domestic producers and their profits. Thus, country Y's producers attempt to imitate the product by acquiring the requisite production technology. The period between the production of the new product in X and Y is called the "imitation lag." The producers of country Y slowly increase their share of the product in the home market, causing X's exports to eventually cease (Soete, 1981). Kaldor (1962) summed up this theory as follows: The commodity composition of trade is not decided by factor endowments of countries but by the technological gap between countries.

The technological gap theory can be applied to cases of new products where the innovative country enjoys an advantage in either quality or production costs. A country exports goods not because of its endowment of factors of production, but because its innovation allows it to monopolize the technology initially and possess the patent on the new product (Soete, 1981).

The theory also suggests that economies of scale, whether static or dynamic, may serve to enlarge and prolong a technological gap in trade. In the static case, the innovating country can build large plants to take advantage of economies of scale as the market for the new product expands, both domestically and internationally. The economies of scale enjoyed by the innovating country can prolong the technological gap in trade. Irrespective of the size of the home market, an innovating country can enjoy economies of scale by building large plants to supply the product to both domestic and international customers. In the dynamic case, an innovating country maintains an advantage because its accumulated production experience and learning allow it to improve the technology ahead of other countries. Such improvement might not be feasible for other countries, as improvement depends on labor experience and familiarity with the production process. Thus, the technological gap is prolonged between the exports of the innovating country and those of other countries.

According to Hufbauer (1966), innovations in new products and processes initially occur mainly in high-wage developed countries and then move to imitating low-wage, less-developed countries. Hufbauer indicated that, at some point in time, an imitating country's low-wage advantage surpasses the innovating country's technological advantage, and the imitating country becomes a net exporter of the product. He argued that low-wage trade usually follows technological-gap trade, although he abandoned the technological gap theory's assumption of no difference in factor endowments and factor prices throughout the world.

Preference Similarity Theory

The preference similarity theory stresses the role of preference diversity. This theory holds that a country's trade with other countries is an extension of its domestic market. The country's production meets the needs of the domestic market, and in the process the country acquires comparative advantage in the production of some products and then exports the products. Individuals in a country have different product preferences, and the resulting diverse demand can be met by importing from another country products similar to those produced in the importing country. Under this theory, the types of goods demanded in a country are mainly decided by the country's overall and per-capita income levels. A country will export and import similar products. As trade partners exchange similar products, the trade extends the variety of goods available to consumers in each country (Hoftyzer 1975; Kohlhagen, 1977).

Monopolistic Competition Theory

Monopolistic competition theory emphasizes the importance of product differentiation in trade. According to the theory, a country trades with other countries to expand the size of its market. A country's industries that have economies of scale and produce differentiated goods can be constrained by the size of the home market. Trade with other countries allows the industries to have larger markets. Under the theory, trade can occur between countries with similar resources or technology, as the products that are traded are not homogeneous but can be good substitutes for each other (Kreinin, 2002; Krugman & Obstfeld, 2000).

Intra-industry and Inter-industry Trade Theories

The theories discussed above provide insights into international trade, but no one theory fully explains the motives of international trade in the real world. Each theory gives a different perspective on international trade.

Kreinin (2002) discussed two components of international trade: inter-industry trade, which is an exchange of totally different products between countries; and intra-industry trade, which is an exchange of similar products between countries. The exchange of textiles for computers is an example of inter-industry trade, and the exchange of different types of textiles is an example of intra-industry trade. Comparative advantage is the basis for inter-industry trade. The pattern of inter-industry trade depends on the different factor endowments of the trade partners. On the other hand, comparative advantage is not the basis for intra-industry trade. Such trade is conducted among countries with similar factor endowments. Economists have developed various models to explain the pattern of intra-industry trade based on such conditions as preference similarity and economies of scale in production. Models that help explain intra-industry trade are preference similarity theory and monopolistic competition theory. Models that help explain inter-industry trade are the Hecksher-Ohlin theory and the human-skills theory. Technological gap theory applies to both inter-industry and intra-industry trade.

According to Kreinin (2002), conditions that generate international trade change over time with technological advancement, capital accumulation, skill development, and invention of new products. These changes affect the ranking of industries in terms of comparative advantage from one time to other, both within and between countries, and thus affect inter-industry trade. These changes and others, such as changes in demand for products, can also affect intra-industry, although not with respect to comparative advantage.

Empirical Research on Determinants of Trade

The factor proportions theory of trade, also known as the Hecksher-Ohlin (H-O) model, has been subjected to extensive empirical testing since the early 1950s. In the first test of the model, Wassily Leontief (1953) analyzed U.S. trade data for 1947. Using data from input-output tables that he had developed, Leontief decomposed U.S. exports and imports into their labor and capital components. He compared the exports and imports in terms of the dollar amounts of capital and labor required to produce $1 million worth of exports and $1 million worth of imports. Contrary to the H-O model, he found that the exports were less capital intensive than the imports. This result later came to be known as the Leontief paradox (Krugman & Obstfeld, 2000). Leontief tried to explain this paradox by pointing out the role of human skills, arguing that the high efficiency of U.S. workers made U.S. exports more labor intensive than U.S. imports. His famous paradox stimulated a large body of empirical research in the field of international trade. Many researchers, including Leontief himself, have examined his methodology by applying it in analyses of U.S. trade performance in different years.

Baldwin (1971) analyzed U.S. trade for 1962 and found support for Leontief paradox. He then expanded the H-O model to include human capital and natural resources. He stressed the importance of human skills, which he measured by (a) the average years of education of the labor force, (b) the average cost of labor education, (c) the average earnings of labor, and (d) the proportion of engineers and scientists required for $1 million worth of U.S. exports and competing imports. His results showed that U.S. exports embodied more human capital than did U.S. imports.

Leamer (1980) approached the testing of the Leontief paradox from a different perspective. He argued that the ratios of factors embodied in a country's exports and imports have no relationship to the country's relative factor endowments in the case of unbalanced exports and imports and that the H-O model should be tested on the basis of consumption and production instead of exports and imports. Taking this approach, he examined Leontief's data and found that the capital-labor ratio of production was greater than that of consumption; thus, he concluded that the Loentief paradox did not hold and the H-O model was supported.

Keesing (1967) examined U.S. trade data for 1962 for 18 industries and related them to research and development (R&D). He used several measures of R&D: (a) the number of scientists and engineers engaged in R&D; (b) expenditures on R&D by industry as a percentage of sales; and (c) expenditures on R&D by the federal government as a percentage of industry sales. He correlated these measures with each of the U.S. industries' shares of the total exports of 10 major industrialized countries. He found a high correlation between each of the R&D measures and the U.S. export shares.

Branson and Junz (1971) investigated U.S. trade patterns for 1964 and found that the net exports of the U.S. had a small negative correlation with physical capital and a large positive correlation with human capital and economies of scale. These results supported the Leontief paradox as well as the human skills and technological gap theories.

Lowinger (1977) examined the roles of physical capital, human capital, and technological capital in determining the relative export shares of various U.S. industries among such industries in a group of 10 countries. Lowinger measured the physical capital of an industry as the book value of fixed assets per employee in the industry. He measured human capital by the capitalized wage differential and technological capital by the cumulative expenditures on R&D. His examination of 15 manufacturing industries, using data from 1968 to 1970, showed that human capital and technological capital were positively and significantly related to export share.

Hufbauer (1966) analyzed the determinants of international trade in synthetic materials, including plastics, synthetic rubber, and man-made fibers. He contended that the factor proportions theory could not explain trade in synthetic materials because the countries that provide most exports of these commodities are poorly endowed with the natural resources needed in the industries that produce them. He also hypothesized that these industries are characterized by considerable economies of scale and hence the home-market size, measured by gross domestic product (GDP), exercises a large influence on the direction of trade in synthetic materials. In addition, technical innovation is very important in these industries. Hufbauer's independent variables were (a) a country's imitation lag behind other countries in years, (b) the national-level wages in the chemical industry, (c) the national GDP, and (d) the national yearly production of synthetic materials. His major finding was that the parameters on the imitation-lag variable were consistently negative and significant, which supported the technological gap theory. In addition, the effect of the size of the home market (GDP) on trade was significant and positive for plastics and synthetic rubber, but not for man-made fibers, and wage rate had a negative and significant effect for man-made fibers, but not for plastics and synthetic rubbers. He argued that economies of scale were relatively unimportant for man-made fibers whereas wage levels exercised great influence in this sector.

Leamer (1984) studied the sources of comparative advantage by grouping traded commodities into 10 aggregates, including two primary products, four crops, and four types of manufactured goods (chemicals, machinery, capital-intensive, and labor-intensive). He selected 11 resources, including physical capital, three kinds of labor (professional and technical, literate, and illiterate), four kinds of land, and three kinds of natural resources. He first conducted a detailed descriptive analysis of the data and tried different ways to display the relationships between the trade positions of 58 countries and their resources over 1958-1975. This analysis suggested that, in general, a country's resources determined the country's commodity composition of trade.

Leamer (1984) also conducted an econometric analysis using the net trade balance for each of the 10 commodity aggregates noted above as the dependent variables and the 11 types of resources as the independent variables. The results supported the H-O model in that unskilled labor and land were sources of comparative advantage for agricultural products, and natural resources were sources of comparative advantage for primary products. The most interesting finding was the altered role of human capital in manufactured products between 1958 and 1975. In 1958, the most skilled labor (professional and technical) was positively and significantly related to net exports of all four manufactured aggregates; in 1975, it was significant only for chemicals, the most skill-intensive aggregate. In 1958, physical capital was positively and significantly related only to net exports of chemicals whereas, in 1975, it contributed positively to net exports of all four types of manufactured goods. The other two kinds of labor were non-significant in 1958, but were positive and significant in 1975 for all manufactured goods except chemicals. Leamer concluded that the human capital embodied in the professional and technical workforce was a major factor in determining exports of manufactured goods in 1958 and that physical capital and literate and illiterate labor were the major factors in 1975 in exports of the manufactured goods with the exception of chemicals.

Zhang and Dardis (1991) investigated the determinants of the textile export performance of 27 major textile exporting countries. The authors measured export performance by a country's gross exports and net exports. They used static and dynamic models for the analysis. Their independent variables were physical capital, technological capital, human capital, unit labor costs, and domestic apparel production. They found that the more the stock of physical capital and the higher the level of human capital, the more were the gross and net exports of textiles, and the more the domestic apparel production, the less were the gross and net exports of textiles.

Trela and Whalley (1990) analyzed the impacts of the elimination of U.S., Canadian, and European Community (EC) tariff and quota restrictions on the textile and clothing imports from 34 developing countries under the Multi-Fiber Arrangement-III for the year 1986. They used an applied general equilibrium model to analyze 14 key textile and apparel categories. They evaluated the national and global welfare costs of eliminating tariffs and bilateral quotas, concluding that the majority of the 34 developing countries would gain from elimination of tariffs and quotas on textiles and apparel, although some would gain more than others. Their results also showed that higher-income developing countries like South Korea, Hong Kong, and Taiwan would gain market share with the elimination of tariffs and quotas due to decreased inter-developed-country trade and developed countries' increased consumption and reduced production.

Au and Chan (2003) examined the determinants of bilateral trade in textiles (SITC 65) and clothing (SITC 84) between each of 30 pairs of OECD countries in the year 2000. The OECD, which stands for the Organization for Economic Cooperation and Development, includes 24 developed countries and six developing countries. Au and Chan examined the general pattern of the bilateral trade in terms of the total value of the traded products. The independent variables were (a) economic conditions, measured by the difference in GDP per capita in U.S. dollars between each pair of trading countries; (b) each trading country's average level of income, measured by GDP per capita in U.S. dollars; (c) the distance in kilometers between two trading countries; (d) common-land border trade, measured by a dummy variable with a value of 1 if the two trading countries shared a land border and 0 otherwise; (e) NAFTA, measured by a dummy variable with a value of 1 if two trading countries were both NAFTA countries and 0 otherwise; and (f) each country's population. They found that all the independent variables except NAFTA were statistically significant for both textiles and clothing. They also found a high correlation between trade in textiles and trade in apparel in the bilateral exchanges between countries, which they attributed to the supply-chain linkage in textile and clothing production activities and the intra-firm trade of multinational companies.

Shah (1994) examined the textile and apparel export patterns and government intervention of India and South Korea over the period 1955-1985 through comparative historical analysis. She found that both India and South Korea displayed high levels of government intervention in the textile and apparel industry and in trade related to these sectors. A major finding of her study was that the government intervention in South Korea fostered the growth of its textile and apparel exports, whereas the government intervention in India hampered the growth of its textile and apparel exports.

Summary

The chapter contains six sections. The first two provide background on India's and South Korea's economies and policies related to economic and industrial development and international trade. Also discussed were these two countries' textile and apparel industries. After gaining independence from colonial powers in the 1940s, both India and South Korea pursued import-substitution development strategies. India pursued inward-oriented strategy until 1991, which reduced its share of world merchandise exports from 2 percent in 1950 to 0.4 percent in 1989. On the other hand, South Korea opened its economy and changed its strategy to outward-oriented in the early 1960s, which contributed to its rapid economic growth during that decade. South Korea became a newly industrialized country by 1970. Since 1991, India adopted new outward-oriented policies in many sectors of the economy in an attempt to make its industry globally competitive.

The chapter's third section describes the Asian financial crisis of the late-1990s, along with its causes and its effects on the economies and the exports of India and South Korea. The Asian financial crisis had disastrous effects on the Korean economy. South Korea experienced a sharp decline in its currency value, stock market, export growth rate, and financial system, which led to severe economic downturn in the economy. The crisis had much less direct impact on India than on South Korea.

The chapter's fourth section summarizes major trade policies, including the MFA and the ATC. The MFA, in effect from 1974 through1994, aimed to protect developed countries' textile and apparel markets against developing countries' imports, and the ATC, which replaced the MFA in 1995 and was in effect through 2004, aimed to completely integrate textile and apparel trade into the multilateral system of GATT by progressively eliminating all MFA quantitative restrictions on textile and apparel products among GATT members. Other trade policies discussed were NAFTA and China's accession to the WTO, which helped Mexico and China increase their shares of the textile and apparel markets of the U.S. and other industrialized countries.

The chapter's fifth section describes major international trade theories, which offer alternative explanations of why countries trade and what commodities they trade. Ricardo contended that the basis for trade between countries was international differences in labor productivity. Hecksher and Ohlin (H-O) proposed the factor proportions theory by modifying Ricardo's model to include the effects of differences in countries' supply of factors like land, labor, and capital on international trade. According to the H-O model, the basis for trade is the difference in factor supplies between countries. Human skills theory explains the commodity composition of trade based on differences in the quality of the labor force in different countries. According to the theory, the commodities produced in a country are closely related to the skill and education of the labor force of the country. Posner (1961) proposed the technological gap theory, which explains trade patterns in terms of the different stages of technical progress of different countries. According to this theory, the commodity composition of trade is not decided by factor endowments of countries but by the technological gap between countries. Monopolistic competition theory emphasizes the importance of product differentiation in trade. According to this theory, a country trades with other countries to expand the size of its market.

The final section of the chapter discusses empirical studies that are based on various international trade theories and provide evidence of the determinants of trade in textiles, apparel, and other commodities. Altogether, the chapter provides foundation for the theoretical framework and the research objective as well as information used in interpreting the results of the econometric analysis.

CHAPTER 3

SETTING OF THE RESEARCH PROBLEM

This chapter presents the research purpose and objectives, the theoretical framework that guides the study, and the theoretical definitions of concepts important to the study. The chapter also indicates major underlying assumptions and limitations of the research.

Research Purpose and Objectives

The overall purpose of this research is to examine the textile and apparel exports of India and South Korea over 1974-2001. This purpose is addressed through an econometric analysis of the determinants of the gross and net exports of textiles and apparel for India and South Korea. The econometric analysis employs four linear models, which are each estimated separately for textiles and apparel for India and for South Korea. The specific objectives of the research are: to examine the determinants of the gross and net exports of India and South Korea during 1974-2001 for

- The textile sector; and
- The apparel sector.

Theoretical Framework

The study proposes that both the textile and the apparel exports of a country are influenced by the country's physical capital, technological capital, human capital, unit labor cost in the sector of interest, domestic apparel production, and domestic cotton-fiber production. The theoretical framework that supports this proposition is based on several theories and previous studies. The major theory is the Hecksher-Ohlin (H-O) model, which is regarded as one of the major trade theories in economics and has played a dominant role in the trade and development literature since the 1950s. The H-O theory holds that a country specializes in and exports commodities that use intensively its relatively abundant factors of production and imports commodities that use intensively its relatively scarce factors of production (Kreinin, 2002). This notion is the fundamental basis for proposing that physical, technological, and human capital, which are all factors of production, would affect a country's textile and apparel exports; however, as discussed below, the original form of the H-O theory does not account for the effects on trade of all of those three factors as viewed in this research.

The original H-O model was a two-commodity, two-factor, two-country model with the following assumptions.

- Each factor of production is homogeneous across the two countries and is immobile between them.
- Each commodity is produced under constant returns to scale in both nations.
- Consumers in the two nations have identical preferences.
- The two countries have identical technology.
- The relative factor intensities in producing the commodities are the same in both countries and are irreversible.
- The two countries differ in their endowments of the two factors.

(Harkness, 1978)

In research applications of the original H-O model, the two factors of production have normally been assumed to be physical capital and labor. A number of researchers, however, have used extensions of the original model to include more than two factors and commodities because the original model could not explain the commodity composition of trade between countries in many instances (Harkness, 1978). As described in the previous chapter, the extended models have included other factors besides the amounts of physical capital and labor, such as types of human capital. Although the original H-O model gives support to a country's physical capital being a determinant of its export patterns, support for technological and human capital having effects on exports relies on more recent theories.

According to the technological gap theory proposed by Posner (1961), technological capital is an indicator of technical advancement in an industry or a country and may affect the products that a country exports and imports. The technological gap theory explains the pattern of trade between countries in terms of technical progress. The theory holds that the commodity composition of trade between countries is decided not by the countries' factor endowments, but by the technological gap between the countries. An innovating country that supplies a new product to its own and other countries' markets accumulates production experience over time in the new product and thereby improves its technology in producing that product, which can result in better quality and lower costs. In addition, the innovating country may enjoy economies of scale in producing the product in large plants to supply its domestic and export markets. These give the innovating country advantages which can prolong the technological gap between it and other countries that imitate its production of the new product (Posner, 1961).

A country's human capital refers to the knowledge, skills, abilities, and capacities of its labor force. The human capital, or labor quality, influences the types of commodities the country produces and trades with other countries. The human skills theory holds that differences in the quality of the labor force in different countries determine the commodity composition of trade between the countries. According to this theory, countries differ not in only the quantity of physical capital but also in the training and education of the labor force. Developed countries are endowed with a large number of scientists, engineers, and technical personnel, whereas developing countries have few skilled workers of those types and have large uneducated populations. The types of products produced in a country are closely related to the skill and education of the labor force. A country with highly skilled labor will produce and export commodities that use such labor intensively, and countries with mostly unskilled labor will produce and export commodities that use such labor intensively (Keesing, 1965).

A related labor issue is the unit cost of labor, which is important in determining a country's export performance in textiles and apparel because of these sectors' labor intensity compared to other industries. As the level of economic development rises in a country, wage rates in the country also rise. Rising wage rates increase production costs, especially in the country's most labor-intensive industries. Increased production costs can change the pattern of comparative advantage and may lead to shifts in the production of labor-intensive commodities to lower-wage countries. The shift of production to lower-wage countries may then reduce the exports of labor-intensive commodities produced in a country whose wage rates have risen relative to those of other countries (MacDonald & Vollrath, 2005).

Besides factors of production, certain variables that are specific to textiles and apparel may affect the exports of those products. One of these variables is domestic apparel production, as Zhang and Dardis (1991) found in the case of textile exports. A country that produces apparel for export must have a sufficiently large production capacity in this product area to be a steady source of supply for export customers. The amount of apparel it exports in a given period will, therefore, depend at least in part on the amount of apparel it produces in that period: The more apparel it produces, the more it could export. Furthermore, textiles (especially fabrics) are important inputs in apparel manufacturing. A country may obtain fabrics for apparel by producing or importing them. The country may also export fabrics and other textiles that it produces. Because textiles are important inputs in apparel manufacturing, it may be expected that the larger a country's domestic apparel production, the less textiles it would have available for export.

Fibers are basic inputs in producing textile products (Dickerson, 1999). They are the fundamental components of yarns from which fabrics are made for use in apparel and other end-use textile products. Fibers are also the fundamental components of thread used to assemble garments and other sewn products and of many cordage products, such as ropes. Some fibers (e.g., cotton, wool) come from nature, and others are manufactured including synthetics (e.g., nylon, polyester) and regenerated fibers (e.g., rayon, acetate). Of these, cotton is the most widely used worldwide in textile products, accounting for 40 percent of global fiber use (MacDonald & Vollrath, 2005). A country that produces yarns and fabrics must obtain the requisite fibers by either producing or importing them. The ready availability of fiber that usually follows from producing it domestically gives a country an advantage in producing textile products for its own market and for export. In assessing the competitiveness of various foreign suppliers to the U.S. apparel market, the U.S. International Trade Commission (2004) cited a complete textile and apparel industry, extending from fiber production through the manufacture of yarns, fabrics, and apparel and other end-use products, as a major feature of foreign suppliers that U.S. buyers consider in deciding where to source apparel in the global marketplace. The same applies to buyers in other industrialized countries, such as those of the European Union. The buyers prefer to source in countries with complete industries because a complete industry helps reduce costs and required lead times when ordering products abroad.

Developed-country buyers who source apparel abroad may be apparel manufacturers, who have some of their products made in factories besides their own, or they may be retailers or marketing companies, who contract for the production of much or all of their apparel products.

Regardless of which, they have faced increasingly intense competition over the years (Nordas, 2004). They often compete with each other on the basis of cost and quick response to customers. The need to quickly respond to customers' demands has made lead time, the time between ordering and receiving goods, a consideration of growing importance in sourcing apparel (Dickerson, 1999). A similar scenario has increasingly applied to non-apparel textile products, such as some toys and home furnishings.

Theoretical Definitions of Major Concepts

- Exports: commodities that a country transports to locations outside its border for commercial purposes (World Bank, n.d.).
- Imports: commodities that are produced abroad and are transported into a country for commercial purposes.
- Gross exports: the total quantity of a country's exports of a commodity or set of commodities in a particular year or series of years (World Bank, n.d.).
- Net exports: the difference between a country's exports and imports in a particular year or series of years (World Bank, n.d.).
- Factor of production: "an input used to produce goods and services, for example, capital or labor" (Deardorff, 2001).
- Factor endowment: the quantity of some resource that a country has, such as land, labor, or capital (Deardorff, 2001).
- Physical capital: machinery, tools, equipment, furniture, parts, and buildings that are required to produce goods and services (Deardorff, 2001)

- Human capital: the knowledge, skills, abilities, and capacities possessed by people, which can be enhanced through education, training, health care, and other means (Deardorff, 2001).
- Technological capital: capital embodied in technical advancements of a country.
- Labor cost: “that part of the cost of a product or service that is attributable to wages” (*Jargons in Human Resources,* n.d), although it can include other labor-related costs of a product or service, such as payments for workers’ health insurance.
- Unit labor cost: “the labor cost per unit of manufacturing output” (Deardorff, 2001).
- Comparative advantage: a country’s ability to produce a good at a lower unit cost than other goods in that country (Krugman & Obstfeld, 2000).

Research Hypotheses

The following hypotheses were formulated on the basis of the theoretical framework and previous research. Each hypothesis applies to both India and South Korea and to both gross and net exports of textiles or apparel.

H1: A country’s stock of physical capital will have had a positive impact on its exports.

Rationale: A country’s stock of physical capital represents the country’s production capacity (Zhang & Dardis, 1991). The higher a country’s physical-capital stock, the higher is its production capacity and therefore the higher is its capacity to produce for export. Zhang and Dardis found that physical-capital stock had positive and significant impacts on both gross and net textile exports in their analysis of 27 countries over 1970-1985.

H2: A country’s technological capital will have had a positive impact on its textile exports and a negative impact on its apparel exports.

Rationale: A country's level of technological capital reflects the country's level of economic development. The more advanced a country, the more will be its endowment of technological capital and the more it would concentrate on sophisticated industries that require heavy capital investment, a high capital to labor ratio, and technologically advanced factors of production. When a country concentrates on sophisticated industries, the physical and human factors of production in the country are shifted away from its more labor-intensive industries that produce relatively simple products, such as apparel, to industries that are more capital- and technology-intensive, such as textiles, chemicals, and machinery. Technological capital may help a country's industries make innovations that allow them to expand exports, as predicted by the technological gap theory (Posner, 1961). Zhang and Dardis (1991) found that technological capital had a positive and significant impact on net exports of textiles in each of the four years they examined over 1970-85 using a sample of 27 countries.

H3-a: Human capital, measured by enrollment in secondary-level education, will have had a positive effect on textile exports but a negative effect on apparel exports.

Rationale: A country's human capital represents the quality of its labor force. Different types of labor embody different degrees of skill and professionalism. Secondary education is equivalent to a high school education in the U.S., although the educational systems of other countries vary widely with respect to the duration and amount of education. Secondary education represents an intermediate level of human capital (Zhang & Dardis, 1991). Over the years, technological advancements have brought many developments in the textile industry, which have increased the industry's sophistication and capital intensity (Dickerson, 1999). These changes have contributed to increased labor productivity and quality of the industry's products. The technical advancements have also increased the needed skill level of workers in the industry in order to effectively operate and maintain the numerous, complex, often computer-controlled machines used to spin yarns and weave, knit, dye, and finish fabrics. On the other hand, although sophisticated machines are used in some operations (e.g., marker making, computerized cutting) in the apparel industry, this industry is considered low-skill in general. Most machines used in this industry do not require the operators to have a secondary-level education. Zhang and Dardis (1991) found that an index of secondary-level education had a positive impact on net textile exports in 1980, although no effect on gross exports of textiles over 1970-85.

H3-b: Human capital, measured by enrollment in tertiary-level education, will have had a positive effect on textile exports, but an uncertain effect on apparel exports.

Rationale: The tertiary level of education is equivalent to a college education in the U.S., although the educational systems in other countries may vary with respect to the duration and amount of education. This level of education represents a high degree of skill. Textiles and apparel are among the most global industries in the world (Dickerson, 1999). Competition in the global market has stimulated technological advancements, including increased use of automated machinery and improved communications, management, marketing, and inventory-control systems. The high level of skill that comes from a tertiary-level education is used in various management, marketing, and product-development functions in both the textile sector and the apparel sector. In addition, these sectors' increasing globalization requires managers' understanding of the world market and of trading systems. On the other hand, the apparel industry does not require high skill for operating much of the production equipment (Bonacich, Cheng, Chinchilla, Hamilton, & Ong, 1994). The combination of low-skill and high-skill labor in the apparel industry makes for an uncertain effect of tertiary-level education on apparel exports.

H4: A country's unit labor cost will have had a negative impact on its exports of both textiles and apparel.

Rationale: The textile and apparel sectors have been of special interest to both developed and developing countries for many decades. Developed countries have long faced competition in both textiles and apparel from low-wage developing countries. Developing countries like India and newly industrialized countries (NICs) like South Korea generally have lower unit labor costs than more-developed countries, but the developing countries and NICs do compete with each other partially on the basis of unit labor costs. Although the capital intensity of the textile sector has greatly increased and this sector is more capital intensive than the apparel sector, both textiles and apparel are more labor intensive than most other manufacturing industries. Due to the relatively high labor intensity, unit labor costs play a major role in textile and apparel trade (Nordas, 2004).

H5: A country's per-capita domestic apparel production will have had a negative impact on its textile exports and a positive impact on its apparel exports.

Rationale: A country's apparel production reflects the linkage between textile and apparel production (Miller, 1982). Unlike some countries which are large producers of apparel but lack well-developed textile industries, both India and South Korea are large producers of both textiles and apparel for their home markets and for export. The larger the per-capita apparel production in a country like India or South Korea, the greater would be its domestic demand for textiles and thus the lower the quantity of textiles available for export. On the other hand, the larger the per-capita domestic apparel production of a country, the better able the country may be to have excess apparel available for export over the amount needed for the domestic market. Zhang and Dardis (1991), who measured a country's apparel production in total, but not on a per-capita basis, found that the amount of domestic apparel production had a negative impact on exports of textiles for the period 1970-85 for the 27 countries they examined.

H6: A country's domestic cotton production will have had a positive impact on its exports of both textiles and apparel.

Rationale: A country that exports textiles and apparel gains an advantage over export competitors by producing the fiber needed to manufacture the yarns and fabrics required to produce textiles and apparel, rather than importing the fiber. Domestic production of fiber helps reduce costs and lead times in providing textiles and apparel to export customers. The main markets of India's and South Korea's textile and apparel exports have long been industrialized countries, where the buyers of these products compete with each other partly on the basis of cost and quick response to their customers (Saxena & Wiebe, 2005). Thus, the more the domestic fiber production in a textile and apparel export country, the more its textile and apparel exports are expected to be. Although cotton is not the only fiber used in textiles and apparel, it is the single most heavily used type of fiber for such products, accounting for 40 percent of global fiber use (MacDonald & Vollrath, 2005).

Assumptions

- The dependent and independent variables used in the study adequately measure the concepts they are intended to measure.
- A standard depreciation rate of 13.3 percent is assumed for a country's physical-capital stock, based on Leamer (1984).
- A standard life of 15 years for physical capital is assumed, based on Leamer (1984).

Limitations

- The study focuses on industry-specific determinants of textile and apparel exports and does not include several variables that may have affected the export patterns of India and South Korea over 1974-2001, such as exchange rates and transportation and communications infrastructure as well as internal government policies that may have influenced the size, structure, and costs of firms and production facilities. Nor does the study directly account for the impact of the Asian financial crisis, the MFA, the ATC, NAFTA, and China's accession to the WTO on the textile and apparel exports of India and South Korea.
- The dependent variables in the econometric analysis are the exports of textiles and of apparel as broad categories, thus not the exports of sub-categories of textiles and apparel.
- This study measures technological capital by the number of scientists, engineers, and technical personnel involved in a country's research and development. This measure may not reflect the actual technological capital of the country.
- Due to data availability the study accounts for the impact on textile and apparel exports of domestic cotton-fiber production, but not the impact of domestic production of all types of fiber.

CHAPTER 4

RESEARCH PROCEDURE

This chapter describes the procedures used to analyze the export performance in textiles and apparel of India and South Korea over 1974-2001, along with the operational definitions and data sources of the variables. The textile exports examined are for products in SITC category 65 and the apparel exports are for products in SITC category 84, where SITC refers to the Standard Industrial Trade Classification Revision 3 (United Nations Statistics Division, n.d.). The SITC describes category 65 as “textile yarns, fabric, etc.” and category 84 as “clothing and accessories.”

The research is based on a study by Zhang and Dardis (1991), who analyzed the determinants of export performance in textiles of 27 major textile exporting countries for the period 1970-1985. An econometric analysis is used to address the research objective to examine the determinants of the gross and net exports of India and South Korea during 1974-2001 for

- The textile sector; and
- The apparel sector.

The analysis of the determinants of the gross and net exports of textiles and apparel for India and South Korea employs four linear models for textiles and apparel separately. Many variables, such as resource endowments and industry characteristics, may affect a country’s export performance in textiles and apparel. The variables included in this study are physical capital, technological capital, human capital, unit labor cost, per-capita domestic apparel production, and domestic cotton production. The theoretical framework provides the basis for proposing that these variables influence exports of textiles and apparel. The study by Zhang and Dardis (1991) noted above included all but one of the independent variables in the present study.

The exception is domestic cotton production. In addition, although Zhang and Dardis included a variable for domestic apparel production, they did not measure it on a per-capita basis as in the present study. The reason for measuring domestic apparel production on a per-capita basis is that the amount of apparel which a country produces and exports may depend partly on its population. The size of a country's population may affect both the number of workers available to produce the apparel, given the high labor intensity of apparel manufacturing, and the excess amount of apparel available for export after meeting the needs of the country's population.

The four models used to analyze the textile and apparel export performance of India and South Korea were derived from Zhang (1988). Each model was estimated separately for India and South Korea and, for each country, separately for textiles and apparel. Models 1 and 2 are two of the models used to analyze the determinants of the gross or net exports over 1974-2001. Current-year values of gross or net exports were the independent variables in both models. These two models differ in that the independent variables in Model 1 are current-year values of those variables, and the independent variables in Model 2 are each lagged one year, that is, previous-year values of the independent variables. Models 3 and 4 are the other two models used to analyze the determinants of gross or net exports of textiles and apparel, but in these models the interest is the examination of the determinants of the annual growth rates of gross or net exports. These two models differ in that the independent variables in Model 3 are current-year annual growth rates of these variables, and the independent variables in Model 4 are previous-year annual growth rates of these variables. Growth rates of exports and of the independent variables were analyzed to account for the changes in these variables within a year's lag.

Lagged variables are used in Models 2 and 4 to gauge the response of current-year export values to previous-year values of the independent variables. The lag on net value of physical-capital stock is to account for the time it takes capital to become fully operational. Similarly, the lag on domestic cotton production is to account for the time required for growing, harvesting, and processing raw cotton into yarns and fabrics and to then process fabrics into apparel and other final textile products. The one-year lags on the three remaining independent variables relate to the possibility that export products are ordered in one year and shipped in the next year (Cline, 1990). Lagged values of unit labor cost may affect current-year textile and apparel export values because previous-year unit labor cost may help determine the prices negotiated for textiles and apparel exports when buyers place their orders for goods that are shipped in the next year. A country's technological capital and its domestic apparel production may both affect the relative amounts and types of textiles and apparel available for export and could then affect the total export values of textiles and apparel ordered in one year and shipped in the next.

The Estimated Models

Model 1 is

$$Y = b_0 + b_1PK + b_2TC + b_3ED2 + b_4ED3 + b_5LC + b_6AP + b_7FP + e, \qquad (1)$$

where

Y = gross or net export value of textiles or apparel;

PK = net value of physical-capital stock;

TC = technological capital;

ED2 = enrollment in secondary-level education;

ED3 = enrollment tertiary-level education;

LC = unit labor cost;

AP = per-capita domestic apparel production;

FP = domestic cotton production;

b_i = estimated parameters, i = 0, 1, 2, …,7; and

e = error term.

Model 2 is

$$Y = b_0 + b_1PK^* + b_2TC^* + b_3ED2^* + b_4ED3^* + b_5LC^* + b_6AP^* + b_7FP^* + e. \quad (2)$$

The variable Y is gross or net export value of textiles or apparel. The variables PK*, TC*, ED2*, ED3*, LC*, AP*, and FP* are one-year lagged values of PK, TC, ED2, ED3, LC, AP, and FP, respectively.

Model 3 is

$$\triangle Y = b_0 + b_1\triangle PK + b_2\triangle TC + b_3\triangle ED2 + b_4\triangle ED3 + b_5\triangle LC + b_6\triangle AP + b_7\triangle FP + e, \quad (3)$$

where $\triangle Y$ = annual growth rate of gross or net exports of textiles or apparel, calculated as follows.

$Y_b = Y_e\,(1+\triangle Y)^t$, where

Y_b, Y_e = gross or net value of textile or apparel exports at the end of current year b and the end of previous year e, respectively.

The variables $\triangle PK$, $\triangle TC$, $\triangle ED2$, $\triangle ED3$, $\triangle LC$, $\triangle AP$, and $\triangle FP$ represent the annual growth rates of PK, TC, ED2, ED3, LC, AP, and FP, respectively, and were found in a manner similar to $\triangle Y$.

Model 4 is

$$\triangle Y = b_0 + b_1\triangle PK^* + b_2\triangle TC^* + b_3\triangle ED2^* + b_4\triangle ED3^* + b_5\triangle LC^* + b_6\triangle AP^* + b_7\triangle FP^* + e. \quad (4)$$

The variables $\triangle PK^*$, $\triangle TC^*$, $\triangle ED2^*$, $\triangle ED3^*$, $\triangle LC^*$, $\triangle AP^*$, and $\triangle FP^*$ represent the one-year lagged values of $\triangle PK$, $\triangle TC$, $\triangle ED2$, $\triangle ED3$, $\triangle LC$, $\triangle AP$, and $\triangle FP$, respectively.

To account for inflation over 1974-2001, the variables Y, LC, and AP were deflated to base year 1974 using the gross domestic product deflators of India and South Korea.

Operational Definitions and Data Sources of Variables in the Models

- Gross export value: the total value, in U.S. dollars, of the textile or apparel exports of India and of South Korea in each year from 1974 through 2001. Gross export value is a fundamental measure of a country's export performance, which indicates the country's trade position in the world market. Gross export value is often used as a dependent variable in international trade research (Bowden, 1983). The use of gross export value alone to measure the textile and apparel export performance of a country may have limitations because the textile and apparel industries are involved in intra-industry trade, where a country may be both an exporter and an importer of textile and apparel products (Zhang & Dardis, 1991). For this reason, net export value was also used to measure export performance.
- Net export value: the difference between the gross export value and the gross import value, in U.S. dollars, of textiles or apparel for India and for South Korea in each year from 1974 through 2001. Many researchers favor net export value over gross export value because it indicates a country's international competitiveness in a commodity as a whole by taking into account both exports and imports (Bowden, 1983). The data on India's and South Korea's gross export and import values in textiles and apparel came from the *Commodity Trade Database* (COMTRADE) of the United Nations Statistics Division.
- Net value of physical-capital stock (PK): This variable represents a country's production capacity. PK was measured by summing a country's gross capital formation flows over

15 years, with the fifteenth year, t, being a year of interest. Each year over 1974-2001 is a year of interest. Zhang and Dardis (1991) also used a 15-year interval for summing capital-formation flows based on the work of Leamer (1984), who indicated that this interval assumes an average capital-asset life of 15 years. The following two formulas, which are from Leamer, were used to calculate PK.

$$K_{tb} = \sum_{j=0}^{t} (1-d)^{t-j} \; (I_j / P_{jb}) \qquad (5)$$

and

$$PK = (K_{tb}) \; . \; (P_{tb}) \; . \; (e_t), \qquad (6)$$

where

K_{tb} = value of capital stock in the home currency at the end of year t, deflated using 1974 as the base year;

P_{tb}, P_{jb} = implicit gross domestic product deflators with base year b = 1974, in year t and year j, respectively;

I_j = gross capital formation in home-currency units in year j;

d = rate of depreciation equal to 13.3 percent, based on Leamer (1984); and

e_t = exchange rate with the U.S. dollar in year t.

The formulas to calculate net value of physical-capital stock have three elements: the inflation rate, the depreciation rate, and the exchange rate. In Equation 5, gross capital formation in a country in every year j is first deflated by P_{jb} to the base-year value, then depreciated by multiplying by $(1-d)^{t-j}$, and then summed to obtain a base-year value in the home currency. In Equation 6, the base-year value in the home currency is inflated to the end-year value by multiplying by P_{tb} and then converted into U.S. dollars by multiplying by e_t (Zhang & Dardis, 1991). Data on exchange rates, gross capital formation (formerly called gross domestic investment), and gross domestic product deflators were taken from the *International Financial Statistics* of the International Monetary Fund.

- Technological capital: Technological capital was measured by the number of scientists, engineers, and technical personnel engaged in research and development (R&D) in a country in a given year. This measure was used due to data availability and may not truly represent the technological capital in a country (Zhang & Dardis, 1991). Data on the number of scientists, engineers, and technical personnel engaged in R&D were taken from various issues of the *Statistical Yearbook* of the United Nations Educational, Scientific, and Cultural Organization (UNESCO). Data on this variable were missing for India for years 1975, 1977, 1979, 1983, 1987, 1991, 1992, 1995, 1997, and 2001. Interpolation and a first-order regression method were used to estimate the missing data according to procedures suggested by Maddala (1977). Interpolation was used to estimate intermediate missing values in a series, and regression was used to estimate non-intermediate missing values, such as for 2001. The following formulas were used for the interpolation.

$$T_x = X_e - X_b / n$$

and

$$X_i = X_b + iT_x,$$

where

X_i = missing value in year I;

X_b = value available in the year before the year of missing value X_i ;

X_e = data available in the year after the year of missing value X_i;

n = number of years between the years for X_b and X_e; and

T_x = the mean of X_b and X_e.

The estimates of non-intermediate missing values were found with the following regression equation using SPSS.

$$Y_i = b_0 + b_1 X_k,$$

where

Y_i = estimated value;

b_0, b_1 = estimated parameters; and

X_k = known value k = 1, 2,…n.

- Human capital: Human capital was measured in two ways: per-capita enrollment at the secondary-education level (ED2) and per-capita enrollment at the tertiary-education level (ED3), in each case in a given year. These were calculated with formulas based on ones used by Zhang and Dardis (1991), as follow.

$$ED2 = \frac{\text{enrollment at the secondary level}}{\text{population aged 15-19}}$$

and

$$ED3 = \frac{\text{enrollment at the tertiary level}}{\text{population aged 20-24}}.$$

The first of these two formulas differs slightly from the one used by Zhang and Dardis, who adjusted the enrollment at the secondary level to a five-year time period and also incorporated duration of study to account for widely different educational systems across the 27 countries they examined. A five-year adjustment and incorporation of duration were not needed in the present research because the duration of secondary education is the same in India and South Korea.

The data on enrollment at the secondary and tertiary levels of education for 1974-1995 were taken from various issues of the *Statistical Yearbook* of UNESCO, and the data for

1996-2001 were taken from *Enrollment in Secondary Education and in Tertiary Education* in the Education Database of UNESCO (n.d). The data on population aged 15-19 and 20-24 came from the *International Financial Statistics* database of the International Monetary Fund. Some data on enrollments in secondary and tertiary education and on population aged 15-19 and 20-24 were missing for both India and South Korea. For India, the following data were missing: secondary-education enrollment for years 1988, 1989, 1990, 1983, 1991, and 1997; tertiary-education enrollment for 1981, 1982, 1991, 1992, 1997, and 1998; population aged 15-19 for 1982, 1983, 1984, 1992, 1994, 1995, and 1999; and population aged 20-24 for 1982, 1983, 1992, 1994, and 1999. For South Korea, the following data were missing: enrollment in both secondary- and tertiary-education enrollment for 1987 and 1997; and the population aged 15-19 and aged 20-24 for years 1974, 1976, 1979, 1991, 1996, 1998, and 1999. Interpolation or regression was used to estimate these missing data in the same manner as described previously.

- Unit labor cost: This variable differs for textiles and apparel in both India and South Korea. Unit labor cost was specified as in Zhang and Dardis (1991): the ratio, in a given year, of total wages and salaries paid to workers in the textile or apparel sector to the value added in the sector. The data on wages and salaries and on value added came from various issues of the *International Yearbook of Industrial Statistics* of the United Nations Industrial Development Organization (UNIDO). This data source defines wages and salaries slightly differently for India and South Korea. For India, the definition is compensation paid to employees, not including benefits or other payments made in kind, and for South Korea, compensation paid to employees, including payments to home workers.

- Per-capita domestic apparel production: This variable was measured by the ratio of a country's total value of apparel produced in a given year to its population in that year. The data on apparel production came from various issues of the UNIDO *International Yearbook of Industrial Statistics,* and the population data came from the United Nations D*emographic Yearbook System*.
- Domestic cotton-fiber production: This variable was measured by the total metric tons of cotton lint produced from harvested seed cotton in a country in a given year. It would have been preferable to use a variable on total production of all fibers, not just cotton, but data on this for both India and South Korea for the entire period from 1974 through 2001 were not found after an extensive search. The data on cotton production were taken from the *Production, Supply, and Distribution* dataset of the U.S. Department of Agriculture.

Statistical Analysis

The four models were estimated using ordinary least squares (OLS). OLS estimators have the smallest variance of all linear unbiased estimators, and they have expected values that are equal to the true values of the parameters and are therefore the best linear unbiased estimators (Pyndyck & Rubinfeld, 1981).

The *F* statistic was used to test the existence of a linear relationship between the dependent variable and the set of independent variables in each model. The null hypothesis for each *F* test was $b_1 = b_2 = b_3 = \ldots b_k = 0$ where b_k represents the slope coefficient for the relationship between the dependent variable and independent variable k. The formula used to calculate the *F* statistic is as follows.

$$F^* = (SSR/k) / \{SSE/ [n - (k+1)]\},$$

where SSR = regression sum of squares;

SSE = error sum of squares;

n = degrees of freedom; and

k = number of predictors.

If $F^* > F$ [1-ά; k, n-(k + 1)], the null hypothesis of no relationship between the dependent and independent variables was rejected at the significance level of ά = .05.

Preliminary Analysis of Multicollinearity

Multicollinearity was a potential problem in estimating the models. Multicollinearity occurs when two or more independent variables are highly correlated with each other. Zhang (1989) noted, for example, that physical capital and technological capital tend to be highly correlated. The presence of multicollinearity in an equation makes it difficult to isolate the impact of each of the correlated independent variables on the dependent variable because the variance of the OLS estimates of the parameters on the correlated independent variables is enlarged due to the correlation, making it so the effect of these variables cannot be precisely measured (Kennedy, 1985).

Pyndyck and Rubinfeld (1981) indicated that little can be done to resolve multicollinearity problems. Gujarati (1988) and Pyndyck and Rubinfeld (1981) recommended a joint *F* test to test the joint significance of a correlated set of variables, a procedure that was followed in the present study when multicollinearity was detected. Several diagnostics were used to determine the existence and extent of multicollinearity in the independent variables. Multicollinearity was assessed by the variance inflation factors (VIF), condition indices, and the correlation matrix for the independent variables in each model (Gujarati 1988). A correlation matrix on its own is insufficient to detect multicollinearity as it cannot diagnose the collinearity among more than two independent variables; thus, VIF, and condition index values were used to see whether and the extent to which the variance of each independent variable had been inflated by the presence of multicollinearity.

The VIF of a regression coefficient can be written as VIF = $1/1 - R_i^2$ where R_i^2 is the coefficient of multiple determination on the i^{th} independent variable in the regression of that variable on all remaining independent variables. The variance inflation factor, which is always greater than 1, is the number of times the variance of the corresponding parameter estimate is increased due to multicollinearity as compared to when no multicollinearity is present. A VIF value larger than 10 indicates severe multicollinearity (Myers, 1990).

The condition index is defined as the square root of the ratio of the largest eigenvalue (λ_{max}) to the smallest eigenvalue (λ_{min}) of a variable. An eigenvalue is defined as a scalar number (λ) of the square matrix A if it satisfies $Ax = \lambda x$ (for some vector $x \neq 0$). If no collinearity is present, the eigenvalues and condition index will each equal to 1. Eigenvalues close to 0 indicate multicollinearity. As collinearity increases, the condition index of a variable will increase. A condition index of more than 30 indicates severe multicollinearity (Gujarati, 1988).

Test for Heteroscedasticity

Besides assessing collinearity between the independent variables in a preliminary analysis, each model was tested for heteroscedasticity. An important assumption of OLS regression is that the error term has a constant variance. The violation of this assumption is called heteroscedasticity. The presence of heteroscedasticity does not destroy the unbiasedness and consistency properties of the usual OLS estimators, but these estimators are no longer efficient as they have high variance. The Bruesch-Pagan (B-P) (or Cook-Weisberg) test was conducted using STATA software to detect herteroscadasticity.

The formula used to calculate the B-P statistic χ^2 in this test is the following

$$\chi^2 = (SSR^*/2) / (SSE/n)^2,$$

where SSR* = the regression sum of squares of the regression of e_i^2 on a set of independent variables X; and

SSE = the error sum of squares of the regression of a dependent variable Y on X.

The B-P statistic compares the SSR from regressing the square of the error term in a regression, e_i^2,on the set of independent variables X to the SSE from regressing the dependent variable Y on the X, with each SS divided by its degrees of freedom. Large values of χ^2 lead to the conclusion that error term does is not have constant variance as assumed in OLS. Heteroscedasticity was not found in any of the models in this study.

CHAPTER 5

RESULTS AND DISCUSSION

This chapter has four sections. The first presents the results of the preliminary analysis, the second and third present the results of the estimations for the gross and net exports of textiles and apparel, and the last section is a discussion of results.

Preliminary Analysis – Collinearity Diagnostics

As described in the Procedure chapter, the collinearity between the independent variables in each regression model was assessed by examining the correlation matrix, VIF values, and condition indices for the variables. The results are reported below. Although the collinearity-diagnostics tables in this section (e.g., Table 5) report tolerance values and eigenvalues along with VIF values and condition indices, the results presented in the text in relation to those tables focus only on the VIF values and condition indices because the tolerance values and eigenvalues were used to calculate those.

Gross and Net Textile Exports

Model 1

India

Table 5 shows the VIF values, tolerance values, eigenvalues, and condition indices for the independent variables in Model 1 for India's gross and net textile exports. The VIF values for all the independent variables except tertiary education and unit labor cost exceed 10, which is the standard of comparison, and therefore indicate multicollinearity of all but two variables with some other independent variables in the model. The condition indices for unit labor cost, per-capita domestic apparel production, and domestic cotton production are all greater than 30, indicating collinearity of each of these variables with some other independent variable or variables (see Table 5). Further, the correlation matrix in Table 6 shows the variables that are highly correlated, that is, those with correlation coefficients (r) greater than or equal to .50. The highly correlated sets of variables are domestic cotton production and technological capital; tertiary-education enrollment and net value of physical-capital stock; per-capita domestic apparel production and domestic cotton production; and secondary-education enrollment and unit labor cost. In the regression analysis, a joint *F* test on each of these sets of variables was conducted to test its joint significance in explaining the gross or net textile exports of India.

Table 5. **Collinearity Diagnostics, Model 1 for India's Gross and Net Textile Exports**

Independent variables	Tolerance	VIF	Eigenvalue	Condition Index
PK	0.05	20.61	1.15	2.39
TC	0.06	16.63	0.21	5.61
ED2	0.04	23.15	0.02	17.74
ED3	0.12	8.49	0.02	18.83
LC	0.11	9.30	0.01	30.53
AP	0.09	11.44	0.00	45.57
FP	0.06	16.56	0.00	86.00

Note. PK = net value of physical-capital stock of India; TC = technological capital; ED2 = secondary-education enrollment; ED3 = tertiary-education enrollment; LC = unit labor cost; AP = per-capita domestic apparel production; and FP = domestic cotton production.

Table 6. **Correlation Matrix, Model 1 for India's Gross and Net Textile Exports**

Independent variables	FP	ED3	LC	AP	TC	PK	ED2
FP	1	0.21	-0.06	-0.32	-0.50	0.06	-0.32
ED3	0.21	1.00	-0.25	0.08	-0.29	-0.71	0.35
LC	-0.06	-0.25	1.00	-0.03	0.05	0.13	0.53
AP	-0.32	0.08	-0.03	1.00	0.03	-0.25	-0.25
TC	-0.50	-0.29	0.05	0.03	1.00	-0.35	-0.03
PK	0.06	-0.71	0.13	-0.25	-0.35	1.00	-0.27
ED2	-0.32	0.35	0.53	-0.25	-0.03	-0.27	1.00

Note. PK = net value of physical-capital stock of India; TC = technological capital; ED2 = secondary-education enrollment; ED3 = tertiary-education enrollment; LC = unit labor cost; AP = per-capita domestic apparel production; and FP = domestic cotton production.

South Korea

Similar to Table 5 for India, Table 7 shows the collinearity diagnostics for the independent variables in Model 1 for South Korea's gross and net textile exports. The VIF values for all the independent variables except secondary-education enrollment and domestic cotton production exceed 10, indicating collinearity of all but those two variables with some other independent variables in the model. The condition indices for unit labor cost, per-capita domestic apparel production, and domestic cotton production are all greater than 30, indicating collinearity of each of those variables with some other independent variable or variables. Further, the correlation matrix in Table 8 shows that some variables are highly correlated (i.e., with correlation coefficients greater than or equal to .50). The sets of highly correlated variables include domestic cotton production and unit labor cost; per-capita domestic apparel production and net value of physical-capital stock; unit labor cost and net value of physical-capital stock; unit labor cost and tertiary-education enrollment; net value of physical-capital stock and technological capital; net value of physical-capital stock and tertiary-education enrollment; and technological capital and tertiary-education enrollment. In the regression analysis, joint *F* tests were conducted to test the joint significance of each of those pairs of variables in explaining South Korea's gross or net textile exports. In addition, a joint *F* test was conducted on unit labor cost, tertiary-education enrollment, net value of physical-capital stock, and technological capital because this group of variables is highly inter-correlated.

Model 2

India

Table 9 shows the collinearity diagnostics for the one-year lagged independent variables in Model 2 for India's current-year gross and net textile exports. The VIF values for all the independent variables except tertiary education and unit labor cost

Table 7. **Collinearity Diagnostics, Model 1 for South Korea's Gross and Net Textile Exports**

Independent variables	Tolerance	VIF	Eigenvalue	Condition Index
PK	0.05	20.61	1.63	1.94
TC	0.01	69.61	0.21	5.42
ED2	0.44	2.27	0.06	10.49
ED3	0.01	80.60	0.01	27.35
LC	0.08	12.95	0.00	38.57
AP	0.06	17.41	0.00	51.44
FP	0.12	8.23	0.00	170.13

Note. PK = net value of physical-capital stock; TC = technological capital; ED2 = secondary-education enrollment; ED3 = tertiary-education enrollment; LC = unit labor cost; AP = per-capita domestic apparel production; and FP = domestic cotton production

Table 8. **Correlation Matrix, Model 1 for South Korea's Gross and Net Textile Exports**

Independent variables	FP	ED2	AP	LC	PK	TC	ED3
FP	1	0.42	0.02	-0.55	-0.12	0.09	0.11
ED2	0.42	1.00	-0.27	-0.30	-0.38	0.28	-0.11
AP	0.02	-0.27	1.00	0.45	0.63	-0.33	0.58
LC	-0.55	-0.30	0.45	1.00	0.76	-0.60	0.54
PK	-0.12	-0.38	0.63	0.76	1.00	-0.66	0.60
TC	0.09	0.28	-0.33	-0.60	-0.66	1.00	-0.90
ED3	0.11	-0.11	0.58	0.54	0.60	-0.90	1.00

Note. PK = net value of physical-capital stock; TC = technological capital; ED2 = secondary-education enrollment; ED3 = tertiary-education enrollment; LC = unit labor cost; AP = per-capita domestic apparel production; and FP = domestic cotton production

exceed 10, the standard of comparison, and therefore indicate collinearity of all but two variables with some other independent variables in the model. The condition indices for unit labor cost, per-capita domestic apparel production, and domestic cotton production are all greater than 30, indicating collinearity of each of these variables with some other independent variable or variables (see Table 9). Further, the correlation matrix (see Table 10) indicates that some variables are highly correlated, according to the same measure of high correlation as used for the Model 1 variables. The highly correlated sets of variables are unit labor cost and secondary-education enrollment; tertiary-education enrollment and net value of physical-capital stock; net value of physical-capital stock and technological capital; and domestic cotton production and per-capita domestic apparel production. In the regression analysis, a joint *F* test on each of these pairs of variables was conducted to test its joint significance in explaining India's gross or net textile exports.

Table 9. **Collinearity Diagnostics, Model 2 for India's Gross and Net Textile Exports**

Independent variables	Tolerance	VIF	Eigenvalue	Condition Index
PK	0.06	17.67	1.16	2.38
TC	0.07	14.37	0.21	5.66
ED2	0.04	24.08	0.02	16.40
ED3	0.22	4.53	0.02	18.45
LC	0.11	9.02	0.01	29.51
AP	0.07	13.40	0.00	41.46
FP	0.06	16.35	0.00	81.93

Note. PK = net value of physical-capital stock; TC = technological capital; ED2 = secondary-education enrollment; ED3 = tertiary-education enrollment; LC = unit labor cost; AP = per-capita domestic apparel production; and FP = domestic cotton production

Table 10. **Correlation Matrix, Model 2 for India's Gross and Net Textile Exports**

Independent variables	FP	ED3	LC	PK	AP	TC	ED2
FP	1	0.13	0.01	0.17	-0.37	-0.49	-0.32
ED3	0.13	1.00	-0.04	-0.59	0.01	-0.12	0.37
LC	0.01	-0.04	1.00	0.02	0.00	-0.09	0.61
PK	0.17	-0.59	0.02	1.00	-0.36	-0.59	-0.17
AP	-0.37	0.01	0.00	-0.36	1.00	0.18	-0.29
TC	-0.49	-0.12	-0.09	-0.59	0.18	1.00	-0.04
ED2	-0.32	0.37	0.61	-0.17	-0.29	-0.04	1.00

Note. PK = net value of physical-capital stock; TC = technological capital; ED2 = secondary-education enrollment; ED3 = tertiary-education enrollment; LC = unit labor cost; AP = per-capita domestic apparel production; and FP = domestic cotton production

South Korea

Table 11 shows the collinearity diagnostics for the one-year lagged variables in Model 2 for South Korea's current-year gross and net textile exports. The VIF values for all the independent variables except secondary-education enrollment exceed 10, indicating collinearity of all but this variable with some other independent variable or variables in the model. The condition indices in the same table for unit labor cost, per-capita domestic apparel production, and domestic cotton production are all greater than 30, indicating collinearity of these variables with some other independent variable or variables. Further, the correlation matrix (see Table 12) shows some highly correlated sets of variables, including unit labor cost and domestic cotton production; per-capita domestic apparel production and tertiary-education enrollment; unit labor cost and net value of physical-capital stock; technological capital and unit labor cost; technological capital and net value of physical-capital stock; and technological capital and tertiary-level education. In the regression analysis, a joint *F* test on each of these pairs of variables was conducted to test its joint significance in explaining South Korea's gross or net textile exports. In addition, a joint *F* test was conducted on unit labor cost, tertiary-education enrollment, and net value of physical-capital stock because these three variables are highly inter-correlated.

Table 11. **Collinearity Diagnostics, Model 2 for South Korea's Gross and Net Textile Exports**

Independent variables	Tolerance	VIF	Eigenvalue	Condition Index
PK	0.04	28.54	1.64	1.93
TC	0.02	65.32	0.23	5.16
ED2	0.54	1.86	0.04	11.95
ED3	0.01	71.52	0.01	26.77
LC	0.05	21.54	0.00	38.60
AP	0.08	11.95	0.00	52.04
FP	0.09	10.98	0.00	171.32

Note. PK = net value of physical-capital stock; TC = technological capital; ED2 = secondary-education enrollment; ED3 = tertiary-education enrollment; LC = unit labor cost; AP = per-capita domestic apparel production; and FP = domestic cotton production

Table 12. **Correlation Matrix, Model 2 for South Korea's Gross and Net Textile Exports**

Independent variables	FP	ED2	AP	LC	TC	PK	ED3
FP	1	0.42	0.02	-0.58	0.14	-0.23	0.12
ED2	0.42	1.00	-0.21	-0.29	0.27	-0.30	-0.09
AP	0.02	-0.21	1.00	0.49	-0.33	0.48	0.60
LC	-0.58	-0.29	0.49	1.00	-0.62	0.83	0.49
TC	0.14	0.27	-0.33	-0.62	1.00	-0.68	-0.86
PK	-0.23	-0.30	0.48	0.83	-0.68	1.00	0.49
ED3	0.12	-0.09	0.60	0.49	-0.86	0.49	1.00

Note. PK = net value of physical-capital stock; TC = technological capital; ED2 = secondary-education enrollment; ED3 = tertiary-education enrollment; LC = unit labor cost; AP = per-capita domestic apparel production; and FP = domestic cotton production

Models 3 and 4

Tables 13-20 show the collinearity diagnostics and correlation martrices for the current-year and previous-year changes in the independent variables in Models 3 and 4 for India's and South Korea's current-year changes in gross and net textile exports. No collinearity was detected in any of these models.

Table 13. **Collinearity Diagnostics, Model 3 for India's Gross and Net Textile Exports**

Independent variables	Tolerance	VIF	Eigenvalue	Condition Index
PK	0.82	1.21	1.16	1.69
TC	0.89	1.13	1.05	1.78
ED2	0.93	1.08	0.79	2.06
ED3	0.91	1.10	0.72	2.15
LC	0.86	1.17	0.59	2.37
AP	0.81	1.23	0.26	3.56
FP	0.94	1.07	0.09	5.99

Note. PK = net value of physical-capital stock of India; TC = technological capital; ED2 = secondary-education enrollment; ED3 = tertiary-education enrollment; LC = unit labor cost; AP = per-capita domestic apparel production; and FP = domestic cotton production.

Table 14. **Correlation Matrix, Model 3 for India's Gross and Net Textile Exports**

Independent variables	FP	AP	ED2	TC	ED3	LC	PK
FP	1.00	-0.03	-0.07	-0.16	0.11	0.02	-0.11
AP	-0.03	1.00	-0.01	-0.11	0.04	0.29	0.37
ED2	-0.07	-0.01	1.00	0.03	0.25	-0.08	0.01
TC	-0.16	-0.11	0.03	1.00	-0.08	-0.23	-0.19
ED3	0.11	0.04	0.25	-0.08	1.00	-0.08	0.00
LC	0.02	0.29	-0.08	-0.23	-0.08	1.00	0.20
PK	-0.11	0.37	0.01	-0.19	0.00	0.20	1.00

Note. PK = net value of physical-capital stock of India; TC = technological capital; ED2 = secondary-education enrollment; ED3 = tertiary-education enrollment; LC = unit labor cost; AP = per-capita domestic apparel production; and FP = domestic cotton production.

Table 15. **Collinearity Diagnostics, Model 4 for India's Gross and Net Textile Exports**

Independent variables	Tolerance	VIF	Eigenvalue	Condition Index
PK	0.80	1.25	1.19	1.65
TC	0.88	1.14	1.06	1.75
ED2	0.91	1.10	0.80	2.02
ED3	0.90	1.11	0.75	2.08
LC	0.88	1.13	0.60	2.33
AP	0.80	1.25	0.26	3.57
FP	0.92	1.09	0.09	6.19

Note. PK = net value of physical-capital stock of India; TC = technological capital; ED2 = secondary-education enrollment; ED3 = tertiary-education enrollment; LC = unit labor cost; AP = per-capita domestic apparel production; and FP = domestic cotton production.

Table 16. **Correlation Matrix, Model 4 for India's Gross and Net Textile Exports**

Independent variables	FP	LC	ED2	PK	ED3	TC	AP
FP	1.00	0.02	-0.05	-0.15	0.12	-0.17	-0.09
LC	0.02	1.00	-0.10	0.16	-0.08	-0.25	0.23
ED2	-0.05	-0.10	1.00	-0.03	0.26	0.01	-0.09
PK	-0.15	0.16	-0.03	1.00	-0.01	-0.17	0.40
ED3	0.12	-0.08	0.26	-0.01	1.00	-0.08	0.04
TC	-0.17	-0.25	0.01	-0.17	-0.08	1.00	-0.12
AP	-0.09	0.23	-0.09	0.40	0.04	-0.12	1.00

Note. PK = net value of physical-capital stock of India; TC = technological capital; ED2 = secondary-education enrollment; ED3 = tertiary-education enrollment; LC = unit labor cost; AP = per-capita domestic apparel production; and FP = domestic cotton production.

Table 17. **Collinearity Diagnostics, Model 3 for South Korea's Gross and Net Textile Exports**

Independent variables	Tolerance	VIF	Eigenvalue	Condition Index
PK	0.70	1.43	1.36	1.62
TC	0.85	1.17	1.12	1.78
ED2	0.85	1.17	0.76	2.17
ED3	0.98	1.02	0.45	2.82
LC	0.83	1.21	0.39	3.03
AP	0.70	1.42	0.21	4.16
FP	0.62	1.61	0.14	5.08

Note. PK = net value of physical-capital stock of India; TC = technological capital; ED2 = secondary-education enrollment; ED3 = tertiary-education enrollment; LC = unit labor cost; AP = per-capita domestic apparel production; and FP = domestic cotton production.

Table 18. **Correlation Matrix, Model 3 for South Korea's Gross and Net Textile Exports**

Independent variables	FP	ED3	ED2	LC	TC	AP	PK
FP	1.00	0.09	-0.12	0.32	-0.02	-0.50	0.46
ED3	0.09	1.00	-0.05	0.11	0.03	-0.04	0.04
ED2	-0.12	-0.05	1.00	-0.05	-0.23	0.02	-0.25
LC	0.32	0.11	-0.05	1.00	0.19	-0.18	0.25
TC	-0.02	0.03	-0.23	0.19	1.00	-0.11	-0.05
AP	-0.50	-0.04	0.02	-0.18	-0.11	1.00	-0.35
PK	0.46	0.04	-0.25	0.25	-0.05	-0.35	1.00

Note. PK = net value of physical-capital stock of India; TC = technological capital; ED2 = secondary-education enrollment; ED3 = tertiary-education enrollment; LC = unit labor cost; AP = per-capita domestic apparel production; and FP = domestic cotton production.

Table 19. **Collinearity Diagnostics, Model 4 for South Korea's Gross and Net Textile Exports**

Independent variables	Tolerance	VIF	Eigenvalue	Condition Index
PK	0.66	1.51	1.36	1.63
TC	0.88	1.14	1.13	1.79
ED2	0.86	1.16	0.73	2.23
ED3	1.00	1.00	0.45	2.85
LC	0.90	1.11	0.35	3.22
AP	0.67	1.50	0.25	3.83
FP	0.64	1.56	0.12	5.49

Note. PK = net value of physical-capital stock of India; TC = technological capital; ED2 = secondary-education enrollment; ED3 = tertiary-education enrollment; LC = unit labor cost; AP = per-capita domestic apparel production; and FP = domestic cotton production.

Table 20. **Correlation Matrix, Model 4 for South Korea's Gross and Net Textile Exports**

Independent variables	FP	ED2	ED3	LC	TC	AP	PK
FP	1.00	0.00	0.02	0.15	-0.09	-0.49	0.48
ED2	0.00	1.00	0.02	0.08	-0.20	-0.08	-0.18
ED3	0.02	0.02	1.00	0.03	-0.01	0.02	0.00
LC	0.15	0.08	0.03	1.00	0.14	0.01	0.13
TC	-0.09	-0.20	-0.01	0.14	1.00	-0.05	-0.09
AP	-0.49	-0.08	0.02	0.01	-0.05	1.00	-0.41
PK	0.48	-0.18	0.00	0.13	-0.09	-0.41	1.00

Note. PK = net value of physical-capital stock of India; TC = technological capital; ED2 = secondary-education enrollment; ED3 = tertiary-education enrollment; LC = unit labor cost; AP = per-capita domestic apparel production; and FP = domestic cotton production.

Gross and Net Apparel Exports

Model 1

India

Table 21 shows the collinearity diagnostics for the independent variables in Model 1 for India's gross and net apparel exports. The VIF values for all the variables except tertiary-education enrollment and unit labor cost exceed 10, indicating collinearity of all but those two variables with some other independent variables in the model. The condition indices in the same table for unit labor cost, per-capita domestic apparel production, and domestic cotton production are all greater than 30, indicating collinearity of each of these variables with some other independent variable or variables. Further, the correlation matrix in Table 22 shows that the following pairs of variables are highly correlated: tertiary-education enrollment and net value of physical-capital stock; domestic cotton production and technological capital; per-capita domestic apparel production and domestic cotton production; and unit labor cost and tertiary-education enrollment. In the regression analysis, a joint *F* test on each of these pairs of variables was conducted to test its joint significance in explaining India's gross or net apparel exports.

Table 21. **Collinearity Diagnostics, Model 1 for India's Gross and Net Apparel Exports**

Independent variables	Tolerance	VIF	Eigenvalue	Condition Index
PK	0.05	21.43	1.16	2.37
TC	0.06	16.67	0.25	5.16
ED2	0.05	19.15	0.03	16.17
ED3	0.11	9.41	0.02	17.88
LC	0.16	6.28	0.01	31.24
AP	0.09	11.61	0.00	45.04
FP	0.06	16.50	0.00	79.23

Note. PK = net value of physical-capital stock; TC = technological capital; ED2 = secondary-education enrollment; ED3 = tertiary-education enrollment; LC = unit labor cost; AP = per-capita domestic apparel production; and FP = domestic cotton production

Table 22. **Correlation Matrix, Model 1 for India's Gross and Net Apparel Exports**

Independent variables	FP	ED3	LC	AP	TC	ED2	PK
FP	1.00	0.19	-0.01	-0.32	-0.50	-0.32	0.07
ED3	0.19	1.00	-0.39	0.11	-0.29	0.35	-0.72
LC	-0.01	-0.39	1.00	-0.12	0.07	0.37	0.23
AP	-0.32	0.11	-0.12	1.00	0.02	-0.31	-0.27
TC	-0.50	-0.29	0.07	0.02	1.00	-0.04	-0.33
ED2	-0.32	0.35	0.37	-0.31	-0.04	1.00	-0.28
PK	0.07	-0.72	0.23	-0.27	-0.33	-0.28	1.00

Note. PK = net value of physical-capital stock; TC = technological capital; ED2 = secondary-education enrollment; ED3 = tertiary-education enrollment; LC = unit labor cost; AP = per-capita domestic apparel production; and FP = domestic cotton production

South Korea

Table 23 shows the collinearity diagnostics for the one-year lagged independent variables in Model 1 for South Korea's current-year gross and net apparel exports. The VIF value of more than 10 for each independent variable except secondary-education enrollment and domestic cotton production indicates collinearity of all but those two variables with some other independent variables in the model. The condition indices in Table 23 for unit labor cost, per-capita domestic apparel production, and domestic cotton production are all greater than 30, indicating collinearity of each of these variables with some other independent variable or variables. Further, the correlation matrix (see Table 24) shows high correlation between the variables in each of the following pairs: domestic cotton production and unit labor cost; per-capita domestic apparel production and net value of physical-capital stock; per-capita domestic apparel production and tertiary-education enrollment; unit labor cost and technological capital; unit labor cost and tertiary-education enrollment; unit labor cost and net value of physical-capital stock; technological capital and net value of physical-capital stock; tertiary-education enrollment and gross and net value of physical capital stock; and technological capital and tertiary-education enrollment. In the regression analysis, a joint *F* test on each of these pairs of variables was conducted to test its joint significance in explaining South Korea's gross or net apparel exports. In addition, a joint *F* test was conducted on per-capita domestic apparel production, net value of physical capital, and tertiary-education enrollment and on unit labor cost, technological capital, tertiary-education enrollment, and net value of physical-capital stock because the variables in each of these two groups are highly inter-correlated.

Table 23. **Collinearity Diagnostics, Model 1 for South Korea's Gross and Net Apparel Exports**

Independent variables	Tolerance	VIF	Eigenvalue	Condition Index
PK	0.04	22.77	1.63	1.93
TC	0.01	77.01	0.20	5.49
ED2	0.43	2.31	0.06	10.09
ED3	0.01	82.22	0.01	28.01
LC	0.07	14.14	0.00	38.61
AP	0.06	15.99	0.00	52.39
FP	0.12	8.10	0.00	174.56

Note. PK = net value of physical-capital stock; TC = technological capital; ED2 = secondary-education enrollment; ED3 = tertiary-education enrollment; LC = unit labor cost; AP = per-capita domestic apparel production; and FP = domestic cotton production

Table 24. **Correlation Matrix, Model 1 for South Korea's Gross and Net Apparel Exports**

Independent variables	FP	ED2	AP	LC	PK	TC	ED3
FP	1	0.43	0.09	-0.54	-0.14	0.12	0.10
ED2	0.43	1.00	-0.26	-0.32	-0.39	0.30	-0.13
AP	0.09	-0.26	1.00	0.36	0.57	-0.29	0.55
LC	-0.54	-0.32	0.36	1.00	0.79	-0.65	0.55
PK	-0.14	-0.39	0.57	0.79	1.00	-0.69	0.61
TC	0.12	0.30	-0.29	-0.65	-0.69	1.00	-0.90
ED3	0.10	-0.13	0.55	0.55	0.61	-0.90	1.00

Note. PK = net value of physical-capital stock; TC = technological capital; ED2 = secondary-education enrollment; ED3 = tertiary-education enrollment; LC = unit labor cost; AP = per-capita domestic apparel production; and FP = domestic cotton production

Model 2

India

Table 25 shows the collinearity diagnostics for the one-year lagged independent variables in Model 2 for India's current-year gross and net apparel exports. The VIF value of more than 10 for each independent variable except tertiary education and unit labor cost indicates collinearity of all but those two variables with some other independent variables in the model. The condition indices in the same table for per-capita domestic apparel production and domestic cotton production are both greater than 30, indicating collinearity of each of these variables with some other independent variable or variables. Further, the correlation matrix (see Table 26) shows high correlation between the variables in each of the following pairs: tertiary-education enrollment and net value of physical-capital stock; net value of physical-capital stock and technological capital; unit labor cost and domestic cotton production; and net value of physical-capital stock and per-capita domestic apparel production. In the regression analysis, a joint *F* test on each of these pairs of variables was conducted to test its joint significance in explaining India's gross or net apparel exports. A joint *F* test was also conducted on tertiary-education enrollment, net value of physical-capital stock, and technological capital because this group of variables is highly inter-correlated.

Table 25. **Collinearity Diagnostics, Model 2 for India's Gross and Net Apparel Exports**

Independent variables	Tolerance	VIF	Eigenvalue	Condition Index
PK	0.06	17.67	1.18	2.35
TC	0.07	14.64	0.25	5.13
ED2	0.05	20.07	0.03	14.90
ED3	0.22	4.52	0.02	16.79
LC	0.19	5.17	0.01	29.34
AP	0.07	13.43	0.00	41.13
FP	0.06	16.49	0.00	74.40

Note. PK = net value of physical-capital stock; TC = technological capital; ED2 = secondary-education enrollment; ED3 = tertiary-education enrollment; LC = unit labor cost; AP = per-capita domestic apparel production; and FP = domestic cotton production

Table 26. **Correlation Matrix, Model 2 for India's Gross and Net Apparel Exports**

Independent variables	FP	ED3	LC	PK	AP	TC	ED2
FP	1	0.13	0.09	0.17	-0.37	-0.49	-0.31
ED3	0.13	1.00	-0.02	-0.59	0.01	-0.12	0.42
LC	0.09	-0.02	1.00	0.02	-0.05	-0.16	0.50
PK	0.17	-0.59	0.02	1.00	-0.36	-0.59	-0.19
AP	-0.37	0.01	-0.05	-0.36	1.00	0.19	-0.34
TC	-0.49	-0.12	-0.16	-0.59	0.19	1.00	-0.07
ED2	-0.31	0.42	0.50	-0.19	-0.34	-0.07	1.00

Note. PK = net value of physical-capital stock; TC = technological capital; ED2 = secondary-education enrollment; ED3 = tertiary-education enrollment; LC = unit labor cost; AP = per-capita domestic apparel production; and FP = domestic cotton production

South Korea

Table 27 shows the collinearity diagnostics for the one-year lagged independent variables in Model 2 for South Korea's current-year gross and net apparel exports. The VIF value of more than 10 for each independent variable except secondary-education enrollment and per-capita domestic apparel production indicates collinearity of all but those two variables with some other independent variables in the model. The condition indices in the same table for unit labor cost, per-capita domestic apparel production, and domestic cotton production are all greater than 30, indicating collinearity of each of these variables with some other independent variable or variables. Further, the correlation matrix (see Table 28) shows high correlation between the variables in each of several pairs as follow: domestic cotton production and unit labor costs; unit labor cost and net value of physical-capital stock; unit labor cost and technological capital; net value of physical-capital stock and technological capital; and technological capital and tertiary-education enrollment. In the regression analysis, a joint *F* test on each of these pairs of variables was conducted to test its joint significance in explaining South Korea's gross or net apparel exports. A joint *F* test was also conducted on unit labor cost, net value of physical-capital stock, and technological capital because these three variables are highly inter-correlated.

Table 27. **Collinearity Diagnostics, Model 2 for South Korea's Gross and Net Apparel Exports**

Independent variables	Tolerance	VIF	Eigenvalue	Condition Index
PK	0.04	22.98	1.63	1.93
TC	0.02	65.77	0.20	5.48
ED2	0.57	1.76	0.05	11.14
ED3	0.02	63.91	0.01	27.76
LC	0.06	16.68	0.00	38.60
AP	0.11	9.05	0.00	53.35
FP	0.09	10.59	0.00	147.68

Note. PK = net value of physical-capital stock; TC = technological capital; ED2 = secondary-education enrollment; ED3 = tertiary-education enrollment; LC = unit labor cost; AP = per-capita domestic apparel production; and FP = domestic cotton production

Table 28. **Correlation Matrix, Model 2 for South Korea's Gross and Net Apparel Exports**

Independent variables	FP	ED2	AP	LC	PK	ED3	TC
FP	1	0.37	0.35	-0.56	-0.15	0.22	0.12
ED2	0.37	1.00	-0.08	-0.19	-0.22	-0.02	0.21
AP	0.35	-0.08	1.00	0.00	0.09	0.44	-0.03
LC	-0.56	-0.19	0.00	1.00	0.78	0.39	-0.62
PK	-0.15	-0.22	0.09	0.78	1.00	0.40	-0.67
ED3	0.22	-0.02	0.44	0.39	0.40	1.00	-0.83
TC	0.12	0.21	-0.03	-0.62	-0.67	-0.83	1.00

Note. PK = net value of physical-capital stock; TC = technological capital; ED2 = secondary-education enrollment; ED3 = tertiary-education enrollment; LC = unit labor cost; AP = per-capita domestic apparel production; and FP = domestic cotton production

Models 3 and 4

Tables 29-36 show the collinearity diagnostics and correlation matrices for the current-year and previous-year changes in the independent variables in Models 3 and 4, for India's and South Korea's current-year changes in gross and net apparel exports. No collinearity was detected in these models.

Table 29. **Collinearity Diagnostics, Model 3 for India's Gross and Net Apparel Exports**

Independent variables	Tolerance	VIF	Eigenvalue	Condition Index
PK	0.77	1.31	1.35	1.47
TC	0.88	1.13	1.08	1.64
ED2	0.62	1.61	0.93	1.77
ED3	0.64	1.57	0.78	1.93
LC	0.48	2.08	0.68	2.08
AP	0.88	1.13	0.18	4.06
FP	0.86	1.16	0.09	5.59

Note. PK = net value of physical-capital stock of India; TC = technological capital; ED2 = secondary-education enrollment; ED3 = tertiary-education enrollment; LC = unit labor cost; AP = per-capita domestic apparel production; and FP = domestic cotton production.

Table 30. **Correlation Matrix, Model 3 for India's Gross and Net Apparel Exports**

Independent variables	FP	AP	ED2	TC	ED3	PK	LC
FP	1.00	-0.05	-0.22	-0.22	-0.07	-0.01	0.29
AP	-0.05	1.00	0.05	-0.03	0.09	0.29	-0.06
ED2	-0.22	0.05	1.00	0.14	0.48	-0.17	-0.58
TC	-0.22	-0.03	0.14	1.00	0.05	-0.21	-0.24
ED3	-0.07	0.09	0.48	0.05	1.00	-0.17	-0.55
PK	-0.01	0.29	-0.17	-0.21	-0.17	1.00	0.33
LC	0.29	-0.06	-0.58	-0.24	-0.55	0.33	1.00

Note. PK = net value of physical-capital stock of India; TC = technological capital; ED2 = secondary-education enrollment; ED3 = tertiary-education enrollment; LC = unit labor cost; AP = per-capita domestic apparel production; and FP = domestic cotton production.

Table 31. **Collinearity Diagnostics, Model 4 for India's Gross and Net Apparel Exports**

Independent variables	Tolerance	VIF	Eigenvalue	Condition Index
PK	0.74	1.35	1.34	1.46
TC	0.89	1.13	1.14	1.59
ED2	0.63	1.60	0.94	1.74
ED3	0.63	1.58	0.79	1.90
LC	0.49	2.04	0.66	2.07
AP	0.84	1.19	0.18	3.93
FP	0.84	1.19	0.09	5.76

Note. PK = net value of physical-capital stock of India; TC = technological capital; ED2 = secondary-education enrollment; ED3 = tertiary-education enrollment; LC = unit labor cost; AP = per-capita domestic apparel production; and FP = domestic cotton production.

Table 32. **Correlation Matrix, Model 4 for India's Gross and Net Apparel Exports**

Independent variables	FP	AP	ED2	TC	ED3	PK	LC
FP	1.00	-0.10	-0.21	-0.23	-0.07	-0.05	0.29
AP	-0.10	1.00	-0.03	-0.05	0.07	0.35	-0.04
ED2	-0.21	-0.03	1.00	0.12	0.49	-0.18	-0.56
TC	-0.23	-0.05	0.12	1.00	0.04	-0.20	-0.23
ED3	-0.07	0.07	0.49	0.04	1.00	-0.17	-0.55
PK	-0.05	0.35	-0.18	-0.20	-0.17	1.00	0.31
LC	0.29	-0.04	-0.56	-0.23	-0.55	0.31	1.00

Note. PK = net value of physical-capital stock of India; TC = technological capital; ED2 = secondary-education enrollment; ED3 = tertiary-education enrollment; LC = unit labor cost; AP = per-capita domestic apparel production; and FP = domestic cotton production.

Table 33. **Collinearity Diagnostics, Model 3 for South Korea's Gross and Net Apparel Exports**

Independent variables	Tolerance	VIF	Eigenvalue	Condition Index
PK	0.73	1.36	1.38	1.59
TC	0.88	1.14	1.13	1.76
ED2	0.84	1.18	0.76	2.14
ED3	0.93	1.08	0.46	2.76
LC	0.89	1.12	0.36	3.10
AP	0.72	1.38	0.29	3.44
FP	0.68	1.47	0.14	4.91

Note. PK = net value of physical-capital stock of India; TC = technological capital; ED2 = secondary-education enrollment; ED3 = tertiary-education enrollment; LC = unit labor cost; AP = per-capita domestic apparel production; and FP = domestic cotton production.

Table 34. **Correlation Matrix, Model 3 for South Korea's Gross and Net Apparel Exports**

Independent variables	FP	ED3	ED2	LC	TC	PK	AP
FP	1.00	0.09	-0.13	0.12	-0.07	0.42	-0.47
ED3	0.09	1.00	-0.07	0.26	0.04	0.05	-0.03
ED2	-0.13	-0.07	1.00	-0.12	-0.24	-0.26	0.02
LC	0.12	0.26	-0.12	1.00	0.12	0.14	-0.06
TC	-0.07	0.04	-0.24	0.12	1.00	-0.08	-0.09
PK	0.42	0.05	-0.26	0.14	-0.08	1.00	-0.33
AP	-0.47	-0.03	0.02	-0.06	-0.09	-0.33	1.00

Note. PK = net value of physical-capital stock of India; TC = technological capital; ED2 = secondary-education enrollment; ED3 = tertiary-education enrollment; LC = unit labor cost; AP = per-capita domestic apparel production; and FP = domestic cotton production.

Table 35. **Collinearity Diagnostics, Model 4 South Korea's Gross and Net Apparel Exports**

Inpendent variables	Tolerance	VIF	Eigenvalue	Condition Index
PK	0.67	1.49	1.36	1.60
TC	0.89	1.12	1.13	1.76
ED2	0.86	1.16	0.73	2.19
ED3	0.98	1.02	0.46	2.75
LC	0.93	1.07	0.36	3.13
AP	0.66	1.51	0.32	3.29
FP	0.66	1.52	0.13	5.12

Note. PK = net value of physical-capital stock of India; TC = technological capital; ED2 = secondary-education enrollment; ED3 = tertiary-education enrollment; LC = unit labor cost; AP = per-capita domestic apparel production; and FP = domestic cotton production.

Table 36. **Correlation Matrix, Model 4 for India's Gross and Net Apparel Exports**

Inpendent variables	FP	LC	ED2	ED3	TC	PK	AP
FP	1.00	-0.02	-0.02	0.01	-0.11	0.47	-0.50
LC	-0.02	1.00	0.07	0.14	0.05	0.08	0.10
ED2	-0.02	0.07	1.00	0.03	-0.21	-0.18	-0.07
ED3	0.01	0.14	0.03	1.00	-0.01	0.01	0.04
TC	-0.11	0.05	-0.21	-0.01	1.00	-0.10	-0.05
PK	0.47	0.08	-0.18	0.01	-0.10	1.00	-0.41
AP	-0.50	0.10	-0.07	0.04	-0.05	-0.41	1.00

Note. PK = net value of physical-capital stock of India; TC = technological capital; ED2 = secondary-education enrollment; ED3 = tertiary-education enrollment; LC = unit labor cost; AP = per-capita domestic apparel production; and FP = domestic cotton production.

Regression Results

This section presents the results of the regression analysis under the four models described in the Procedure chapter of the determinants of the gross and net exports of textiles and apparel for India and South Korea. As seen in the tables in this section, p values less than .05 were taken to indicate statistical significance. In the following description of the results, all the monetary values are in terms of U.S. dollars.

Results for Gross Textile Exports

Tables 37-38 show the regression results for gross exports of textiles and apparel for India and South Korea.

Table 37. **Regression Results for Gross Textile Exports of India, 1974-2001**

Independent variables	Model 1 Gross exports Y	Model 2 Gross exports Y (previous-year independent)	Model 3 Gross exports ΔY	Model 4 Gross exports ΔY (previous-year independent)
Net value of physical-capital stock	.732* (2.057)	.709 (1.919)	.088 (.398)	.200 (-.853)
Technological capital	-.030 (-.094)	-.340 (-1.021)	-.065 (-.306)	.085 (.379)
Secondary education	.643 (1.704)	1.006* (2.331)	.171 (.822)	.218 (.992)
Tertiary education	-.344 (-1.503)	-.216 (-1.154)	.065 (.312)	.062 (.279)
Unit labor cost	1.277*** (5.338)	1.228*** (4.653)	-.084 (-.387)	-.220 (-.982)
Per-capita domestic apparel production	.659* (2.482)	.594 (1.845)	-.201 (-.907)	-.025 (-.108)
Cotton production	.117 (.367)	.037 (.105)	.344 (-1.665)	.084 (.384)
Adjusted R^2	.834	.791	-.078	-.192
F statistic	20.352***	15.625***	.719	.379

Note. Numbers in parentheses are t-ratios.
$*p \leq .05$. $**p \leq .01$. $***p \leq .001$.

Table 38. **Regression Results for Gross Textile Exports of South Korea, 1974-2001**

Independent variables	Model 1 Gross exports Y	Model 2 Gross exports Y (previous-year independent)	Model 3 Gross exports ΔY	Model 4 Gross exports ΔY (previous-year independent)
Net value of physical-capital stock	1.641* (2.042)	1.495* (2.023)	-.246 (-1.065)	.071 (.279)
Technological capital	-2.569 (-1.740)	-1.999 (-1.788)	-.077 (-.369)	-.218 (-.984)
Secondary education	-.140 (-.525)	.363 (1.925)	-.305 (-1.464)	.052 (.232)
Tertiary education	2.787 (1.754)	2.506* (2.142)	-.107 (-.549)	.025 (.120)
Unit labor cost	.614 (.963)	.193 (.300)	-.111 (-.521)	.062 (.282)
Per-capita domestic apparel production	1.264 (1.712)	.672 (1.405)	-.052 (-.226)	-.212 (-.835)
Cotton production	.638 (1.256)	1.734*** (3.783)	-.164 (-.667)	-.090 (-.348)
Adjusted R^2	.154	.483	-.017	-.159
F-statistic	1.704	4.606**	.937	.470

Note. Numbers in parentheses are t-ratios.
*$p \leq .05$. **$p \leq .01$. ***$p \leq .001$.

Model 1

Model 1 measures the impact of current-year values of the independent variables on current-year gross exports.

India. The F statistic for Model 1 for India's gross textile exports is significant at $p < .001$, indicating a significant relationship between those exports and the set of independent variables. The adjusted R^2 of .834 indicates that the independent variables explain 83.4 percent of the variance in India's gross textile exports. The only significant independent variables are net value of physical-capital stock, unit labor cost, and per-capita domestic apparel production. Each is positively related to gross textile exports. The coefficient of .732 on net value of physical-capital stock indicates an increase (decrease) of $0.73 in India's gross textile exports per dollar increase (decrease) in the net value of its physical-capital stock. The positive relationship between net value of physical-capital stock and gross textile exports is as expected. Unit labor cost and per-capita domestic apparel production are both positively related to gross textile exports, which is contrary to the hypothesized relationship in each case. The coefficient of 1.277 on unit labor cost indicates an increase (decrease) of $1.28 in India's gross textile exports per dollar increase (decrease) in unit labor cost. The coefficient of .659 on per-capita domestic apparel production indicates an increase (decrease) of $0.66 in India's gross textile exports per dollar increase (decrease) in per-capita domestic apparel production. The joint F tests conducted to test the joint significance of the highly correlated pairs of independent variables in explaining India's gross textile exports produced the following significant results: per-capita domestic apparel production and domestic cotton production, $F(2, 25) = 21.889$, $p < .001$; unit labor cost and secondary-education enrollment, $F(2, 25) = 29.524$, $p < .001$; domestic cotton production and technological capital, *F* (2, 25) = 19.967, $p < .001$; and tertiary-education enrollment and net value of physical-capital stock, *F* (2, 25) = 22.184, $p < .001$.

South Korea. Model 1 for South Korea's gross textile exports is not significant, as shown in the Table 38; thus, those exports are not significantly related to the independent variables.

Model 2

Model 2 measures the impact of previous-year values of the independent variables on current-year gross textile exports.

India. The *F* statistic for Model 2 for India is significant at $p < .001$, indicating a significant relationship between India's current-year gross textile exports and the one-year lagged independent variables. The adjusted R^2 of .791 indicates that the lagged independent variables explain 79.1 percent of the variance in India's current-year gross textile exports. The only significant independent variables are secondary-education
enrollment per capita of 15-19 year olds and unit labor cost. Both are positively related to gross textile exports, is as hypothesized in the case of the former but contrary to the hypothesized relationship in the latter case. The coefficient of 1.006 on secondary-education enrollment indicates an increase (decrease) of $1.01 in India's current-year gross textile exports per person increase (decrease) in its previous-year enrollment in secondary education. The coefficient of 1.228 on unit labor cost indicates an increase (decrease) of $1.23 in India's current-year gross textile exports per dollar increase (decrease) in its previous-year unit labor cost.

The joint *F* tests that were conducted on the pairs of highly correlated independent variables showed that each pair is jointly significant in explaining India's gross textile exports. The results are as follow: secondary-education enrollment and unit labor cost, *F* (2, 25) = 32.993, $p < .001$; per-capita domestic apparel production and domestic cotton production, *F* (2, 25) =

22.208, $p < .001$; net value of physical-capital stock and technological capita, F (2, 25) = 17.113, $p < .001$; tertiary-education enrollment and net value of physical-capital stock, F (2, 25) = 22.391, $p < .001$; and domestic cotton production and technological capital, F (2, 25) = 17.371, $p < .001$.

South Korea. The F statistic for Model 2 for South Korea is significant at $p < .01$, indicating a significant relationship between South Korea's current-year gross textile exports and the previous-year independent variables. The adjusted R^2 of .483 indicates that the one-year lagged independent variables explain 48.3 percent of the variance in South Korea's current-year gross textile exports. The only significant independent variables are net value of physical-capital stock, tertiary-education enrollment, and domestic cotton production. Each is positively related to gross textile exports as expected. The coefficient of 1.495 on net value of physical-capital stock indicates an increase (decrease) of $1.50 in South Korea's current-year gross textile exports per dollar increase (decrease) in its previous-year net value of physical-capital stock. The coefficient of 2.506 on tertiary-education enrollment indicates an increase (decrease) of $2.51 in South Korea's current-year gross textile exports per person increase (decrease) in its previous-year enrollment in tertiary education. The coefficient of 1.734 on domestic cotton production indicates an increase (decrease) of $1.73 in South Korea's current-year gross textile exports per metric-ton increase (decrease) in its previous-year cotton production. Although joint F tests were conducted on several sets of correlated variables, as noted in the section on collinearity diagnostics, the only two that showed significant results are the following: domestic cotton production and unit labor cost, F (2, 25) = 7.533, $p < .01$; and unit labor cost, technological capital, and net value of physical capital stock, F (2, 25) = 3.020, $p < .05$.

Models 3 and 4

Models 3 and 4 measure the impact of current-year and previous-year changes, respectively, in the independent variables on current-year changes in gross textile exports. Neither Model 3 nor 4 is significant for either India or South Korea, as shown by the non-significant *F* statistics for these four cases; therefore, current-year changes in these two countries' gross textile exports are not significantly related to either current-year or previous-year changes in the independent variables.

Results for Gross Apparel Exports

Tables 39 and 40 show the regression results for gross apparel exports of India and South Korea.

Model 1

Model 1 measures the impact of current-year values of the independent variables on current-year gross apparel exports.

India. The *F* statistic for Model 1 for India's gross apparel exports is significant at $p < .001$, indicating a significant relationship between those exports and the set of independent variables. The adjust R^2 of .932 indicates that the independent variables explain 93.2 percent of the variance in India's gross apparel exports. The only significant variables are net value of physical-capital stock and per-capita domestic apparel production. Both are positively related to India's gross exports of apparel as hypothesized. The coefficient of .620 on net value of physical-capital stock indicates an increase (decrease) of $0.62 in India's gross apparel exports per dollar increase (decrease) in the net value of its physical-capital stock. The coefficient of .379 on per-capita domestic apparel production indicates an increase (decrease) of $0.38 in India's gross apparel exports per dollar increase (decrease) in its per-capita domestic apparel production.

Table 39. **Regression Results for Gross Apparel Exports of India, 1974-2001**

Independent variables	Model 1 Gross exports Y	Model 2 Gross exports Y (previous-year independent)	Model 3 Gross exports ΔY	Model 4 Gross exports ΔY (previous-year independent)
Net value of Physical-capital stock	.620** (2.660)	.648** (2.849)	.321 (1.426)	.109 (.484)
Technological capital	-.372 (-1.809)	-.482* (2.327)	-.377 (-1.797)	-.305 (-1.471)
Secondary education	.312 (1.417)	.714** (2.949)	-.225 (-.898)	.327 (1.327)
Tertiary education	-.123 (-.797)	-.052 (-.452)	-.017 (-.067)	.010 (.041)
Unit labor cost	-.016 (-.131)	.023 (.185)	.139 (.489)	-.044 (-.157)
Per-capita domestic apparel production	.379* (2.206)	.002 (.013)	.230 (1.093)	-.104 (-.488)
Cotton production	.107 (.522)	.155 (.705)	.021 (.100)	-.169 (-.793)
Adjusted R^2	.932	.921	.051	-.025
F statistic	53.454***	45.974***	.812	.905

Note. Numbers in parentheses are t-ratios.
$*p \leq .05$. $**p \leq .01$. $***p \leq .001$.

Table 40. **Regression Results for Gross Apparel Exports of South Korea, 1974-2001**

Independent Variables	Model 1 Gross exports Y	Model 2 Gross exports Y (previous-year independent)	Model 3 Gross exports ΔY	Model 4 Gross exports ΔY (previous-year independent)
Net value of physical-capital stock	-.329* (-2.161)	-.339* (-2.103)	-.050 (-.212)	.147 (.571)
Technological capital	-1.320*** (-4.710)	-1.520*** (-5.582)	-.104 (-.481)	-.089 (-.400)
Secondary education	.082 (1.681)	.181*** (4.060)	-.223 (-1.016)	.095 (.420)
Tertiary education	.900** (3.108)	1.348*** (5.023)	-.224 (-1.069)	-.191 (.429)
Unit labor cost	.065 (.539)	-.167 (-1.221)	-.177 (.833)	-.007 (-.030)
Per-capita domestic apparel production	.275* (2.155)	.236* (2.335)	.036 (-.151)	-.265 (-1.020)
Cotton production	-.140 (-1.545)	.394** (3.608)	-.181 (-.741)	-.050 (-.192)
Adjusted R^2	.972	.970	-.097	-.202
F-statistic	137.251***	123.829***	.659	.351

Note. Numbers in parentheses are t-ratios.
$*p \leq .05$. $**p \leq .01$. $***p \leq .001$.

The joint *F* tests conducted on the pairs of highly correlated independent variables showed that the following pairs are jointly significant in explaining India's gross apparel exports: domestic cotton production and technological capital, F (2, 25) = 70.806, $p < .001$; per-capita domestic apparel production and domestic cotton production, F (2, 25) = 122.688, $p < .001$; unit labor cost and tertiary-education enrollment per-capita of 20-24 year olds, F (2, 25) = 39.639, $p < .001$; and tertiary- education enrollment and net value of physical-capital stock, F (2, 25) = 118.271, $p < .001$.

South Korea. The *F* statistic for Model 1 for South Korea is significant at $p < .001$, indicating a significant relationship between South Korea's gross exports of apparel and the set of independent variables. The adjusted R^2 of .972 indicates that the independent variables explain 97.2 percent of the variance in South Korea's gross apparel exports. The significant independent variables are net value of physical-capital stock, technological capital, tertiary-education enrollment per capita of 20-24 year olds, and per-capita domestic apparel production. The coefficient of -.329 on net value of physical-capital stock indicates a decrease (increase) of $0.32 in South Korea's gross apparel exports per dollar increase (decrease) in the net value of its physical-capital stock. The coefficient of -1.320 on technological capital indicates a decrease (increase) of $1.32 in the country's gross apparel exports per person increase (decrease) in its number of scientists, engineers, and technical personnel involved in R&D. The coefficient of .900 on tertiary-education enrollment indicates an increase (decrease) of $0.90 in South Korea's gross apparel exports per person increase (decrease) in its tertiary-education enrollment. The coefficient of .275 on per-capita domestic apparel production indicates an increase (decrease) of $0.28 in South Korea's gross apparel exports per dollar increase (decrease) in its per-capita domestic apparel production. The negative relationship between technological capital and gross apparel exports is as expected, but the negative relationship between net value of physical-capital stock and gross apparel exports and the positive relationship between per-capita domestic apparel production and gross apparel exports are contrary to the hypothesized relationships. No particular directionality of the tertiary-education coefficient was hypothesized.

A joint *F* test was conducted on each pair of highly correlated independent variables in the model. Joint significance was found in numerous cases as follow: technological capital and tertiary-education enrollment, F (2, 25) = 184.127, $p < .001$; net value of physical-capital stock and tertiary-education enrollment, F (2, 25) = 97.233, $p < .001$; net value of physical-capital stock and technological capital, F (2, 25) = 176.063, $p < .001$; unit labor cost and tertiary-education enrollment, F (2, 25) = 70.991, $p < .001$; unit labor cost and technological capital, F (2, 25) = 141.607, $p < .001$; unit labor cost and net value of physical-capital stock, F (2, 25) = 82.159, $p < .001$; per-capita domestic apparel production and tertiary-education enrollment, F (2, 25) = 103.569, $p < .001$; per-capita domestic apparel production and net value of physical-capital stock, F (2, 25) 121.991, $p < .001$; and domestic cotton production and unit labor cost, F (2, 25) = 10.298, $p < .01$. Joint *F* tests were also conducted on two sets of more than two highly correlated independent variables. Joint significance was found for both, as follow: per-capita domestic apparel production, net value of physical-capital stock, and tertiary-education enrollment, F (3, 24) = 81.325, $p < .001$; and net value of physical-capital stock, technological capital, tertiary-education enrollment, and unit labor cost, F (4, 23) = 134.583, $p < .001$.

Model 2

Model 2 measures the impact of previous-year values of the independent variables on current-year gross apparel exports.

India. The *F* statistic for Model 2 for India is significant at $p < .001$, indicating a significant relationship between India's current-year gross apparel exports and the one-year lagged independent variables. The adjusted R^2 of .921 indicates that the independent variables explain 92.1 percent of the variance in India's current-year gross apparel exports. The only significant independent variables are net value of physical-capital stock, technological capital, and secondary-education enrollment per capita of 15-19 year olds. Net value of physical-capital stock and secondary-education enrollment are both positively related to gross apparel exports, whereas technological capital is negatively related to gross apparel exports. The signs on the coefficients for net value of physical-capital stock and technological capital are as expected, but that for secondary-education enrollment is not. The coefficient of .648 on previous-year net value of physical-capital stock indicates an increase (decrease) of $0.65 in India's current-year gross apparel exports per dollar increase (decrease) in the previous-year net value of its physical-capital stock. The coefficient of -.482 on previous-year technological capital indicates a decrease (increase) of $0.48 in India's current-year gross apparel exports per person increase (decrease) in its previous-year number of scientists, engineers, and technical personnel involved in R&D. The coefficient of .714 on previous-year secondary-education enrollment indicates an increase (decrease) of $0.71 in India's current-year gross apparel exports per person increase (decrease) in its secondary-education enrollment.

The joint *F* tests on pairs of highly correlated independent variables in the model produced the following significant results: domestic cotton production and technological capital, $F(2, 25) = 61.350$, $p < .001$; unit labor cost and secondary-education enrollment, $F(2, 25) = 110.737$, $p < .001$; per-capita domestic apparel production and domestic cotton production, $F(2, 25) = 81.910$, $p < .001$; technological capital and net value of physical-capital stock, $F(2, 25) =$

23.541, $p < .001$; and tertiary-education enrollment and net value of physical-capital stock, F (2,2 5) = 75.774, $p < .001$.

South Korea. The F statistic for Model 2 for South Korea is significant at $p < .001$, indicating a significant relationship between South Korea's current-year gross apparel exports and the one-year lagged independent variables. The adjusted R^2 of .970 indicates that the independent variables explain 97.0 percent of the variance in South Korea's current-year gross apparel exports. All but one of the independent variables in the model is significant. The significant variables are net value of physical-capital stock, technological capital, secondary-education enrollment per capita of 15-19 year olds, tertiary-education enrollment per capita of 20-24 year olds, per-capita domestic apparel production, and domestic cotton production. The signs on the coefficients for technological capital, per-capita domestic apparel production, and domestic cotton production are as expected, but those for net value of physical-capital stock and secondary-education enrollment are opposite expectations. No particular directionality of the tertiary-education coefficient was hypothesized.

The coefficient of -.339 on net value of physical-capital stock indicates a current-year decline (increase) of $0.34 in South Korea's gross apparel exports per dollar increase (decrease) in its previous-year net value of physical-capital stock. The coefficient of -1.520 on technological capital indicates a current-year decline (increase) of $1.52 in South Korea's gross apparel exports per person increase (decrease) in its previous-year number of scientists, engineers, and technical personnel involved in R&D. The coefficient of .181 on secondary-education enrollment indicates a current-year increase (decrease) of $0.18 in South Korea's gross apparel exports per person increase (decrease) in its previous-year secondary-education enrollment. The coefficient of 1.348 on tertiary-education enrollment indicates a current-year increase (decrease) of $1.35 in South Korea's gross apparel exports per person increase (decrease) in its previous-year tertiary-education enrollment. The coefficient of .236 on per-capita domestic apparel production indicates a current-year increase (decrease) of $0.24 in South Korea's gross apparel exports per dollar increase (decrease) in its previous-year per-capita domestic apparel production. The coefficient of .394 on domestic cotton production indicates a current-year increase (decrease) of $0.39 in South Korea's gross apparel exports per metric-ton increase (decrease) in its previous-year domestic cotton production.

Joint F tests were conducted on the sets of highly correlated independent variables in the model. Those on pairs of variables produced the following significant results: per-capita domestic apparel production and domestic cotton production, F (2, 25) = 60.389, $p < .001$; per-capita domestic apparel production and tertiary-education enrollment, F (2, 25)= 67.327, $p < .001$; tertiary-education enrollment and technological capital, F (2, 25) = 182.750, $p < .001$; net value of physical-capital stock and technological capital, F (2, 25) = 143.783, $p < .001$; unit labor cost and technological capital, F (2, 25) = 133.894, $p < .001$; unit labor cost and net value of physical-capital stock, F (2, 25) = 75.493, $p < .001$; and unit labor cost and domestic cotton production, F (2, 25) = 14.342, $p < .001$. The joint F test on the one set of three highly inter-correlated variables showed the following significant result: unit labor cost, net value of physical-capital stock, and technological capital, F (3, 24) = 103.512, $p < .001$.

Model 3 and 4

Models 3 and 4 measure the impact of current-year and previous-year changes, respectively, in the independent variables on current-year changes in gross apparel exports. Neither Model 3 nor 4 is significant for either India or South Korea, as shown by the non-significant F statistics for these four cases; therefore, current-year changes in these two countries' gross apparel exports are not significantly related to either current-year or previous-year changes in the independent variables.

Results for Net Textile Exports

Tables 41 and 42 show the regression results for net textile exports of India and South Korea.

Model 1

Model 1 measures the impact of current-year values of the independent variables on current-year net textile exports. *India.* The *F* statistic for Model 1 for India's met textile exports is significant at the .001 level, indicating a significant relationship between those exports and the set of independent variables. The adjusted R^2 of .773 indicates that 77.3 percent of the variance in India's net textile exports is explained by the independent variables. The only significant independent variables are unit labor cost and per-capita domestic apparel production. Each is positively related to net textile exports, which is contrary to the hypothesized relationship in each case. The coefficient of 1.245 on unit labor cost indicates an increase (decrease) of $1.25 in the net textile exports of India per dollar increase (decrease) in unit labor cost.

Table 41. **Regression Results for Net Textile Exports of India, 1974-2001**

Independent variables	Model 1 Net exports Y	Model 2 Net exports Y (previous-year independent)	Model 3 Net exports ΔY	Model 4 Net exports ΔY (previous-year independent)
Net value of physical-capital stock	.625 (1.501)	.623 (1.599)	.399* (2.404)	.047 (.213)
Technological capital	-.016 (-.042)	-.266 (-.758)	-.212 (-1.329)	-.214 (-1.021)
Secondary education	.580 (1.313)	1.005* (2.210)	-.341* (-2.175)	.259 (1.257)
Tertiary education	-.328 (-1.226)	-.261 (-1.324)	-.482** (-3.040)	.185 (.893)
Unit labor cost	1.245*** (4.449)	1.296*** (4.653)	.403* (2.471)	.040 (.190)
Per-capita domestic apparel production	.761* (2.452)	.736* (2.170)	.073 (.439)	-.189 (-.857)
Cotton production	1.04 (.278)	-.059 (-.157)	.212 (1.361)	-.222 (-1.080)
Adjusted R^2	.773	.768	.387	-.045
F statistic	14.101***	13.764***	3.436**	.833

Note. Numbers in parentheses are *t*-ratios.
$*p < .05$. $**p < .01$. $***p < .001$.

Table 42. **Regression Results for Net Textile Exports of South Korea, 1974-2001**

Independent variables	Model 1 Net exports Y	Model 2 Net exports Y (previous-year independent)	Model 3 Net exports ΔY	Model 4 Net exports ΔY (previous-year independent)
Net value of physical-capital stock	1.909** (2.717)	1.051 (1.384)	.576** (3.023)	.040 (.151)
Technological capital	-4.144** (-3.210)	-1.828 (1.591)	-.312 (-1.813)	.141 (.615)
Secondary education	-.235 (-1.009)	.247 (1.276)	-.114 (-.664)	-.049 (-.210)
Tertiary education	3.905** (2.811)	1.900 (1.581)	-.137 (-.855)	.051 (.236)
Unit labor cost	.976 (1.753)	-.266 (-.403)	.140 (.800)	.125 (.552)
Per-capita domestic apparel production	.818 (1.268)	.086 (.175)	.279 (1.470)	-.034 (.131)
Cotton production	.622 (1.400)	1.805*** (3.831)	.123 (.606)	.241 (.871)
Adjusted R^2	.353	.454	.316	-.247
F statistic	3.108*	4.210**	2.779*	.236

Note. Numbers in parentheses are *t*-ratios.
**p* < .05. ***p* < .01. ****p* < .001.

The coefficient of .761 on per-capita domestic apparel production indicates an increase (decrease) of $0.76 in the net textile exports of India per dollar increase (decrease) in per-capita domestic apparel production. A joint *F* test was conducted to test the joint significance of the highly correlated set of independent variables in the model, which are tertiary-education enrollment and net value of physical-capital stock. The result indicates that these variables are jointly significant in explaining India's net textile exports, F (2, 25), $p < .001$.

South Korea. The *F* statistic for Model 1 for South Korea is significant at the .02 level, indicating a significant relationship between South Korea's net textile exports and the independent variables. The adjusted R^2 of .353 indicates that the independent variables explain 35.3 percent of the variance in South Korea's net textile exports. The only significant independent variables are net value of physical-capital stock, technological capital, and tertiary-education enrollment per capita of 20-24 year olds. The coefficient of -4.144 on technological capital indicates a decrease (increase) of $4.14 in South Korea's net textile exports per person increase (decrease) in its number of scientists, engineers, and technical personnel involved in R&D. The negative relationship between net textile exports and technological capital is contrary to expectations.

Both net value of physical-capital stock and tertiary-education enrollment are positively related to net textile exports, as expected. The coefficient of 1.909 on net value of physical-capital stock indicates an increase (decrease) of $1.90 in South Korea's net textile exports per dollar increase (decrease) in the net value of its physical-capital stock. The coefficient of 3.905 on tertiary-education enrollment indicates an increase (decrease) of $3.91 in net textile exports of South Korea per person increase (decrease) in tertiary-education enrollment.

Joint *F* tests were conducted to test the joint significance of the sets of highly correlated independent variables. Those sets of variables are unit labor cost and domestic cotton production; per-capita domestic apparel production and net value of physical-capital stock; unit labor cost and net value of physical-capital stock; unit labor cost and technological capital; labor cost and tertiary-education enrollment; net value of physical-capital stock and technological capital; net value of physical-capital stock and tertiary-education enrollment; and technological capital and tertiary-education enrollment. In addition, a joint *F* test was conducted on unit labor cost, tertiary-education, net value of physical-capital stock, and technological capital, given the high inter-correlation among these four variables. The only sets of correlated variables that are jointly significant in explaining South Korea's net textile exports are domestic cotton production and unit labor cost, F (2, 25) = 4.308, $p < .05$; and unit labor cost, tertiary-education enrollment, net value of physical-capital stock, and technological capital, F (4, 23) = 3.633, $p <.001$.

Model 2

Model 2 measures the impact of previous-year values of the independent variables on current-year net textile exports.

India. The *F* statistic for Model 2 for India is significant at the .001 level, indicating a significant relationship between India's current-year net textile exports and the one-year lagged independent variables. The adjusted R^2 of .768 indicates that the independent variables explain 76.8 percent of the variance in India's net textile exports. The only significant independent variables are secondary-education enrollment per capita of 15-19 year olds, unit labor cost, and per-capita domestic apparel production. The coefficient of 1.005 on secondary-education enrollment indicates an increase (decrease) of $1.01 in India's current-year net textile exports per person increase (decrease) in its previous-year enrollment in secondary education. The positive relationship between this variable and textile exports is as expected. The coefficient of 1.296 on unit labor cost indicates an increase (decrease) of $1.30 in India's current-year net textile exports per dollar increase (decrease) in its previous-year unit labor cost. The coefficient of 0.736 on previous-year per capita domestic apparel production indicates an increase (decrease) of $0.73 in India's current-year net textile exports per dollar increase (decrease) in per-capita domestic apparel production. Contrary to the findings, unit labor cost and its per-capita domestic apparel production were each hypothesized to be negatively related to textile exports.

Joint *F* tests were conducted on three pairs of highly correlated independent variables and showed that all three pairs are jointly significant in explaining India's net textile exports. The results are as follow: unit labor cost and secondary-education enrollment, $F\ (2, 25) = 23.043$, $p < .001$; tertiary-education enrollment and net value of physical-capital stock, $F\ (2, 25) = 18.711$, $p < .001$; and physical-capital stock and technological capital, $F\ (2, 25) = 17.413$, $p < .001$.

South Korea. The *F* statistic for Model 2 for South Korea is significant at the .005 level, indicating a significant relationship between South Korea's current-year net textile exports and the previous-year independent variables. The adjusted R^2 of .454 indicates that the previous-year independent variables explain 45.4 percent of the variance in South Korea's current-year net textile exports. The only significant independent variable is domestic cotton production, which is positively related to net textile exports as expected. The coefficient of 1.805 on this variable indicates an increase (decrease) of $1.81 in South Korea's current-year net textile exports per metric-ton increase (decrease) in its cotton production. Although joint *F* tests were conducted on several sets of correlated variables, as noted in the section on collinearity diagnostics, the only two that showed significance are the following: per-capita domestic apparel production and unit labor cost, F (2, 25) = 10.053, $p < .001$; and unit labor cost, net value of physical-capital stock, and technological capital, F (3, 24) = 2.807, $p < .001$.

Model 3

Model 3 measures the impact of current-year changes in the independent variables on current-year changes in net textile exports.

India. The F statistic for Model 3 for India is significant at the .01 level, indicating a significant relationship between current-year changes in India's net textile exports and current-year changes in the independent variables. The adjusted R^2 of .387 indicates that the independent variables explain 38.7 percent of the variance in current-year changes in net textile exports. The significant independent variables in Model 3 for India are net value of physical-capital stock, secondary-education enrollment per capita of 15-19 year olds, tertiary-education enrollment per capita of 20-24 year olds, and unit labor cost. The coefficient of .399 on changes in net value of physical-capital stock indicates an increase (decrease) of $0.40 in India's current-year net textile exports per dollar current-year increase (decrease) in the net value of its physical-capital stock. The positive relationship between textile exports and net value of physical-capital stock was expected; however, contrary to expectations, secondary-education enrollment and tertiary-education enrollment are negatively related to current-year net exports of textiles. The coefficient of -0.341 on current-year changes in secondary-education enrollment indicates a current-year reduction (increase) of $0.34 in India's net textile exports per person increase (decrease) in its secondary-education enrollment. The coefficient of -.482 on current-year changes in tertiary-education enrollment indicates a current-year reduction (increase) of $0.48 in the country's net textile exports per person increase (decrease) in its current-year tertiary-education enrollment. The coefficient of .403 on current-year changes in unit labor cost indicates a current-year increase (decrease) of $0.40 in net textile exports per dollar increase (decrease) in current-year unit labor cost. The positive relationship between current-year changes in unit labor cost and current-year changes net textile exports is contrary to what was expected.

South Korea. The *F* statistic for Model 3 for South Korea is significant at the .03 level, indicating a significant relationship between South Korea's current-year changes in net textile exports and current-year changes in the independent variables. The adjusted R^2 of .310 indicates that the independent variables explain 31.0 percent of the variance in current-year changes in net textile export. The only significant independent variable is net value of physical-capital stock, which is positively related to net textile exports as expected. The coefficient of .576 on net value of physical-capital stock indicates a current-year increase (decrease) of $0.57 in South Korea's current-year net textile exports per dollar increase (decrease) in the current-year net value of its physical-capital stock.

Model 4

Model 4 measures the impact of previous-year changes in the independent variables on current-year changes in net textile exports. This model is not significant for either India or South Korea, as shown by the non-significant *F* statistic in each case; thus, neither of these countries' current-year changes in net textile exports are significantly related to previous-year changes in the independent variables.

Results for Net Apparel Exports

Tables 43 and 44 show the regression results for net exports of apparel for India and South Korea.

Model 1

Model 1 measures the impact of current-year values of the independent variables on current-year net apparel exports.

India. The *F* statistic for Model 1 for India's net apparel exports is significant at the .001 level, indicating a significant relationship between those exports and the set of independent variables. The adjusted R^2 of .931 indicates that the independent variables explain 93.1 percent of the variance in India's net apparel exports. The only significant independent variables are net value of physical-capital stock and per-capita domestic apparel production. Both are positively related to India's net exports of apparel as hypothesized. The coefficient of .616 on net value of physical-capital stock indicates an increase (decrease) of $0.61 in India's net apparel exports per dollar increase (decrease)

Table 43. **Regression Results for Net Apparel Exports of India, 1974-2001**

Independent variables	Model 1 Net exports Y	Model 2 Net exports Y (previous-year independent)	Model 3 Net exports ΔY	Model 4 Net exports ΔY (previous-year independent)
Net value of physical-capital stock	.616** (2.626)	.643** (2.815)	.081 (.345)	.192 (.809)
Technological capital	-.372 (-1.797)	-.483* (2.320)	-.321 (-1.458)	-.182 (-.837)
Secondary education	.312 (1.408)	.716** (2.940)	-.013 (-.049)	.132 (.512)
Tertiary education	-.124 (-.799)	-.052 (-.453)	-.040 (.156)	.152 (.592)
Unit labor cost	.016 (.124)	.024 (.193)	.049 (.163)	-.069 (-.237)
Per-capita domestic apparel production	.382* (2.215)	.004 (.018)	.223 (1.012)	.008 (.036)
Cotton production	.107 (.521)	.157 (.713)	.166 (.745)	-.282 (-1.263)
Adjusted R^2	.931	.920	-.153	-.132
F statistic	52.779***	45.458***	.488	.550

Note. Numbers in parentheses are t-ratios.
$*p < .05$. $**p < .01$. $***p < .001$.

Table 44. **Regression Results for Net Apparel Exports of South Korea, 1974-2001**

Independent Variables	Model 1 Net exports Y	Model 2 Net exports Y (previous-year independent)	Model 3 Net exports ΔY	Model 4 Net exports ΔY (previous-year independent)
Net value of physical-capital stock	-.354** (2.571)	-.314 (-1.928)	-.108 (.452)	-.015 (-.056)
Technological capital	-1.297*** (-5.126)	-1.531* (-5.549)	-.128 (-.586)	-.115 (-.516)
Secondary education	.074 (1.684)	.164** (3.627)	-.104 (-.469)	.183 (.804)
Tertiary education	.791 (3.026)	1.256*** (4.618)	-.224 (-1.052)	-.080 (-.372)
Unit labor cost	.042 (.388)	-.151 (-1.089)	-.224 (-1.037)	-.001 (-.005)
Per-capita domestic apparel production	.209 (1.809)	.197 (1.928)	.083 (.347)	-.144 (-.553)
Cotton production	-.167 (-2.032)	.334* (3.015)	-.276 (-1.112)	-.163 (-.626)
Adjusted R^2	.978	.969	.128	-.208
F statistic	168.956**	120.560***	.561	.336

Note. Numbers in parentheses are t-ratios.
$*p < .05$. $**p < .01$. $***p < .001$.

in the net value of its physical-capital stock. The coefficient of .382 on per-capita domestic apparel production indicates an increase (decrease) of $0.38 in India's net apparel exports per dollar increase (decrease) in its per-capita domestic apparel production. A joint *F* test was conducted on the set of highly correlated independent variables in the model: tertiary-education enrollment and net value of physical-capital stock. According to this test, these variables are jointly significant in explaining India's net apparel exports, $F\ (2, 25) = 116.76$, $p < .001$.

South Korea. The *F* statistic for Model 1 for South Korea is significant at $p < .001$, indicating a significant relationship between South Korea's net exports of apparel and the set of independent variables. The adjusted R^2 of .978 indicates that the independent variables explain 97.8 percent of the variance in South Korea's net apparel exports. The only significant independent variables are net value of physical-capital stock and technological capital. Contrary to expectations, each is negatively related to South Korea's exports of apparel. The coefficient of -.354 on net value of physical-capital stock indicates a decrease (increase) of $0.35 in South Korea's net apparel exports per dollar increase (decrease) in the net value of its physical-capital stock. The coefficient of

-1.297 on technological capital indicates a decrease (increase) of $1.30 in the country's net apparel exports per person increase (decrease) in its number of scientists, engineers, and technical personnel involved in R&D. In addition, a joint *F*-test was conducted on each pair of highly correlated independent variables in the model. Joint significance was found in numerous cases as follow: domestic cotton production and unit labor, $F\ (2, 25) = 9.975$, $p < .001$; per-capita domestic apparel production and net value of physical capital, $F\ (2, 25) = 118.005$, $p < .001$; per-capita domestic apparel production and tertiary-education enrollment, $F\ (2, 25) = 105.053$, $p < .001$; unit labor cost and technological capital, $F\ (2, 25) = 158.926$, $p < .001$; unit labor cost and tertiary-education enrollment, F (2, 25) = 75.648, $p < .001$; unit labor cost and net value of physical-capital stock, F (2, 25) = 82.650, $p < .001$; technological capital and net value of physical capital stock, F (2, 25) = 192.761, $p < .001$; tertiary-education enrollment and net value of physical-capital stock, F (2, 25) = 100.071, $p < .001$; and technological capital and tertiary-education enrollment, F (2, 25) = 216.174, $p < .001$. Joint F-tests were also conducted on two sets of more than two highly correlated independent variables. Joint significance was found in both cases, as follow: per-capita domestic apparel production, net value of physical-capital stock, and tertiary-education enrollment, F (3, 24) = 80.698, $p < .001$; and unit labor cost, technological capital, tertiary-education enrollment, and net value of physical-capital stock, F (4, 23) = 164.937, $p < .001$.

Model 2

Model 2 measures the impact of previous-year values of the independent variables on current-year net apparel exports.

India. The F statistic for Model 2 for India is significant at the .001 level, indicating a significant relationship between India's current-year net apparel exports and the one-year lagged independent variables. The adjusted R^2 of .920 indicates that the independent variables explain 92.0 percent of the variance in India's current-year net apparel exports. The only significant independent variables are net value of physical-capital stock, technological capital, and secondary-education enrollment per capita of 15-19 year olds. Both net value of physical-capital stock and secondary-education enrollment are positively related to net apparel exports. The positive relationship between net value of physical-capital stock and net apparel exports was expected, but that between secondary-education enrollment and net apparel exports was not. The coefficient of .643 on previous-year net value of physical-capital stock indicates an increase (decrease) of $0.64 in India's exports per dollar increase (decrease) in the net value of its physical-capital stock. The coefficient of .716 on previous-year secondary-education enrollment indicates that the current-year net apparel exports of India increased (decreased) $0.71 per person increase (decrease) in its secondary-education enrollment. Technological capital is negatively related to net apparel exports, as expected. The coefficient of -.483 on previous-year technological capital indicates a decrease (increase) in India's net apparel exports per person increase (decrease) in its previous-year number of scientists, engineers, and technical personnel involved in R&D.

Joint *F*-tests were conducted on the sets of highly correlated independent variables in the model. Those on pairs of variables produced the following significant results: tertiary-education enrollment and net value of physical-capital stock, $F = (2, 25) = 75.004$, $p < .001$; and net value of physical-capital stock and technological capital, $F (2, 25) = 23.226$, $p < .001$. The joint *F* test on the one set of three highly inter-correlated variables showed the following significant result: tertiary-education enrollment, net value of physical-capital stock, and technological capital, $F (3, 24) = 48.764$, $p < .05$.

South Korea. The *F* statistic for Model 2 for South Korea is significant at $p < .001$, indicating a significant relationship between South Korea's current-year net apparel exports and the one-year lagged independent variables. The adjusted R^2 of .969 indicates that the previous-year independent variables explain 96.9 percent of the variance in South Korea's current-year net apparel exports. The significant independent variables in the model are technological capital, secondary-education enrollment per capita of 15-19 year olds, tertiary-education enrollment per capita of 20-24 year olds, and domestic cotton production. The signs on the coefficients for technological capital and domestic cotton production are as expected, but the sign on the secondary-education coefficient is opposite that expected. No particular directionality of the tertiary-education coefficient was hypothesized. The coefficient of -1.531 on technological capital indicates a current-year decline (increase) of $1.53 in South Korea's net apparel exports per person increase (decrease) in its previous-year number of scientists, engineers, and technical personnel involved in R&D. The coefficient of .164 on secondary education indicates an increase (decrease) of $0.16 in South Korea's current-year net apparel exports per person increase (decrease) in its previous year secondary-education enrollment. The coefficient of 1.256 on tertiary education indicates a current-year increase (decrease) of $1.26 in South Korea's net apparel exports per person increase (decrease) in its previous-year tertiary-education enrollment.

In addition, a joint *F* test was conducted on each set of highly correlated independent variables. The results on pairs of variables are the following: per-capita domestic apparel production and unit labor cost, F (2, 25) = 13.775, $p < .001$; unit labor cost and net value of physical-capital stock, F (2, 25) = 76.482, $p < .001$; unit labor cost and technological capital, F (2, 25) = 150.203, $p < .001$; net value of physical-capital stock and technological capital, F (2, 25) = 158.606, $p < .001$; and technological capital and tertiary-education enrollment, F (2, 25) = 214.394, $p < .001$. The joint F test on the set of three highly correlated variables produced the following significant result: unit labor cost, net value of physical-capital stock, and technological capital, F (3, 24) = 116.376, $p < .001$.

Model 3 and 4

Models 3 and 4 measure the impact of current-year and previous-year changes, respectively, in the independent variables on current-year changes in net apparel exports. Neither Model 3 nor 4 is significant for either India or South Korea, as shown by the non-significant *F* statistics for these four cases; therefore, current-year changes in these two countries' net apparel exports are not significantly related to either current-year or previous-year changes in the independent variables.

Discussion of Results

Table 45 shows the expected signs of the coefficients on the independent variables in all estimated models for the gross and net exports of textiles and apparel for

Table 45. **Hypothesized Signs on the Coefficients in Each Estimated Model**

Variables	Textiles	Apparel
Net value of physical-capital stock	Positive	Positive
Technological capital	Positive	Negative
Secondary education	Positive	Negative
Tertiary education	Positive	Uncertain
Unit labor Cost	Negative	Negative
Per-capita domestic apparel production	Negative	Negative
Domestic cotton production	Positive	Positive

India and South Korea. As seen in the results, several independent variables had the expected signs in some of the four models for gross and net textile or apparel exports, but in other cases, variables were either non-significant or had signs opposite those expected. The theoretical framework and the rationales for the hypotheses presented earlier provide support for the relationships between textile or apparel exports and the independent variables found to conform to the hypotheses; thus, the discussion of results focuses on possible reasons for the significant relationships that are contrary to the hypotheses. It is important to note, however, that because multicollinearity was found in some cases in Models 1 and 2 for all the significant variables with signs opposite those expected, the results may be unreliable in those cases. Recall that Models 3 and 4 showed no multicollinearity.

Textile Exports

Effect of domestic apparel production

With Models 1 and 2 for India's net textile exports and with Model 1 for its gross textile exports, the results showed positive impacts of per-capita domestic apparel production on the exports, which is contrary to expectations. Per-capita domestic apparel production was not significant in Model 2 for India's gross textile exports, Models 3 and 4 for its gross and net textile exports, and in all the models for South Korea's gross and net textile exports. The positive relationships in Model 1 for India's gross textile exports and in Models 1 and 2 for its net textile exports indicate that India's per-capita domestic apparel production tended to move in the same direction as both its gross and net apparel exports during 1974-2001. Zhang (1988) obtained similar results for domestic apparel production with his dynamic model for net textile exports. He attributed the positive relationship between the domestic apparel production and textile exports to the expansion of domestic textile production stimulated by increased domestic apparel production, which may have increased countries' supplies of textiles available for export. A similar explanation may apply to the findings in this study of positive impacts of per-capita domestic apparel production on India's gross and net textile exports. According to the data in this research, India's domestic apparel production increased from US$60 million in 1974 to US$3228 million in 2001 (see Appendix Table 1.20). Over the same period, its gross textile exports increased from US$0.82 billion to US$5.34 billion and net textile exports rose from US$0.81 billion to US$4.66 billion (see Table 1.1).

Effect of unit labor cost

With Models 1, 2, and 3 for India's net textile exports and with Models 1 and 2 for its gross textile exports, the results showed positive impacts of unit labor cost on the textile exports, rather than the hypothesized negative impact. Unit labor cost was not significant in Model 4 for India's net textile exports, in Models 3 and 4 for its gross textile exports, and in all the models for South Korea's gross and net textile exports. The positive relationships in Models 1, 2, and 3 for India's net textile exports and in Models 1 and 2 for its gross textile exports indicate that India's textile exports and unit labor cost tended to move in the same direction during 1974-2001; however, the data compiled for this research show that its textile exports and unit labor costs moved in opposite directions over the period. India's unit labor cost in textiles decreased from US$0.56 in 1974 to US$0.012 in 2001 (see Table 1.14) as its gross textile exports increased from US$0.82 billion in 1974 to US$5.34 billion in 2001 and its net textile exports increased from $0.81 billion in 1974 to $4.66 billion in 2001 (see Table 1.1). The relationships obtained between textile exports and unit labor cost variable therefore appear to be unreliable. This may be attributable to the presence of multicollinearity or to methodological limitations, such as that the variables on textile exports, unit labor cost, and other factors in the models were not scaled to similar magnitudes. A possibility that could be explored in future research is that the Indian government's high degree of intervention affected the relationships between the included variables in a manner based more on politics than on economics, and may even be the underlying cause of collinearity between independent variables.

Effect of secondary- and tertiary-education enrollment

With Model 3 for India's net textile exports, the results showed a negative impact of current-year changes in secondary-education enrollment on current-year changes in net textile exports. Secondary-education enrollment was positively related to net and gross textile exports in Model 2 for India, as hypothesized, but was not significant in Models 1 and 4 for India's net textile exports and in Models 1, 3, and 4 for India's gross textile exports. Secondary-education enrollment was not significant in any model for South Korea. Contrary to what was hypothesized, the negative relationship between secondary-education enrollment and net textile exports in Model 3 for India indicates that net textile exports and secondary-education enrollment tended to move in opposite directions during 1974-2001. Although the textile industry has retained the largest share of industrial production in India's economy, accounting for 20 percent of total industrial production in 2001 (Shetty, 2001), as an example, the manufacturing base in India has evolved since 1974 with expansion into a growing range of industries like chemicals, pharmaceuticals, steel, cement, food processing, leather goods, and software (*The World Factbook*, 2005). The diversification of India's manufacturing may have provided increased employment opportunities for India's secondary-education graduates in industries besides textiles, with the effect of drawing off such workers from the textile industry. A similar phenomenon may underlie the negative relationship found between India's tertiary-education enrollment and net textile exports with Model 3, contrary to expectations.

Effect of technological capital

The results for Model 1 for South Korea's net textile exports showed a negative impact of technological capital on the exports. Technological capital was not significant in Models 2, 3, and 4 for South Korea's net textile exports and in all the models for India's gross and net textile exports and for South Korea's gross textile exports. The negative relationship between South Korea's technological capital and net textile exports in Model 1 indicates that the country's net textile exports increased (decreased) as its number of scientists, engineers, and technical personnel involved in R&D decreased (increased); however, the data compiled for this research show an increased number of scientists, engineers, and technical personnel involved in R&D in South Korea over 1974-2001 (see Appendix Table 1.8), as well as an increase in South Korea's net textile exports during that period (see Appendix Table 1.1). The results for technological capital may therefore be unreliable, perhaps for the same reasons as for unit labor cost. It is possible, nevertheless, that other forces may be at work.

The negative relationship between South Korea's technological capital and net textile exports in Model 1 may be partially attributable to its strong promotion of research in fields like machinery, shipbuilding, chemicals, marine science, and electronics since the 1970s (Ministry of Science and Technology, 2005). In addition, South Korea has implemented several policies beginning in the late 1970s to shift its industrial base from light manufacturing to capital- and technology-intensive industries. The fourth Five-Year Plan, which was implemented in 1977, promoted the development of technology-intensive industries like industrial machinery, electronics, and shipbuilding. The fifth Five-Year plan, which went into effect in 1982, emphasized expansion of the electronics industry of South Korea and encouraged investments and research in semi-conductors, televisions, and video recorders. The Highly Advanced National Project implemented in 1992 and the Special Act for Scientific and Technology Innovation implemented in 1997 under the eighth Five-Year Plan aimed to shift the country's industrial development towards capital- and technology-intensive industries (Ministry of Science and Technology). The heavy emphasis on the types of research and industries noted above may have led to an increased number of scientists, engineers, and technical personnel involved in R&D related to those activities at the expense of R&D directly relevant to the textile industry.

Apparel Exports

Effects of secondary- and tertiary-education enrollment

With Model 2 for both gross and net apparel exports for India and for South Korea, the results showed positive impacts of secondary-education enrollment on net apparel exports, contrary to the hypothesized relationships. Secondary-education enrollment was not significant in any other estimated model for either gross or net apparel exports. The positive relationships with Model 2 between secondary-education enrollment and gross or net apparel exports may be at least partially attributable to the increasingly demanding management of relationships with actual and potential apparel export customers, of apparel production according to export customers' specifications, and of the complex logistics involved in international dealings as competition in the world apparel market has intensified since 1974. The concomitant rising demand for managers who can proficiently handle the complexities of supplying apparel export markets may have led to a growing number of apparel-company managers with at least a secondary education. Thus, secondary-education enrollment and apparel exports may go hand in hand, evidencing as a positive relationship between them. A similar phenomenon may underlie the positive relationship found between South Korea's tertiary-education enrollment and net apparel exports under Model 2 and its tertiary-education enrollment and gross apparel exports under Models 1 and 2, contrary to expectations.

Effect of net value of physical-capital stock

With Model 1 for South Korea's net apparel exports and with Models 1 and 2 for its gross apparel exports, the results showed negative impacts of net value of physical-capital stock on the apparel exports. With Models 1 and 2 for India's gross and net apparel exports, the results showed positive impacts of the net value of its physical-capital stock on the apparel exports as expected. Net value of physical-capital stock was not significant in Models 3 and 4 for both gross and net apparel exports of either India or South Korea. The negative relationship between South Korea's net value of physical-capital stock and apparel exports in certain models indicates that, contrary to expectations, South Korea's apparel exports and net value of physical-capital stock tended to move in opposite directions during 1974-2001. Appendix Tables 1.1 show that South Korea's net and gross apparel exports declined after 1991 following steady growth over 1974-1991. On the other hand, the net value of its physical-capital stock rose nearly steadily over 1974-1997 (see Appendix Table 1.3), representing growth in capital investment in the country.

As South Korea underwent rapid economic growth since 1974, capital investment in the country not only increased, but went increasingly to capital-intensive industries like electronics, automobiles, shipbuilding, steel, industrial machinery, and petrochemicals. The increased investment in such industries followed the fourth Five-Year Plan, which went into effect in 1977 and emphasized the development of technology-intensive industries like industrial machinery, electronics, and shipbuilding. (Harvie & Lee, 2003). One result is that Korea's shipbuilding industry has had more than a one-third share of the world market since 1997, ranking first in the world. In addition, its production of both automobiles and petrochemicals had become the fifth largest in the world by 1997. By that same year, Korea had become the world's largest supplier of semiconductors, providing more than 40 percent of global output (Embassy of Korea, 2005). Accompanying the infusion of financial resources into South Korea's capital-intensive industries, especially since 1980, has been reduced capital flow into its labor-intensive industries, including apparel (Harvie & Lee, 2003). Given the above, its may not be surprising to find a negative relationship between Korea's total net value of physical-capital stock and its apparel exports.

CHAPTER 6

SUMMARY, CONCLUSIONS, IMPLICATIONS, AND SUGGESTIONS FOR FUTURE RESEARCH

The chapter summarizes the research and presents the major conclusions, implications of the research results, and suggestions for future research.

Summary of the Research

The overall purpose of this research is to analyze the textile and apparel exports of India and South Korea over 1974-2001. This purpose was addressed by econometrically analyzing the determinants of India's and South Korea's gross and net exports of textiles and apparel during 1974-2001. Economic theories of international trade and related empirical research provide the foundation for the study. The study extends that by Zhang and Dardis (1991) who analyzed the determinants of textile exports over the period 1970-1985, using a sample of 27 major textile exporting countries.

Secondary data for each year over 1974-2001 were used for the variables in the analysis. The variables include the gross and net values of India's and South Korea's textile and apparel exports, as well as each of these countries' net value of physical-capital stock, technological capital, two different levels of human capital, unit labor cost in textiles and in apparel, per-capita domestic apparel production, and domestic cotton-fiber production. The Procedure chapter indicates the data sources, the operational definitions of the variables, and the models that were estimated by regression. The values of the variables that are expressed monetarily were deflated. The data analysis included 32 estimations using four different linear models to test the hypothesized relationships between the textile or apparel exports and other variables for India and South Korea separately. One model examined the impact of current-year values of the independent variables on current-year exports. Another examined the impact of one-year lagged values of the independent variables on current-year exports. The other two models examined the impact of changes in the independent variables over one-year intervals on changes in exports over the same one-year intervals. The dependent variable in each of those two models was current-year changes in exports, either textiles or apparel; the independent variables in one were current-year changes in the values of those variables, and the independent variables in the other were previous-year changes in the values of those variables.

Major Conclusions

Tables 46 and 47 summarize the regression results for gross and net exports of textiles and apparel for India and South Korea. The discussion below forst presents the major conclusions for each independent variable according to the respective hypothesis and then presents the conclusions concerning which of the four estimated models performed best in identifying the determinants of textile exports and of apparel exports.

H1: A country's stock of physical capital will have had a positive impact on its exports of both textiles and apparel.

The regression results for this hypothesis in the case of textiles indicate that the current-year net value of physical-capital stock positively impacted the gross textile exports of India and both gross and net textile exports of South Korea over 1974-2001. For India, the positive effect of current-year net value of physical-capital stock was most pronounced for gross textile exports, which increased by US $0.73 per dollar increase in net value of physical-capital stock. The positive effect of current-year net value of physical-capital stock was even more pronounced for South Korea's gross and net textile exports, which increased between $1.64 and $1.90 per dollar increase in net value of physical-capital stock.

Table 46. **Signs on the Significant Variables in the Regressions for Gross and Net Textile Exports of India and South Korea, 1974-2001.**

		Model 1	Model 2	Model 3	Model 4
Gross Textile Exports					
India		PK+ LC+ AP+	ED2 LC+	NS	NS
	Adjusted R^2	0.834	0.791	-0.078	-0.192
South Korea		PK+	PK+ ED3+ FP+	NS	NS
	Adjusted R^2	0.154	0.483	-0.017	-0.159
Net Textile Exports					
India		LC+ AP+	ED2+ LC+ AP+	PK+ ED2- ED3- LC+	NS
	Adjusted R^2	0.773	0.768	0.387	-0.045
South Korea		PK+ TC- ED3+	FP+	PK+	NS
	Adjusted R^2	0.353	0.454	0.316	-0.247

Note. PK = net value of physical-capital stock of India; ED2 = secondary-education enrollment; ED3 = tertiary-education enrollment; LC = unit labor cost; AP = per-capita domestic apparel production; FP = domestic cotton production; and NS = not significant.

Table 47. **Signs on the Significant Variables in the Regressions for Gross and Net Apparel Exports of India and South Korea, 1974-2001.**

		Model 1	Model 2	Model 3	Model 4
Gross Apparel Exports					
India		PK+ AP+	PK+ TC- ED2+	NS	NS
	Adjusted R2	0.932	0.921	0.051	-0.025
South Korea		PK- TC- ED3+ AP+	PK- TC- ED2+ ED3+ AP+ FP+	NS	NS
	Adjusted R2	0.972	0.97	-0.097	-0.202
Net Apparel Exports					
India		PK+ AP+	PK+ TC- ED2+	NS	NS
	Adjusted R2	0.931	0.92	-0.153	-0.132
South Korea		PK- TC-	TC- ED2+ ED3+ FP+	NS	NS
	Adjusted R2	0.978	0.969	0.128	-0.208

Note. PK = net value of physical-capital stock of India; TC = technological capital; ED2 = secondary-education enrollment; ED3 = tertiary-education enrollment; LC = unit labor cost; AP = per-capita domestic apparel production; FP = domestic cotton production; and NS = not significant.

Although the results also indicate positive effects of current-year net value of physical-capital stock on India's gross and net apparel exports, they indicate negative effects on South Korea's gross and net apparel exports. The magnitude of the positive effect was less on India's gross and net apparel exports than on its gross textile exports, with the apparel exports increasing between $0.61 and $0.64 per dollar increase in net value of physical-capital stock. The magnitude of the negative impact on South Korea's gross and net apparel exports was minimal by comparison, with the exports declining in the range of US $0.33 to US $0.35 per dollar increase in net value of physical-capital stock.

As shown in Tables 46 and 47, one-year lagged net values of physical-capital stock were positively related to South Korea's current-year gross textile exports and to India's current-year gross and net apparel exports. Of these cases, the strongest relationship was between South Korea's previous-year net value of physical-capital stock and its current-year gross textile exports, which increased $1.50 per dollar increase in the net value of physical-capital stock. A negative impact of previous-year net value of physical-capital stock was found in one instance, South Korea's current-year gross apparel exports, but the impact was in the same range as that of current-year net value of physical-capital stock.

H2: A country's technological capital will have had a positive impact on its textile exports and a negative impact on its apparel exports.

In line with the hypothesis, the results indicate that current-year technological capital, measured as the number of scientists, engineers, and technical personnel involved in R&D, negatively affected South Korea's gross and net apparel exports, but contrary to the hypothesis, also had a negative effect on its net textile exports. Possible reasons for the negative effects were discussed in the previous chapter. The negative effect was rather large in all three cases. The largest impact was the US $4.14 drop in net textile exports per person increase in the number of scientists, engineers, and technical personnel involved in R&D. South Korea's gross and net apparel both decreased about US $1.30 per person increase in its number of scientists, engineers, and technical personnel when instead the impact of one-year lagged technological capital was examined, the results showed a negative effect on both India's and South Korea's current-year gross and net apparel exports as hypothesized. The effect was most pronounced in the case of South Korea, whose current-year apparel exports decreased by about US $1.50 per person increase in its previous-year number of scientists, engineers, and technical personnel involved in R&D.

H3-a: Human capital, measured by enrollment in secondary-level education, will have had a positive effect on textile exports but a negative effect on apparel exports.

The results indicate that a positive impact of previous-year secondary-education enrollment on India's current-year gross and net exports of textiles and apparel and on South Korea's current-year gross and net apparel exports. The positive effect was largest for India's gross and net textile exports, which increase by US $1.00 per person increase in previous-year enrollment in secondary education. Contrary to expectations, the results also showed a negative impact of current-year changes in secondary-education enrollment on current-year changes in net textile exports of India but the impact was small.

H3-b: Human capital, measured by enrollment in tertiary-level education, will have had a positive effect on textile exports, but an uncertain effect on apparel exports.

The regression results indicate that the current-year tertiary-education enrollment had a positive impact on South Korea's net textile exports and gross apparel exports. The largest of these effects were on net textile exports, which increased $3.90 per person increase in enrollment of tertiary education. One-year lagged tertiary-education enrollment also positively affected South Korea's gross textile exports and its gross and net apparel exports. Previous-year enrollment in tertiary-education led to a US $2.50 increase in South Korea's current-year gross textile exports and an increase of US $1.25 to US $1.35 in its current-year gross and net apparel exports. A result contrary to expectations was a relatively small negative effect of current-year changes in tertiary-education enrollment impact on current-year changes in India's net textile exports.

H4: A country's unit labor cost will have had a negative impact on its exports of both textiles and apparel.

Contrary to the hypothesis, results indicate large positive impacts of current-year unit labor cost on India's gross and net textile exports, such that the imports increased in the range of US $1.25 to US $1.28 per dollar increase in unit labor cost. One-year lagged unit labor cost also showed a positive impact of approximately the same magnitude on India's gross and net textile exports. Although the results also showed a positive relationship between current-year changes in unit labor cost and current-year changes in net textile exports, the coefficient was only .403. Due to multicollinearity and methodological limitations mentioned earlier, the signs on unit labor cost variables may not accurately reflect the effect of labor cost on exports.

H5: A country's per-capita domestic apparel production will have had a negative impact on its textile exports and a positive impact on its apparel exports.

The results indicated, contrary to expectations, a positive impact of domestic apparel production on India's gross and net textile exports, but in conformance with expectations, also a positive impact on India's net apparel exports and South Korea's gross apparel exports. The positive effect was strongest for India's gross and net textile exports, which increased between

$0.73 and $0.76 per dollar increase in its domestic apparel production. One-year lagged domestic apparel production also had a positive impact on India's current-year net textile exports and South Korea's gross apparel exports. This effect was strongest for India's current-year net textile exports which increased $0.73 per dollar increase in its domestic apparel production.

H6: A country's domestic cotton production will have had a positive impact on its exports of both textiles and apparel.

The results for this hypothesis indicate that one-year lagged domestic cotton production had a positive impact on South Korea's current-year gross and net textile and apparel exports. The positive effect was most pronounced in the case of the gross textile exports, which increased $1.73 per metric-to increase in domestic cotton production.

Best Model

Textile Exports

The best model for textile exports Model 1 for India, which measured the impact of current-year independent variables on current-year gross textile exports. This model has adjusted R^2 of .834 and the largest number of significant variable, those being net value of physical-capital stock, unit labor cost, and domestic apparel production.

Apparel Exports

The best model for apparel exports was Model 2 for South Korea which measured the impact of one-year lagged independent variables on current-year gross apparel exports. This model had an adjusted R^2 of .970 and the largest number of significant variables, which were net value of physical-capital stock, technological capital, enrollment in secondary- and tertiary-education, per-capita domestic apparel production, and domestic cotton production.

Implications

The results of this research should be of interest to textile and apparel industry analysts, policy makers concerned with factors influencing countries' export performance in textiles and apparel, and investors interested in the industries of India and South Korea. Policy makers and industry analysts should focus on means for creating a favorable environment in India for meeting the growing global demand for textiles and apparel, as well as the growing competition for high-quality and low-priced products in major export markets following the elimination of quotas in 2005. This study's findings of positive impacts of net value of physical-capital stock on India's gross textile exports and gross and net apparel exports suggest that policy makers in India should work to enhance government policies to stimulate more capital investments in the country including foreign investment in the Indian textile and apparel industry. Between 1991 and 2004, the India textile and apparel industry received only one percent of the country's total inflow of foreign direct investment, unlike in competitor nations like China, Bangladesh, Mexico, Mauritius, and Caribbean Basin countries where foreign investment has played a critical role in developing their textile and apparel industries (Tewari, 2005). India could follow the foot steps of South Korea in policies on foreign investment, business strategies, and planned industrial investments that have contributed to South Korea's miraculous growth in the past decades.

The findings of positive impacts of enrollment in secondary-level education on India's gross and net exports of textiles and apparel imply that policy makers and investors should consider investing in and improving India's human capital to advance India's ability to compete in major markets in terms of product quality and service following the elimination of quotas. India is in need of improving the quality and variety of its products and services provided through effective management and reduced lead times to be able to compete in the international textile and apparel market. According to a report of the U.S. International Trade Commission (2004), India's poor infrastructure and inefficient bureaucracy are among the concerns of the U.S. retailers who source textile products from India. In order to attract buyer from major importing countries like the U.S., Indian investors and policy makers should give attention to improving the country's business climate, infrastructure, logistics and shipping and to easing the paper work and legal restrictions related to trade. The results of the present study also showed positive impacts of domestic apparel production on India's gross and net exports of textiles and apparel. These results suggest that policy makers should give priority to the growth of domestic apparel production in the country by easing permits and regulatory policies that impede entry of domestic and foreign investors into the sector and b providing credit and tax deductions, tariff exemptions, and preferential loans to entrepreneurs in India's apparel industry.

In the case of South Korea, this study indicated positive impacts of the net value of physical-capital stock on gross and net textile exports, suggesting that policy makers and investors should target textile and apparel products in which South Korea has a competitive edge over other countries in terms of technology and human capital. Analysts and investors should give attention to improving markets for smart textiles and other high-tech textiles for which South Korea possesses comparative advantage in competing with developed and developing countries. This study's findings of negative impacts of net value of physical-capital stock and technological capital on South Korea's gross and net apparel exports implies that South Korea will likely lose comparative advantage in apparel production in the long run. Buyers would be wise to look elsewhere to source their production in countries with comparative advantage in apparel production as well as integrated production systems to accommodate full-package production.

Suggestions for Future Research

This study addresses the effects of industry-specific variables, including domestic apparel and cotton production and unit labor cost, on textile and apparel exports and not the effects of government policies on the exports. According to Haggard (1990), a country's exports are critically influenced by government policies and are not entirely ruled by its factor endowments. In the case of textile and apparel exports, influential policies could be ones that help or deter the development of certain industries, such as described in the literature review of this thesis, or they could be policies that govern international trade, such as voluntary-export restraints (VERs) to limit one country's exports to another. As an example, the VERs established under the Multi-Fiber Arrangement are believed to have strongly influenced the textile and apparel exports of newly industrialized countries like South Korea and of many developing countries like India, as these were quantitative restrictions on their textile and apparel exports to developed-country markets (Cline, 1990). Although the VERs limited the quantity of countries' exports, countries could often maintain or increase the total value of their textile and apparel exports by upgrading to higher-valued products and by shifting to unrestricted products. Also outside the scope of this study are the effects of countries' communication and transportation infrastructures. Depending on its stage of development and level of sophistication, a country's communication and transportation infrastructure can either facilitate or impede its exportation of products.

A limitation of this study lies in the specification of some variables. For example, measuring technological capital by the number of scientists, engineers, and technical personnel involved in a country's research and development and measuring human capital by enrollment per-capita in secondary- and tertiary-level education may not capture the actual technological capital and human capital of the country. In addition, multicollieарity problems were found among the independent variables. Although joint *F* tests were conducted on highly correlated independent variables in various models to test the significance of such variables in determining textile or apparel exports, these tests do not remove the multicollinearity that makes regression results unreliable. Lastly, data were missing for some years for India's and South Korea's enrollment in secondary and tertiary education and their numbers of scientists, engineers, and technical personnel involved in R&D. Values for the missing data were provided through interpolation and regression, but the actual values would have been preferable.

This study can serve as a starting point for future research on the determinants of textile and apparel exports of India, South Korea, or other countries. Certain limitations of the present study were cited in the paragraph above and earlier in the thesis. Future research could address ways to overcome at least some of the limitations, such as multicollinearity and lack of scaling of variables to similar magnitudes. Researchers could also analyze the effects of such variables as VERs, exchange rates, and communication and transportation infrastructure on countries' textile and apparel exports. Another important extension of the present study could be the use of variables lagged by more than one-year or having different lag structures than those in the present study.

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APPENDIX

Tables of the Research Data

Table 1A. **Gross and Net Textile Exports (SITC 65) of India and South Korea, 1972-2001**

	India			South Korea	
Years	Gross exports	Net exports	Years	Gross exports	Net export
1972	7214656453	7104799379	1972	128288147949	34558212821
1973	6691267432	6623173238	1973	244361309836	75513283374
1974	6714591747	6608716100	1974	238411260032	232123675564
1975	6504785279	4853724088	1975	233274450065	141938655272
1976	5690556436	5609485639	1976	250728859311	162908307806
1977	5514229011	5409452099	1977	221653384352	149501555941
1978	4624844216	4331310535	1978	232657694597	171459712531
1979	4961853426	4672385545	1979	215019380356	162797749643
1980	4890671101	4582794962	1980	291530401877	237331453470
1981	4622516651	4273031999	1981	275132875351	219680487412
1982	3818855747	3404892802	1982	233846603983	181823726162
1983	3395427264	2931925912	1983	228436104011	180606681194
1984	4600057622	4242330686	1984	223981927864	172194555456
1985	3511925633	3091594405	1985	233710150261	174743844135
1986	3619393731	3242900590	1986	220901457673	157230471757
1987	4539181407	4136180747	1987	219878238397	143792951760
1988	4255476668	3782123667	1988	191106577568	128531909168
1989	4984533162	4453126557	1989	187200328872	122961316404
1990	5053077811	4499096492	1990	184504326474	124710778200
1991	7315867132	6929449120	1991	195015946684	129616641373
1992	7507212315	7086860823	1992	198182967804	135509191522
1993	7794232867	7189571704	1993	185859841489	131049523510
1994	8675160833	7942874211	1994	183448274695	124612026884
1995	9441919420	8697458945	1995	178013297904	119452005173
1996	9474852194	8826857794	1996	178674361714	123792966933
1997	9884856792	9147369823	1997	344531324164	251121721316
1998	8119125670	7326275711	1998	209618251172	167694717987
1999	8341983999	7525340943	1999	185974494282	136981622445
2000	9793573234	8853659499	2000	205205967357	149455890107
2001	8308992679	7240884479	2001	167730045325	118562428369

Note. Values are in U.S. dollars.

Table 2A. **Changes in Gross and Net Textile Exports: India, 1973-2001**

Years	Gross exports	(a-b)	(a - b)/b	Net Exports	(a-b)	(a - b)/b
1973	6691267432	6691267432	0.072500	6623173238	-481626140.6	-0.06779
1974	6714591747	23324315.5	0.003486	6608716100	-14457138.52	-0.00218
1975	6504785279	-209806468	-0.031246	4853724088	-1754992011	-0.26556
1976	5690556436	-814228843	-0.125174	5609485639	755761550.9	0.15571
1977	5514229011	-176327425	-0.030986	5409452099	-200033540	-0.03566
1978	4624844216	-889384795	-0.161289	4331310535	-1078141564	-0.19931
1979	4961853426	337009211	0.072869	4672385545	341075009.8	0.07875
1980	4890671101	-71182326	-0.014346	4582794962	-89590582.82	-0.01917
1981	4622516651	-268154449	-0.054830	4273031999	-309762963.2	-0.06759
1982	3818855747	-803660905	-0.173858	3404892802	-868139197.4	-0.20317
1983	3395427264	-423428482	-0.110878	2931925912	-472966889.3	-0.13891
1984	4600057622	1204630358	0.354780	4242330686	1310404773	0.44694
1985	3511925633	-1.09E+09	-0.236548	3091594405	-1150736281	-0.27125
1986	3619393731	107468098	0.030601	3242900590	151306184.8	0.04894
1987	4539181407	919787676	0.254128	4136180747	893280156.6	0.27546
1988	4255476668	-283704738	-0.062501	3782123667	-354057080.1	-0.08560
1989	4984533162	729056494	0.171322	4453126557	671002890.8	0.17741
1990	5053077811	68544648.9	0.013751	4499096492	45969935.03	0.01032
1991	7315867132	2262789321	0.447804	6929449120	2430352628	0.54019
1992	7507212315	191345183	0.026155	7086860823	157411702.8	0.02272
1993	7794232867	287020552	0.038233	7189571704	102710881.1	0.01449
1994	8675160833	880927966	0.113023	7942874211	753302507.2	0.10478
1995	9441919420	766758586	0.088386	8697458945	754584733.6	0.09500
1996	9474852194	32932774.2	0.003488	8826857794	129398849.5	0.01488
1997	9884856792	410004598	0.043273	9147369823	320512028.4	0.03631
1998	8119125670	-1.77E+09	-0.178630	7326275711	-1821094112	-0.19908
1999	8341983999	222858330	0.027449	7525340943	199065232.5	0.02717
2000	9793573234	1451589235	0.174010	8853659499	1328318556	0.17651
2001	8308992679	-1.49E+09	-0.151587	7240884479	-1612775021	-0.18216

Note. All values are in U.S. dollars. Each change value in the fourth and seventh columns equals the difference between the value of exports at the end of the previous year and at the end of the current year divided by export value in the previous year.
a = end of current year; b = end of previous year.

Table 3A. **Changes in Gross and Net Textile Exports: South Korea, 1973-2001**

Years	Gross exports	a-b	(a-b)/b	Net Exports	a-b	(a-b)/b
1973	2.44361E+11	2.44361E+11	0.90500	75513283374	40955070553	1.185104
1974	2.38411E+11	-5950049804	-0.02435	2.32124E+11	1.5661E+11	2.073945
1975	2.33274E+11	-5136809967	-0.02155	1.41939E+11	-90185020292	-0.388520
1976	2.50729E+11	17454409246	0.07482	1.62908E+11	20969652534	0.147737
1977	2.21653E+11	-29075474959	-0.11596	1.49502E+11	-13406751865	-0.082300
1978	2.32658E+11	11004310244	0.04965	1.7146E+11	21958156590	0.146876
1979	2.15019E+11	-17638314240	-0.07581	1.62798E+11	-8661962888	-0.050520
1980	2.9153E+11	76511021521	0.35583	2.37331E+11	74533703828	0.457830
1981	2.75133E+11	-16397526526	-0.05625	2.1968E+11	-17650966058	-0.074370
1982	2.33847E+11	-41286271368	-0.15006	1.81824E+11	-37856761251	-0.172330
1983	2.28436E+11	-5410499972	-0.02314	1.80607E+11	-1217044968	-0.006690
1984	2.23982E+11	-4454176147	-0.01950	1.72195E+11	-8412125738	-0.046580
1985	2.3371E+11	9728222397	0.04343	1.74744E+11	2549288679	0.014805
1986	2.20901E+11	-12808692588	-0.05481	1.5723E+11	-17513372378	-0.100220
1987	2.19878E+11	-1023219276	-0.00463	1.43793E+11	-13437519997	-0.085460
1988	1.91107E+11	-28771660828	-0.13085	1.28532E+11	-15261042592	-0.106130
1989	1.872E+11	-3906248696	-0.02044	1.22961E+11	-5570592764	-0.043340
1990	1.84504E+11	-2696002398	-0.01440	1.24711E+11	1749461796	0.014228
1991	1.95016E+11	10511620211	0.05697	1.29617E+11	4905863173	0.039338
1992	1.98183E+11	3167021119	0.01624	1.35509E+11	5892550149	0.045461
1993	1.8586E+11	-12323126315	-0.06218	1.3105E+11	-4459668012	-0.032910
1994	1.83448E+11	-2411566794	-0.01298	1.24612E+11	-6437496626	-0.049120
1995	1.78013E+11	-5434976790	-0.02963	1.19452E+11	-5160021711	-0.041410
1996	1.78674E+11	661063809	0.00371	1.23793E+11	4340961760	0.036341
1997	3.44531E+11	1.65857E+11	0.92826	2.51122E+11	1.27329E+11	1.028562
1998	2.09618E+11	-1.34913E+11	-0.39158	1.67695E+11	-83427003329	-0.332220
1999	1.85974E+11	-23643756889	-0.11279	1.36982E+11	-30713095542	-0.183150
2000	2.05206E+11	19231473075	0.10341	1.49456E+11	12474267662	0.091065
2001	1.6773E+11	-37475922032	-0.18263	1.18562E+11	-30893461738	-0.206710

Note. All values are in U.S. dollars. Each change value in the fourth and seventh columns equals the difference between the value of exports at the end of the previous year and the end of the current year divided by export value in the previous year.
a = end of current year; b = end of previous year.

Table 4A. **Gross and Net Apparel Exports (SITC 84) of India and South Korea, 1972-2001**

India			South Korea		
Years	Gross Exports	Net exports	Years	Gross Exports	Net exports
1972	783168645	782248863.5	1972	321236759801	307550738540
1973	976088556	974612403.9	1973	421016168339	414870293409
1974	1332552906	1331578451	1974	463174897152	460318722160
1975	1619009794	1616915102	1975	412763572905	411390732581
1976	2558078464	2557035671	1976	487585045204	485045490203
1977	2125843934	2125088620	1977	424005229776	422194629312
1978	2357744141	2357156360	1978	391447659122	389396827763
1979	2712938589	2712613616	1979	338283338045	336221651062
1980	2520709563	2519981728	1980	391270833905	389396555784
1981	2987005067	2985911761	1981	434402110395	433233846341
1982	2243772919	2241356048	1982	394369696837	393108183858
1983	2654617838	2651070582	1983	350804579667	349572727247
1984	3264506863	3257786254	1984	387501847103	386210006716
1985	3104756651	3103866752	1985	412215995360	410698284193
1986	3620932077	3614474055	1986	378215114601	376710559608
1987	4244161787	4237217785	1987	407979455155	406766228170
1988	4059515405	4051584195	1988	348347351688	346768490454
1989	5689819475	5681962236	1989	322030857006	318955015255
1990	5894485215	5890866367	1990	244122226790	239360495430
1991	7331551649	7326437136	1991	201208516488	196040533843
1992	7964022376	7953661463	1992	167421218146	160619065162
1993	7962946869	7953411860	1993	131564946912	123683978853
1994	8423788017	8414221468	1994	100267847701	87835936524
1995	8944956538	8930408322	1995	73525236249	57503757487
1996	8138214203	8118656915	1996	60584081132	38835694620
1997	8237129290	8220149119	1997	110240050118	73305497903
1998	8573509495	8549151655	1998	88102680995	78409096078
1999	8502575969	8469404300	1999	79736597292	67068123090
2000	10148563941	10104581240	2000	83678634262	61736023820
2001	8536005398	8471647840	2001	69286601934	42827035900

Note. Values are in U.S. dollars.

Table 5A. **Changes in Gross and Net Apparel Exports of India, 1973-2001**

Years	Gross Exports	a-b	(a-b)/b	Net Exports	a-b	(a-b)/b
1973	976088556	976088556	0.2463330	974612404	192363540	0.2459110
1974	1332552906	356464350	0.3651967	1331578451	356966047	0.3662650
1975	1619009794	286456888	0.2149685	1616915102	285336651	0.2142850
1976	2558078464	939068670	0.5800266	2557035671	940120569	0.5814290
1977	2125843934	-432234530	-0.1689680	2125088620	-431947051	-0.1689200
1978	2357744141	231900208	0.1090862	2357156360	232067740	0.1092040
1979	2712938589	355194448	0.1506501	2712613616	355457255	0.1507990
1980	2520709563	-192229026	-0.0708560	2519981728	-192631888	-0.0710100
1981	2987005067	466295504	0.1849858	2985911761	465930033	0.1848940
1982	2243772919	-743232148	-0.2488220	2241356048	-744555714	-0.2493600
1983	2654617838	410844919	0.1831045	2651070582	409714534	0.1827980
1984	3264506863	609889025	0.2297465	3257786254	606715672	0.2288570
1985	3104756651	-159750213	-0.0489350	3103866752	-153919502	-0.0472500
1986	3620932077	516175426	0.1662531	3614474055	510607303	0.1645070
1987	4244161787	623229710	0.1721186	4237217785	622743730	0.1722920
1988	4059515405	-184646382	-0.0435060	4051584195	-185633590	-0.0438100
1989	5689819475	1630304069	0.4016007	5681962236	1630378041	0.4024050
1990	5894485215	204665741	0.0359705	5890866367	208904130	0.0367660
1991	7331551649	1437066434	0.2437985	7326437136	1435570769	0.2436940
1992	7964022376	632470727	0.0862670	7953661463	627224327	0.0856110
1993	7962946869	-1075507	-0.0001350	7953411860	-249603	-0.0000310
1994	8423788017	460841148	0.0578732	8414221468	460809607	0.0579390
1995	8944956538	521168521	0.0618687	8930408322	516186854	0.0613470
1996	8138214203	-806742336	-0.0901900	8118656915	-811751407	-0.0909000
1997	8237129290	98915088	0.0121544	8220149119	101492204	0.0125010
1998	8573509495	336380204	0.0408371	8549151655	329002536	0.0400240
1999	8502575969	-70933526	-0.0082740	8469404300	-79747355	-0.0093300
2000	10148563941	1645987972	0.1935870	10104581240	1635176940	0.1930690
2001	8536005398	-1612558543	-0.1588950	8471647840	-1632933400	-0.1616000

Note. All values are in U.S. dollars. Each change value in the fourth and seventh columns equals the difference between the value of exports at the end of the previous year and the end of the current year divided by export value in the previous year.
a = end of current year; b = end of previous year.

Table 6A. **Changes in Gross and Net Apparel Exports of South Korea, 1973-2001**

Years	Gross exports	a-b	(a-b)/b		Net Exports	a-b	(a-b)/b
1973	4.21E+11	4.21E+11	0.3110		4.15E+11	1.07E+11	0.3490
1974	4.63E+11	4.22E+10	0.1000		4.60E+11	4.55E+10	0.1100
1975	4.13E+11	-5.04E+10	-0.1090		4.11E+11	-4.89E+10	-0.1060
1976	4.88E+11	7.48E+10	0.1810		4.85E+11	7.37E+10	0.1790
1977	4.24E+11	-6.36E+10	-0.1300		4.22E+11	-6.29E+10	-0.1300
1978	3.91E+11	-3.26E+10	-0.0770		3.89E+11	-3.28E+10	-0.0780
1979	3.38E+11	-5.32E+10	-0.1360		3.36E+11	-5.32E+10	-0.1370
1980	3.91E+11	5.30E+10	0.1570		3.89E+11	5.32E+10	0.1580
1981	4.34E+11	4.31E+10	0.1100		4.33E+11	4.38E+10	0.1130
1982	3.94E+11	-4.00E+10	-0.0920		3.93E+11	-4.01E+10	-0.0930
1983	3.51E+11	-4.36E+10	-0.1100		3.50E+11	-4.35E+10	-0.1110
1984	3.88E+11	3.67E+10	0.1050		3.86E+11	3.66E+10	0.1050
1985	4.12E+11	2.47E+10	0.0640		4.11E+11	2.45E+10	0.0630
1986	3.78E+11	-3.40E+10	-0.0820		3.77E+11	-3.40E+10	-0.0830
1987	4.08E+11	2.98E+10	0.0790		4.07E+11	3.01E+10	0.0800
1988	3.48E+11	-5.96E+10	-0.1460		3.47E+11	-6.00E+10	-0.1470
1989	3.22E+11	-2.63E+10	-0.0760		3.19E+11	-2.78E+10	-0.0800
1990	2.44E+11	-7.79E+10	-0.2420		2.39E+11	-7.96E+10	-0.2500
1991	2.01E+11	-4.29E+10	-0.1760		1.96E+11	-4.33E+10	-0.1810
1992	1.67E+11	-3.38E+10	-0.1680		1.61E+11	-3.54E+10	-0.1810
1993	1.32E+11	-3.59E+10	-0.2140		1.24E+11	-3.69E+10	-0.2300
1994	1.00E+11	-3.13E+10	-0.2380		8.78E+10	-3.59E+10	-0.2900
1995	7.35E+10	-2.67E+10	-0.2670		5.75E+10	-3.03E+10	-0.3450
1996	6.06E+10	-1.29E+10	-0.1760		3.88E+10	-1.87E+10	-0.3250
1997	1.10E+11	4.97E+10	0.8200		7.33E+10	3.45E+10	0.8880
1998	8.81E+10	-2.21E+10	-0.2010		7.84E+10	5.10E+09	0.0700
1999	7.97E+10	-8.37E+09	-0.0950		6.71E+10	-1.13E+10	-0.1450
2000	8.37E+10	3.94E+09	0.0490		6.17E+10	-5.33E+09	-0.0800
2001	6.93E+10	-1.44E+10	-0.1720		4.28E+10	-1.89E+10	-0.3060

Note. All values are in U.S. dollars. Each change value in the fourth and seventh columns equals to the difference between the value of exports at the end of the previous year and the end of the current year divided by export value in the previous year.
a = end of current year; b = end of previous year.

Table 7A. **Net Value of Physical-Capital Stock (PK) of India and South Korea, 1972-2001**

India			South Korea	
Years	PK		Years	PK
1972	4531767494323		1972	10905397536329
1973	5706536791268		1973	11284228255419
1974	6880909223716		1974	12123526076042
1975	8356007815214		1975	12586170604579
1976	9196858936233		1976	12821760538381
1977	9732946385044		1977	13177619824219
1978	10835115908959		1978	13778175350502
1979	11837949657422		1979	14557125288298
1980	14286789168725		1980	14894605924388
1981	20003151674890		1981	14856595825785
1982	24068285469950		1982	14842805846805
1983	30670560450778		1983	14838582276821
1984	40690880459544		1984	14904933946436
1985	46105774629496		1985	15230511015965
1986	56219425853684		1986	15168792775431
1987	63096411004769		1987	15228806561111
1988	93664206781266		1988	15341055898644
1989	123830894421127		1989	15583359968539
1990	155369439330682		1990	16107887120939
1991	253778630921332		1991	16732374999125
1992	297477723370164		1992	17063549866969
1993	404731028704462		1993	17201364449273
1994	478854137480823		1994	17395258276887
1995	645954895230548		1995	17650478743647
1996	751055104530622		1996	17990431316844
1997	910595125089486		1997	18060017898765
1998	1114787692569020		1998	17278558370773
1999	1277854828102400		1999	16911758352932
2000	1477328361094190		2000	16711322171002
2001	1649522443818480		2001	16394785795950

Note. Each value was calculated using the formula PK = K_{tb}*P_{tb}*e_t, where PK = net value of physical-capital stock; K_{tb} = value of capital stock in the home currency at the end of year t, deflated to base year 1974; P_{tb} = implicit gross domestic product deflators with base year b = 1974, in year t; and e_t = exchange rate with the U.S. dollar in year t. Values are in U.S. dollars.

Table 8A. **Changes in Net Value of Physical-Capital Stock (PK) of India and South Korea, 1973-2001**

	India					
Years	PK	a-b	(a-b)/b	PK	a-b	(a-b)/b
1973	5.70654E+12	1.175E+12	0.2592298	1.12842E+13	3.788E+11	0.0347379
1974	6.88091E+12	1.174E+12	0.2057942	1.21235E+13	8.393E+11	0.0743780
1975	8.35601E+12	1.475E+12	0.2143755	1.25862E+13	4.626E+11	0.0381609
1976	9.19686E+12	8.409E+11	0.1006283	1.28218E+13	2.356E+11	0.0187182
1977	9.73295E+12	5.361E+11	0.0582903	1.31776E+13	3.559E+11	0.0277543
1978	1.08351E+13	1.102E+12	0.1132411	1.37782E+13	6.006E+11	0.0455739
1979	1.18379E+13	1.003E+12	0.0925540	1.45571E+13	7.789E+11	0.0565351
1980	1.42868E+13	2.449E+12	0.2068635	1.48946E+13	3.375E+11	0.0231832
1981	2.00032E+13	5.716E+12	0.4001153	1.48566E+13	-3.801E+10	-0.0025519
1982	2.40683E+13	4.065E+12	0.2032247	1.48428E+13	-1.379E+10	-0.0009282
1983	3.06706E+13	6.602E+12	0.2743143	1.48386E+13	-4.224E+09	-0.0002846
1984	4.06909E+13	1.002E+13	0.3267081	1.49049E+13	6.635E+10	0.0044716
1985	4.61058E+13	5.415E+12	0.1330739	1.52305E+13	3.256E+11	0.0218436
1986	5.62194E+13	1.011E+13	0.2193576	1.51688E+13	-6.172E+10	-0.0040523
1987	6.30964E+13	6.877E+12	0.1223240	1.52288E+13	6.001E+10	0.0039564
1988	9.36642E+13	3.057E+13	0.4844617	1.53411E+13	1.122E+11	0.0073709
1989	1.23831E+14	3.017E+13	0.3220727	1.55834E+13	2.423E+11	0.0157945
1990	1.55369E+14	3.154E+13	0.2546904	1.61079E+13	5.245E+11	0.0336594
1991	2.53779E+14	9.841E+13	0.6333883	1.67324E+13	6.245E+11	0.0387691
1992	2.97478E+14	4.37E+13	0.1721937	1.70635E+13	3.312E+11	0.0197925
1993	4.04731E+14	1.073E+14	0.3605423	1.72014E+13	1.378E+11	0.0080765
1994	4.78854E+14	7.412E+13	0.1831417	1.73953E+13	1.939E+11	0.0112720
1995	6.45955E+14	1.671E+14	0.3489596	1.76505E+13	2.552E+11	0.0146718
1996	7.51055E+14	1.051E+14	0.1627052	1.79904E+13	3.4E+11	0.0192602
1997	9.10595E+14	1.595E+14	0.2124212	1.806E+13	6.959E+10	0.0038680
1998	1.11479E+15	2.042E+14	0.2242408	1.72786E+13	-7.815E+11	-0.0432701
1999	1.27785E+15	1.631E+14	0.1462764	1.69118E+13	-3.668E+11	-0.0212286
2000	1.47733E+15	1.995E+14	0.1561003	1.67113E+13	-2.004E+11	-0.0118519
2001	1.64952E+15	1.722E+14	0.1165578	1.63948E+13	-3.165E+11	-0.0189414

Note. Each value was calculated using the formula PK = K_{tb}*P_{tb}*e_t, where PK = net value of physical-capital stock; K_{tb} = value of capital stock in the home currency at the end of year t, deflated to base year 1974; P_{tb} = implicit gross domestic product deflators with base year b = 1974, in year t; e_t = exchange rate with the U.S. dollar in year t. Values are in U.S. dollars. All values are in U.S. dollars. Each change value in the fourth and seventh columns equals the difference between the value of PK at the end of the current-year and the end of the previous-year divided by value in the previous year.
a = end of current year; b = end of previous year.

Table 9A. **Technological Capital of India and South Korea, 1972-2001**

Years	India	South Korea
1972	103767	8764
1973	96954	9974
1974	59239	10854
1975	56672	19331
1976	54105	19390
1977	55316	22086
1978	56527	23658
1979	60701	23393
1980	64875	25851
1981	79286.5	29533
1982	93698	40111
1983	96917	45894
1984	100136	54778
1985	103772.5	59622
1986	107409	68529
1987	113218	75159
1988	119027	80238
1989	123531.5	91187
1990	128036	99427
1991	130152.8	121024
1992	132269.5	135389
1993	134386.3	143312
1994	136503	174248
1995	246837.5	185789
1996	357172	187670
1997	343832	196748
1998	330492	180486
1999	339166.25	202087
2000	347840.5	221000
2001	356514.75	241675

Note. Technological capital is measured as the number of scientists, engineers, and technical personnel involved in research and development.

Table 10A. **Changes in Technological Capital of India and South Korea, 1972-2001**

	India			South Korea		
Years	TC	a-b	(a-b)/b	TC	a-b	(a-b)/b
1973	96954	-6813	-0.06566	9974	1210	0.138065
1974	59239	-37715	-0.38900	10854	880	0.088229
1975	56672	-2567	-0.04333	19331	8477	0.781002
1976	54105	-2567	-0.04530	19390	59	0.003052
1977	55316	1211	0.02238	22086	2696	0.139041
1978	56527	1211	0.02189	23658	1572	0.071176
1979	60701	4174	0.07384	23393	-265	-0.011200
1980	64875	4174	0.06876	25851	2458	0.105074
1981	79286.5	14411.5	0.22214	29533	3682	0.142432
1982	93698	14411.5	0.18177	40111	10578	0.358176
1983	96917	3219	0.03436	45894	5783	0.144175
1984	100136	3219	0.03321	54778	8884	0.193577
1985	103772.5	3636.5	0.03632	59622	4844	0.088430
1986	107409	3636.5	0.03504	68529	8907	0.149391
1987	113218	5809	0.05408	75159	6630	0.096747
1988	119027	5809	0.05131	80238	5079	0.067577
1989	123531.5	4504.5	0.03784	91187	10949	0.136457
1990	128036	4504.5	0.03646	99427	8240	0.090364
1991	130152.8	2116.8	0.01653	121024	21597	0.217215
1992	132269.5	2116.7	0.01626	135389	14365	0.118695
1993	134386.3	2116.8	0.01600	143312	7923	0.058520
1994	136503	2116.7	0.01575	174248	30936	0.215865
1995	246837.5	110334.5	0.80829	185789	11541	0.066233
1996	357172	110334.5	0.44699	187670	1881	0.010124
1997	343832	-13340	-0.03735	196748	9078	0.048372
1998	330492	-13340	-0.03880	180486	-16262	-0.082650
1999	339166.3	8674.25	0.02625	202087	21601	0.119682
2000	347840.5	8674.25	0.02558	221000	18913	0.093588
2001	356514.8	8674.25	0.02494	241675	20675	0.093552

Note. TC = number of scientists, engineers, and technical personnel involved in R&D. Each change value equals to the difference between the value of TC at the end of the current-year and at the end of the previous-year divided by the value in the previous year.
a = end of current year; b = end of previous year;

Table 11A. **Human Capital: India, 1972-2001**

Years	Secondary Enrollment	Population Aged 15-19	ED2	Tertiary Enrollment	Population Aged 20-24	ED3
1972	21265709	58395000	0.36417	3146892	49399000	0.063703554
1973	21341412	60120000	0.3549802	3500690	50646000	0.06912076
1974	22977254	62040000	0.3703619	4531689	52007000	0.087136136
1975	23638666	64009000	0.3693022	4615992	53399000	0.086443417
1976	24325788	63702000	0.3818685	4555001	52828000	0.086223234
1977	25831558	65899000	0.3919871	5038369	54947000	0.09169507
1978	26810272	67744000	0.3957586	4456198	56667000	0.078638326
1979	28065536	69958000	0.4011769	5345580	58818000	0.090883403
1980	32748397	71943000	0.4551992	3545318	60723000	0.058385093
1981	31666289	73817000	0.4289837	4691701	62693000	0.074836125
1982	34032130	75448900	0.451062	4857134	63843125	0.076079207
1983	39681305	77080800	0.5148014	5474700	64993250	0.084234901
1984	42106750	78712700	0.5349423	4271618	66143375	0.064581192
1985	44484544	80344600	0.5536719	4470844	67293500	0.066437977
1986	46348795	82590000	0.5611914	4806179	69490000	0.069163606
1987	45879040	84272000	0.5444162	4275859	72014000	0.059375385
1988	49535112	85952000	0.5763113	4528956	74533000	0.06076444
1989	51625010	87631000	0.5891181	4739965	77053000	0.061515645
1990	53714908	89313000	0.6014232	4950974	79574000	0.062218488
1991	55804806	91153000	0.6122103	4946398	81915000	0.060384521
1992	62115978	91032500	0.6823495	4941822	83739500	0.059014229
1993	64115978	90912000	0.7052532	4937245	85564000	0.057702363
1994	65206357	91016000	0.7164274	4932669	84531333	0.058353143
1995	66633720	91120000	0.7312744	5695780	83498667	0.068214023
1996	68872393	91224000	0.7549811	6060418	82466000	0.073489899
1997	68344192	94292000	0.7248143	7338632	83657000	0.087722866
1998	65271840	98133333	0.6651342	7504065	85164000	0.088113111
1999	70412400	100000000	0.704124	9404460	86671000	0.108507575
2000	71879180	105816000	0.6792846	9834046	88178000	0.111524938
2001	75596380	104946310.9	0.7203338	10576653	90680000	0.116637109

Note. ED2 was calculated by enrollment at the secondary level/ population aged 15-19; and ED3 was calculated by enrollment at the tertiary level/ population aged 20-24.

Table 12A. **Changes in Human Capital: India, 1973-2001**

Years	ED2	a-b	(a-b)/b		ED3	a-b	(a-b)/b
1973	0.35498	-0.009190	-0.02523		0.069121	0.005417	0.085038
1974	0.37036	0.015382	0.04333		0.087136	0.018015	0.260636
1975	0.36930	-0.001060	-0.00286		0.086443	-0.000690	-0.007950
1976	0.38187	0.012566	0.03403		0.086223	-0.000220	-0.002550
1977	0.39199	0.010119	0.02650		0.091695	0.005472	0.063461
1978	0.39576	0.003772	0.00962		0.078638	-0.013060	-0.142390
1979	0.40118	0.005418	0.01369		0.090883	0.012245	0.155714
1980	0.45520	0.054022	0.13466		0.058385	-0.032500	-0.357580
1981	0.42898	-0.026220	-0.05759		0.074836	0.016451	0.281768
1982	0.45106	0.022078	0.05147		0.076079	0.001243	0.016611
1983	0.51480	0.063739	0.14131		0.084235	0.008156	0.107200
1984	0.53494	0.020141	0.03912		0.064581	-0.019650	-0.233320
1985	0.55367	0.018730	0.03501		0.066438	0.001857	0.028751
1986	0.56119	0.007520	0.01358		0.069164	0.002726	0.041025
1987	0.54442	-0.016780	-0.02989		0.059375	-0.009790	-0.141520
1988	0.57631	0.031895	0.05859		0.060764	0.001389	0.023394
1989	0.58912	0.012807	0.02222		0.061516	0.000751	0.012363
1990	0.60142	0.012305	0.02089		0.062218	0.000703	0.011425
1991	0.61221	0.010787	0.01794		0.060385	-0.001830	-0.029480
1992	0.68235	0.070139	0.11457		0.059014	-0.001370	-0.022690
1993	0.70525	0.022904	0.03357		0.057702	-0.001310	-0.022230
1994	0.71643	0.011174	0.01584		0.058353	0.000651	0.011278
1995	0.73127	0.014847	0.02072		0.068214	0.009861	0.168986
1996	0.75498	0.023707	0.03242		0.073490	0.005276	0.077343
1997	0.72481	-0.030170	-0.03996		0.087723	0.014233	0.193672
1998	0.66513	-0.059680	-0.08234		0.088113	0.000390	0.004449
1999	0.70412	0.038990	0.05862		0.108508	0.020394	0.231458
2000	0.67929	-0.024840	-0.03528		0.111525	0.003017	0.027808
2001	0.72033	0.041049	0.06043		0.116637	0.005112	0.045839

Note. ED2 was calculated by enrollment at the secondary level/ population aged 15-19; and ED3 was calculated by enrollment at the tertiary level/ population aged 20-24. Each change value equals to the difference between the value of ED2 or ED3 at the end of the current-year and at the end of the previous-year divided by the values in the previous year.
a = end of current year; b = end of previous year;

Table 13A. **Human Capital: South Korea, 1972-2001**

Years	Secondary Enrollment	Population Aged 15-19	ED2	Tertiary Enrollment	Population Aged 20-24	ED3
1972	2300986	2729354	0.8430515	225835	3542642	0.0637475
1973	2695053	2844374	0.947503	250233	3806518	0.065738
1974	2879948	2959394	0.9731546	273479	4070393	0.0671874
1975	3111510	3074414	1.012066	297219	4334269	0.0685742
1976	3322010	3322798	0.9997629	325460	4445466	0.0732117
1977	3492091	3571183	0.9778527	365107	4556663	0.080126
1978	3692809	3819567	0.9668135	418875	4667860	0.089736
1979	3997316	4045490	0.9880919	509308	4610402	0.1104693
1980	4285889	4271413	1.003389	615452	4552943	0.1351767
1981	4335025	4268672	1.0155442	786354	4443455	0.176969
1982	4435000	4390327	1.0101753	954066	4389491	0.2173523
1983	4571459	4511981	1.0131822	1075969	4335526	0.248175
1984	4718225	4521850	1.043428	1345114	4359879	0.3085209
1985	4834339	4274337	1.1310149	1455759	4407777	0.3302706
1986	4864045	4247156	1.1452475	1514784	4496767	0.3368607
1987	4767828	4232724	1.1264207	1544077	4568987	0.3379472
1988	4671611	4242464	1.1011551	1573369	4598261	0.3421661
1989	4545896	4289287	1.0598256	1630374	4564993	0.3571471
1990	4559557	4288624	1.0631748	1691429	4464015	0.3789031
1991	4458490	4387155	1.01626	1761775	4315266	0.4082657
1992	4484422	4485685	0.9997184	1858568	4166516	0.4460724
1993	3619938	4536703	0.7979226	2099021	4015682	0.522706
1994	4568829	4516212	1.0116507	2196895	3936507	0.5580823
1995	4639728	4435973	1.0459324	2342786	3863491	0.606391
1996	4662492	4320916	1.0790518	2541659	3851022	0.659996
1997	4046826	4205859	0.9621877	2589024	3838553	0.674479
1998	3431160	4090802	0.83875	2636388	3826084	0.6890565
1999	3316630	3975745	0.834216	2837880	3813615	0.7441443
2000	3205115	*3860688*	0.8301927	3003498	*3801146*	0.7901559
2001	3111434	3936561	0.790394	3129899	3603912	0.8684726

Note. ED2 was calculated by enrollment at the secondary level/ population aged 15-19; and ED3 was calculated by enrollment at the tertiary level/ population aged 20-24.

Table 14A. **Changes in Human Capital: South Korea, 1973-2001**

Years	ED2	a-b	(a-b)/b		ED3	a-b	(a-b)/b
1973	0.947503	0.104452	0.123897		0.065738	0.001991	0.031226
1974	0.973155	0.025652	0.027073		0.067187	0.001449	0.022047
1975	1.012066	0.038911	0.039985		0.068574	0.001387	0.020641
1976	0.999763	-0.012300	-0.012160		0.073212	0.004637	0.067627
1977	0.977853	-0.021910	-0.021920		0.080126	0.006914	0.094442
1978	0.966814	-0.011040	-0.011290		0.089736	0.009610	0.119936
1979	0.988092	0.021278	0.022009		0.110469	0.020733	0.231048
1980	1.003389	0.015297	0.015481		0.135177	0.024707	0.223659
1981	1.015544	0.012155	0.012114		0.176969	0.041792	0.309168
1982	1.010175	-0.005370	-0.005290		0.217352	0.040383	0.228194
1983	1.013182	0.003007	0.002977		0.248175	0.030823	0.141810
1984	1.043428	0.030246	0.029852		0.308521	0.060346	0.243159
1985	1.131015	0.087587	0.083942		0.330271	0.021750	0.070496
1986	1.145248	0.014233	0.012584		0.336861	0.006590	0.019954
1987	1.126421	-0.018830	-0.016440		0.337947	0.001087	0.003226
1988	1.101155	-0.025270	-0.022430		0.342166	0.004219	0.012484
1989	1.059826	-0.041330	-0.037530		0.357147	0.014981	0.043783
1990	1.063175	0.003349	0.003160		0.378903	0.021756	0.060916
1991	1.016260	-0.046910	-0.044130		0.408266	0.029363	0.077494
1992	0.999718	-0.016540	-0.016280		0.446072	0.037807	0.092603
1993	0.797923	-0.201800	-0.201850		0.522706	0.076634	0.171796
1994	1.011651	0.213728	0.267856		0.558082	0.035376	0.067679
1995	1.045932	0.034282	0.033887		0.606391	0.048309	0.086562
1996	1.079052	0.033119	0.031665		0.659996	0.053605	0.088400
1997	0.962188	-0.116860	-0.108300		0.674479	0.014483	0.021944
1998	0.838750	-0.123440	-0.128290		0.689056	0.014577	0.021613
1999	0.834216	-0.004530	-0.005410		0.744144	0.055088	0.079947
2000	0.830193	-0.004020	-0.004820		0.790156	0.046012	0.061832
2001	0.790394	-0.039800	-0.047940		0.868473	0.078317	0.099116

Note. ED2 was calculated by enrollment at the secondary level/ population aged 15-19; and ED3 was calculated by enrollment at the tertiary level/ population aged 20-24. Each change value equals to the difference between the value of ED2 or ED3 at the end of the current-year and at the end of the previous-year divided by the value in the previous year.
a = end of current year; b = end of previous year;

Table 15A. **Unit Labor Cost in Textiles: India, 1972-2001**

Years	Total labor cost (million Rs.)	Value added (million Rs)	Unit Labor cost (million Rs.)	Exchange Rate	Unit labor cost (million $)	Unit labor cost (million $ deflated)
1972	5221	9688	0.538966542	8.08	0.06670378	0.773846492
1973	5860	11206	0.522934142	8.2	0.063772456	0.617637423
1974	7499	13173	0.569270477	8.15	0.069849138	0.569270477
1975	8070	11934	0.676219206	8.93	0.075724435	0.628825478
1976	7860	12382	0.634792441	8.88	0.071485635	0.547675796
1977	9330	13622	0.684921451	8.2	0.083527006	0.52215725
1978	9830	16875	0.582518519	8.18	0.071212533	0.409479377
1979	11522	20451	0.563395433	7.9	0.071315878	0.360830053
1980	12547	20776	0.603917982	7.93	0.076156114	0.325196511
1981	12700	20153	0.63017913	9.09	0.069326637	0.288897843
1982	14453	20275	0.712848335	9.63	0.074023711	0.293091708
1983	16733	24480	0.683537582	10.49	0.065160875	0.241160623
1984	18527	25935	0.71436283	12.45	0.057378541	0.226160343
1985	18123	26414	0.686113425	12.16	0.056423801	0.191621977
1986	20151	29451	0.684221249	13.12	0.05215101	0.171061151
1987	21173	28581	0.74080683	12.87	0.057560748	0.162835211
1988	22609	32449	0.696754908	14.94	0.046636875	0.120496646
1989	26406	48020	0.549895877	17.03	0.032289834	0.082838401
1990	29367	57129	0.514047156	18.07	0.028447546	0.066205029
1991	30882	53181	0.580696113	25.83	0.02248146	0.065118483
1992	35473	59140	0.599814001	26.2	0.022893664	0.058701414
1993	39021	85633	0.455677134	31.38	0.01452126	0.038841965
1994	43251	104124	0.41537974	31.38	0.013237085	0.030038816
1995	53655	99855	0.537329127	35.18	0.01527371	0.033125971
1996	54180	116458	0.465232101	35.93	0.012948291	0.024903779
1997	60065	121720	0.493468616	39.28	0.012562847	0.023737573
1998	51174	139375	0.367167713	42.48	0.008643308	0.015446018
1999	54842	145814	0.37610929	43.49	0.008648179	0.014222335
2000	57958	157211	0.36866377	46.75	0.007885856	0.012922199
2001	54088	139599	0.387452632	48.18	0.008041773	0.01249

Note. The unit labor cost in rupees equals the total labor cost in rupees divided by the value added in rupees. The unit labor cost in rupees was converted to U.S. dollars using the rupee-dollar exchange rate and then deflated to base year 1974.

Table 16A. **Unit Labor Cost in Textiles: South Korea, 1972-2001**

Years	Wages (billionW.)	Wages (million W)	Value added (billion W.)	Value Added (million W.)	Unit Labor (million W.)	Exchange rate	Unit labor cost (million $)	Unit labor cost (million $ deflated)
1972	42.2	42200	148.3	148300	0.28455833	398.9	0.00071336	0.518195476
1973	67.3	67300	283.4	283400	0.23747354	397.5	0.00059742	0.335424801
1974	88	88000	283.4	283400	0.31051517	484	0.00064156	0.310515173
1975	130	130000	456.2	456200	0.28496274	484	0.00058877	0.211649907
1976	188.6	188600	656.3	656300	0.28736858	484	0.00059374	0.155959086
1977	263	263000	758.3	758300	0.34682843	484	0.00071659	0.146819623
1978	370.4	370400	1129	1129000	0.32807795	484	0.00067785	0.102847334
1979	473.3	473300	1268	1268000	0.37326498	484	0.00077121	0.091364879
1980	571.1	571100	1609	1609000	0.35494096	659.9	0.00053787	0.071354512
1981	661	661000	2021	2021000	0.32706581	700.5	0.0004669	0.05243741
1982	725.2	725200	2005	2005000	0.36169576	748.8	0.00048303	0.05048004
1983	762	762000	2234	2234000	0.34109221	795.5	0.00042878	0.040577461
1984	871.2	871200	2625	2625000	0.33188571	827.4	0.00040112	0.034535779
1985	920.5	920500	2867	2867000	0.32106732	890.2	0.00036067	0.033410025
1986	1084	1084000	3513	3513000	0.30856818	861.4	0.00035822	0.024710709
1987	1326	1326000	4222	4222000	0.31406916	792.3	0.0003964	0.021456224
1988	1550	1550000	4662	4662000	0.33247533	684.1	0.000486	0.019117986
1989	1790	1790000	4667	4667000	0.38354403	679.6	0.00056437	0.019660782
1990	1933	1933000	4836	4836000	0.3997105	716.4	0.00055794	0.01698284
1991	2188.4	2188400	6164.4	6164400	0.35500616	760.8	0.00046662	0.012456066
1992	2450.8	2450800	6373.2	6373200	0.38454779	788.4	0.00048776	0.011889679
1993	2624.9	2624900	6624.8	6624800	0.39622328	808.1	0.00049031	0.010355136
1994	2778.8	2778800	7298.7	7298700	0.38072533	788.7	0.00048273	0.008501435
1995	2701.7	2701700	8099	8099000	0.33358439	774.7	0.0004306	0.006353809
1996	2672	2672000	7992	7992000	0.33433433	844.2	0.00039604	0.005661748
1997	2557	2557000	8024	8024000	0.31866899	1695	0.00018801	0.004929058
1998	2156.2	2156200	8545	8545000	0.2523347	1204	0.00020958	0.003959717
1999	2488.6	2488600	9725	9725000	0.25589717	1138	0.00022487	0.003671339
2000	2816.9	2816900	9660	9660000	0.29160455	1264.5	0.00023061	0.003828177
2001	2779.4	2779400	8880	8880000	0.3129955	1313.5	0.00023829	0.003821966

Note. The unit labor cost and value added in billion won were converted to million won. The unit labor cost in million won equals the total labor cost in won divided by the value added in won. The unit labor cost was converted to U.S. dollars using the won-dollar exchange rate and then deflated to base year 1974.

Table 17A. **Changes in Unit Labor Cots of Textiles: India and South Korea 1973-2001**

	India			South Korea		
Years	(million $)	a-b	(a-b)/b	(million $)	a-b	(a-b)/b
1973	0.617637	-0.15621	-0.20186	0.335425	-0.18277	-0.35271
1974	0.56927	-0.04837	-0.07831	0.310515	-0.02491	-0.07426
1975	0.628825	0.05956	0.10462	0.21165	-0.09887	-0.31839
1976	0.547676	-0.08115	-0.12905	0.155959	-0.05569	-0.26313
1977	0.522157	-0.02552	-0.04659	0.14682	-0.00914	-0.05860
1978	0.409479	-0.11268	-0.21579	0.102847	-0.04397	-0.29950
1979	0.36083	-0.04865	-0.11881	0.091365	-0.01148	-0.11165
1980	0.325197	-0.03563	-0.09875	0.071355	-0.02001	-0.21902
1981	0.288898	-0.03630	-0.11162	0.052437	-0.01892	-0.26511
1982	0.293092	0.00419	0.01452	0.05048	-0.00196	-0.03733
1983	0.241161	-0.05193	-0.17718	0.040577	-0.00990	-0.19617
1984	0.22616	-0.01500	-0.06220	0.034536	-0.00604	-0.14889
1985	0.191622	-0.03454	-0.15272	0.03341	-0.00113	-0.03260
1986	0.171061	-0.02056	-0.10730	0.024711	-0.00870	-0.26038
1987	0.162835	-0.00823	-0.04809	0.021456	-0.00325	-0.13170
1988	0.120497	-0.04234	-0.26001	0.019118	-0.00234	-0.10898
1989	0.082838	-0.03766	-0.31253	0.019661	0.00054	0.02839
1990	0.066205	-0.01663	-0.20079	0.016983	-0.00268	-0.13621
1991	0.065118	-0.00109	-0.01641	0.012456	-0.00453	-0.26655
1992	0.058701	-0.00642	-0.09854	0.01189	-0.00057	-0.04547
1993	0.038842	-0.01986	-0.33831	0.010355	-0.00153	-0.12907
1994	0.030039	-0.00880	-0.22664	0.008501	-0.00185	-0.17901
1995	0.033126	0.00309	0.10277	0.006354	-0.00215	-0.25262
1996	0.024904	-0.00822	-0.24821	0.005662	-0.00069	-0.10892
1997	0.023738	-0.00117	-0.04683	0.004929	-0.00073	-0.12941
1998	0.015446	-0.00829	-0.34930	0.00396	-0.00097	-0.19666
1999	0.014222	-0.00122	-0.07922	0.003671	-0.00029	-0.07283
2000	0.012922	-0.00130	-0.09142	0.003828	0.00016	0.04272
2001	0.01249	-0.00043	-0.03345	0.003822	-0.00001	-0.00162

Note. All values are in U.S. dollars. Each change value in the fourth and seventh columns equals to the difference between the value of unit labor cost at the end of the previous year and at the end of the current year divided by export value in the previous year.
a = end of current year; b = end of previous year.

Table 18A. **Unit Labor Cost in Apparel: India, 1972-2001**

Years	Wages apparel (million Rs.)	Value added (million Rs.)	Unit labor (million Rs.)	Exchange Rate	Unit labor cost (million $)	Unit labor cost (deflated $)
1972	50	89.33	0.5597224	8.08	0.0692726	0.803647656
1973	56	92	0.6086957	8.2	0.0742312	0.718930327
1974	72	111	0.6486486	8.15	0.0795888	0.648648649
1975	103	181	0.5690608	8.93	0.0637246	0.529177388
1976	158	300	0.5266667	8.88	0.0593093	0.454388817
1977	200	340	0.5882353	8.2	0.071736	0.448447517
1978	215	421	0.5106888	8.18	0.0624314	0.35898695
1979	240	434	0.5529954	7.9	0.0699994	0.354169283
1980	265	490	0.5408163	7.93	0.0681988	0.291217661
1981	271	573	0.4729494	9.09	0.0520296	0.21681781
1982	306	659	0.4643399	9.63	0.0482181	0.190916034
1983	667	676	0.9866864	10.49	0.0940597	0.34811532
1984	422	1033	0.4085189	12.45	0.0328128	0.129333114
1985	494	1073	0.4603914	12.16	0.0378611	0.128580949
1986	538	1396	0.3853868	13.12	0.029374	0.096349994
1987	738	2053	0.3594739	12.87	0.0279312	0.07901522
1988	983	3099	0.3171991	14.94	0.0212315	0.054856344
1989	1229	4129	0.2976508	17.03	0.017478	0.04483924
1990	1446	5536	0.2611994	18.07	0.0144549	0.033640329
1991	1898	8276	0.2293378	25.83	0.0088787	0.025717638
1992	2559	9488	0.2697091	26.2	0.0102942	0.026395359
1993	3628	21454	0.169106	31.38	0.005389	0.014414612
1994	4809	24110	0.1994608	31.38	0.0063563	0.014424311
1995	6146	24110	0.254915	35.18	0.007246	0.015715333
1996	6904	23485	0.2939749	35.93	0.0081819	0.015736415
1997	8074	21972	0.3674677	39.28	0.0093551	0.017676486
1998	7612	31808	0.2393109	42.48	0.0056335	0.010067334
1999	9500	36282	0.2618378	43.49	0.0060206	0.009901232
2000	11502	35566	0.3233988	46.75	0.0069176	0.011335594
2001	11904	32704	0.3639922	48.18	0.0075548	0.011733724

Note. The unit labor cost in rupees equals the total labor cost in rupees divided by the value added in rupees. The unit labor cost in rupees was converted to U.S. dollars using the rupee-dollar exchange rate and then deflated to base year 1974.

Table 19A. **Unit Labor Cost in Apparel: South Korea, 1972-2001**

Years	Wages (billion W)	Wages (million W.)	Val. added (billion W)	Value added (million W.)	Unit labor (million W.)	Exchange Rate	Unit labor cost (million $)	Unit labor cost (deflated $)
1972	11	11000	32.9	32900	0.3343465	398.9	0.0008382	0.6088623
1973	17.3	17300	79.3	79300	0.2181589	397.5	0.0005488	0.3081434
1974	29	29000	79.3	79300	0.3656999	484	0.0007556	0.3656999
1975	46.4	46400	117.6	117600	0.3945578	484	0.0008152	0.2930493
1976	84.8	84800	202.3	202300	0.4191794	484	0.0008661	0.2274947
1977	112.9	112900	259.4	259400	0.4352352	484	0.0008992	0.184244
1978	155.8	155800	370.5	370500	0.4205128	484	0.0008688	0.1318242
1979	181.8	181800	402	402000	0.4522388	484	0.0009344	0.1106955
1980	219.5	219500	550	550000	0.3990909	659.9	0.0006048	0.0802301
1981	298.6	298600	792	792000	0.3770202	700.5	0.0005382	0.0604464
1982	347.4	347400	803	803000	0.4326276	748.8	0.0005778	0.0603796
1983	385	385000	896	896000	0.4296875	795.5	0.0005401	0.0511171
1984	482.1	482100	1111	1111000	0.4339334	827.4	0.0005245	0.0451548
1985	524.9	524900	1125	1125000	0.4665778	890.2	0.0005241	0.0485517
1986	609	609000	1393	1393000	0.4371859	861.4	0.0005075	0.0350107
1987	736	736000	1676	1676000	0.4391408	792.3	0.0005543	0.0300007
1988	865	865000	1917	1917000	0.4512259	684.1	0.0006596	0.0259464
1989	1017	1017000	2102	2102000	0.4838249	679.6	0.0007119	0.0248013
1990	1059	1059000	2407	2407000	0.4399668	716.4	0.0006141	0.0186932
1991	1090.3	1090300	2688.7	2688700	0.405512	760.8	0.000533	0.0142282
1992	1188.6	1188600	2811.8	2811800	0.4227185	788.4	0.0005362	0.0130699
1993	1444.7	1444700	3758.4	3758400	0.3843923	808.1	0.0004757	0.0100459
1994	1584.7	1584700	4157	4157000	0.3812124	788.7	0.0004833	0.0085123
1995	1793	1793000	5104	5104000	0.3512931	774.7	0.0004535	0.0066911
1996	1761.4	1761400	4989	4989000	0.3530567	844.2	0.0004182	0.0059788
1997	1671.1	1671100	4946	4946000	0.337869	1695	0.0001993	0.005226
1998	1241.9	1241900	3449	3449000	0.3600754	1204	0.0002991	0.0056504
1999	1427.7	1427700	3737	3737000	0.3820444	1138	0.0003357	0.0054812
2000	1636.5	1636500	4343	4343000	0.3768133	1264.5	0.000298	0.0049468
2001	1716.2	1716200	4832	4832000	0.3551738	1313.5	0.0002704	0.004337

Note. The unit labor cost and value added in billion won were converted to million won. The unit labor cost in million won equals the total labor cost in won divided by the value added in won. The unit labor cost was converted to U.S. dollars using the won-dollar exchange rate and then deflated to base year 1974.

Table 20A. **Changes in Unit Labor Cost of Apparel: India and South Korea 1973-2001**

	India			South Korea		
Years	(million $)	a-b	(a-b)/b	(million $)	a-b	(a-b)/b
1973	0.71893	-0.08472	-0.10542	0.308143	-0.30072	-0.4939
1974	0.648649	-0.07028	-0.09776	0.3657	0.05756	0.1868
1975	0.529177	-0.11947	-0.18418	0.293049	-0.07265	-0.1987
1976	0.454389	-0.07479	-0.14133	0.227495	-0.06555	-0.2237
1977	0.448448	-0.00594	-0.01308	0.184244	-0.04325	-0.1901
1978	0.358987	-0.08946	-0.19949	0.131824	-0.05242	-0.2845
1979	0.354169	-0.00482	-0.01342	0.110695	-0.02113	-0.1603
1980	0.291218	-0.06295	-0.17774	0.08023	-0.03047	-0.2752
1981	0.216818	-0.07440	-0.25548	0.060446	-0.01978	-0.2466
1982	0.190916	-0.02590	-0.11946	0.06038	-0.00007	-0.0011
1983	0.348115	0.15720	0.82340	0.051117	-0.00926	-0.1534
1984	0.129333	-0.21878	-0.62848	0.045155	-0.00596	-0.1166
1985	0.128581	-0.00075	-0.00582	0.048552	0.00340	0.0752
1986	0.09635	-0.03223	-0.25067	0.035011	-0.01354	-0.2789
1987	0.079015	-0.01733	-0.17991	0.030001	-0.00501	-0.1431
1988	0.054856	-0.02416	-0.30575	0.025946	-0.00405	-0.1351
1989	0.044839	-0.01002	-0.18261	0.024801	-0.00115	-0.0441
1990	0.03364	-0.01120	-0.24976	0.018693	-0.00611	-0.2463
1991	0.025718	-0.00792	-0.23551	0.014228	-0.00447	-0.2389
1992	0.026395	0.00068	0.02635	0.01307	-0.00116	-0.0814
1993	0.014415	-0.01198	-0.45390	0.010046	-0.00302	-0.2314
1994	0.014424	0.00001	0.00067	0.008512	-0.00153	-0.1527
1995	0.015715	0.00129	0.08950	0.006691	-0.00182	-0.2140
1996	0.015736	0.00002	0.00134	0.005979	-0.00071	-0.1065
1997	0.017676	0.00194	0.12329	0.005226	-0.00075	-0.1259
1998	0.010067	-0.00761	-0.43047	0.00565	0.00042	0.0812
1999	0.009901	-0.00017	-0.01650	0.005481	-0.00017	-0.0300
2000	0.011336	0.00143	0.14487	0.004947	-0.00053	-0.0975
2001	0.011734	0.00040	0.03512	0.004337	-0.00061	-0.1233

Note. All values are in U.S. dollars. Each change value in the fourth and seventh columns equals the difference between the value of unit labor cost at the end of the previous year and at the end of the current year divided by value in the previous year.
a = end of current year; b = end of previous year.

Table 21A. **Per-capita Domestic Apparel Production: India, 1972-2001**

Years	Dom. Prod. (million Rs)	Exchange Rate	Dom. Prod. (million $)	Dom.Prod deflated (million $)	Population	Per-capita deflated $
1972	431	8.08	53.382426	619.30228	580745000	1.07E-06
1973	463	8.2	56.423171	546.45946	593989000	9.20E-07
1974	494	8.15	60.613497	494	607329000	8.13E-07
1975	610	8.93	68.309071	567.24733	620701000	9.14E-07
1976	928	8.88	104.5045	800.6446	634072000	1.26E-06
1977	1438	8.2	175.36585	1096.2748	647476000	1.69E-06
1978	1892	8.18	231.29584	1329.9749	660998000	2.01E-06
1979	2334	7.9	295.44304	1494.8246	674762000	2.22E-06
1980	2806	7.93	353.84615	1510.9691	688856000	2.19E-06
1981	3486	9.09	383.49835	1598.1137	703301000	2.27E-06
1982	3935	9.63	408.6189	1617.898	718072000	2.25E-06
1983	4827	10.49	460.15253	1703.0261	733166000	2.32E-06
1984	4300	12.45	345.38153	1361.3383	748568000	1.82E-06
1985	6026	12.16	495.55921	1682.9783	764260000	2.20E-06
1986	7345	13.12	559.83232	1836.3127	780243000	2.35E-06
1987	8700	12.87	675.99068	1912.3289	796504000	2.40E-06
1988	11500	14.94	769.74565	1988.8076	812994000	2.45E-06
1989	15800	17.03	927.77452	2380.172	829649000	2.87E-06
1990	20653	18.07	1142.9441	2659.9359	846418000	3.14E-06
1991	24770	25.83	958.96245	2777.6746	863261000	3.22E-06
1992	34751	26.2	1326.374	3400.9424	880166000	3.86E-06
1993	43563	31.38	1388.2409	3713.3145	897140000	4.14E-06
1994	68732	31.38	2190.3123	4970.4589	914200000	5.44E-06
1995	83713	35.18	2379.5623	5160.8489	931351000	5.54E-06
1996	102681	35.93	2857.8068	5496.4928	948591000	5.79E-06
1997	96471	39.28	2455.9827	4640.5938	965878000	4.80E-06
1998	118321	42.48	2785.3343	4977.5301	983110000	5.06E-06
1999	130496	43.49	3000.5978	4934.6236	1.00E+09	4.93E-06
2000	149473	46.75	3197.2834	5239.245	1.02E+09	5.15E-06
2001	155552	48.18	3228.5596	5014.4053	1.03E+09	4.85E-06

Note. Per-capita domestic apparel production equals the total domestic production divided by the population. The domestic apparel production in rupees was converted to U.S. dollars using the rupee-dollar exchange rate and then deflated to base year 1974.

Table 22A. **Per-Capita Domestic Apparel Production: South Korea, 1972-2001**

Years	Production (billion W)	Production (million W)	Exchange Rate	Production (million $)	Production deflated (million $)	Population	Per-Capita Dom. Prod
1972	94	94000	398.9	235.64803	171178.8760	33296200	0.005141093
1973	140	140000	397.5	352.20126	197746.1280	33978800	0.005819691
1974	251	251000	484	518.59504	251000.0000	34643300	0.007245268
1975	385	385000	484	795.45455	285950.4210	35280900	0.008104964
1976	666	666000	484	1376.0331	361447.8340	35887000	0.010071832
1977	806	806000	484	1665.2893	341196.4110	36464500	0.009356947
1978	1029	1029000	484	2126.0331	322575.4980	37022100	0.008713052
1979	1140	1140000	484	2355.3719	279040.2700	37572400	0.007426735
1980	1458	1458000	659.9	2209.4257	293104.7440	38124000	0.007688195
1981	1974	1974000	700.5	2817.9872	316485.0770	38681600	0.008181799
1982	1973	1973000	748.8	2634.8825	275361.5860	39240800	0.007017227
1983	2208	2208000	795.5	2775.6128	262671.0030	39790800	0.0066013
1984	2704	2704000	827.4	3268.0687	281376.2170	40315900	0.006979287
1985	2730	2730000	890.2	3066.7266	284081.7580	40805700	0.006961816
1986	3386	3386000	861.4	3930.8103	271157.1290	41255200	0.006572678
1987	4212	4212000	792.3	5316.1681	287750.6830	41670300	0.006905414
1988	4807	4807000	684.1	7026.7505	276411.9600	42065300	0.006571021
1989	5105	5105000	679.6	7511.7716	261686.4950	42460200	0.006163101
1990	5547	5547000	716.4	7742.8811	235680.1000	42869300	0.005497643
1991	5603.2	5603200	760.8	7364.8791	196598.9230	43297400	0.004540663
1992	5759.6	5759600	788.4	7305.4287	178078.7680	43739100	0.004071386
1993	7478.5	7478500	808.1	9254.424	195447.5810	44185400	0.004423352
1994	8441	8441000	788.7	10702.422	188483.9410	44622800	0.004223938
1995	10392	10392000	774.7	13414.225	197937.2740	45040900	0.004394612
1996	9841	9841000	844.2	11657.19	166651.3400	45437200	0.003667729
1997	9963	9963000	1695	5877.8761	154104.1100	45814200	0.003363676
1998	6928	6928000	1204	5754.1528	108716.4050	46172000	0.002354596
1999	7595	7595000	1138	6673.9895	108964.9410	46512000	0.002342727
2000	9146	9146000	1264.5	7232.8984	120068.4650	46835500	0.002563621
2001	10752	10752000	1313.5	8185.7632	131291.9120	47141900	0.002785037

Note. Per-capita domestic apparel production equals the total domestic production divided by the population. The domestic apparel production in won was converted to U.S. dollars using the won-dollar exchange rate and then deflated to base year 1974.

Table 23A. **Changes in Per-Capita Domestic Apparel Production: India and South Korea 1973-2001**

	India			South Korea		
Years	Production (million $)	a-b	(a-b)/b	Production (million $)	a-b	(a-b)/b
1973	9.20E-07	-1.46E-07	-0.1372949	0.0058197	0.0006786	0.1319949
1974	8.13E-07	-1.07E-07	-0.1158552	0.0072453	0.0014256	0.2449575
1975	9.14E-07	1.00E-07	0.1235362	0.008105	0.0008597	0.1186562
1976	1.26E-06	3.49E-07	0.3816918	0.0100718	0.0019669	0.2426745
1977	1.69E-06	4.30E-07	0.3408943	0.0093569	-0.0007149	-0.0709786
1978	2.01E-06	3.19E-07	0.1883586	0.0087131	-0.0006439	-0.0688146
1979	2.22E-06	2.03E-07	0.1010228	0.0074267	-0.0012863	-0.1476311
1980	2.19E-06	-2.19E-08	-0.0098807	0.0076882	0.0002615	0.0352052
1981	2.27E-06	7.89E-08	0.0359512	0.0081818	0.0004936	0.0642029
1982	2.25E-06	-1.92E-08	-0.0084452	0.0070172	-0.0011646	-0.142337
1983	2.32E-06	6.97E-08	0.0309458	0.0066013	-0.0004159	-0.0592722
1984	1.82E-06	-5.04E-07	-0.2170828	0.0069793	0.000378	0.0572594
1985	2.20E-06	3.84E-07	0.2108842	0.0069618	-1.75E-05	-0.0025033
1986	2.35E-06	1.51E-07	0.0687579	0.0065727	-0.0003891	-0.055896
1987	2.40E-06	4.74E-08	0.0201355	0.0069054	0.0003327	0.0506242
1988	2.45E-06	4.54E-08	0.0188982	0.006571	-0.0003344	-0.0484248
1989	2.87E-06	4.23E-07	0.1727583	0.0061631	-0.0004079	-0.0620786
1990	3.14E-06	2.74E-07	0.095399	0.0054976	-0.0006655	-0.1079745
1991	3.22E-06	7.51E-08	0.0238892	0.0045407	-0.000957	-0.1740708
1992	3.86E-06	6.46E-07	0.2008685	0.0040714	-0.0004693	-0.1033499
1993	4.14E-06	2.75E-07	0.0711908	0.0044234	0.000352	0.0864487
1994	5.44E-06	1.30E-06	0.3135716	0.0042239	-0.0001994	-0.0450821
1995	5.54E-06	1.04E-07	0.0191837	0.0043946	0.0001707	0.0404063
1996	5.79E-06	2.53E-07	0.0456802	0.0036677	-0.0007269	-0.1654032
1997	4.80E-06	-9.90E-07	-0.170828	0.0033637	-0.0003041	-0.0828996
1998	5.06E-06	2.59E-07	0.0538056	0.0023546	-0.0010091	-0.2999932
1999	4.93E-06	-1.29E-07	-0.0255204	0.0023427	-1.19E-05	-0.0050405
2000	5.15E-06	2.18E-07	0.0442124	0.0025636	0.0002209	0.094289
2001	4.85E-06	-3.00E-07	-0.0581499	0.002785	0.0002214	0.0863683

Note. Per-capita domestic apparel production equals the total domestic production divided by the population. All values are in U.S. dollars. Each change value in the fourth and seventh columns equals the difference between the value of per-capita domestic apparel production at the end of the previous year and the end of the current year divided by value in the previous year.
a = end of current year; b = end of previous year.

Table 24A. **Domestic Cotton-Fiber Production: India and South Korea, 1972-2001**

Years	India	South Korea
1972	1124993	3919
1973	1079488	4137
1974	1198585	3701
1975	1130436	3484
1976	1011558	2177
1977	1229066	1960
1978	1348163	1960
1979	1363404	3048
1980	1321818	2613
1981	1428069	1524
1982	1470743	1306
1983	1332922	1089
1984	1820194	871
1985	1964111	653
1986	1579389	435
1987	1554568	218
1988	1788406	218
1989	2295056	218
1990	1988932	218
1991	2022897	218
1992	2346004	218
1993	2133720	218
1994	2427216	218
1995	2884877	218
1996	3030318	218
1997	2686093	218
1998	2804971	218
1999	2651909	218
2000	2379969	218
2001	2678037	218

Note. Values are in metric tons.

Table 25A. **Changes in Domestic Cotton-Fiber Production: India and South Korea, 1973-2001**

	India			South Korea		
Years	production	a-b	(a-b)/b	production	a-b	(a-b)/b
1973	1079488	-45505	-0.040449	4137	218	-0.05563
1974	1198585	119097	0.1103273	3701	-436	0.10539
1975	1130436	-68149	-0.056858	3484	-217	0.058633
1976	1011558	-118878	-0.105161	2177	-1307	0.375144
1977	1229066	217508	0.2150228	1960	-217	0.099678
1978	1348163	119097	0.0969004	1960	0	0
1979	1363404	15241	0.011305	3048	1088	-0.5551
1980	1321818	-41586	-0.030502	2613	-435	0.142717
1981	1428069	106251	0.0803825	1524	-1089	0.416762
1982	1470743	42674	0.0298823	1306	-218	0.143045
1983	1332922	-137821	-0.093708	1089	-217	0.166156
1984	1820194	487272	0.3655668	871	-218	0.200184
1985	1964111	143917	0.0790668	653	-218	0.250287
1986	1579389	-384722	-0.195876	435	-218	0.333844
1987	1554568	-24821	-0.015716	218	-217	0.498851
1988	1788406	233838	0.1504199	218	0	0
1989	2295056	506650	0.283297	218	0	0
1990	1988932	-306124	-0.133384	218	0	0
1991	2022897	33965	0.017077	218	0	0
1992	2346004	323107	0.1597249	218	0	0
1993	2133720	-212284	-0.090487	218	0	0
1994	2427216	293496	0.1375513	218	0	0
1995	2884877	457661	0.1885539	218	0	0
1996	3030318	145441	0.050415	218	0	0
1997	2686093	-344225	-0.113594	218	0	0
1998	2804971	118878	0.0442568	218	0	0
1999	2651909	-153062	-0.054568	218	0	0
2000	2379969	-271940	-0.102545	218	0	0
2001	2678037	298068	0.1252403	218	0	0

Note. Production values are in metric tons. Each change value equals to the difference between the value of domestic cotton production at the end of the previous year and at the end of the current year divided by value in the previous year.
a = end of current year; b = end of previous year