South Asia Development Matters

CONFERENCE EDITION

South Asia's Turn

Policies to Boost Competitiveness and Create the Next Export Powerhouse

WORLD BANK GROUP

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Gladys Lopez-Acevedo, Denis Medvedev, and Vincent Palmade

The text of this conference edition is a work in progress for the forthcoming book, *South Asia's Turn: Policies to Boost Competitiveness and Create the Next Export Powerhouse* (DOI 10.1596/978-1-4648-0973-6). A PDF of the final book, once published, will be available at https://openknowledge.worldbank.org/ and print copies can be ordered at www.amazon.com. Please use the final version of the book for citation, reproduction, and adaptation purposes.

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Foreword

South Asia is at a turning point. The region is benefiting from a confluence of positive internal and external forces. South Asian countries are starting to receive the competitiveness dividends from the economic reforms and public investments in infrastructure and education carried over the last 25 years. Rising labor costs in East Asia are steering global investors towards South Asia as a possible cheaper alternative. At a time of declining global growth and trade, South Asia—home to a quarter of humanity—has the potential to boost global growth as both a major exporter and consumer market. This is good news, not only for South Asia but for the world as a whole.

But, challenges to the region's competitiveness remain. More than one million young people are reaching working age every month and will need jobs; firm competitiveness is low; and countries in the region have not been particularly successful in integrating with each other.

This report, *South Asia's Turn: Policies to Boost Competitiveness and Create the Next Export Powerhouse*, looks in detail at the drivers and constraints impacting South Asia's competitiveness. It outlines the four policy levers which will help the region-become more globally competitive across a broader spectrum of industries, accelerating growth and reducing poverty, especially for women. One of these policy levers (improving the business environment) is well known, but much remains to be done. The other three (policies to better connect to Global Value Chains, maximize agglomeration benefits and strengthen firm capabilities) are much less discussed and we hope this report will help policy makers focus more on them.

The report combines a critical mass of quantitative analysis, using the latest data and tools available, with a rich set of industry and company case studies to draw new insights on what South Asia needs to do to boost competitiveness. And it proposes a number of specific policy solutions drawn from relevant international good practices (including from within the region).

We very much hope that this report will help the countries of South Asia, individually as well as collectively, take a turn toward realizing their great competitiveness potential.

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Acknowledgments

This report was prepared by a team led by Denis Medvedev (GTCDR) and Vincent Palmade (GTCDR) under the guidance of Esperanza Lasagabaster (Practice Manager, GTCDR) and Martin Rama (Chief Economist, SARCE). Annette Dixon (Vice President, SARVP), Anabel Gonzalez (Senior Director, GTCDR), and Cecile Fruman (Director, GTCDR) linked the team to the World Bank Group's overall strategy and steered them in that direction.

This report presents a combination of findings from a cross-cutting analysis of the dynamics of firms, clusters, value chains, and cities across the region as well as detailed case studies of the agribusiness, electronics, apparel and automotive industries. The full report together with the extended versions of the four industry case studies are freely available online at: www.worldbank.org/SouthAsiaCompetes.

Chapter 1 of the report was authored by Gonzalo Varela and Antonio Martuscelli; Chapter 2 by Gonzalo Varela, Antonio Martuscelli, and Apoorva Gupta; Chapter 3 by Filipe Lage de Sousa, Deeksha Kokas, and Giuliana de Mendiola Ramirez; Chapter 4 by Filipe Lage de Sousa and Deeksha Kokas; Chapter 5 by Michael Ferrantino and Gaurav Nayyar; Chapter 6 by Xavier Cirera and Ana Cusolito, with inputs from Filipe Lage de Sousa; Chapter 7 by Gladys Lopez-Acevedo, Vincent Palmade and Dominique van der Mensbrugghe and Chapter 8 by Gladys Lopez-Acevedo and Vincent Palmade. Bill Shaw streamlined, organized, and edited the narrative.

The agribusiness case study (attached to Chapter 3) was authored by Soujanya Chodavarapu, Asa Giertz, and Peter Jaeger. The electronics case study (attached to Chapter 4) was authored by Ashish Narain with support from Sriyani Hulugalle, Tim Sturgeon and Daria Taglioni. The apparel case study (attached to Chapter 5) was authored by Gladys Lopez-Acevedo, Raymond Robertson and Atisha Kumar. The automotive case study (attached to Chapter 6) was authored by Priyam Saraf with support from Michel Bacher, Sanjay Kathuria, and Amjad Bashir.

Major contributions were received from Alvaro Gonzalez, Atisha Kumar, and Siddharth Sharma, and the team benefitted from the advice by Sebastian Saez. Guoliang Feng, Deeksha Kokas, and Lara Loewenstein provided invaluable research assistance. Rosanna Chan, Eric Manes, Tugba Gurcanlar, Fatima Shah, Anna Reva, Bertine Kamphuis, Paramita Dasgupta and Luke Jordan provided critical inputs during the inception phase. Isaac Lawson and Tanya Cubbins provided production and logistical support. Sections of the report draw extensively on a recently prepared "Stiches to Riches" report (World Bank, 2016). The peer reviewers were Uri Dadush (Carnegie Endowment for International Peace), Navin Girishankar (GTCDR), Pravin Krishna (Johns Hopkins University), Bill Maloney (GGEVP), and Shubham Chaudhuri (GMFDR).

The team is grateful to South Asia country directors and, most importantly, country authorities for their support throughout this endeavor.

Abbreviations

ABMP	Agribusiness and Marketing Project
ADB	Asian Development Bank
ADF	Agriculture Development Fund
AEPC	Apparel Export Promotion Council
AFG	Afghanistan
AOTS/JASTECA	The Overseas Human Resources and Industry Development Association of Japan/Japan Sri Lanka Technical and Cultural Association
ASEAN	Association of Southeast Asian Nations
ASI	Annual Survey of Industries
ASI/NSS	Annual Survey of Industries/National Sample Survey
BBS	Bangladesh Bureau of Statistics
BCG	Boston Consulting Group
BEC	Broad Economic Categories
BEPZA	Bangladesh Export Processing Zones Authority
BGD	Bangladesh
CBEC	Central Board of Excise and Customs
CBUs	Completely Built Units
CDM	Clean Development Mechanism Model
CEPA	Comprehensive Economic Partnership Agreement
CGE	Computable General Equilibrium
CMIE	Centre for Monitoring Indian Economy
COMTRADE	United Nations Commodity Trade Statistics Database
CPO	Chief Procurement Officer
CSO	Central Statistics Office
CSR	Corporate Social Responsibility
CST	Central Sales Tax
CTO	Commonwealth Telecommunications Organisation
D.C.	District of Columbia
DAI	Development Alternatives Incorporated
DB	Doing Business
DCS	Department of Census and Statistics
DRC	Democratic Republic of Congo
DTRE	Duty and Tax remission for Export Program
EAP	East Asia and the Pacific
ECA	Eastern Europe & Central Asia
Eds.	Editors
EPZ	Export Processing Zone
ES	Enterprise Survey
EU	The European Union

EXPY	Sophistication of Exports
FAO	Food and Agriculture Organization of the United Nations
FAOSTAT	Statistics Division of FAO
FBIC	Fung Business Intelligence Center
FDI	Foreign Direct Investment
FOB/CIF	Free On Board/Cost, Insurance and Freight
FWF	Fair Wear Foundation
GCI	Global Competitiveness Index
GDP	Gross Domestic Product
GGEVP	Office of the Vice President Equitable Growth, Finance, and Institutions Global Practice
GMFDR	Macroeconomic and Fiscal Management Global Practice
GoP	Government of Pakistan
GSO	General Statistics Office
GST	Goods and Services Tax
GTAP	Global Trade Analysis Project
GTCDR	Trade and Competitiveness Global Practice
GVC	Global Value Chains
HIES	Bangladesh Household Income and Expenditure Survey
HP	Hewlett Packard
IARI	Indian Agricultural Research Institute
IBM	International Business Machines
ICP	International Comparison Program
ICRIER	India Council for Research on International Economic Relations
ICRIER	Indian Council for Research on International Economic Relations
ICT	Information Communication Technology
IFEAT	International Federation of Essential Oils and Aroma Trades
IFPRI	International Food Policy Research Institute
IGC	International Growth Centre
IIMA	Indian Institute of Management Ahmedabad
ILFS	Infrastructure Leasing & Financial Services Limited
ILO	International Labor Organization
IMF	International Monetary Fund
INDSTAT4	Industrial Statistics Database:
IOCO	Input Output Co-efficient Organization
IOSR	International Organization of Scientific Research
ISIC	International Standard Industrial Classification of All Economic Activities
ITA	International Trade Administration
JV	Joint Venture

KM	Kilometers
KSA-AM	Kurt Salmon Associates-Apparel Magazines
LAC	Latin America and the Caribbean
LFS	Sri Lanka Labor Force Survey
LKA	Sri Lanka
LPI	Logistics Performance Index
LSE	London School of Economics
MAS	Movers and Shakers Apparel
MDV	Maldives
MENA	Middle East North Africa
MFA	Multi Fiber Arrangement
MFN	Most-Favored Nation
MHV	Mountain Hazelnut Ventures
MMF	Man-made fiber
MOSPI	Ministry of Statistics and Programme Implementation
MSPs	Minimum Support Prices
MSSL	Motherson Sumi
NAFTA	North America Free Trade Agreement
NDTV	New Delhi Television Limited
NGOs	Non-Governmental Organization
NSSO	National Sample Survey Office
NTMs	Non-Tariff Measures
OECD	Organization for Economic Co-operation and Development
OEMs	Original Equipment Manufacturers
OLS	Ordinary Least-Squares
OTEXA	Office of Textiles and Apparel
PAK	Pakistan
PPM	Per Million Produced
PPP	Purchasing Power Parity
PSIC	Pakistan Standard Industrial Classification
PTA	Purified Terephthalic Acid
R&D	Research and Development
RCAPS	The Ritsumeikan Center for Asia Pacific Studies
RCT	Randomized Control Trial
RVCs	Regional Value Chains
SAARC-TPN	South Asian Association for Regional Cooperation Trade Promotion Network
SACU	Southern Africa Customs Union
SAFTA	South Asian Free Trade Area
SAR	South Asia Region
SARCE	Office of the Chief President South Asia Region
SARVP	Office of the Vice President South Asia Region

SERC	Spatial Economics Research Centre
SEZ	Special Economic Zones
SIAM	Society of Indian Automobile Manufacturers
SITC	Standard International Trade Classification
SITP	International Trade Fair for Public Works and Construction Machinery
SLR	Sri Lanka
SMEs	Small and Medium Enterprises
SMT	Surface Mounted Technology
SPS	Sanitary and Phytosanitary
SROs	Statutory Rule Orders
STICERD	The Suntory and Toyota International Centres for Economics and Related Disciplines
TC	Technical Collaboration
TFP	Total Factor Productivity
TiVA	Trade in Value Added
TNC	Trade Negotiations Committee
TPP	Trans-Pacific Partnership
TTIP	Trans-Atlantic Trade and Investment Partnership
TVET	Technical, Vocational Education and Training
UN	United Nations
UNIDO	United National Industrial Development Organization
UNSD	United Nations Statistics Division
US	United States
US$	United States Dollars
USAID	United States Agency for International Development
USITC	United States International Trade Commission
VA	Value-added
WB	World Bank
WDI	World Development Indicators
WEF	World Economic Forum
WITS	World Integrated Trade Solution
WTO	World Trade Organization
ZEF	Center for Development Research

Overview

Which region will become the next global factory? As the work force ages and labor costs rise in China and other East Asian countries, many eyes turn to South Asia. South Asia's potential is unquestionable: education levels are on the rise, more than one million young workers enter the labor market each month, and the population of the region's mega agglomerations and sprawling cities is expanding at roughly the same pace. By 2030 more than a quarter of the world's working adults will live in South Asia. But despite flashes of brilliance across a handful of sectors, locations, and leading firms, this potential remains largely underutilized.

South Asia is less competitive than its neighbors and global benchmarks when it comes to attracting investment, penetrating tough markets, diversifying and upgrading its products, and integrating within the region. These foregone opportunities also manifest themselves in low scores across a range of international competitiveness metrics. At a time when the growth rate of global trade has dramatically slowed down, how can South Asia improve its competitiveness, become an exports powerhouse, create jobs, reduce poverty, and boost shared prosperity? This report proposes that the solution lies in improving productivity, and looks for clues on how to do it in the dynamics of firms, industry value chains, clusters, and cities across the region.

With few exceptions, South Asia has reaped limited benefits from global integration

Recent slowdown in trade notwithstanding, the global economy is more connected than ever. Participation in larger regional and global markets offers many opportunities to raise productivity: stronger competitive pressures weed out least productive firms while others improve by gaining access to new knowledge and better inputs. Across the region, there are several examples of these channels at work, ranging from highly successful apparel industries in Bangladesh and Sri Lanka to India's software and BPO sectors, and from productive agglomeration of light manufacturing firms in Sialkot, Pakistan, to Bangalore, India, becoming a global R&D hub for major auto-parts and electronics producers. South Asia's leading firms have managed to rise to standards of global excellence, demonstrating that world class levels of operational performance, efficiency, and innovation can be achieved with the right management, scale/technology and worker training. Lastly, since 2010 the region has consistently had a higher trade-to-GDP ratio than China on the strength of its services trade and—when controlling for size—India's export and import orientation are above global average.

From a more aggregate vantage point, however, South Asia's intra-regional and global ties remain relatively weak. Merchandise trade-to-GDP and FDI-to-GDP ratios in the region are well below competitors' ratios. From 1990 to 2014, the

region received, on average, between 2.2 and 2.8 percentage points of GDP less FDI inflows than countries in East Asia. Moreover, countries in South Asia receive little FDI from within the region. Trade integration is also low. Over 1990-2014, South Asia's average ratio of exports to GDP varied between 17 and 21 percentage points below East Asia, and the average ratio of imports to GDP was 21–22 percentage points lower.

The region has also made little progress in diversifying its exports and moving up the value chain. Although South Asia has had some success in penetrating new markets, almost 80 percent of the region's export growth from 2001 to 2013 came from the sale of the same goods to the same destinations, and the remaining 20 percent came from selling the same products to new markets. Exports remain highly concentrated in textiles and apparel in Bangladesh, Afghanistan, Nepal, Pakistan and Sri Lanka, in minerals in Bhutan, and in animal and vegetable products in Afghanistan and Maldives. Overall, the region's export basket does not reflect substantial transformation of production structures or innovative activities. While the sophistication of exports has increased in India, it has remained low in the rest of South Asia and quality (as measured by the prices its products fetch in international markets) has generally remained low and has declined for some countries.

In the meantime, the global environment is becoming tougher. The demand for developing countries' exports is limited by the slow recovery in industrial economies and the impact of declines in commodity prices on resource-rich economies, while the benefits to many commodity importers have been eroded by declining remittances. New mega-regional trade agreements (e.g., the Trans-Pacific Partnership, TPP, and the Trans-Atlantic Trade and Investment Partnership, TTIP) may lead to trade and investment diversion away from non-members. Against this background, it has become even more urgent for countries in South Asia to make overdue investments in boosting competitiveness to avoid falling further behind comparator countries in the global marketplace.

Productivity is the key to improved competitiveness

What lies behind South Asia's subdued competitiveness and what strategies can help the region become more competitive? Porter (1990) has argued that different countries have become competitive with a different mix of endowments, factor prices, and policies. Although competitiveness can be buttressed in the short term by keeping costs low, the only sustainable path to improved competitiveness in the long term lies in increased productivity. And yet, South Asia's growth over the past two decades seems to have been driven mostly by accumulation of factor quantities rather than improvements in their quality or efficiency/productivity. This means that accelerating productivity growth should be front and center on the policymakers' agenda in the region, to ensure continued and sustained progress on job creation, growth, poverty reduction, and shared prosperity.

Across the globe, one mechanism for long-term improvements in productivity has been the movement of resources from agriculture to higher-productivity manufacturing and services. Between 1960 and 2013, the share of agriculture in South Asia's GDP decreased from 44 to 19 percent, while the share of industry rose from 18 to 29 percent. Similar to patterns observed in OECD economies, labor productivity differentials between agriculture and more modern activities play an important role in explaining the movement of labor across sectors—with the sensitivity of labor movement to productivity much higher in South Asia than in high income countries. However, the movement of labor from agriculture to industry and services in South Asia has not been rapid enough to substantially reduce the large differences in productivity across sectors. In other words, the region has a significant untapped potential (e.g., compared to OECD economies) to reap productivity gains by further reallocation of labor from lower to higher productivity activities.

Another important mechanism for productivity growth operates within sectors through movement of resources from less productive to more productive firms. In South Asia, high dispersion of productivity levels across firms and a strong bias of the firm distribution towards small, inefficient, and slow-growing firms indicate that the potential of this channel to raise efficiency is large. Firms aged 25 years or more in Bangladesh, Bhutan, India, and Sri Lanka are only 50—90 percent larger than start-ups, while in China, Indonesia, and Vietnam similar firms are two to five times larger. According to some estimates, if distortions which prevent the reallocation of resources to more productive firms in India were brought down to the levels observed in the United States, this could lead to productivity gains of as much as 60 percent.

Barriers to the growth of firms can likely be found in policies. Across the region, licensing and size restrictions (which have declined in importance but still exist), labor regulations that increase the cost of hiring and firing, financial sector regulations that favor small enterprises, and inadequate bankruptcy laws may have limited the ability of efficient plants to grow and enabled inefficient plants to survive. Taxes or labor costs that affect larger firms more than smaller firms may reduce the return on investment in large firms. Impediments to reaching foreign markets, both from trade policy and high costs of logistics, can also impede expansion.

The drivers and constraints to productivity growth were analyzed in four case studies of critical and representative industries (agribusiness, electronics, apparel and automotive). These case studies better show the linkages between the external environment of firms and their behavior within a well-defined industry where industry dynamics (for example, competition) can be analyzed and performance benchmarked. As such, they are of great help to understand the relative importance of external factors in driving/constraining firm's performance/productivity. Also and crucially, industry case studies enable to

assess the impact of industry specific factors/policies which traditional cross-cutting analysis are ill-equipped to get at.

Business environment challenges remain a constraint on firm performance

On average, countries in South Asia score poorly on major indices used globally to capture key aspects of competitiveness, such as the Global Competitiveness Index (GCI) published by the World Economic Forum and the World Bank's *Doing Business* report. In the most recent (2015–2016) GCI rankings, India is the only South Asian country in the top half of nearly 140 countries. In the World Bank's 2016 *Doing Business* report, all the South Asian economies, with the exception of Bhutan, are ranked in the bottom half. Ten years ago, a World Bank Investment Climate Assessment argued that South Asian countries under-perform comparators on many investment climate dimensions, including infrastructure and electricity supply, access to finance, employee skills, and corruption. Similar results emerge from the most recent round of Enterprise Surveys, where an average firm in South Asia consistently ranks each investment climate constraint as more binding than does an average firm in China or Vietnam. While performance varies substantially across countries and indicators—pointing to significant potential for improvement by leveraging best practices from within the region—the overall gap puts South Asia's firms at a clear disadvantage vis-à-vis select comparators in other parts of the world. These challenges may be particularly binding on the region's high potential firms—which would otherwise grow more rapidly and create more jobs in the absence of distortions.

The agribusiness case study shows how business environment issues (e.g. trade barriers, restrictions agricultural markets, products and prices as well as blanket subsidies) remain the main impediment to the inclusive and sustainable development of the sector.

Growth of the region's cities and clusters offers multiple opportunities to raise firm productivity

Economic activity in South Asia is highly concentrated. In most countries a small number of districts account for a large share of economic activity: for example, in India, the five largest districts account for 18 percent of total employment. However, the degree of geographic concentration of manufacturing activities in South Asia has not changed substantially in the last two decades: the share of the top five districts in total employment has remained relatively constant, although which districts are in the top five has changed. This indicates that more productive locations have generally not been successful in attracting additional resources at the expense of less productive locations, although congestion in the major economic centers has not reached sufficiently high levels to push a substantial share of economic activity out to the periphery. In the three South Asian countries with adequate data, district or state borders tend to be "thick" in the sense that

impediments to efficient allocation of resources between districts are stronger than distortions within districts.

Agglomeration economies—the benefits that accrue to firms and workers from locating close together in cities or clusters—matter for firm productivity: a 10 percent increase in district employment leads to a 0.2–0.9 percent increase in TFP of the district's firms. The effect operates primarily through two channels: localization (i.e., firms in the same industry locating close together to benefit from, for example, a specialized labor pool) and urbanization (i.e., firms from different industries locating close together to benefit from a diverse supplier network, common infrastructure, or a large number of workers). Unlike in high-income countries, firms in South Asia appear to benefit relatively more from wide diversity of workers available in a single location (urbanization economies) rather than a concentration of highly specialized workers (localization economies). These results suggest that cities, with diverse labor pools catering to a range of industries, may currently be more effective vehicles of supporting firm productivity in South Asia than clusters, which cater to a specific sector—although the two are not mutually exclusive. For example, a number of top firms in South Asia's automotive sector fostered innovation by locating close to customers to enable their engineers to work together with those of the client, and gradually built up their capacities from simpler to more complex components.

The electronics case study shows that what is missing for South Asia to become competitive in this critical industry are urban ecosystems providing thick markets for skilled labor, large tracts of industrial land, and world class logistics.

Increasing prominence of global value chains provides a pathway to greater efficiency

Participation in global value chains (GVCs), and exposure to international markets more generally, is associated with higher levels of firm productivity in South Asia. Access to foreign markets—either through trade or licensing foreign technology—brings stronger outcomes in terms of ICT adoption and innovation, and these in turn have a robust positive relationship with firm-level productivity Greater exposure to international trade makes firms more viable participants in GVCs, which in turn can further enhance productivity in a virtuous cycle. For example, a number of South Asia's leading firms in the automotive sector learned by becoming domestic suppliers to multinationals entering the region, and then leveraged that experience to access international markets on their own. While it is also true that more productive firms may self-select to join GVCs, evidence suggests that GVC participation and deeper global integration more generally have positive productivity impacts on firms.

At more than 20 percent of its exports coming from GVC products, South Asia has the second-highest rate of GVC participation among developing regions. However, this largely reflects the region's strong performance in apparel. Bangladesh has one of the highest GVC participation rates in the world precisely

because Bangladesh exports are heavily concentrated in garments. India's participation in GVCs is low, because it has a more diversified export basket. There is also substantial variation in terms of where most firms in each country locate along the value chains: firms in Pakistan tend to be more upstream, while Sri Lankan and Bangladeshi firms are much further downstream. Final apparel producers in Sri Lanka and Pakistan have been more successful at penetrating higher-income markets than firms in Bangladesh and India, while firms in Pakistan and Bangladesh have shown greater ability to penetrate high-income markets in intermediate apparel. Overall market sophistication, however, declined between 2000 and 2010 in all four countries, indicating either increased sales to middle-income markets or more intense competition in high-income markets, or both.

The importance of taking a regional perspective to the competitiveness agenda is emphasized by the fact that value chains tend to cluster on a regional basis in light of transport and other transactions costs, as well as the need for timely delivery. Bangladesh and Sri Lanka have the highest share of final apparel goods (86 and 44 percent of apparel exports) in the region, and source many apparel inputs from Pakistan and India who focus relatively less on final products (18 and 6 percent of apparel exports). In 2013, two-thirds of India's exports of knit and crochet fabric were destined for Sri Lanka and Bangladesh, while nearly half of Pakistan's exports of woven cotton denim were destined for Bangladesh and Sri Lanka There is also an emerging "East Asia/South Asia" regional value chain, especially in intermediate apparel: 70 percent of South Asia's imported apparel inputs come from East Asia and, together with intra-South Asian trade, account for 94 percent of the regions apparel inputs. South Asian GVC activity is more integrated with East Asia than any other region in the world, except East Asia itself.

Despite the importance of GVCs for firm productivity and overall exports growth, South Asia lags on many capabilities that matter for GVC participation. Countries in South Asia are, on average, more wage competitive and closer to markets than members of Association of Southeast Asian Nations (ASEAN) or Southern Africa Customs Union (SACU), but compare unfavorably with regard to policy variables such as human capital, institutions, logistics and trade barriers on imports of intermediate inputs. Bangladesh, Pakistan, and Maldives charge high tariffs on intermediate apparel goods, and all countries impose high tariffs on final autos. Non-tariff barriers are also pervasive, particularly in the auto sector in Pakistan. There is also substantial room for improvement with regard to trade facilitation, with the ability to access imported inputs in a timely manner particularly important for sectors where South Asia has already developed an advantage (apparel) as well as sectors of emerging opportunity (electronics). Restrictive product market regulations—such as limits on storage, processing, and marketing of agricultural produce, price caps and minimum support prices on key agricultural commodities, fragmented approaches to food safety standards and

their poor enforcement, and gaps in harmonization of local norms with international auto standards—inhibit South Asia's ability to further link to GVCs in agribusiness and automotive.

The apparel case study shows how barriers to import for exporters prevent the region from realizing its great potential.

Improving firm capabilities and leveraging technology can substantially raise firm productivity

Outside of a few global leaders, firm capabilities in the region tend to be limited. The region's firms over-employ relatively scarce capital and under-employ South Asia's abundant labor. Given the prevailing wage rates and marginal products of workers, the optimum level of labor in Indian and Sri Lankan firms is 3.3 times current employment levels, while estimates for Nepal and Pakistan are even higher. Thus, most firms in South Asia do not operate close to what would be considered optimum efficiency levels given the prevailing factor prices, bringing down aggregate productivity. Potential reasons for this less-than-rational behavior include limited managerial capacity, labor market rigidities (particularly with regard to firing workers), and spatial distortions which prevent firms locating close to a ready supply of workers (or vice versa).

Although the region's top firms make investments in creating knowledge and skilling/training their workforce a priority, on average firms in South Asia under-invest in knowledge. Overall (public and private) investment in R&D in the region is low and is increasingly falling behind Latin America and particularly East Asia. There is large heterogeneity within the region, with higher incidence of firms conducting R&D in Bangladesh and India (above the rates observed in Africa and Eastern Europe & Central Asia) and a much lower incidence in Nepal and Pakistan (below the average of Africa and ECA). In general, larger firms are more likely to engage in R&D activities. With the exception of Bangladesh, access to licenses to use foreign technology increases R&D, while financial constraints significantly inhibit R&D investments.

Adoption rates of ICT also vary across the region. Indian firms score very high on multiple dimensions of technology use: close to 100 percent of registered firms have computers and an internet connection, which is in line with the average for OECD countries. ICT use in Pakistan is in line with global peers, but very low in Bangladesh and Nepal. However, despite widespread internet use, the adoption of e-commerce and other online business tools is limited. At most three quarters of digitally connected firms use the Internet to buy, sell, market, or manage their inventory online, with the regional average closer to 50 percent. Firm size, export status, and to a lesser extent import status are important determinants of ICT adoption at the firm level. Complementary factors—technology and skills—are also important determinants of ICT adoption. Lastly, access to finance and to financial institutions is critical in facilitating the adoption of e-commerce. The region's moderate achievements on many of these dimensions may explain the

limited penetration of some technologies and hint at missed opportunities to improve productivity performance.

Patterns of investment in innovation inputs—including ICT, managerial practices, and R&D investments—are reflected in innovation outputs. Within the region, close to 80 percent of firms in Bangladesh and India engage in technological innovation, well above the average in Eastern Europe and Africa. On the other hand, only around 20 percent of firms in Nepal and Pakistan invest in new products or processes. Moreover, the acquisition of knowledge capital (e.g., R&D, investments in equipment, and training) is highly concentrated in a few firms, and mature, exporting, and foreign-owned firms tend to be the most innovative. Relative to other regions, a much larger share of innovation in South Asia takes place in-house, limiting productive collaboration across firms and possibly explaining high rates of imitation instead of radical innovation.

Returns to innovation in Bangladesh, India, and Nepal are positive and statistically significant. One percent increase in innovation intensity raises firm productivity by 0.6–1.4 percent, an impact that is 2-5 times stronger than magnitudes commonly estimated for OECD countries. However, even among the leaders, most innovation reflects imitation of existing products and/or processes. Few firms engage in disruptive innovative activities such as introducing new products to the country or to the world. Most of the firms in the region tend to innovate for upgrading the quality of their products, although the introduction of new products is slightly more frequent in India. And most innovation is done in-house (more so than in Africa or ECA), which may contribute to limiting the potential for new products.

The automotive case study shows how protections from global good practices (high import tariffs and obsolete safety and emission standards) limit the spread of world class firm capabilities.

Faster exports and jobs growth are within reach if productivity performance improves

South Asia has tremendous potential to increase incomes and gain market share in exports through policies that enhance productivity. In a forward-looking scenario where productivity growth contributes around 2 percentage points per year to increases in regional GDP—consistent with South Asia's best historical performance—South Asia becomes the world's fastest-growing region in terms of exports. By 2030, it could more than triple its share in global exports of electronics and motor vehicles, and come close to doubling its already significant market share in wearing apparel. Additional steps to boost productivity through (i) further investments in port infrastructure, improvements in customs processes and behind-the-border services (e.g., warehousing, transportation); (ii) more rapid implementation of ongoing improvements in the port-to-port trade and transportation costs; and (iii) a reduction in the domestic cost of trade could boost

exports growth by more than one percentage point per year relative to the baseline and lead to additional unskilled wage gains of as much as 17 percent.

Turning to job creation, the report considers the intensely competitive apparel market. Productivity-enhancing measures which could result in a 10 percent cost advantage vis-à-vis Chinese apparel may lead to a 13–25 percent (depending on country) rise in South Asian countries' apparel exports to the United States. Given the high labor intensity of apparel manufacturing and the large sensitivity of South Asia's labor supply, particularly for women, to higher wages, a 10 percent price advantage over China in the U.S. market could translate into employment gains of 8.9 percent in Pakistan, followed by Bangladesh (4.2 percent) and India (3.3 percent). These would be well-paying jobs; the wage premium of the apparel sector over agriculture ranges from 8 to 27 percent, depending on the country, and is even higher for women. Moreover, jobs created in textiles and apparel are likely to particularly attract low-skilled women. These results point to the critical importance of implementing productivity-enhancing measures in the apparel sector—but also caution that inaction may lead to a decline in market share as competitors that have pursued more aggressive apparel-friendly policies (such as Vietnam and Cambodia) can stand to gain much more than the South Asian countries in terms of market access. The prospect of new mega-regional trade agreements such as TPP and TTIP—where South Asian countries have thus far remained on the sidelines—giving an additional boost to the region's main competitors further underscores the urgency of reforms.

Policy levers to boost competitiveness and productivity

In order to realize these gains and more, the region's policymakers should re-examine the contents and prioritization of the policy toolkit when it comes to competitiveness and productivity. In addition to policies aimed at further improvements in South Asia's business environment, this report highlights three policy areas which have so far been less prominent in discussions around competitiveness and productivity but which—as shown by the empirical results and the industry case studies—have the potential to raise productivity across the region. These include policies to maximize benefits of agglomeration economies, better connect to global value chains, and boost firm capabilities. They also include, in the critical case of the agribusiness value chains (amounting to one third of South Asia's GDP), the need to reform agricultural markets, price regulations, product standards and large poorly targeted subsidies.

Deriving maximum productivity benefits from South Asia's rapid urbanization requires policies which leverage agglomeration economies while minimizing the adverse impacts of congestion forces. The removal of policy-induced distortions that limit the flexibility of labor, capital, and land markets could enable more productive firms to grow. In particular, policies to increase the flexibility of labor markets, especially for women—who face particularly high discrimination in South Asia's labor markets—are likely to substantially reduce

misallocation of labor and improve productivity. Policies directed at improving urban governance and bridging the region's infrastructure gap will ensure that firms and workers will be matched more easily. Achieving this will require tackling congestion issues head-on. In particular, investments in roads and public transit, provision of quality affordable housing and other basic infrastructure services, and reducing the negative social impact of agglomeration (e.g., crime) should be high on the policy-makers' agenda.

When large-scale solutions are difficult or costly, improved infrastructure could be delivered through industrial zones or clusters. While a number of traditional approaches to industrial zones in South Asia have not delivered the expected benefits, there are encouraging examples of new approaches from within and outside the region, such as India's SITP model and China's plug-and-play industrial zones. Location of clusters often makes all the difference, and countries in the region could make further efforts to identify and develop industrial areas close to ports, resolve pending issues in existing industrial zones, and ensure provisions for worker housing. Providing access to R&D and testing facilities, waste dumping, and recycling facilities would make these zones more attractive to SMEs.

Strengthening the participation of the region's firms in global value chains calls for taking specific steps which matter most to global buyers as well as broad-based investments in GVC capabilities. The former include fundamentals such as cost, quality, and lead times, particularly relevant given the shift toward lean retailing and just-in-time delivery in many industries. However, other factors are also growing in importance. Buyers who attempt to reduce the complexity of their supply chains increasingly value offering accompanying services such as input sourcing, product development, and financing (known as full package services). Buyers also take into account social and (to a lesser extent) environmental compliance, which has become more important to their bottom line in response to pressure from corporate social responsibility (CSR) campaigns by NGOs and compliance-conscious consumers.

Improving broader-based GVC capabilities requires policy actions such as facilitating imports for exporters (e.g., through better functioning duty drawback schemes), reducing average rates of protection and harmonizing tariff schedules across intermediate and final goods, improving standards and product market regulations, and strengthening trade logistics to reduce customs clearance and transit times—all areas where the region falls short of its Southeast Asian competitors and global benchmarks. At the firm level, improving firm capabilities to adopt new technology (including better managerial practices) and innovate will be critical to accelerate introduction of new products, improving product quality, and moving into higher value segments within existing or new GVCs.

When it comes to innovation, managerial capabilities, technology adoption, and worker skills, the report's findings suggest different priorities across the region. In Nepal and Bangladesh, the focus should be on further efforts to foster

the general adoption of internet and computers, which will require overcoming infrastructure challenges as well improving the provision of complementary skills—such as technology and human capital. In the case of India, where the use of ICT is already highly mainstreamed, the focus should be on further improvements of ICT practices, in particular e-commerce and other online business tools. Given the large extent of software development and the relative high availability of IT engineers, access to finance and establishment of broad base financial transactions platforms online could be critical in broadening the use of internet for commercialization.

A possible explanation for South Asia's growing gap in R&D investments vis-à-vis other regions are low returns to R&D in the absence of complementary factors: managerial capabilities, worker skills and finance. Therefore, investing in these should be a policy priority throughout the region. Modernizing training institutions and expanding access to on-the-job training can lead to higher efficiency and lower costs, while programs that support improving firm capabilities through technology extension, managerial training, access to consulting services, networking, and information can have large and long-lasting productivity benefits. In addition to these initiatives, the region's innovation leaders should focus on breaking the nature of inward innovation development by supporting cooperation with other firms and institutions in order to generate novel, and if possible, radical innovations. On the other hand, for laggards policy should focus on increasing the number of firms engaged in incremental innovation in order to boost productivity, profits, survival rates, and sales growth.

PART I. SOUTH ASIA'S COMPETITIVENESS CHALLENGE AND OPPORTUNITY

Chapter 1. The region's competitiveness potential remains largely unrealized

Which region will become the next global factory? As the work force ages and labor costs rise in China and other East Asian countries, many eyes turn to South Asia. It is a region that is still largely rural, where agriculture accounts for a large share of employment and a substantial fraction of GDP, and it has not been particularly successful in integrating within itself and with the rest of the world. Yet, more than one million young workers enter the labor market each year and by 2030, 26 percent of the world's working adults will live in South Asia. This is the region's greatest opportunity and greatest challenge.

In the meantime, the global environment is becoming tougher. The commodity boom is over, putting brakes on demand and tightening fiscal belts in resource-rich countries. While commodity importers benefit from improved terms of trade, many also receive reduced remittances, limiting the benefits to the current account. Slowing global growth and even more pronounced slowdown in global trade make it more challenging for firms to enter and expand in export markets. New mega-regional trade agreements (for example, TPP and TTIP) promise welfare gains to members but may lead to trade and investment diversion away from non-members. Against this background, it has become even more urgent for countries in South Asia to make overdue investments in boosting competitiveness and raising productivity to avoid falling further behind comparator countries in the global marketplace.

There are plenty of examples of pockets of excellence in the region. Exports of goods and services are higher than in China, relative to GDP. At the sectoral level, the software industry in India, the garment sector in Bangladesh and Sri Lanka, and the Sialkot cluster in Pakistan are global success stories. And at the firm level there is also no shortage of global champions (for example, US Apparel, Orient Craft, Pacific Jeans, and MAS in apparel, Tata Motors, Bharat Forge, Hi-Tech Gear, and HTGL in automotive, Fauji Foundation, Dilmah, and KRBL in agribusiness, and Dixon Technologies and Micromax in electronics). Yet, so far the region as a whole has made relatively little progress in integrating within itself and with the rest of the world, diversifying and increasing the sophistication of its export

bundle, moving up the quality ladder, and improving its ranking on many competitiveness benchmarks. It has yet to realize the substantial benefits of economic integration and achieve its full potential—both relative to its endowments and global competitors—while the window of opportunity may not remain open for long. The following discussion develops this observation in more detail.

Multiple pockets of excellence evidence vast untapped potential

South Asia, and India in particular, is already well known for having achieved excellence and pre-eminence in the ICT industry. Less well known, is the fact that South Asian countries/locations/firms are becoming major players in important manufacturing industries. These successes include:

- The apparel industries in Sri Lanka and Bangladesh which are as big (on a per capita basis) as the ones in China and Vietnam.
- The light manufacturing cluster in Sialkot (Pakistan), which despite all odds, have achieved dominant global market shares in products such as soccer balls and surgical instruments.
- Indian auto-part firms which are becoming global players through exports to and acquisition in leading markets such as Germany.
- Global electronics and auto part firms establishing their global R&D centers in India
- Leading agribusiness firms developing, in partnership with governments, new varieties for the domestic and international markets (for example, tea in Sri Lanka as well as rice and mint oil in India).

These cases were selected for in-depth case studies of this report so as to better understand the drivers of competitiveness as well as the constraints limiting more often occurrences of such cases to more firms, locations, industries and countries at a time where South Asia is uniquely positioned to take advantage of rising production cost in East Asia.

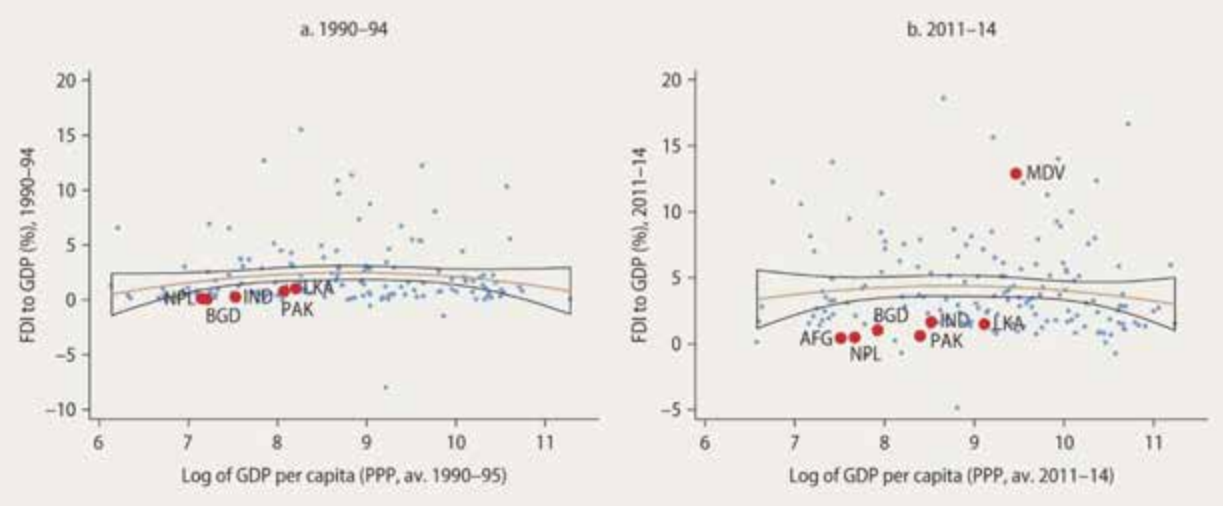
Difficulties in attracting investment and penetrating global markets

Integration in trade and investment can increase productivity. Opening up local markets to foreign trade and investment increases competition, which encourages labor and capital to move from less productive to more productive firms (Melitz, 2003). Further, increased competition may induce firms to improve their efficiency (Helpman and Krugman, 1985), to focus on their core competencies (Bernard et al.,

2006) and reduce managerial slack (Hicks, 1935), or to invest in new technology (Aghion et al., 2005). Finally, openness facilitates access to better inputs and technologies (Atkin et al., 2016), which is particularly important for those developing countries where import substitution policies previously reduced firms' ability to purchase imported inputs.

Despite these well-known benefits of economic integration, South Asia's intra-regional and global ties are relatively weak. Foreign investment, for example, is low (Figure 1.1). Over the period 1990-2014, the region received, on average, between 2.2 and 2.8 percentage points of GDP less FDI inflows than countries in East Asia (see Annex). Particularly in the later part of this period (2011-2014), FDI inflows in all countries (except Maldives) were substantially below the average of countries at similar levels of development.

Figure 1.1. Countries in South Asia attract less FDI than global peers



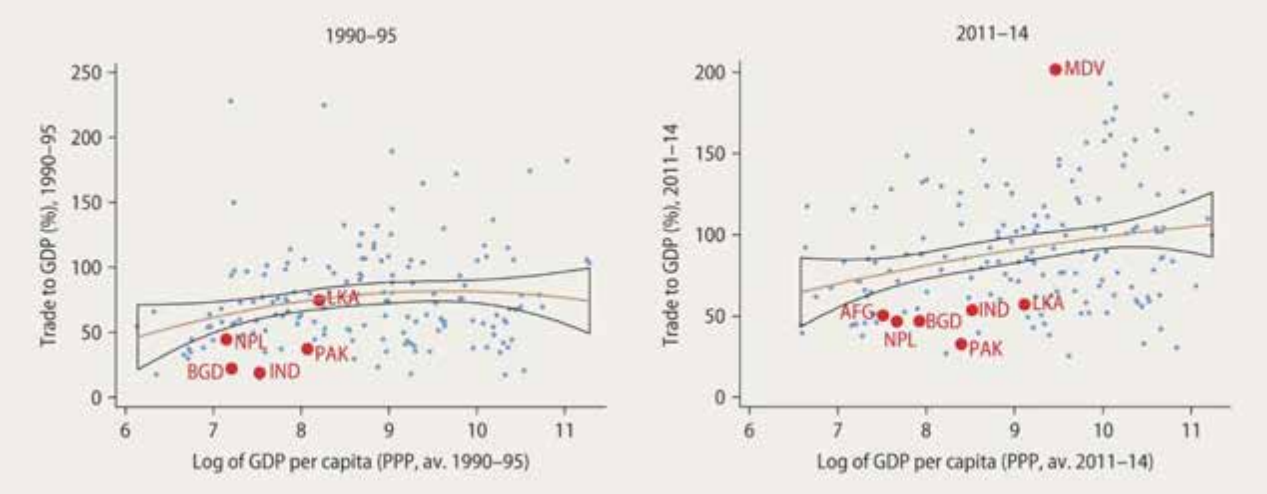
Source: Authors' calculations based on WDI.

Lack of investment integration in South Asia is particularly evident when considering intra-regional flows. Globally, South-South cross border investment has increased, and a recent market survey showed that multinationals in other regions tend to allocate a significant share of outward investment within their region. By contrast, countries in South Asia receive little FDI from within the region. In particular, despite the lower transactions cost of investing in nearby, familiar markets, Indian multinationals tend to invest outside the region (Gomez-Mera et al., 2014).

Some of the blame for low FDI inflows can be traced to burdensome regulations governing FDI. Nepal, for example, has not attracted substantial FDI largely because of the complicated processes required to repatriate profits, high entry barriers (with a long negative list) and insufficient guarantees of investor protection. The lack of readily-available land with adequate access to

infrastructure services has constrained foreign investment, particularly in Bangladesh. For example, in 2011 Samsung's large intended investment in electronics in Bangladesh fell through largely because adequate land was not available in an export processing zone. By contrast, one element of the competition among Indian states for investment by major original equipment manufacturers (OEMs) is through offering land in conjunction with tax incentives, although there is some risk that such competition will lead to sub-optimal investment locations and industry fragmentation.

Figure 1.2. South Asia's trade integration is relatively low



Source: Authors' calculations based on WDI.

Trade integration is also low. Over 1990-2014, South Asia's average ratio of exports to GDP varied between 17 and 21 percentage points below East Asia, and the average ratio of imports to GDP was 21-22 percentage points lower than in EAP countries (Maldives, with a highly developed tourism export sector, is again the exception).[1] Countries in the region have become more integrated in the global marketplace; the region today accounts for 60 percent more of merchandise trade than in 2000-2004 (from 1.15 dollars of every 100 traded globally, to 1.82 dollars). Nevertheless, growth in the region has been more inward-oriented than in East Asia.

South Asian countries can be divided into two groups by their performance in merchandise exports. While exports increased at double-digit rates over 2000-2013 in India, Bhutan, Bangladesh and Afghanistan (14, 16, 13 and 15 percent per annum), growth was slower in Pakistan, Sri Lanka and Maldives (8, 5 and 2 percent per annum) and exports fell in Nepal at 1 percent per annum (Table 1.1). However, regardless of whether countries belong to slow- or fast-growing groups, their share of global merchandise export markets remains small. For example, India, with an 80 percent increase in its market share in the past decade and a half, has just reached 1.5 percent of the global exports market. Bangladesh, with somewhat slower growth of 50 percent, has passed Pakistan to become the second

largest merchandise exporter in South Asia with nearly 0.2 percent of the global merchandise market. Afghanistan and Bhutan more than doubled their global market share in the past decade and a half, but still account for less than 0.01 percent of the world market, combined.

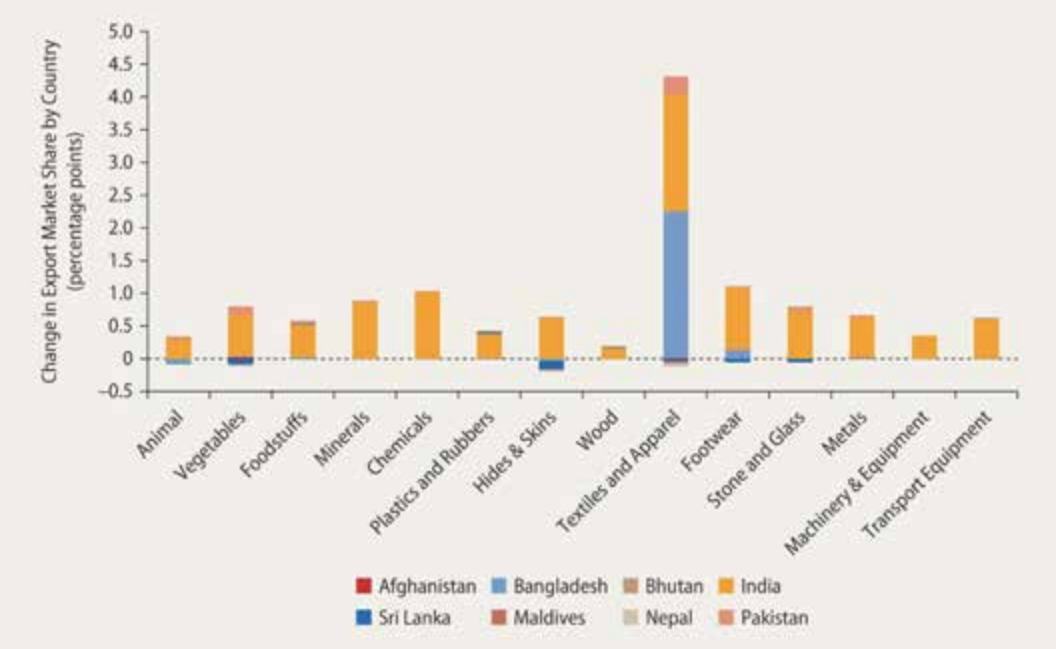
Table 1.1. Despite rapid merchandise exports growth, South Asia global footprint remains small

	Afghanistan	Bangladesh	Bhutan	India	Sri Lanka	Maldives	Nepal	Pakistan	South Asia
2000–2004	0.002	0.107	0.001	0.814	0.074	0.003	0.010	0.139	1.149
2010–2014	0.004	0.162	0.001	1.463	0.057	0.001	0.004	0.135	1.827
Absolute growth	0.002	0.055	0.001	0.649	−0.017	−0.002	−0.005	−0.005	0.678
Percent Growth	121	52	112	80	−23	−61	−54	−3	59

Source: Authors' calculations based on UN Comtrade.
Note: Cell values indicate the share of each country in global merchandise exports, in percentage points.

The textiles and apparel sector is one exception to this general trend (Figure 1.3). Following the end of the Multi Fiber Arrangement in 2004, South Asia's share of global exports in garments rose from 7.4 percent in 2000-2004 to 11.6 percent in 2010-2014. More than half of that increase is accounted for by Bangladesh (due in particular to effective import facilities for exporters), about 40 percent by India, and the remainder by Pakistan. Gains in market shares in other sectors are almost all below 1 percentage point, and almost fully explained by increased exports from India.

Figure 1.3. Outside of garments, South Asia's market share growth has been low



Source: Authors' calculations based on UN Comtrade.

In services, the region has recorded much better performance. Overall, South Asia's share of global services exports rose from 0.9 percent in the early 1990s to 3.6 percent in the early 2010s. Every country in the region except Nepal increased its share of global services exports; India, and at a substantially lower scale, Maldives, more than doubled their shares of services exports (Table 1.2).

Table 1.2. South Asia's performance on services exports outdoes manufacturing by a large margin

	Afghanistan	Bangladesh	India	Sri Lanka	Maldives	Nepal	Pakistan	South Asia
1990–1994		0.05	0.54	0.06	0.01	0.03	0.17	0.87
2000–2004		0.05	1.27	0.07	0.02	0.02	0.12	1.56
2010–2013	0.08	0.06	3.16	0.08	0.05	0.02	0.13	3.58
Absolute growth		0.01	1.89	0.01	0.02	0.00	0.01	2.02
Percent Growth		26	149	8	107	−13	10	129

Source: Authors' calculations based on UN Comtrade.
Note: Cell values indicate the share of each country in global services exports, in percentage points.

Limited trade integration reflects elevated trade costs. For example, Nepal charges high tariffs on yarn, a key input into most of its apparel exports. In India, high tariffs on inputs particularly affects the electronics sector, while tariffs on man-made fiber (combined with the problems with duty drawback schemes for exporters) essentially limit exporters to garments made of domestic cotton, which are concentrated during the summer season, thus reducing capacity utilization. On top of high tariff rates, South Asian countries impose high para-tariffs, an additional tax on imported products that is typically complicated, subject to arbitrary enforcement, and is applied irrespective of trade preferences. The average import tax rates in Bangladesh and Sri Lanka are more than double the customs duty average if para-tariffs are included (Kathuria et al. 2015). The decline in tariffs and increase in para-tariffs in Bangladesh have made the latter the more important constraint on imports (World Bank, 2014). By contrast, Sri Lanka's garment exporters have benefited greatly from zero tariffs on textile imports. In services trade, Bangladesh, India, Nepal and Sri Lanka are substantially more restrictive than high income economies, and even China, according to the World Bank's Services Trade Restrictiveness Index, although Pakistan's service restrictiveness is relatively low.[2]

Earlier steps to reduce barriers to trade and investment in the region have paid substantial productivity dividends and hint at potential future benefits from further policy efforts to improve integration. In India, for example, the reduction in tariffs on auto parts and electronics greatly increased competition in the domestic market, raising standards among firms and enabling them to increase productivity further by working with demanding clients. More broadly, the sharp fall in the level and dispersion of tariffs in response to the 1991 balance of payments crisis induced firms to improve their efficiency and improved their

access to imported inputs (Topalova and Khandelwal, 2011).[3] The productivity benefits of reform were smallest in sectors where burdensome regulations limited firms' ability to adopt new technologies,[4] greater for domestic than foreign firms (probably because foreign firms had already been exposed to competition), and largest in industries that also experienced the most deregulation and FDI liberalization. About a third of the rise in firms' product diversification was due to increased access to better quality and higher variety of imported intermediate inputs (Goldberg et al. 2010). Improved services policies after 1991 also boosted Indian firms' productivity. Policy changes that facilitated the operations of foreign services firms—particularly in banking, telecommunications, insurance and transport—increased the productivity of foreign and local manufacturing firms that used those services (Arnold et al. 2015).

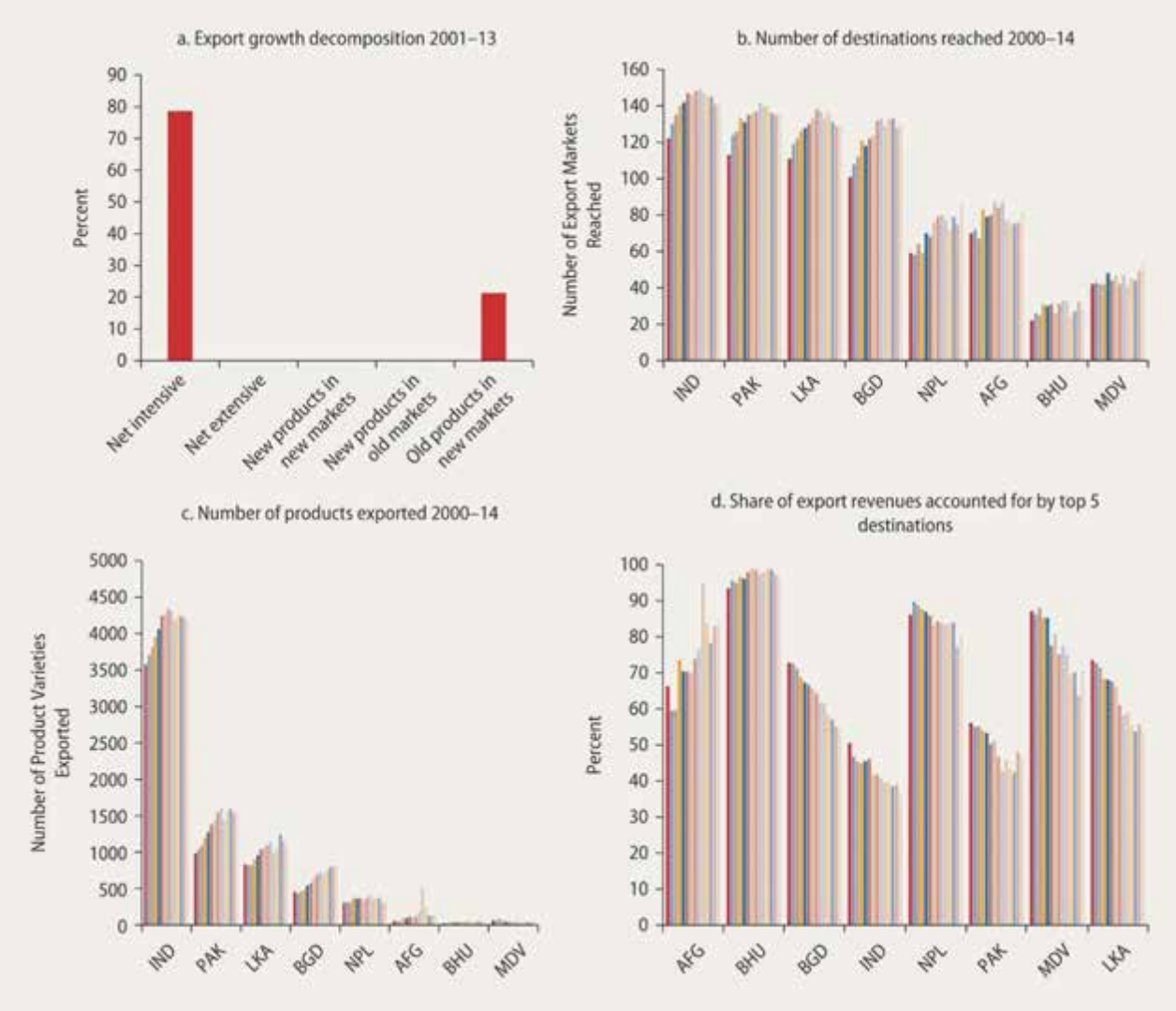
Little progress in diversifying the merchandise export basket

The composition of merchandise exports in South Asian countries has changed little in 15 years, which points to limited product innovation. Exports remain highly concentrated in textiles and apparel in Bangladesh, Afghanistan, Nepal, Pakistan and Sri Lanka, in minerals in Bhutan, and in animal and vegetable products in Afghanistan and Maldives. Almost 80 percent of the region's export growth from 2001 to 2013 came from the sale of the same goods to the same destinations (Figure 1.4), and the remaining 20 percent came from selling the same products to new markets. While the number of product varieties exported increased in almost all countries (with the exception of Nepal), diversification into new products (either in old or new markets) accounted, on average, for only 0.07 percent of export growth. In some countries, most exports go to only a few destinations. For example, the top 5 export destinations account for 97 percent of export revenues in Bhutan and 70 percent of in Maldives. In contrast, India's top 5 markets purchase only 36 percent of the country's exports (Figure 1.4).

Elusive sophistication and low quality of exports

On average, the sophistication of merchandise exports in South Asia (as measured by the EXPY indicator) is higher than expected given the region's income level.[5] However, with the exception of India, countries in the region have not been successful in further increasing export sophistication.

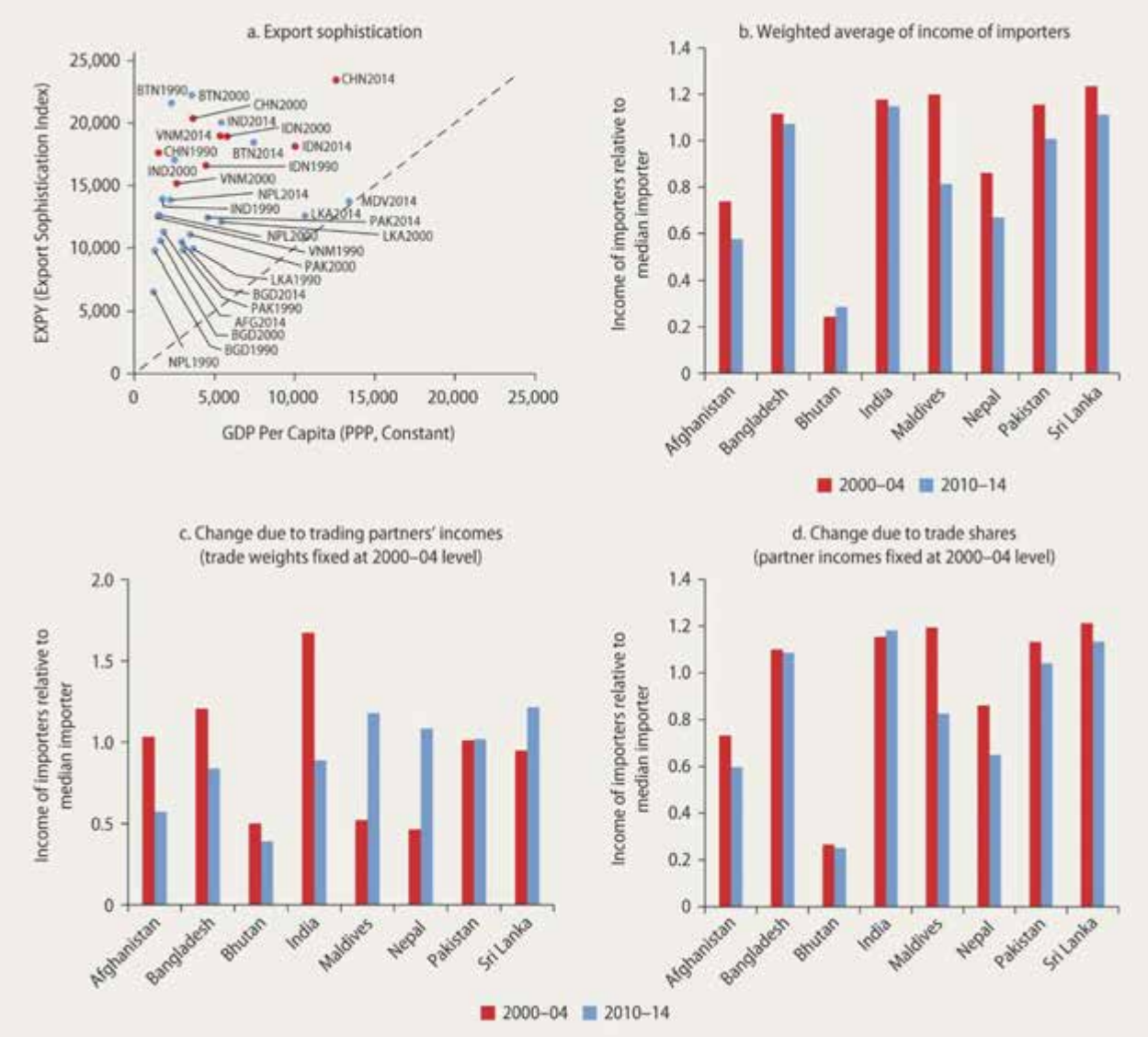
Figure 1.4. Most exports growth in South Asia has taken place along the intensive margin



Source: Authors' calculations based on UN Comtrade.

While India leapfrogged both Vietnam and Indonesia on this metric between 2000 and 2014, sophistication did not increase in Bangladesh and Sri Lanka, rose steadily but from a low level in Pakistan, and declined in Bhutan (Figure 1.5, top left panel). Even in India, one measure of export quality and sophistication (PRODY),[6] has remained low. A recent IMF study finds that the average level of sophistication for India's manufacturing exports is lower than for the rest of Asia, in sharp contrast to India's performance in the services sector.[7] The average sophistication of the countries that purchase exports from South Asia, as measured by the weighted average of the buyers' per capita incomes, has declined over time (Figure 1.5, top right panel). This is both because South Asia is moving toward relatively poorer trading partners (Figure 1.5, bottom right panel), and because the existing trading partners are growing less rapidly than average (Figure 1.5, bottom left panel).

Figure 1.5. Average export sophistication in South Asia has been on the decline

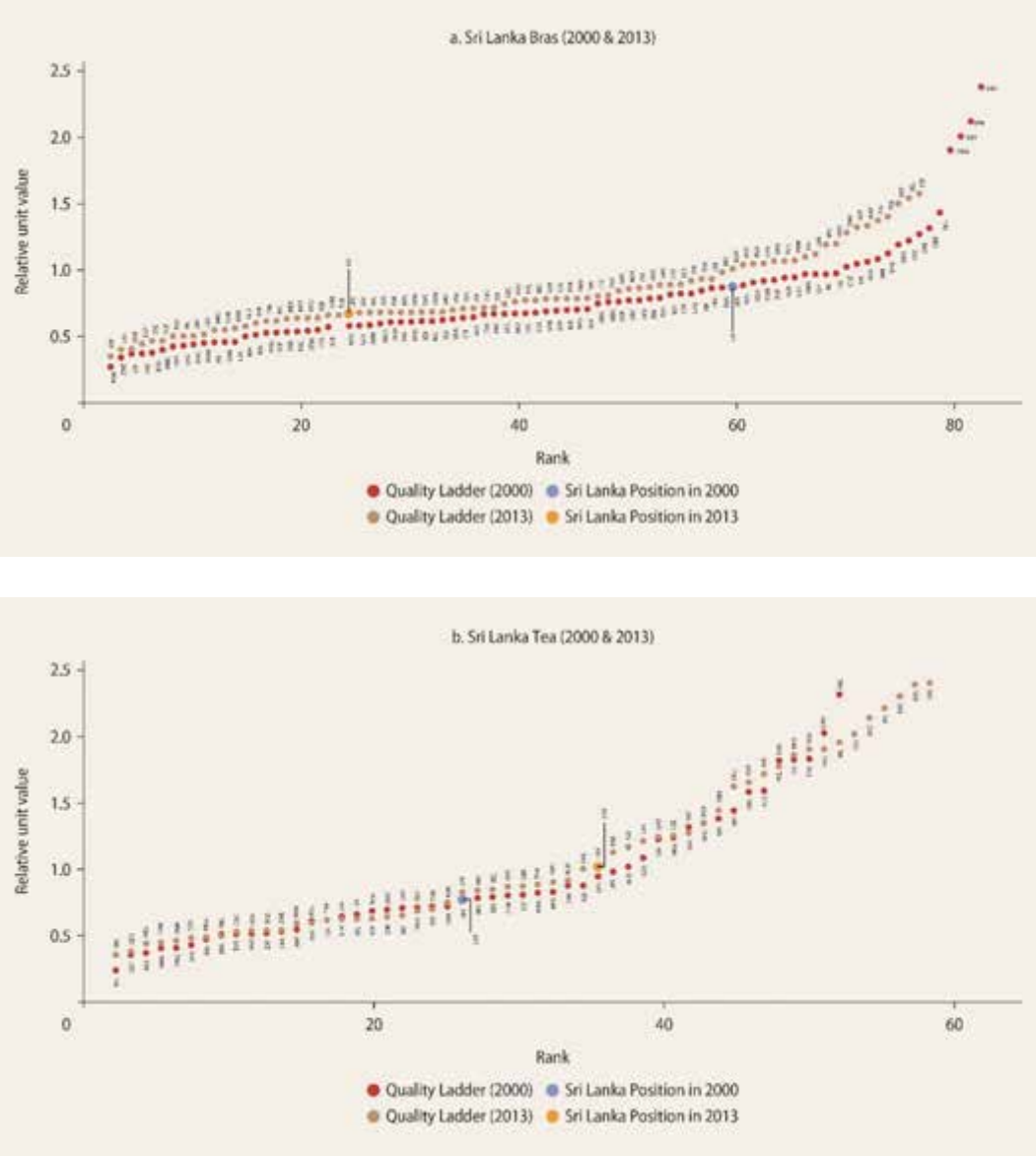


Source: Authors' calculations based on UN Comtrade.

Quality, as measured by the price that exporters of a particular product fetch in international markets compared with other producers, is generally low and has declined for some countries.[8] For example, Sri Lankan apparel (for example, brassieres) was at the higher end of the price spectrum at the turn of the century, but now fetches prices in the lower fifth of the distribution. In tea, where the country has a built-in brand name, Sri Lankan exporters secure prices just above the median. Pakistani cotton increased from the bottom 30th percentile to almost the mid-point of the distribution of prices. Trousers, however, are sold at the very bottom of the distribution of prices. Key Bangladesh exports have lost ground along the quality ladder. In cotton t-shirts, for example, the country's exports fell from the middle of the price distribution in 2000 to the 10th percentile in 2013.

Indian cars and cell phones also secure low prices relative to competitors. There are some exceptions in agricultural products, however. In the Maldives, some exports of fish are priced at the high end of the market—tilapia exporters, for example, receive 50 percent more than the price received by the median exporter of the same product (Figure 1.6). Similarly, figs from Afghanistan have substantially moved up the quality ladder between 2000 and 2013.

Figure 1.6. Export quality is generally low and has declined for some countries



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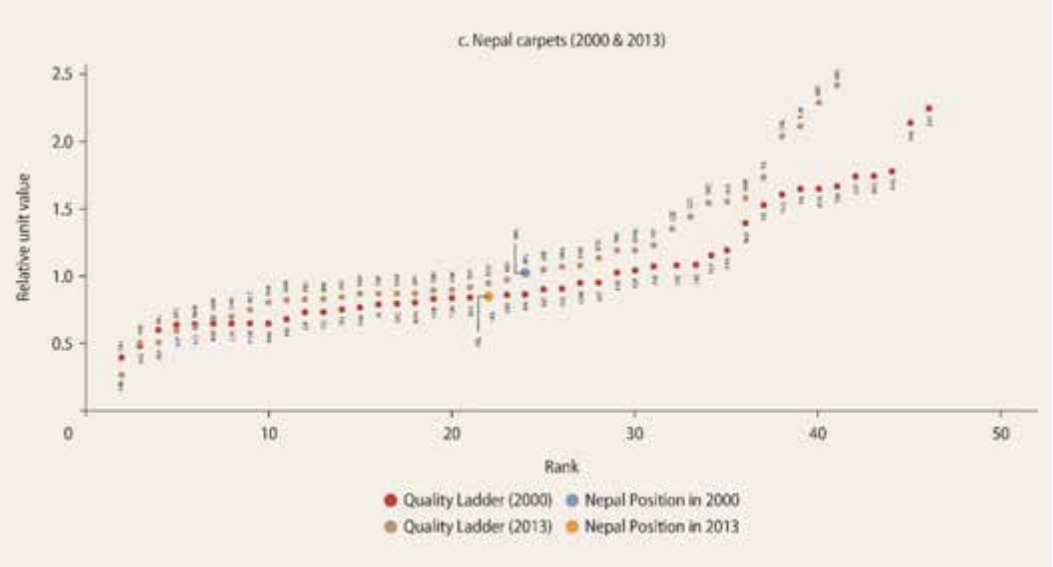

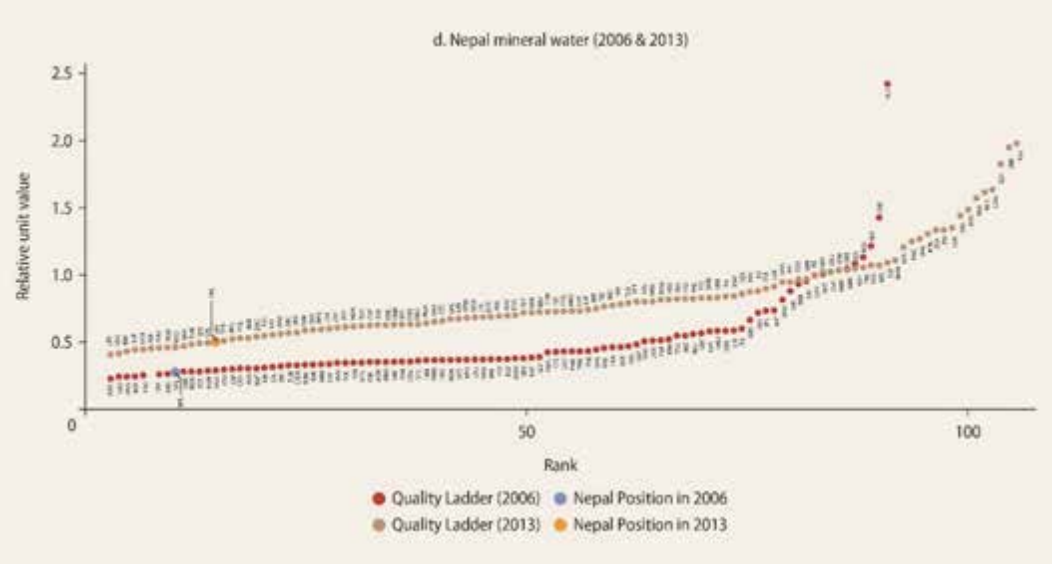

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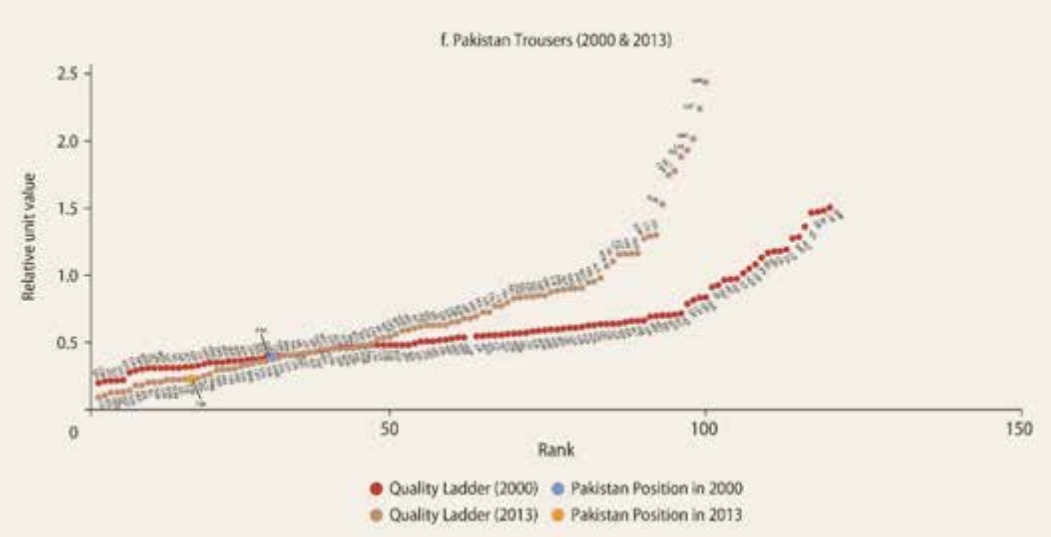

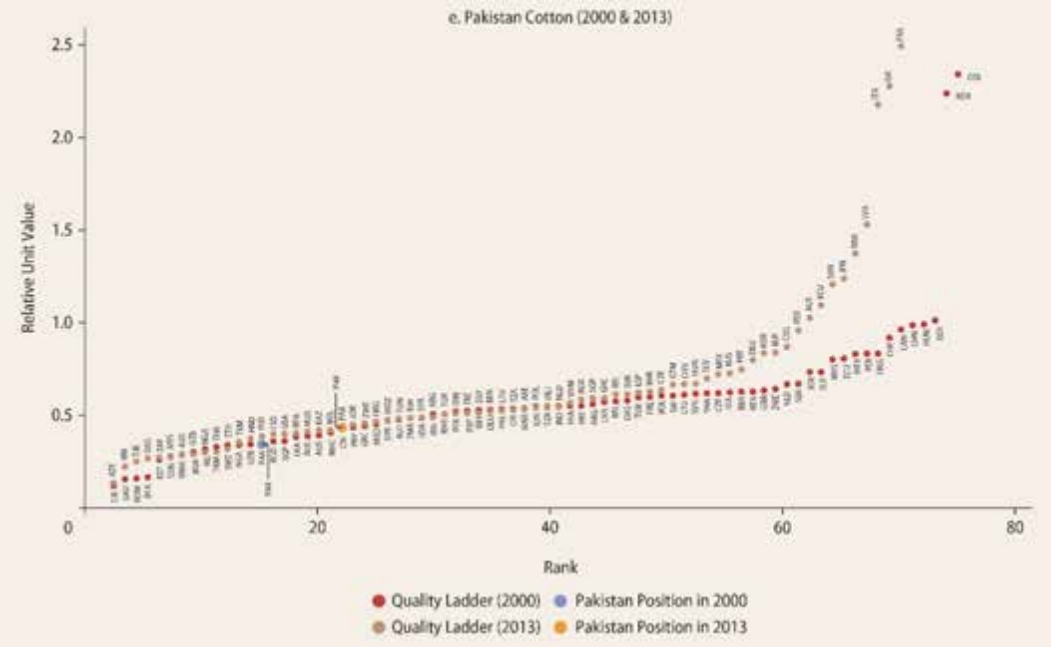

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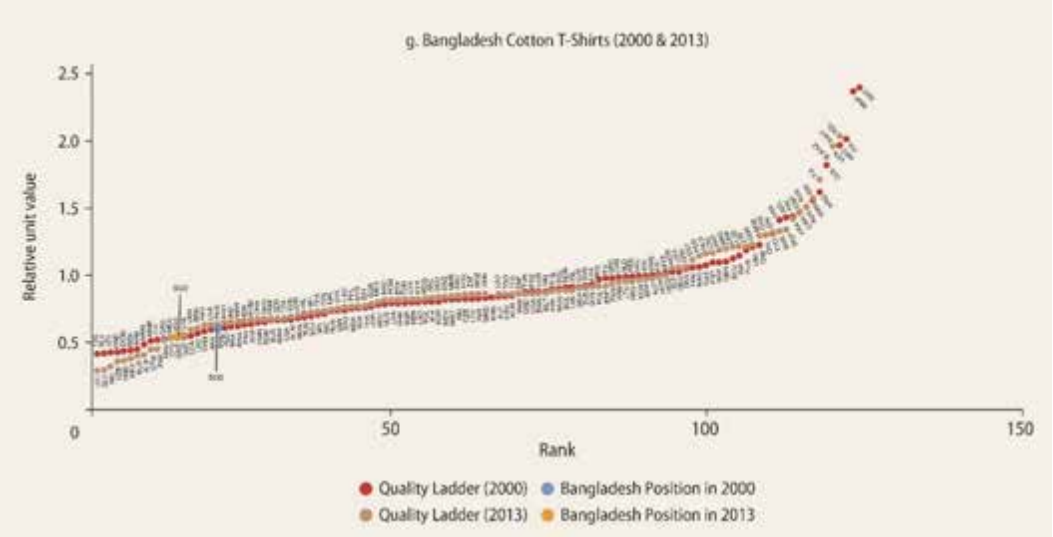

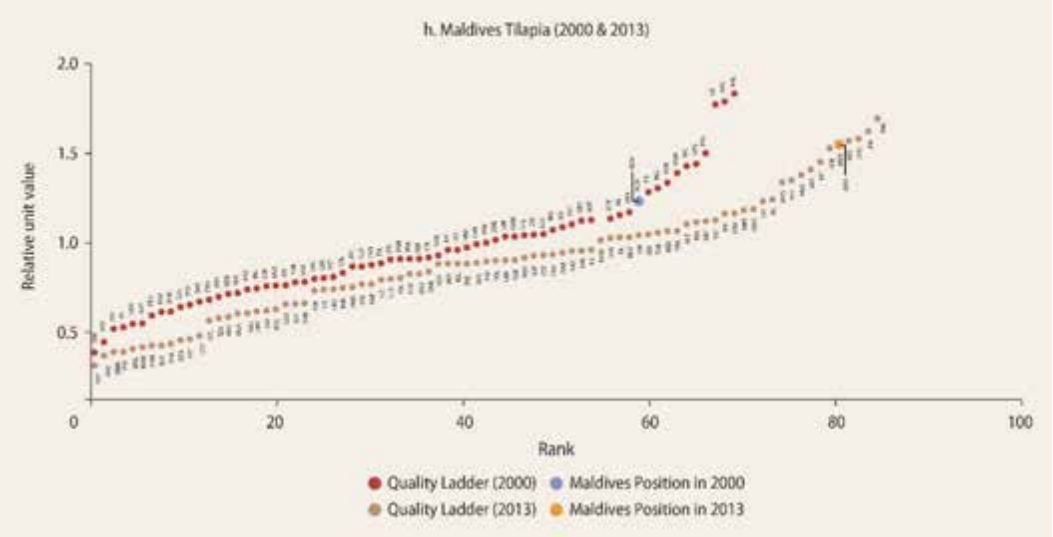

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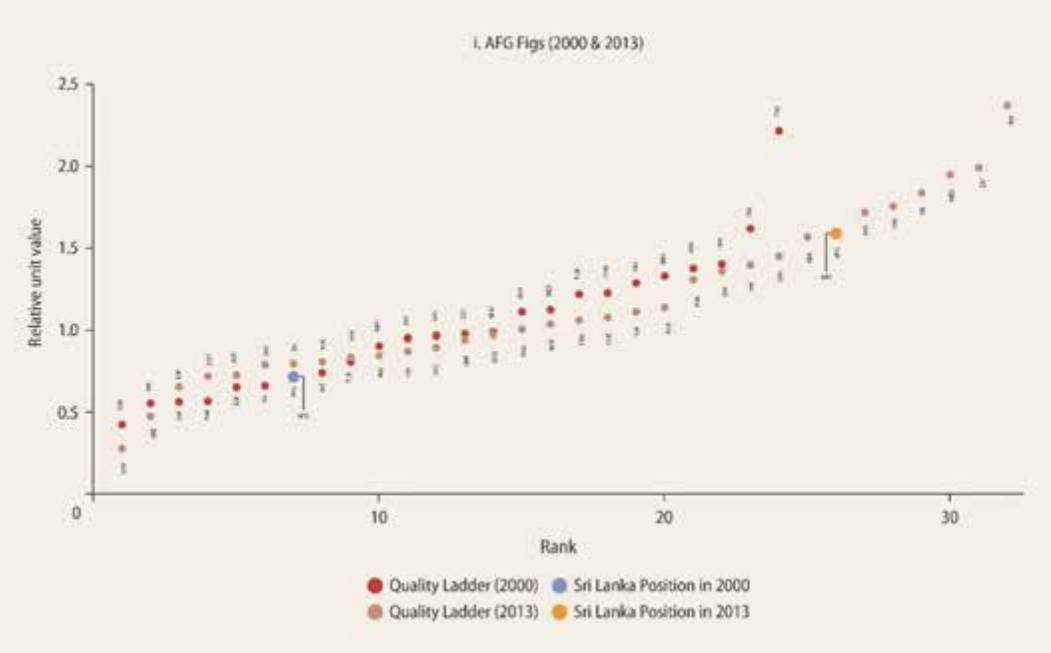


Source: Authors' calculations based on UN Comtrade.

Annex to Chapter 1

Table 1.3. FDI, Imports and Exports/GDP ratios, per capita income, and regional patterns

1990-2014	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	FDI/GDP	FDI/GDP	Imp/GDP	Imp/GDP	Exp/GDP	Exp/GDP
GDP Per Capita (PPP, Constant 2005)		6.91e-05***		0.000199***		0.000750***
		(1.07e-05)		(2.92e-05)		(2.51e-05)
ECA	0.705	0.0880	−11.63***	−12.98***	−8.802***	−13.82***
	(0.521)	(0.533)	(1.425)	(1.432)	(1.348)	(1.230)
LAC	0.622	0.985*	−15.10***	−12.91***	−14.36***	−9.476***
	(0.552)	(0.562)	(1.526)	(1.541)	(1.443)	(1.324)
MENA	−1.688***	−2.729***	−16.64***	−18.68***	−9.538***	−17.09***
	(0.652)	(0.694)	(1.820)	(1.878)	(1.721)	(1.613)
North America	−2.259	−4.128***	−35.99***	−40.89***	−29.72***	−48.19***
	(1.485)	(1.520)	(4.119)	(4.159)	(3.895)	(3.573)
SAR	−2.855***	−2.266**	−21.09***	−21.21***	−23.57***	−17.62***
	(0.858)	(0.893)	(2.325)	(2.396)	(2.199)	(2.059)
SSA	0.178	0.881*	−14.41***	−11.90***	−20.93***	−11.50***
	(0.516)	(0.530)	(1.425)	(1.464)	(1.348)	(1.258)
Constant	2.238**	1.368	54.82***	51.91***	47.44***	37.05***
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4,062	3,979	4,154	4,075	4,154	4,075
R-squared	0.034	0.043	0.055	0.069	0.090	0.260

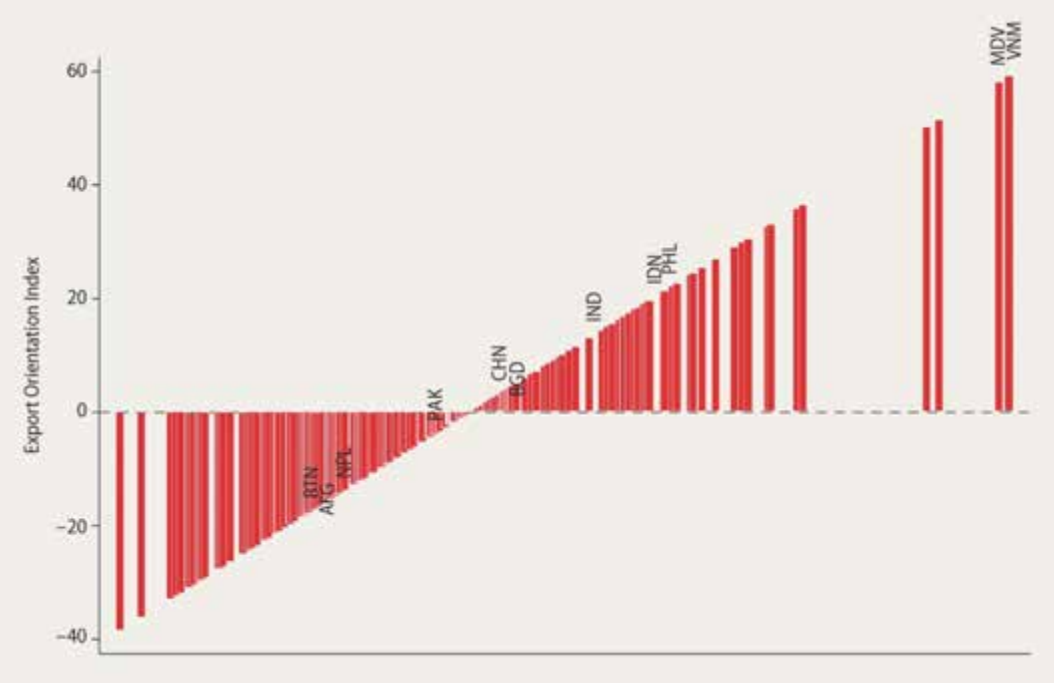
Source: Authors' calculations based on WDI
Note: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 1.4. Changes in FDI, imports and exports/GDP, per capita income, and regional patterns

1990-2014	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	D1.FDI/GDP	D1.FDI/GDP	D1.Imp/GDP	D1.Imp/GDP	D1.Exp/GDP	D1.Exp/GDP
GDP Per Capita (PPP, Constant 2005)		5.29e-05***		0.000216***		0.000833***
		(1.21e-05)		(4.29e-05)		(4.04e-05)
ECA	1.888***	1.428**	−3.495*	−4.859**	−2.665	−7.906***
	(0.586)	(0.599)	(2.093)	(2.105)	(2.083)	(1.984)
LAC	0.684	0.860	−12.61***	−10.71***	−11.97***	−6.366***
	(0.618)	(0.630)	(2.238)	(2.256)	(2.227)	(2.126)
MENA	−0.397	−0.906	−5.583**	−5.603**	−0.998	−7.491***
	(0.731)	(0.771)	(2.641)	(2.714)	(2.629)	(2.557)
North America	0.973	−0.450	−5.025	−10.26*	−3.048	−23.23***
	(1.644)	(1.685)	(5.925)	(5.999)	(5.896)	(5.653)
SAR	−0.669	−0.366	−4.277	−4.890	−16.20***	−10.54***
	(0.998)	(1.041)	(3.475)	(3.598)	(3.458)	(3.391)
SSA	1.660***	2.196***	−0.633	2.479	−10.02***	0.495
	(0.580)	(0.599)	(2.102)	(2.175)	(2.092)	(2.050)
Constant	−1.592	−2.283*	4.477	1.022	6.143	−6.049*
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,892	3,811	3,896	3,830	3,896	3,830
R-squared	0.007	0.012	0.012	0.018	0.016	0.119

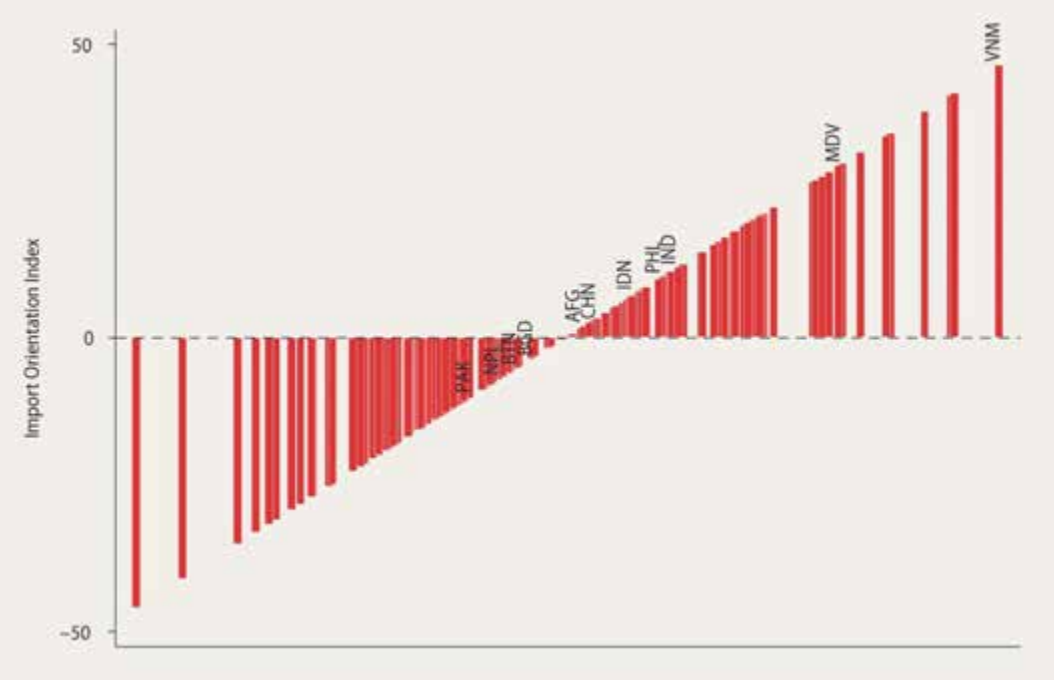
Source: Authors' calculations based on WDI
Note: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Figure 1.7. Export Orientation Index—Ranking SAR countries and comparators



Source: Authors' calculations based on WDI.

Figure 1.8. Import Orientation Index—Ranking SAR countries and comparators



Source: Authors' calculations based on WDI.

Chapter 2. Improving competitiveness is about raising productivity rather than keeping costs low

Competitiveness occupies a central position in government and industry agendas in South Asia.[9] However, current performance—whether measured as participation in global markets or common competitiveness benchmarks—has been subdued. For example, the region possesses several key advantages in the apparel sector: it has an abundant supply of workers, labor costs are one-half to one-quarter of China's, and South Asia is a top cotton producer in an industry where textiles make up close to 70 percent of production costs. Some leading apparel firms in South Asia have achieved world class operational performance by investing in training and technology, reaping economies of scale, and in the case of India and Pakistan, by integrating vertically to avoid barriers to sourcing high-quality inputs on the global market. Nevertheless, although South Asia increased its share of the global apparel market from 7.5 to 12.3 percent from 2000 to 2012, it continues to lag well behind China which accounts for 41 percent of the market (Table 2.1). Despite higher labor costs, China is able to attract buyers by offering a wide range of apparel at short lead times, while high productivity limits total costs despite relatively high wages. No country in South Asia has thus far succeeded in offering a comparable package of goods and services.

Table 2.1. Apparel competitiveness of South Asia lags well behind China

Country	Rank in Top 15 Apparel Exporters	Apparel Exports as a Share of World Apparel Exports (Percent)	Apparel Exports as a Share of Country Exports (Percent)	Average Apparel Monthly Earnings (US$/per hour)
Bangladesh	2	6.4	82.8	0.51
India	7	3.5	5.2	1.06
Pakistan	13	1.2	19.0	0.58
Sri Lanka	14	1.2	44.8	0.55
China	1	41	7.1	2.60

Source: World Bank staff calculations based on COMTRADE (exports) and household surveys (earnings).

This example illustrates the difficulty in defining national competitiveness, because different countries have become "competitive" with a different mix of endowments, factor prices, and policies (Porter, 1990). If competitiveness is defined as purely gains in global market share, countries can remain competitive in the short term by keeping production costs low through controlled exchange

rates, rigid factor markets, and similar policies. However, such policies and the larger focus on gaining a bigger slice of the pie are quite likely to be a zero-sum game (Krugman, 1994). A better strategy for improved competitiveness is to reduce the transaction costs for firms to compete domestically and globally by providing efficient infrastructure services, a smoother business environment and more effective public services. Still, reducing these costs has its limits as well.

On the other hand, investing in productivity-enhancing measures can pay continuous dividends over the long term. Porter (1990) ties competitiveness to the efficiency with which firms combine factors of production (total factor productivity, TFP) and argues that the "only meaningful concept of competitiveness at the national level is productivity." This is also the perspective adopted by this report: productivity is what drives competitiveness in the long run, and boosting productivity leads to rising living standards through higher wages and returns on investment. Productivity in South Asia has been less studied than various cost factors, so the following discussion focuses on three major challenges to productivity growth in the region.

At the macro level, the contribution of total factor productivity (TFP) to growth in South Asia has declined in recent years, and factors subject to diminishing returns—quantity rather than quality of labor and non-ICT investment—have been the main drivers of growth. This calls for greater focus on improving productivity to sustain and accelerate growth, create jobs, reduce poverty, and boost shared prosperity. The main forces that can increase productivity growth are increased integration with the global economy, the movement of resources from agriculture to higher productivity manufacturing and services, and the movement of capital and labor from less productive to more productive firms within narrowly-defined economic activities.

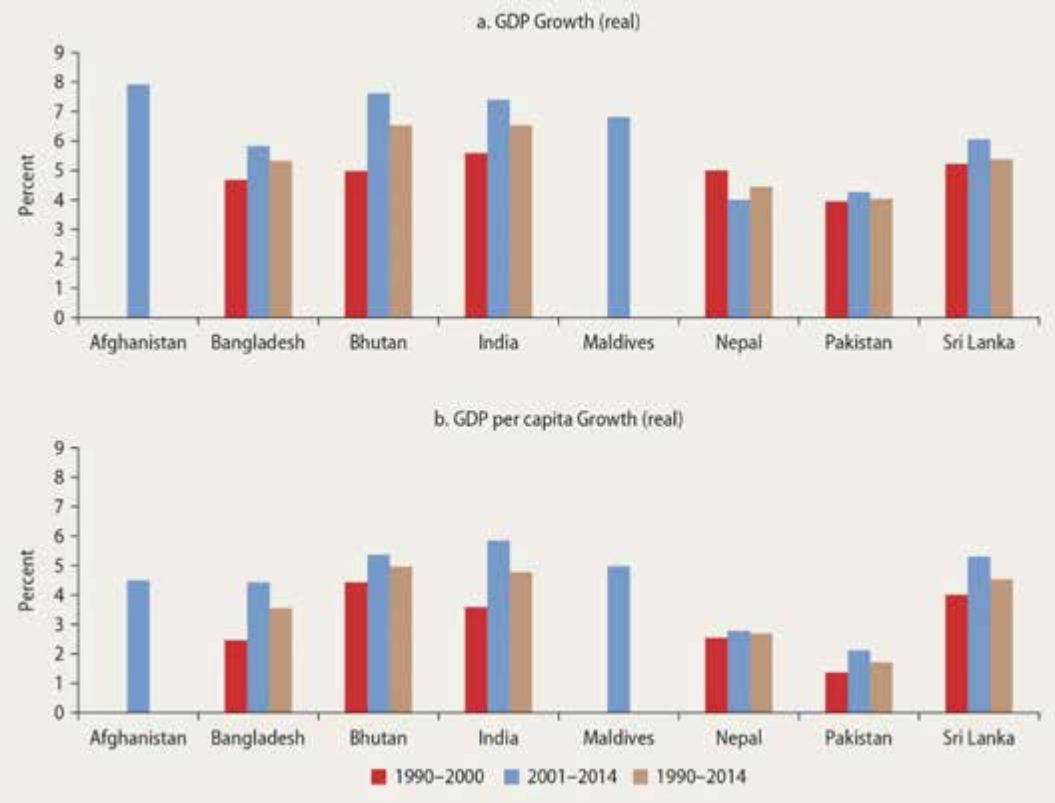
At the sectoral level, the movement of labor from agriculture to industry and services (structural transformation) has not been rapid enough in South Asia to markedly reduce the large differences in productivity across sectors. While countries in the region are at different points along this transformation, South Asia is overall in its early stage, leaving significant untapped potential to reap productivity gains by further reallocation of labor from lower to higher productivity activities.

At the level of the firm, large productivity differences exist between South Asian firms, and much of the region's resources are locked away in small, low-productivity firms that neither grow nor exit, indicating the existence of barriers to market entry and exit (Cabral, 2007; Li and Rama, 2015; Tybout, 1996). The consequent "misallocation" of resources accounts for a large share of the difference in productivity between South Asia and high-income economies (Hsieh and Klenow, 2009; Hsieh and Olken, 2014; Pages, 2010).[10] The following discussion develops these observations in more detail.

Macro challenge: contribution of TFP to growth is low and declining

GDP in South Asia more than quadrupled from 1990 to 2014, and most countries enjoyed rapid growth in output and per capita income (Figure 2.1). However, the contribution of total factor productivity to GDP growth has been mixed, as indicated by the four countries with the data (from the Conference Board) required to decompose GDP growth into its components, including changes in the quantity of labor, the quality of labor, ICT capital, non-ICT capital, and TFP (Figure 2.2).[11]

Figure 2.1. Real GDP and GDP per capita growth in South Asia has accelerated



Source: Authors' calculations based on WDI.
Note: Afghanistan's growth both for GDP and GDP per capita is calculated over 2002-2014 due to data availability.

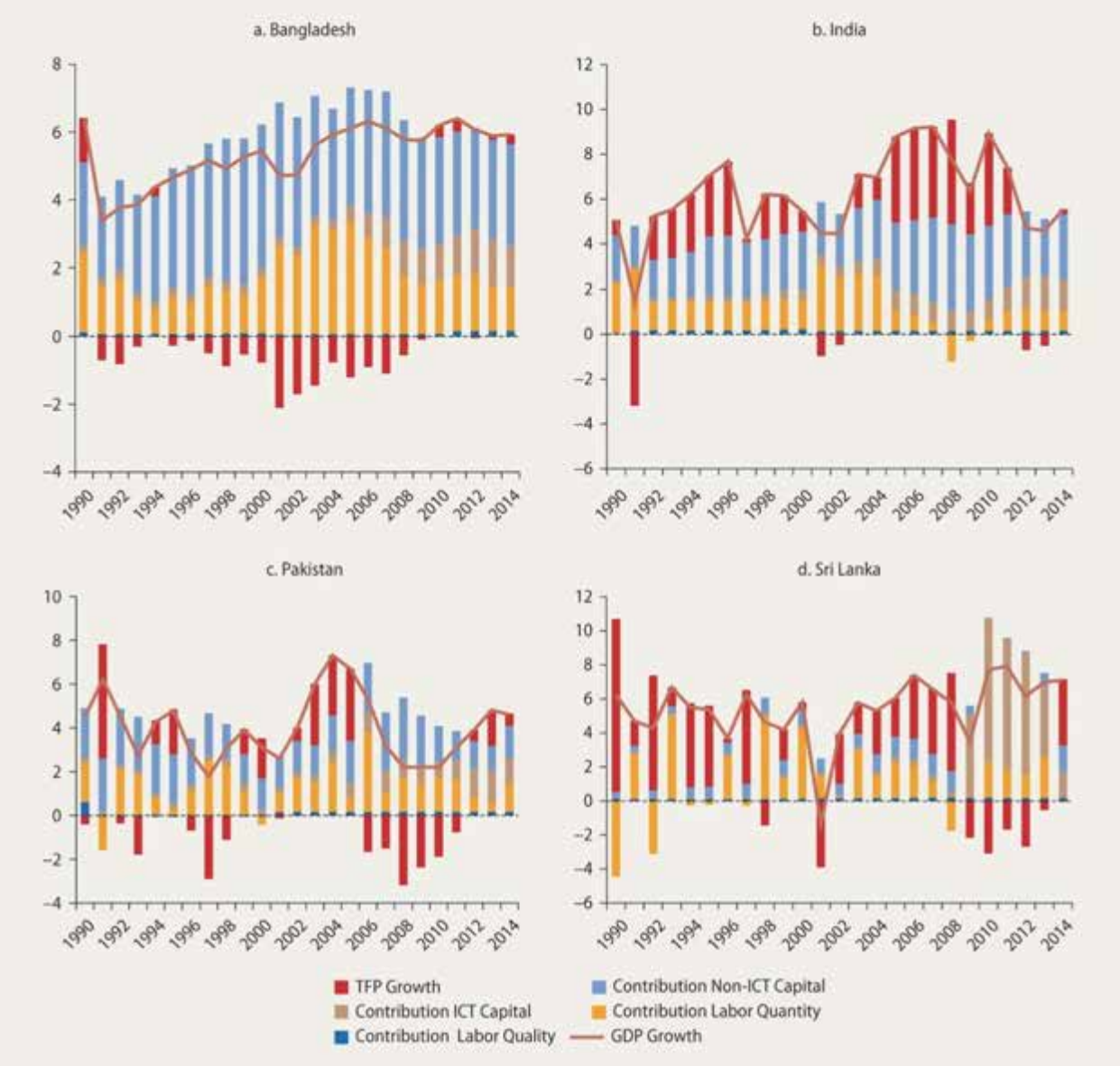
Three messages emerge from this analysis:

- In India and Pakistan, which achieved high rates of GDP growth, increases in TFP made a substantial contribution to growth.
- The contribution of TFP gains to economic growth in the region has declined across the four countries. In India and Pakistan, the contribution of TFP to GDP growth has declined dramatically since 2011 and 2006, respectively. In Sri Lanka, while the contribution of TFP picked up in 2014, it has declined from the high level before 2009. These developments parallel a

broader trend in the average contribution of TFP to growth in developing countries, which has been muted since the onset of the 2008 financial crisis. In Bangladesh TFP has played a negligible role in GDP growth during the entire period of analysis.[12]

- Non-ICT investment and increases in the number of workers have been the leading forces behind growth in all four countries. Although investment in ICT has increased its contribution to growth in India, and substantially so in Sri Lanka, most of the growth is still accounted for by more labor (rather than higher-quality labor) and non-ICT investment—both factors subject to diminishing returns.

Figure 2.2. South Asia's growth has been largely driven by factor accumulation

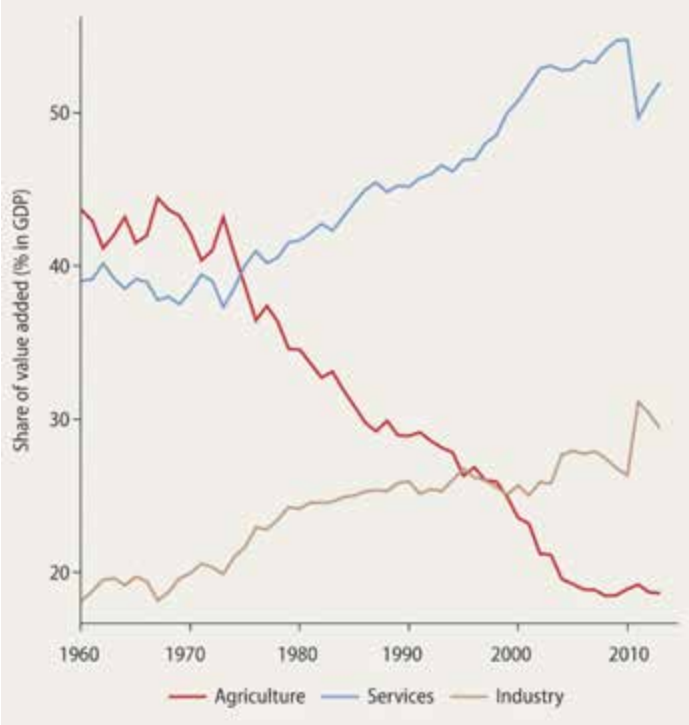


Source: Conference Board.

Sectoral challenge: slow pace of structural transformation

As in other countries at similar stages of development, resources in South Asia are moving from agriculture to manufacturing and services (Figure 2.3). This shift in economic activities from lower-productivity, traditional sectors to more modern and productive ones is known as structural transformation. Between 1960 and 2013, the average share of agriculture in GDP in South Asia fell from 44 percent to 19 percent, while the share of industry increased from 18 to 29 percent. Over the same period, real GDP per capita of the region nearly quintupled.

Figure 2.3. Agriculture has given way to industry and services

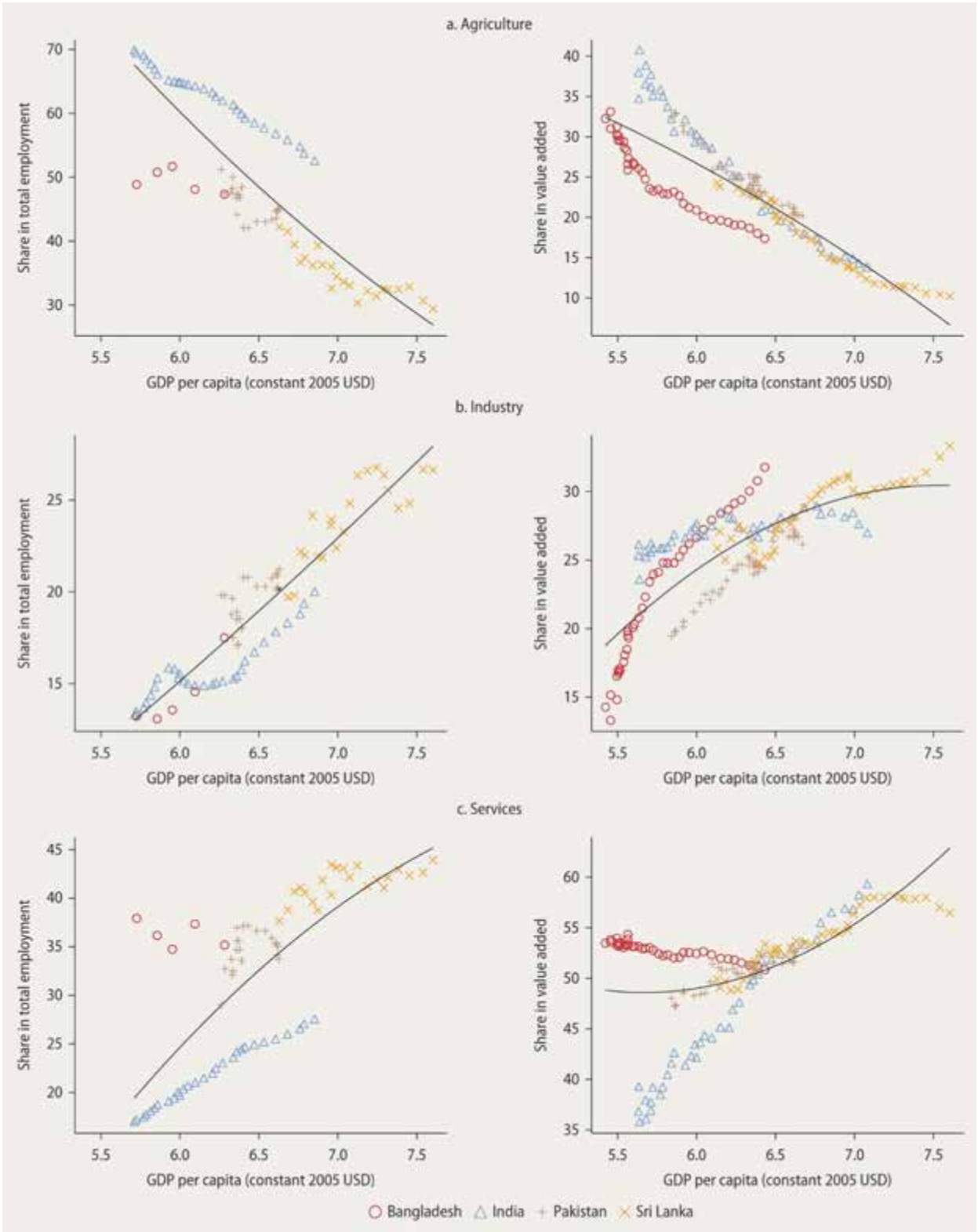


Source: World Development Indicators database.

Individual countries are at different points along this transformation, but the overall trend is quite consistent (for convenience, the eight countries are divided between the four larger and the four smaller in panels (a) and (b) of Figure 2.4). An increase in real GDP per capita has been associated with a decline in the share of agriculture in employment and value added, and concomitant increases in the shares of services and industry.[13] Maldives, a small island economy, has traditionally had a large services sector owing to tourism, and has not experienced much structural change in the last decade. The share of value added of industry, however, appears to plateau at certain levels of income (at least in the larger countries), consistent with the views of structural transformation in the literature (Herrendorf et al., 2013).

Figure 2.4. As incomes grow, resources shift from agriculture to industry and services

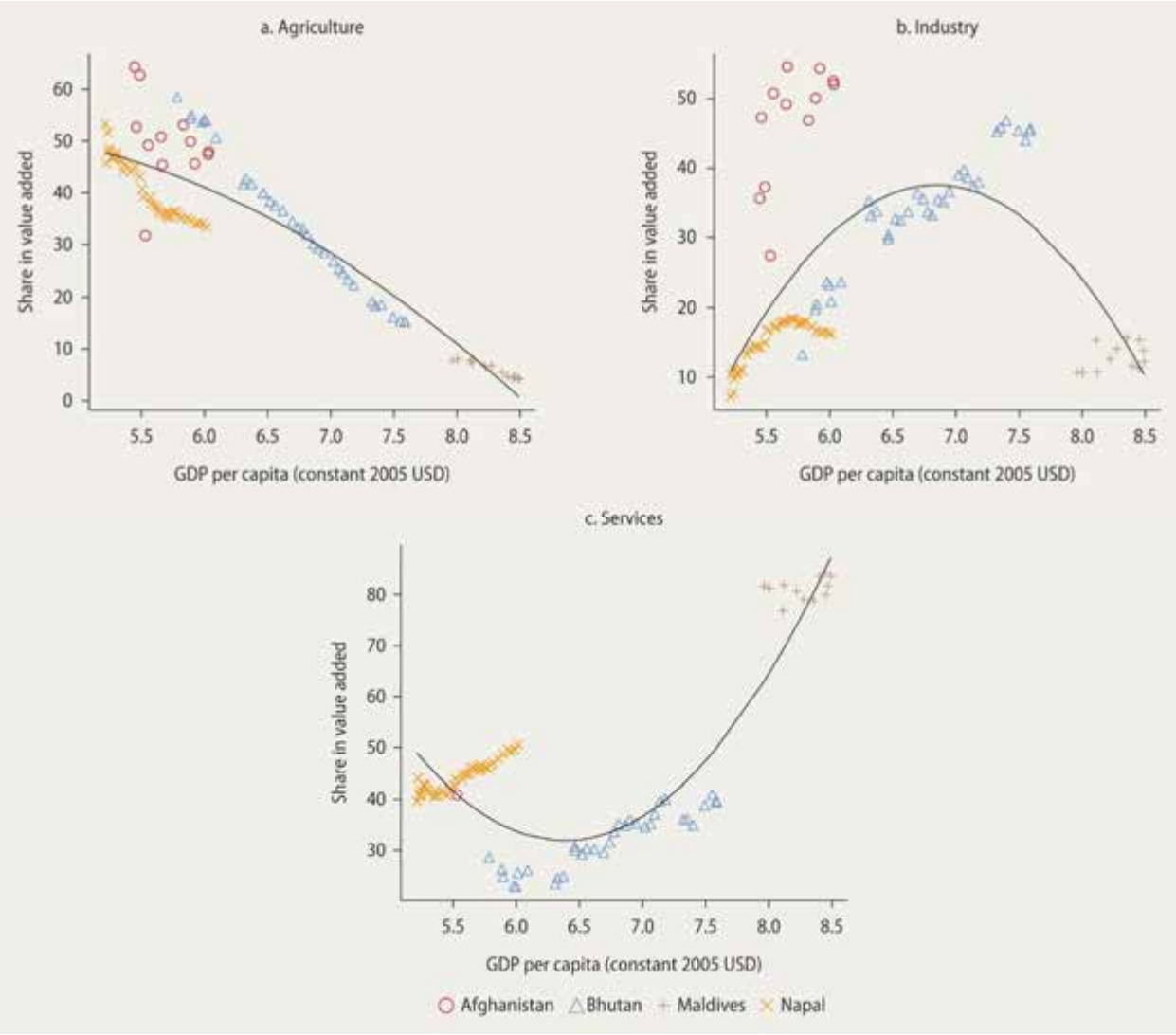
Panel (a): employment and value added shares by sector for Bangladesh, India, Pakistan, and Sri Lanka



(Continued next page)

Figure 2.4 (continued)

Panel (b): Value added shares by sector in Afghanistan, Bhutan, Maldives, and Nepal



The share of employment in agriculture has been consistently higher than the share of value added at all levels of GDP per capita, for the four countries with adequate data. This suggests that agricultural productivity has not improved substantially over the decades. The share of services in employment and value added in this sector is high in South Asia, particularly considering the relatively low income levels. The share of services in GDP appears to rise relatively early in the development process, at below US$700 per person (in 2005 prices). This pattern differs from the experience of mature industrialized countries such as United Kingdom, France, and the United States, where the share of the services sector reached high levels only at high levels of GDP per capita (for example, see Verma, 2012).

Workers in South Asia are moving from agriculture to the higher-productivity manufacturing and services sectors (Figure 2.3), a transition which has been associated with increases in aggregate productivity.[14] However, the share of agriculture in total employment in the region remains high at over 50 percent, despite the fact that labor productivity in industry and services is several times that of agriculture. For example, in India average labor productivity in industry from 2004-2013 was approximately 5 times, and services 6.5 times, the level of productivity in agriculture and services, illustrating the potential for major productivity gains in the region from accelerating the process of structural transformation.

Differences in labor productivity play an important role in pulling labor to more productive sectors, above and beyond the "natural" rate of structural transformation (Table 2.2).[15] In other words, movement from agriculture to industry and services is significantly faster in periods when the difference in productivity between the two sectors is larger. In this way, the process of structural transformation in South Asia is similar to the experience of OECD countries, although there are differences due either to the two groups of countries being at a different stage of the same path, or the paths being a bit different. In either case, the response of employment to differences in sectoral productivity levels is much higher in South Asia than in OECD economies, indicating that boosting productivity growth in manufacturing and services in South Asia carries a much greater potential for accelerating structural transformation, increasing non-farm employment, and raising income growth.

Table 2.2. Labor productivity drives structural transformation

OECD countries	From Agriculture to Industry	From Agriculture to Services
Intercept	0.14	0.08
	(0.09)	(0.08)
Lag employment share	0.97***	0.97***
	(0.00)	(0.01)
Labour prod. differential	0.18*	0.17*
	(0.08)	(0.07)
N	730	730
India, Pakistan, and Sri Lanka		
Intercept	15.68***	16.53***
	(4.15)	(4.77)
Lag employment share	0.84***	0.83***
	(0.05)	(0.05)
Labour prod. differential	4.43***	3.70**
	(1.25)	(1.21)
N	70	70

Note: Standard errors in parentheses, country fixed effects included but not shown.
*p < 0.05, **p < 0.01, ***p < 0.001.

Firm challenge: firm growth is low and resources are trapped in small firms

In addition to resources moving from less to more productive sectors (i.e., structural transformation), productivity growth can be driven by movement in resources from less-productive to more-productive firms within narrowly defined economic activities. When this mechanism does not function as effectively as it could—for example, due to barriers to competition—the economy suffers from misallocation of resources (Box 2.1).

Box 2.1. Barriers to competition and productivity dispersion

Consider a fictional example of an economy with two firms. One operates at low productivity, but manages to survive in the market because it has political connections through which it secures subsidized credit. The other firm has no political connections, borrows at the market rate, and therefore faces higher costs. However, the second firm has higher productivity, which enables it to compete with the first firm.[16] If labor and capital were to move from the firm with low productivity to the firm with high productivity, aggregate output would be higher, and the difference between productivity levels in the two firms would be lower. Thus, the misallocation of capital results in low output per worker, on average across the two firms.

Barriers to competition in the real world also can create and perpetuate substantial misallocation of resources. For example, informal, low productivity retailers in Brazil can secure a large share of the market because they are subject to less stringent labor market regulations, and thus lower labor costs, than higher-productivity supermarkets (Mc Kinsey Global Institute, 1998). Subsidized loans and differential tax-code treatment in Japan are used "to keep mom-and-pop retailers from going out of business" (Lewis 2004). And, prior to reforms, severe restrictions on FDI in retail prevented investment by global best practice retailers in India.[17]

Evidence shows that the costs of misallocation, in terms of aggregate productivity, can be very high. In a seminal study, Hsieh and Klenow (2009) measure resource misallocation in China and India by comparing productivity dispersion among firms in these countries with the U.S. market.[18] They find that firms in China and India produce the same products with vastly different levels of productivity, with a range that is much wider than in the United States. Reducing these productivity gaps to the level of efficiency observed in the United States would increase TFP by 40-60 percent in India (and by 30-50 percent in China), and output would increase by twice as much if investment increased in response to higher productivity. Conversely, a more rapid expansion by less efficient firms than by more efficient firms in the early 1990s reduced TFP growth in Indian manufacturing by 2 percent over the 1987-94 period (Hsieh and Klenow, 2009).

While the detailed data required to replicate the Hsieh and Klenow (2009) analysis for other countries in the region are not available, indicators of

productivity differences among firms compared to India can be calculated for a few sectors in Bangladesh, Sri Lanka and Nepal. The results show that substantial scope exists for improving productivity by shifting labor and capital to higher-productivity firms in the Nepalese food beverages sector (firms in the lowest ten percent of the TFP distribution are more than 5 times less productive than those at the highest ten percent) and other manufacturing, and less so (relative to India) in Sri Lanka and Bangladesh (Table 2.3).[19] The results also hint at the importance of competition: in Bangladesh and Sri Lanka, firms in the apparel sector, which is significantly exposed to competition through exports, shows less productivity dispersion than in India.

Table 2.3. Productivity dispersion across South Asia's firms tends to be large

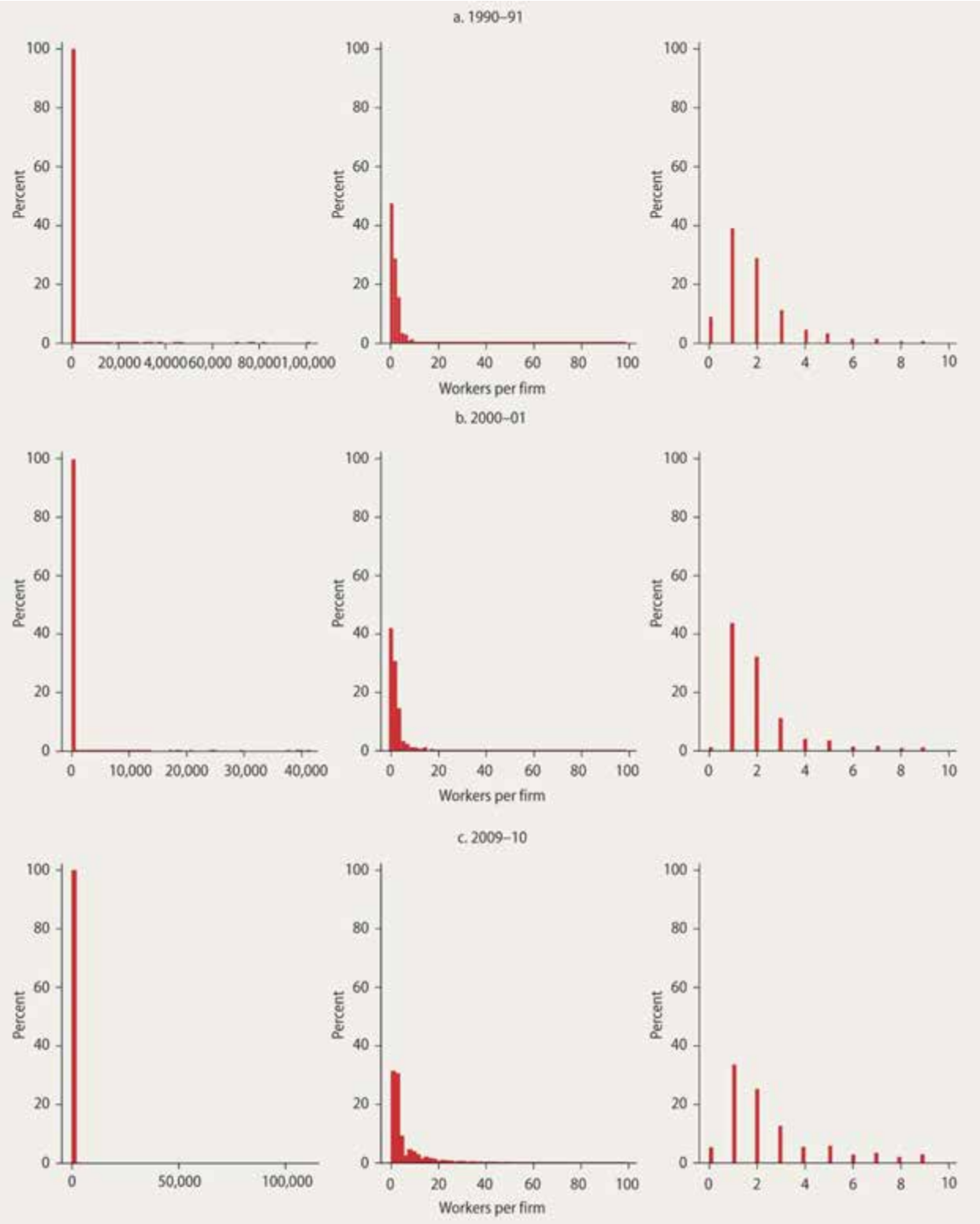
(coefficients of variation by sector and country)

(Relative to India)	Bangladesh	India	Sri Lanka
Food and Beverages	0.64	1.00	1.56
Textiles	1.79	1.00	
Apparel	0.65	1.00	0.98
Basic Metals	2.75	1.00	
Other Manufacturing	1.49	1.00	2.95

Source: David Francis based on World Bank Enterprise Surveys.

Some authors have explained high productivity dispersion—and, consequently, lower overall productivity—by a disproportionately high number of small, unproductive firms which neither grow nor exit, releasing resources into the economy (Li and Rama, 2015). For example, the share of manufacturing firms with less than 10 employees in India is "almost visually indistinguishable from 100 percent" and the most common observation in the sample is a firm with a single employee (Hsieh and Olken 2014). By contrast, in the United States, the most common observation in the sample is a firm with 45 employees. Moreover, the dominance of small firms in India appears to be the same, or perhaps even greater, as it was more than 20 years ago (Figure 2.5). Even when the smallest (less than 5 employee) firms are excluded from the analysis, evidence from the World Bank Enterprise Surveys indicates that the importance of small firms in South Asia is greater than in comparator East Asian countries, except for Bangladesh (Table 2.4).[20] Countries with higher levels of GDP per capita tend to have a smaller share of firms with only a few employees (see Figure 2.8, Figure 2.9, and Figure 2.10 in the Annex).

Figure 2.5. Size distribution of firms in India is heavily biased towards small firms



Source: Authors' calculations using combined ASI/NSS data.

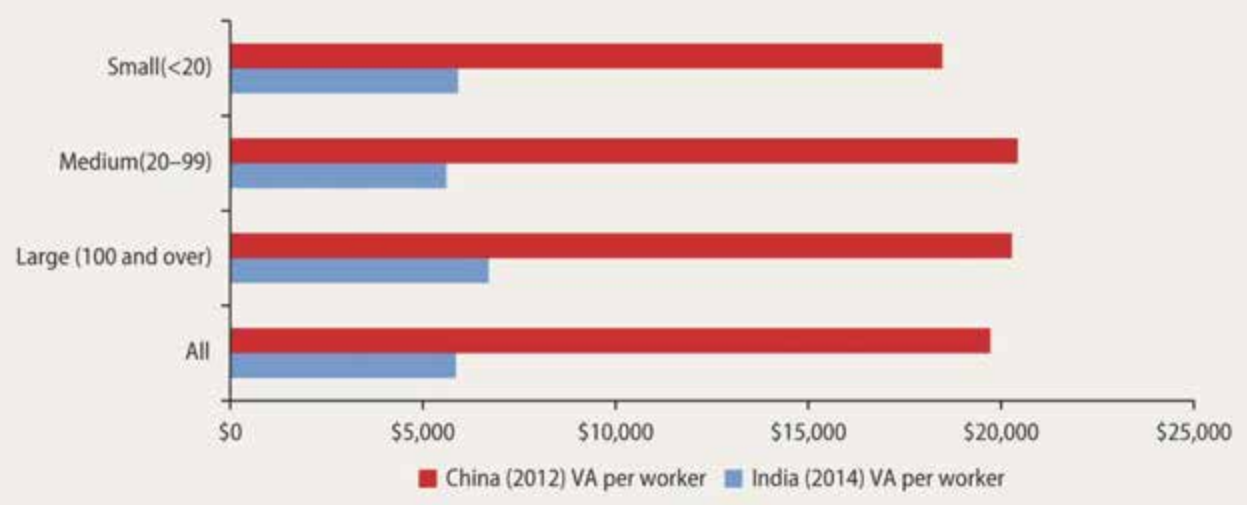
Table 2.4. Small firms dominate the distribution across South Asia (except in Bangladesh)
(distribution of firms by size—South Asia and comparator countries, percent)

	Small (5–19)	Medium (20–99)	Large (100 and more)
Afghanistan 2014	69.37	25.51	5.12
Bangladesh 2013	37.29	35.98	26.74
Bhutan 2015	70.88	24.74	4.39
China 2012	55.05	32.4	12.55
India 2014	42.87	43.75	13.37
Indonesia 2009	87.99	9.76	2.25
Nepal 2013	82.25	15.58	2.17
Pakistan 2013	44.32	39.58	16.1
Philippines 2009	52.39	34.63	12.98
Sri Lanka 2011	75.89	18.18	5.93
Vietnam 2009	45.22	36.43	18.34

Source: Authors' calculations using Enterprise Surveys.

There are many reasons why small firms may be less productive than larger ones: economies of scale, access to finance, better employees, and stronger business practices. Larger firms tend to innovate more, particularly in terms of process and organization, because they can more easily secure finance for risky projects and because of the potential for economies of scale in research and development investments (see Del Mel et al., 2008; Cohen and Klepper, 1996b and Ayyagari et al. 2007). Larger firms also tend to invest more in administration and adopt better management and overall business practices, which are highly correlated with firm performance (Bloom and Van Reenen 2007; Bloom et al., 2011).[21] Regardless of the channel, productivity does appear to be lower in small than in large firms in Asia. For example, in both India and China, value added per worker in small firms is much lower than in large firms (Figure 2.6).[22,23]

Figure 2.6. Labor productivity is lower in small firms in India and China



Source: Francis (2015).
Note: In India, VA per worker for all firms is calculated from a sample of 4774 firms, for large firms from a sample of 1144, for medium, of 2378 firms, and for small firms of 1252. For china, the sample sizes are 1349, 579, 587, and 183 firms respectively.

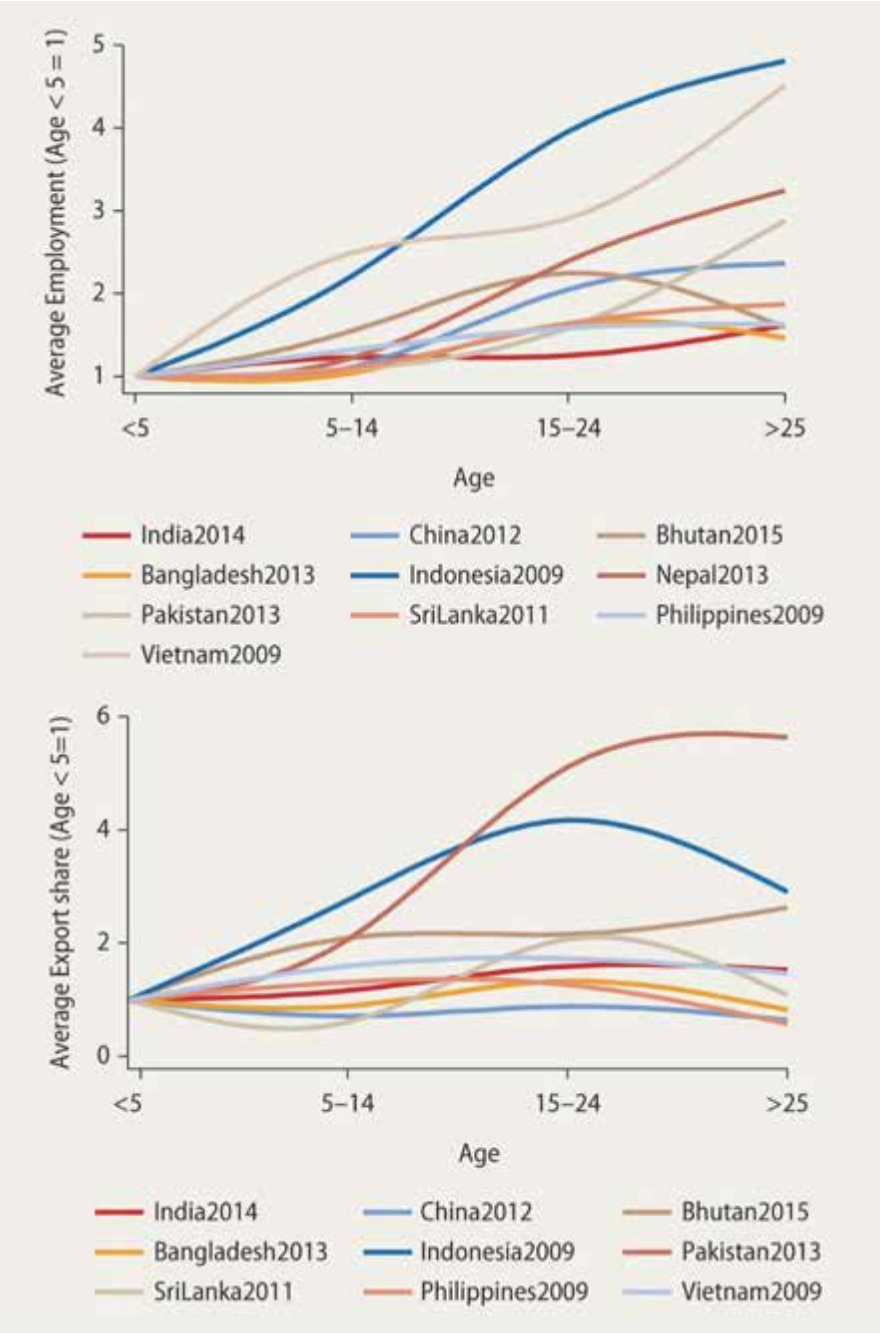
This pattern is also documented by Hsieh and Klenow (2009), who argue that the relationship between productivity and size is stronger in China and India than in the United States due to distortions which prevent firms from achieving optimal size (and consistent with Banerjee and Duflo's (2005) contention that Indian policies constrain its most efficient producers and coddle its least efficient ones). Moreover, India's productivity growth between 1993 and 2007 was associated with productivity gains within large manufacturing plants (200 or more workers) rather than with gains within small firms or with reallocation between plants (Bollard et al., 2011).

Another symptom of resource misallocation in the region is that firms face difficulties in growing. In India, manufacturing plants that are 40 years old are only 40 percent larger than young manufacturing plants (under 5 years of age), while in the United States older plants are more than seven times larger than the younger ones (Hsieh and Klenow 2014). The same conclusion holds more broadly across the region: firms aged 25 years or more in India, Sri Lanka, Bangladesh, and Bhutan are only 50-90 percent larger than firms aged five years or less. By contrast, older firms in Vietnam are on average 4.5 times the size of younger firms, in Indonesia older firms are on average 4.8 times as large, and in China 2.4 times as large (Figure 2.7).

One explanation for this is that in India (and also in China), within narrowly defined industries, larger plants have higher marginal products of labor and capital, while in the United States the difference is much smaller (Hsieh and Klenow 2009). A higher marginal product of labor in large firms likely indicates distortions that prevent firm growth, since in a world without distortions, firms would continue to expand until the marginal product of labor or capital equalizes across firms.

Barriers to the growth of firms can likely be found in policies. Across the region, licensing and size restrictions (which have declined in importance but still exist), labor regulations that increase the cost of hiring and firing, financial sector regulations that favor small enterprises, and inadequate bankruptcy laws may have limited the ability of efficient plants to grow and enabled inefficient plants to survive. Problems in enforcing contracts, for example, make it costly to hire the right managers, which is crucial for firms' growth (Bloom et al., 2013). Taxes or labor costs that affect larger firms more than smaller firms may reduce the return on investment in large firms. Impediments to reaching foreign markets, both from trade policy and high costs of logistics, can also impede expansion.

Figure 2.7. Firm in South Asia grow less rapidly than in comparator countries



Note: The left panel of the figure shows the average number of workers for different age cohorts of firms normalized with respect to the first age cohort (< 5 years old firms), using the enterprise surveys for SAR and comparator countries). The right panel shows the average export share (over total sales) for different age cohorts of firms, also normalized to the first age cohort.

Four case studies of important industries to better understand the drivers and constraints of competitiveness in South Asia

Four industry case studies (Agribusiness, Electronics, Apparel and Automotive) constitute an essential part of this report as they enable to better understand the drivers and constraints of South Asia's competitiveness. The four case studies are featured at the end of each Chapter of Part II (Productivity performance: firms and linkages) of this report - extended versions of the industry case studies can be found online atwww.worldbank.org/SouthAsiaCompetes. The main conclusions and recommendations emanating from these case studies are also featured in the Overview and Part III (The way forward) of the report.

These industry case studies are an essential part of the report because they allow to better understand the drivers and constraints of competitiveness in South Asia by showing the linkages between the external environment of firms and their behavior within a well-defined industry where industry dynamics (for example, competition) can be analyzed and performance benchmarked. As such, they are of great help to understand the relative importance of external factors in driving/constraining firm's performance/productivity. Also and crucially, industry case studies enable to assess the impact of industry specific factors/policies which traditional cross-cutting analyses are ill-equipped to get at.

And indeed, the main finding from the four industry case studies is that industry-specific policies, also called product market regulations, are the main constraint to South Asia's realizing its great untapped competitiveness potential. These policies include restrictions on trade, prices, products (standards) and markets that have protected firms from exposure to global good practices (automotive and agribusiness) or have limited firms' capacity to adopt these practices (apparel and electronics).

Manufacturing case studies were selected because the region's performance has been lagging in manufacturing relative to services. These particular manufacturing case studies were selected because they are important and representative of different types of manufacturing industries. In effect:

- Agribusiness (including agriculture) accounts for one third of South Asia's GDP and is crucial for all countries. It has large growth prospects as a result of income growth and urbanization. It has also the opportunity to improve livelihoods in rural areas by linking farmers to processors and traders who are willing to pay a premium for higher quality products as well as by providing off farm jobs opportunities. The case study is featured at the end of Chapter 3 (Business environment challenges) because it shows how, despite much attention and reforms, business environment issues continue to be a big challenge in South Asia, especially industry specific ones (also called product market regulations) which tend to have been overlooked by policy makers.

- Electronics is one of the largest and fastest growing industries in the world and has played an important role in the development trajectories of several newly industrialized economies. Surprisingly, South Asia is not currently a significant player in the sector despite very competitive labor costs and the fact that leading firms are achieving world class productivity in the region. The case study is featured at the end of Chapter 4 (Agglomeration economies) because it shows that what is missing in South Asia are urban eco-systems providing thick markets for skilled labor, large tracts of industrial land for clusters to thrive and world class logistics to import/export seamlessly.
- Apparel is the largest globally traded labor intensive industry in the world. With rising labor cost in East Asia, South Asia has an historic opportunity to capture its fair share of the global apparel market (it has only 12 percent compared to 41 percent for China alone), pulling in the process millions out of poverty, especially women. The case is featured at the end of Chapter 5 (Global Value Chains) because it shows how, despite the reforms of the nineties, trade barriers continue to stand in the way of South Asia realizing its great potential in apparel.
- Automotive is one of the most important industries globally and in South Asia, contributing 19 million of direct and indirect jobs in India alone. The potential for South Asia to become globally competitive in this sector is shown by the experience of Indian auto-parts manufacturers who became world leaders by having first acquired technical and managerial skills from leading original equipment manufacturers (OEMs) established in India, followed by a process of serving increasingly discerning customers in competitive export markets. The case is featured at the end of Chapter 6 (Firm capabilities) because it shows how firm capabilities are acquired and spread through (competitive) exposure to global good practices.

The country coverage of each industry case study (table 2.5) was determined based on its importance, as well as resources and data availability. For each industry case study, we also included relevant good practice benchmarks from outside South Asia—mostly from East Asia which shares many of the same characteristics as South Asia and has been performing better.

Table 2.5. Country coverage of the four industry case studies

	Afghanistan	Bangladesh	Bhutan	India	Maldives	Nepal	Pakistan	Sri Lanka	China	Vietnam	Thailand
Agribusiness	X	X	X	X	X	X	X	X			X
Electronics		X		X				X	X	X	
Apparel		X		X			X	X	X	X	
Automotive				X			X		X		

The analytical approach followed for these case studies relied on both quantitative and qualitative analysis carried out under the following framework (see the on-line extended versions for more details):

- The first step consists in assessing the competitiveness performance of the industry in each country by comparing its performance in terms of output, trade, productivity and cost with the other selected South Asian countries, as well as the good practice comparator countries from outside the region (see Table 1.1 above). This first step relies primarily on quantitative analysis using national statistics for output, WITS for trade data, and enterprise surveys (national surveys as well as the standardized World Bank enterprise surveys) for productivity and cost.
- The second step consists in analyzing the drivers of productivity and cost at the firm and industry level, including scale, skills, technology and innovation, agglomeration economies within clusters, and linkages along local and global value chains. This step combines results from enterprises surveys (including the innovation and labor force modules of the World Bank enterprise surveys) and in-depth firm interviews. It also includes, in the case of apparel, a survey of global buyers to understand what drives their decisions beyond cost and quality—for example, short lead times as well as compliance with social and environmental standards.
- The third step addresses constraints in the external environment of firms that limit their capacity or incentives to take advantage of these drivers. This step combines in-depth firm interviews with the analysis of the impact of external factors (for example, infrastructure constraints and trade regimes) on firms' behavior and performance.
- The fourth and final step consists in developing policy recommendations to remove the constraints and exploit the drivers of competitiveness. This final step is inspired by the policy choices taken by the more successful countries in the region and elsewhere—for example, the bonded warehouse regime which facilitated access to imported textiles for Bangladesh's apparel exporters. It also includes, in the case of apparel, an estimate (based on a gravity model) of how improved competitiveness (fostered by new policies) would affect output and jobs.

Annex to Chapter 2

The following model describes a simple process of reallocation of labor across different sectors, assuming a two sector economy consisting of agriculture and industry. Employment in each sector can change due to net addition of new workers as labor force grows, or due to inter-sectoral migration of labor. This can be represented as follows:

$$L_t^A = (1 + g^A)L_{t-1}^A + M \tag{1}$$

where L^A is the number of people employed in agriculture, g^A is the (constant) net rate of employment growth in agriculture, and M is the migration of laborers from industry to agriculture. Dividing equation (1) by total employment L, and assuming total employment grows at a constant net rate of g yields:

$$\frac{L_t^A}{L_t} = \frac{(1 + g^A)L_{t-1}^A}{(1 + g)L_{t-1}} + \frac{M}{L_t} \tag{2}$$

Define m as the percentage of population that migrates from one sector to another, such that $m = M/L_t$. Assuming there are no frictions in the movement of labor from agriculture to industry (or, equivalently, that these frictions remain constant over time), inter-sectoral migration should be driven by the wage gap between two sectors. For example, if the industrial wage rate is higher than the agricultural wage rate, workers should migrate from agriculture to industry. Further, wage rate in a sector is equal to the marginal product of labor in that sector, which in turn is a function of labor productivity. Thus m can be written as:

$$m = f(w^A, w^I) = f(h(\omega^A, \omega^I)) = g(\omega^A, \omega^I) \tag{3}$$

where w is the wage rate in a sector, and ω is the labor productivity. Equation (2) can therefore be expressed as follows:

$$\frac{L_t^A}{L_t} = \frac{(1 + g^A)L_{t-1}^A}{(1 + g)L_{t-1}} + g(\omega^A, \omega^I \tag{4}$$

This equation can be estimated using the following reduced form model for OECD countries and South Asian economies for which we have sufficient data on employment (India, Pakistan, and Sri Lanka). Proxying labor productivity in each sector with value-added per worker yields the following:

$$\frac{L_{ikt}}{L_{kt}} = \alpha + \gamma\left(\frac{L_{ikt-1}}{L_{kt-1}}\right) + \beta\ (log(VAPW_{ikt-1}) - log(VAPW_{jkt-1})) + \delta_k Country_k + \epsilon_{ikt} \tag{5}$$

where i represents agriculture and j represents industry or services, k represents the country dummy and t represents time. $VAPW$ is the value added per worker calculated as the value added at constant prices divided by the number of workers. L_i/L is the employment share calculated as the number of employees in a sector divided by total employment.

Figure 2.8. Scatter plot of quartile 1 of employment distribution of firms and income per capita

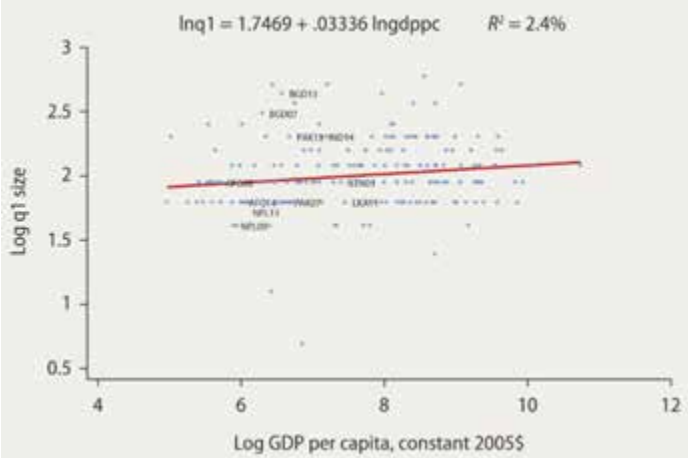


Figure 2.9. Scatter plot of quartile 2 (median) of employment distribution of firms and income per capita

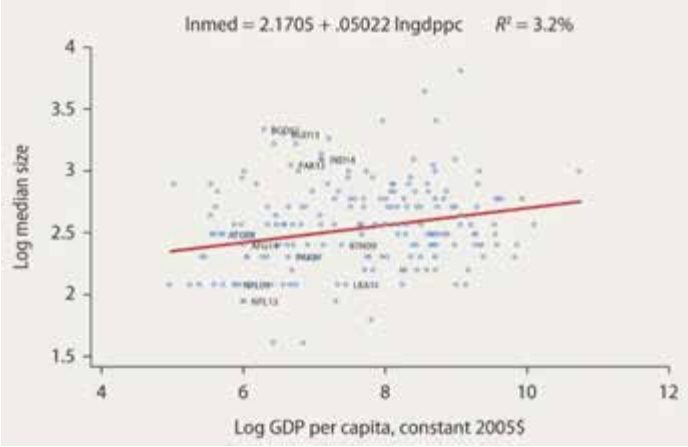
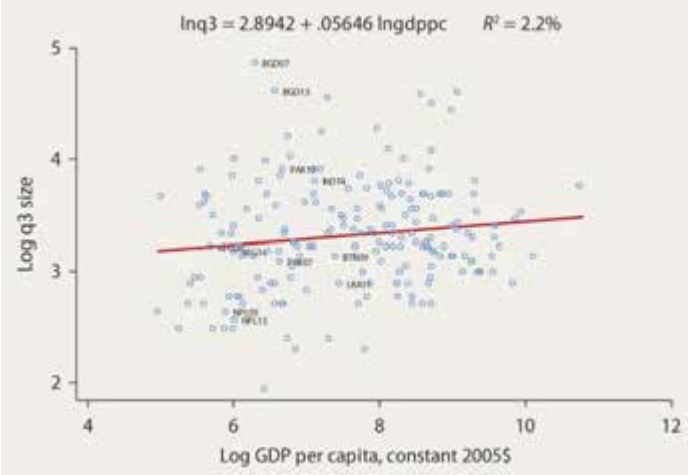


Figure 2.10. Scatter plot of quartile 3 of employment distribution of firms and income per capita



Source: Authors' elaboration based on WB Enterprise Surveys.

PART II: PRODUCTIVITY PERFORMANCE: FIRMS AND LINKAGES

While productivity can be measured at different levels—macro, sectoral, geographic, and so on—the most robust and intuitive representation is at the level of the firm. The focus on the firm as the unit of analysis and firm dynamics as the driver of productivity growth goes back at least as far Schumpeter (1911), with competition playing a key role in forcing inefficient, unproductive, or unprofitable firms to either improve or exit and transfer their resources to more efficient, productive, or profitable firms, thus boosting economy-wide productivity.

Formally, there are two mutually reinforcing mechanisms—spurred on by competition in product and factor markets—that increase productivity. First, greater competition, from either domestic or international sources, pushes firms to become more efficient at doing what they do: for example, by learning from international exposure, investing in innovation, improving business practices, adopting better technology including ICT, and improving the input mix. This is the *within-firm* component of productivity growth. Second, competition also induces inefficient firms to transfer resources to more efficient ones or exit altogether, boosting economy-wide productivity—this is the *between-firm* component of productivity growth (Cabral, 2007). Resources can flow from less to more productive uses due to improvements in standard factors like infrastructure, business environment, and so on, but also as a result of participation in global value chains (Saia et al., 2015) and agglomeration economies (Desmet and Rossi-Hansberg 2009; Michaels, Rauch and Redding 2012).

The decomposition of changes in productivity into between- and within-firm components (with the former further broken down into contributions from firm entry and exit) has become a standard approach to thinking about productivity dynamics (Olley and Pakes, 1996; Melitz and Polanec, 2012). Unfortunately, none of the countries in the region carry out large, longitudinal firm surveys which would directly allow for this type of analysis.[24] Therefore, this report approximates the spirit of the decomposition by using cross-sectional firm data to consider elements that are likely to impact productivity across and within firms, in turn. This section begins with the business environment, agglomeration economies and participation in global value chains (GVCs) as determinants of performance across firms, and then considers the role of technology and innovation in determining within-firm productivity.

Several broad conclusions emerge. South Asia scores poorly on many indicators of the quality of the business environment, which greatly constrains firms' productivity in general and particularly limits the growth of firms with high levels of productivity. Productivity gains through the further concentration of economic activity require a reduction in distortions in product and factor markets,

particularly barriers that limit the flow of resources between districts and states. Participation in GVCs can raise productivity through exposure to competition and knowledge spill-overs from connections with lead firms; however, South Asian participation in GVCs is largely confined to apparel. Reducing trade barriers, increasing skills, and improving logistics would facilitate greater participation in GVCs. Finally, access to technology varies greatly across South Asian economies, ranging from extensive technology use in India to limited ICT adoption in Bangladesh and Nepal. Even among lead countries, however, the use of e-commerce and other productivity-enhancing online business tools is relatively low. Innovation tends to be concentrated in few, mature firms, and is likely to represent imitation of existing products rather than new products. Greater investment in R&D, improved resource management, and the development of skills that are complementary to technology could play a critical role in increasing innovation and thus boosting productivity.

Chapter 3. Business environment challenges continue to weigh on firm performance

Much of the macro and sectoral challenges to productivity in South Asia can be traced to a difficult operating environment for the region's firms. The business environment (investment climate) has received a great deal of attention in policy and empirical literature as a major constraint hampering firm productivity in the region. Most studies define the investment climate as the environment which determines entrepreneurs' ability to work efficiently, such as the degree of difficulty in accessing production inputs and dealing with regulatory and legal requirements, and the level of security in running operations and obtaining payments. As argued by Hallward-Driemeier (2007), an inefficient business environment will lead to low and uncertain returns on investment, dragging down overall productivity and possibly more than offsetting technical improvements on the factory floor.

On average, countries in South Asia score poorly on two major indices used globally to capture key aspects of the business environment: the Global Competitiveness Index (GCI) published by the World Economic Forum and the World Bank's *Doing Business* report. In the most recent (2015-2016) GCI rankings, India is the only South Asian country in the top half of nearly 140 countries, featured in the 55 position but lagging well behind China at 28. India is followed by Sri Lanka at 68, Nepal at 100, Bhutan at 105, Bangladesh at 107, and Pakistan at 126. Although all South Asian economies (with the exception of Bhutan) improved since last year, many have yet to regain the ground they lost since 2007: for

example, Pakistan has lost 34 places and India, despite making major advances, still ranks 7 positions lower than it did in 2007.

When it comes to the components of the overall ranking, the most challenging areas in Bangladesh, Bhutan, Nepal and Pakistan include inadequate supply of infrastructure and corruption, while in Sri Lanka the most problematic factors are inefficient government bureaucracy and access to finance. While India has recently achieved better GCI scores on macro stability, institutions, and infrastructure, its score remains hampered by inadequate electricity supply and poor technology readiness of its businesses.

In the World Bank's 2016 *Doing Business* report (published in October 2015), all the South Asian economies, with the exception of Bhutan, are ranked in the bottom half, with an average ranking on the Ease of Doing Business of 128. By contrast, many of South Asia's competitors, such as Thailand (49), China (84) and Vietnam (90), are all in the top half of the ranking. Bhutan has the region's highest rank, at 71, followed by Nepal (99), Sri Lanka (107), India (130), Pakistan (138), Bangladesh (174) and Afghanistan (177). Compared to the 2015 ranking, only India and Sri Lanka improved—going from the position 134 to 130 and 113 to 107 respectively—while all the other countries experienced a setback.

Figure 3.1. South Asian countries lag behind comparators in business environment rankings

Source: Doing Business database. 2016 Doing Business report (published in October 2015)
Note: The distance to frontier score benchmarks economies with respect to regulatory practice, showing the absolute distance to the best performance in each Doing Business indicator. An economy's distance to frontier score is indicated on a scale from 0 to 100, where 0 represents the worst performance and 100 the frontier.

On average, the South Asian economies rank highest in Protecting Minority Investors, with India and Pakistan ranked in the 8th and 25th positions globally. The region's next best performing category is Starting a Business, but rankings here are already well below comparators: India ranked 155 out of 189 economies, and while Sri Lanka ranked better (98), it nevertheless cost 18.7 percent of income per capita to set up a firm, compared to 6.4 percent in Thailand and 4.9 percent in Vietnam. The areas with the most opportunity for improvement are Enforcing Contracts (where the region's average ranking is 143), Registering Property (136), and Resolving Insolvency (129). On average, resolving a commercial dispute through the courts takes 1,077 days in South Asia—almost twice the global average of 630 days.

The region also performs poorly in logistics rankings. According to the World Bank's Logistics Performance Index, in 2014 South Asia had the lowest logistics performance among all developing regions due to poor quality of trade and transport related infrastructure, time-consuming clearance processes, low quality of logistics services, and lack of timeliness of shipments in comparison to economies like China, Vietnam and Thailand. Similar to GCI rankings, none of the South Asian economies are featured in the top 50 of the LPI, while China with is ranked at 30, Thailand at 31 and Vietnam at 48. Between 2007 and 2014, only Nepal and Sri Lanka have been able to improve their logistics performance by gaining 25 places and 3 places in the overall LPI rankings—but much ground still remains to be covered.

Poor logistics can sharply reduce efficiency. Lengthy and unpredictable delays in customs clearance can force firms to hold higher inventories (regional firms in auto components, textiles, electronics, and heavy engineering report maintaining 27 percent higher inventories on average to deal with uncertain delivery times), and can impose delays in production and increased turn-around times. Delays due to poor road infrastructure and lengthy inter-state clearance processes have similar effects. For example, in India, crossing two state borders between origin and destination can add as much as a week to the uncertainty in delivery schedules (Jordan and Kamphuis, 2014).

Moving from expert surveys and *de jure* requirements (such as the *Doing Business* report) to perceptions by firms (for example, the World Bank's Enterprise Surveys) further underscores the pervasiveness of the challenges. In a 2006 Investment Climate Assessment, the World Bank argued that South Asian countries under-perform comparators on many investment climate dimensions, including infrastructure and electricity supply, access to finance, employee skills, and corruption (World Bank, 2006). Similar results emerge from the most recent round of Enterprise Surveys (2011–2015), where an average firm in South Asia consistently ranks each investment climate constraint as more binding than does an average firm in China or Vietnam (Table 3.1). While performance varies substantially across countries and indicators—pointing to significant potential for improvement by leveraging best practices from within the region—the overall gap puts South Asia's firms at a clear disadvantage vis-à-vis select comparators in other parts of the world.

Table 3.1. Investment climate constraints in South Asia manifest across a range of dimensions

	Afghanistan	Bangladesh	Bhutan	India	Nepal	Pakistan	Sri Lanka	South Asia	China	South Africa	Turkey	Vietnam
	(2014)	(2013)	(2015)	(2014)	(2013)	(2013)	(2011)		(2012)	(2007)	(2013)	(2015)
Access to Finance	49	23	19	15	40	22	33	18	5	16	10	14
Political Environment	76	76	12	16	85	34	13	28	1	3	13	3
Crime	58	8	1	5	14	35	7	10	1	38	8	5
Taxes	56	20	24	31	23	55	41	36	7	8	25	8
Corruption	62	49	4	36	42	64	15	42	1	17	12	5
Informality	33	9	10	17	29	12	28	14	7	11	14	11
Infrastructure	81	55	29	26	79	79	36	42	6	24	25	18
Electricity	66	52	14	21	69	75	26	35	3	21	18	4
Telecom	59	3	15	4	3	14	6	7	4	4	9	8
Transport	43	15	14	10	32	27	12	15	3	4	10	10
Labor Regulations	11	3	15	11	3	12	13	12	1	6	6	4
Workforce Education	53	16	14	9	9	23	16	13	2	9	10	8
Trade & Customs	47	8	9	12	29	30	31	18	4	2	11	24

Source: Staff calculations using Enterprise Surveys.
Note: Cells indicate the percentage of firms who view any given obstacle as a major or severe constraint.

Lessons from case studies of this report echo the findings from the surveys. Difficulties in importing goods, poor trade logistics, and high protection rates have made participation in global markets more costly for firms across the region, while outdated standards and restrictive regulations have limited competition in automotive and agribusiness sectors. Difficulties in accessing well-located and well-serviced industrial land and poor availability of skilled workers have also emerged as important bottlenecks to firm growth.

While firms may have different capabilities to overcome various investment climate constraints, studies show that an average firm in South Asia experiences a sizeable productivity loss from the poor investment climate. For example, Hallward-Driemeier (2007) finds a significant negative impact of customs delays, power outages, poor access to finance, and limited connectivity on total factor productivity and investment rates of garment firms across the region. In particular, the author shows that, if the business environment for firms in India were the same as in China, firm productivity could be one percentage point higher. Analysis that approximates the approach of Hallward-Driemeier (2007) with the most recent round of Enterprise Surveys shows that, by and large, investment climate challenges continue to affect firm performance in the region. Across a wide sample of manufacturing firms in Bangladesh, Bhutan, India, Nepal, Pakistan, and

Sri Lanka, both output and value added per worker are systematically lower when firms face greater business environment constraints (Table 3.2).

Table 3.2. Investment climate deficiencies are associated with poorer firm performance

	Output Per Worker (Log)	Value Added Per Worker (Log)
Losses from power outages (log)	−0.024**	−0.038***
Losses in transit (log)	−0.079***	−0.036***
Improved access to finance	0.342***	0.403***
Observations	4,566	4,498
R-squared	0.039	0.027
Sector dummies (number)	20	19

Note: ***p < 0.01, **p < 0.05, *p < 0.1.

A restrictive business environment can be particularly damaging to firms that have the most to contribute to productivity growth and job creation. Many investment climate constraints can be particularly burdensome for small firms (Word Bank, 2006), limiting their ability to grow and create employment. Some evidence also shows that higher productivity firms in the region may actually face greater constraints in accessing public services, suggesting that investment climate deficiencies are particularly binding on firms that would grow more rapidly and create more jobs in the absence of distortions (Carlin and Schaffer, 2012).

The severity of investment climate obstacles in the region and their adverse impact on productivity have given rise to a series of wide-ranging reforms to address constraints along each aspect of the business environment. For example, the ADB (2006), ADB and World Bank (2004), Afram and Salvi Del Pero (2012), Ferrari and Dhingra (2009), OECD (2009), and World Bank (2006a, 2006b, 2008a, 2008b, 2009, 2010), among others, have proposed a range of policy actions to regional authorities. Improving the investment climate is also high on the regional authorities' own policy agendas: nearly every country in the region is taking concrete steps to strengthen the business environment (Box 3.1).

Box 3.1. Efforts to improve the investment climate in South Asia

In *Bangladesh*, the authorities initiated a number of reforms to address binding constraints impeding private sector growth in the recent years. New pieces of business friendly legislations include: (i) the Economic Zones Act of 2010, modernizing the country's economic zones agenda, including the institutional setup, and allowing for more efficient incentives and private participation; (ii) the Competition Law, which is meant to uphold a level playing field for businesses; and (iii) a new Value Added Tax Law that eases the compliance mechanisms for businesses and reduces discretionary exemptions. The authorities also introduced regulatory reforms streamlining business registration, trademark and patent registration, and simplified trade licenses and construction permits: a total of 56 regulatory processes have been reformed in recent years including company, investment, tax, and trademark registrations; trade licenses at local government levels; subordinate rules under three different tax laws for better contract enforcement; and dispute resolution. To foster trade competitiveness, the Government has launched a trade information portal and introduced risk management in clearance process, as well as taking preparatory steps to a new Customs Act, a national single window for trade, and making multi-modal transport effective for trade logistics. Responding to concerns on fragmented policy coordination, these reforms are being carried out in the context of a formal, structured public-private dialogue.

In *India*, the authorities recently launched a new ambitious program of regulatory reform which is at the heart of the "Make in India" initiative. In 2015, the authorities eliminated the minimum capital requirement and ended the requirement to obtain a certificate to commence business operations. Now Indian entrepreneurs no longer need to deposit 100,000 Indian rupees (US$1,629)—equivalent to 111 percent of income per capita—in order to start a local limited liability company, and can start business five days earlier. Utilities in Delhi and Mumbai undertook significant business process reengineering, combining inspections and procedures to reduce the time required for companies to get connected to the grid and get on with their business. In addition, the Central Government called for all states to adopt automation in registration processes, move towards effective single windows, and implement risk-based inspection regimes that introduce self-certification and third-party audit schemes to lessen the burden of inspections on low and medium risk businesses. More recently, the Bankruptcy law was reformed, dedicated benches have been put in place to resolve commercial disputes in Delhi and Mumbai and the reform of the Goods and Services Tax (GST) is well underway.

In *Sri Lanka*, the authorities have recently taken steps to eliminate obstacles to FDI, including a) elimination of upfront payment of the land lease tax for foreign companies; and b) implementation of online processing of business visas. Regulatory barriers to trade are being reduced through agreement to ratify the WTO Trade Facilitation Agreement (which is the basis for a medium-term trade reform agenda) and creation of the National Trade Facilitation Committee, which will be the body in charge of leading trade facilitation reform. Finally, a new Secured Transactions Act will enable the use of movables assets as collateral for bank loans, improving access to finance for SMEs. These are positive initial steps in the right direction, but significant barriers still exist on regulatory, legal and institutional fronts.

In *Pakistan*, the authorities have recently embarked on a two-year roadmap to improve the country's Doing Business ranking to the top 100 by 2018, by preparing a DB Reform Strategy. The strategy provides reform recommendations for all the DB indicators, and also identifies institutions at the provincial and federal level with the mandate to carry out the reforms. The strategy is currently being implemented both at the federal and provincial levels, after having been endorsed by an 'Ease of Doing Business Committee' formed by the Government on investment climate reforms. In addition, and complementing the big push on Doing Business, the Government of Pakistan also took a series of legislative actions and implemented regulations to improve access to credit, payment of taxes, and financial intermediation (capital markets and housing finance), as well as reforms in financial transparency and oversight of state owned enterprises.

While the importance of addressing investment climate constraints in the region is beyond question, the issues are well-known and policy pathways to address them have been mapped out by various institutions, including the region's own governments - with the big exception of industry specific business environment issues (also called product market regulations) which remain a critical constraint to productivity growth by restricting investment and competition as revealed in the four industry case studies, especially the one on the agribusiness value chains presented immediately thereafter—there is little that the current study can add to the vast body of knowledge on the issue. Therefore, the discussion in the following Chapters focuses on newer, less-researched determinants and correlates of firm productivity in South Asia: agglomeration economies, value chains, and firm capabilities, including technology and innovation.

INDUSTRY CASE STUDY A: Industry specific business environment issues limit the inclusive and sustainable growth of agribusiness

Agribusiness (including agriculture) accounts for one third of South Asia's GDP and has the potential to double over the next fifteen years (reaching US$1.5 trillion by 2030). This increase will be driven by rapid growth in income and urbanization leading to the consumption of higher value products (including for export markets) and downstream food related services. This will create millions of productive jobs outside agriculture and positive backward linkages to farmers, most of them small and vulnerable.

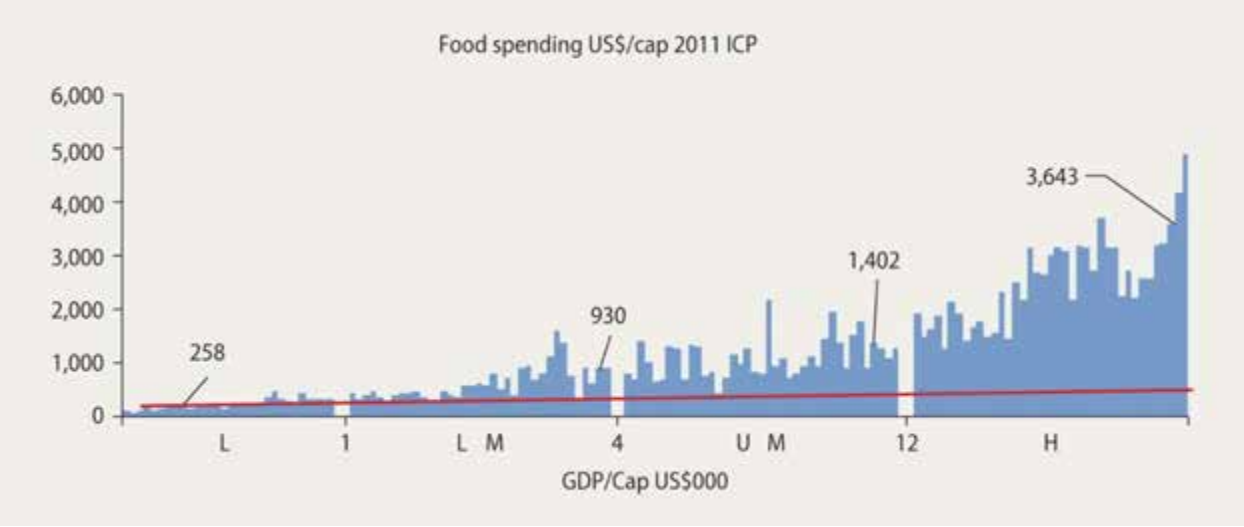
Numerous examples show how leading private firms and market forces are needed to develop and diffuse the new higher value products and services as well as to facilitate access to knowledge, finance and markets to smallholders. Government-led arrangements, put in place to support farmers and achieve food security, are no more relevant and in fact counterproductive now. On one hand they discourage private investments and limit competition in the new high value markets (trade barriers, price caps on higher value goods, restrictions on private agricultural markets, storage and FDI in retail), on the other hand they encourage excessive production of low value commodities (minimum support prices and government procurements) and unsustainable agricultural practices (large poorly targeted subsidies leading to overuse of water).

South Asia's great agribusiness opportunity

Agribusiness (agriculture, food processing, food retail and restaurants) accounts for a third of South Asia's GDP and is estimated to double in size over the next 15 years, reaching US$1.5 trillion by 2030. Future growth will be driven by income growth (5% p.a.) and urbanization, shifting the demand towards higher-value

products (e.g. horticulture, livestock, and packaged and processed) and food related services. Figure 3.2 below shows that spending on food starts to grow significantly at South Asia's current GDP per capita level, US$1,500.

Figure 3.2. Food spending in relation to GDP per capita



Source: Source: Analysis of World Bank 2011 ICP report

Investments in agro-food processing result in higher input and income multipliers than in any other industry, and the employment effect is about 2.5 times that of other sectors (World Bank, 2014). The increased demand for higher value agricultural products and interactions with increasingly sophisticated buyers increases the productivity and income of poor farmers. Furthermore, some of the agricultural products with the highest growth potential, for example dairy, can disproportionately benefit women.

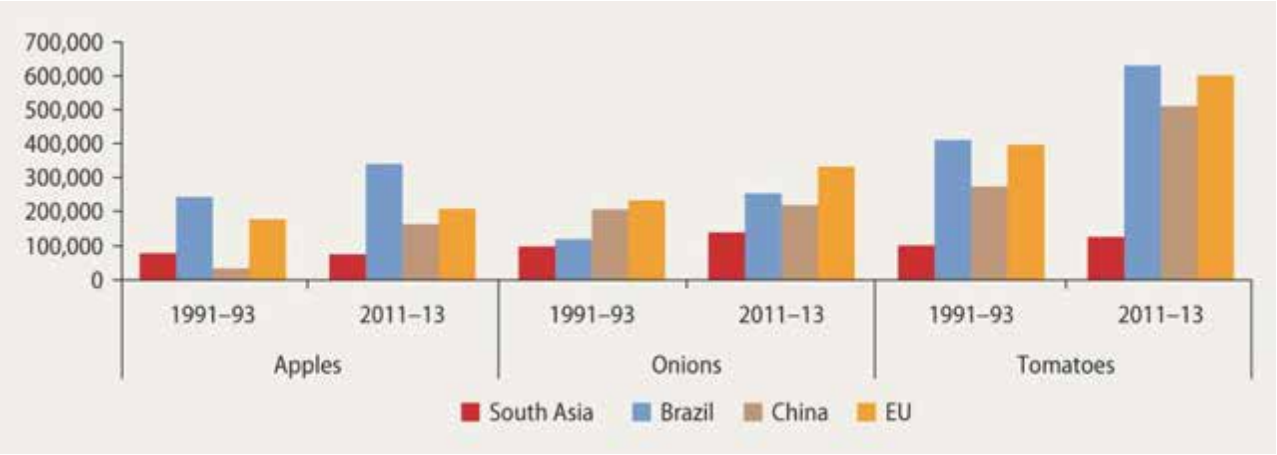
South Asia has also the opportunity to develop its exports, from a low base (South Asia's share of world agro-food trade is 3 percent compared to 14 percent for East Asia). Export bright spots already include Basmati rice (India and Pakistan), dry fruits and nuts (Afghanistan) and branded tea (Sri Lanka).

South Asia's three agribusiness challenges

Seizing these opportunities will require addressing three related challenges:

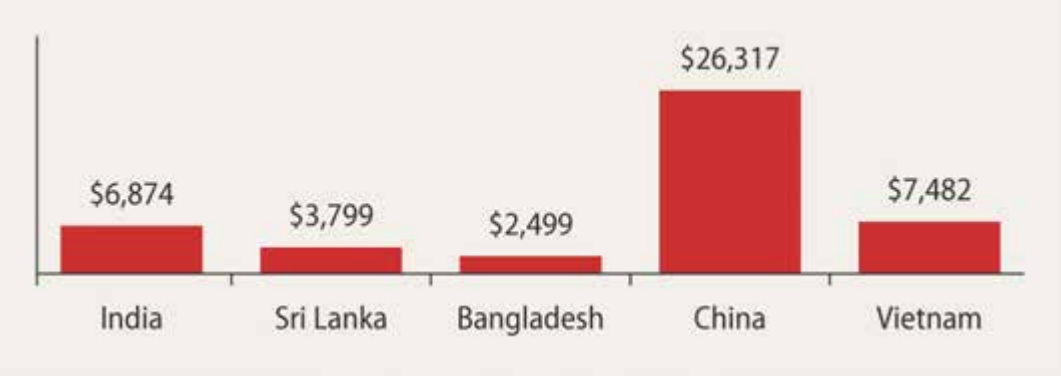
The productivity challenge. Agriculture yields remain low, especially in high potential high value products such as horticulture (figure 3.3). Post-harvest losses are high due to lack of storage capacity (India's Planning Commission estimated the warehousing shortage at 35 million tons) and productivity in agro-processing firms is much lower in South Asia than in East Asia (figure 3.4).

Figure 3.3. Horticulture yield, Hg/Ha



Source: FAO STAT, August 2015.

Figure 3.4. Productivity in agro-processing firms (output value/employee)



Source: World Bank Enterprise Survey 2014.

The small-holder challenge. Agricultural production in South Asia is predominantly in the hand of small scale farmers who are among the most vulnerable sections of the population. Lack of market information and logistical difficulties prevent small-scale producers from accessing markets efficiently. If the product is to be exported, the logistics and financing requirements are usually beyond their capabilities.

The natural resources challenge. Agriculture's share of total fresh water use is very high (e.g. 99 percent in Afghanistan and 90 percent in India) and competition for water is increasing with growth in manufacturing and in household consumption (FAO Country Profiles, 2014). Much of the region's irrigation depends on groundwater (e.g. 60 percent in India, of which 15 percent are overexploited--World Bank, 2013). Climate change is exacerbating the need to improve water management and use.

How lead agribusiness firms can help address these challenges

36 leading agribusiness firms in South Asia were interviewed as part of this report. Their experience sheds light on how, together with market forces and government support, they can help develop and bring to market superior products as well as help farmers access knowledge, finance and markets.

Developing and marketing new high value products. A first example is Dilmah Tea, Sri Lanka's largest exporter of tea and the sixth largest tea company in the world, which exports premium tea to more than 80 countries. It started in 1974 with 18 employees, and now has 35,000. It remained competitive due to continuous investment in R&D and innovative marketing. Another example is KRBL, one of the world's largest exporter of Basmati rice which successfully marketed the PUSA 1121 basmati rice developed by the Indian Agricultural Research Institute. This variety became a best seller in the Gulf and India. Higher prices led to rapid adoption by farmers—the new variety accounting for 84 percent of basmati plantings in Punjab and 68 percent in Haryana by 2013.

Facilitating smallholder access to knowledge, finance and markets. In Bangladesh, Aftab Bahumuki Farms Limited introduced contract farming for commercial broilers on an experimental basis, by working with a select group of 20 farmers. The number of farmers involved had increased to 650 by 2003. A study[25] found that these contracted farmers achieved 30% higher net returns than non-contracted farmers. In Bhutan, Mountain Hazelnut Ventures was established in 2010 to plant and process hazelnuts. The company distributed hazelnut tissue-cultured plantlets and planting material to farmers. In three years of operation 2,000 hectares had been planted and 5,000 farmers trained. In India, Desai F&V, by taking control of the logistics and managing the process from fruit formation onwards, succeeded in supplying remote urban centers with quality bananas, and in exporting Grade 'A' fruit to distant markets in the Middle East. Pepsico provided potato varieties suitable for the processing of potato chips to thousands of Indian small-holders supplying to its processing facilities.

Linkages with downstream producers can also improve farmers' access to finance. This is achieved directly through a variety of contract farming arrangements, with inputs provided on the basis of agreements to sell the output at a later date. There are indirect benefits as well, as banks are more willing to lend to farmers that have a contractual arrangement with a processor. Godrej Agrovet has helped 50,000 smallholders over 8 Indian states access bank financing by guaranteeing prices and standardizing financing agreements between the banks and the farmers. Here also the government and development partners can help promote such arrangements as in the case of Afghanistan (box 3.2).

Box 3.2. Promoting access to finance and backward linkages in Afghanistan

In Afghanistan, the Agriculture Development Fund (ADF) began in 2010 as a US$100 million USAID project to provide much needed long term financing along agribusiness value chains. The fund was rated as the most successful USAID project in Afghanistan, with a more than 95 percent reimbursement rate and 60,000 farmers benefiting. The fund is facing excess demand and discussions are underway to scale it up. The key innovation of the ADF is to provide long-term loans to agro-food processors on the condition that they on-lend a portion to their suppliers-farmers. This approach leverages the agro-food processors' knowledge and business leverage over their suppliers to ensure proper use of the funds and repayment. By contrast, commercial banks in Afghanistan mostly cater to urban areas and lack such access and knowledge. The ADF has been operated by professionals with extensive experience in commercial banking and agribusiness and incorporates financial products that are fully compliant with Sharia.

How industry specific business environment issues stand in the way

Agricultural policies, put in place in the 1960s to support farmers and achieve food security, are now limiting private investments and competition in the new high value markets and encouraging excessive production of low value commodities through unsustainable agricultural practices.

Barriers to trade. Average applied MFN rates on food products remain high in the region (e.g. 33% for India and 26% in Sri Lanka compared to 16% in China and Vietnam). There are also instances of inverted tariff structure which discourage domestic production—e.g. in Afghanistan where tariffs on intermediate goods (10.2%) are higher than on final goods (7%). Non-tariff barriers (para-tariffs, ad hoc quantitative restrictions, cumbersome standards and custom procedures) have long been cited as one of the major reasons behind the low intra-regional trade. For example, revenue collection from supplementary duties exceeded revenue collection from customs duty in the 2012-2013 fiscal year in Bangladesh.

Restrictions on agricultural markets. Outdated regulations, such as the 1939 Agriculture Produce Market Ordinance Act in Pakistan and the 1956 Agriculture Produce Marketing Act in India have hindered private investments in market and storage infrastructure as well as contract farming. The central government of India has promoted reforms (along the lines of a "Model APMC Act") since 2003, and while several states have introduced new legislation to modify the Act since, the changes have been partial and uneven; further, in many cases changes have not been implemented in full spirit, largely preserving the status quo. Modern food retailers, which foster innovation and competition along the value chains, are also

restricted by regulations (e.g. FDI restrictions in India). Early reforms are promising. For example, the creation of a private chili trading platform in Kunri which followed the 2012 reforms by the Sindh province (Pakistan) abolishing notified market areas and market committees, and allowing private markets and direct buying.

Restrictions on prices and inadequate product standards. Investment in higher value food products is discouraged by price caps on items such as milk and meat—e.g. in Punjab, Pakistan. Also, inadequate food safety certification systems can have serious negative impact on exports. For example, India had to upgrade its testing facilities to resume the export of Alphonso mangoes to the EU.

Minimum Support Prices (MSPs) and subsidies on fertilizers and water. The drive to food security in the 1960s and 1970s led to multiple public interventions to support the production of low value commodities. By providing high returns and low risks, these measures discourage farmers from moving into higher value crops. MSPs and fertilizers subsidies are also backed by large government procurement and distribution systems plagued with inefficiencies. India's large subsidies get the most publicity because of its size (US$38 billion dollars in the 2016 budget—excluding power and irrigation subsidies) and the fact that it is poorly targeted, but the subsidy bills of Sri Lanka and Bangladesh are also enormous—nearly as large as all public expenditures on agriculture. Pakistan subsidizes fertilizer through low urea prices. Large water subsidies (e.g. irrigation charges only cover 10% of the cost in Punjab, Pakistan and water pumping enjoys free power in Punjab, India) leads to unsustainable overuse of water.

The extended version of this case study is available on-line at:
www.worldbank.org/SouthAsiaCompetes

Chapter 4. Productivity-boosting agglomeration economies are under-leveraged

Agglomeration economies are the benefits that arise when firms and people locate near one another (for example, in cities and industrial clusters). In South Asia—where concentration of economic activity is rather high—there is plenty of potential for agglomeration economies to increase productivity. However, distortions in goods and factor market prevent resources from flowing to more productive firms, with state and district borders forming boundaries to efficient allocation of resources. Therefore, despite the statistically significant effect of agglomeration on productivity—which in South Asia operates mainly via urbanization (cities) rather than localization (clusters)—the full productivity benefits of agglomeration economies are yet to be realized. The following discussion develops these observations in more detail.

Economic activity in South Asia is highly concentrated

Economic activity tends to be geographically concentrated. This stylized fact holds in any country regardless of which industry is considered or concentration measure is used. For example, Rosenthal and Strange (2004) show that in the United States, heavy geographic concentration of industries is not limited to sectors highly dependent on particular raw materials (such as wood in the furniture industry), but extends to sectors where distance or location is much less of an issue, such as the software industry. Michaels, Rauch and Redding (2012) show that the transformation of the American and Brazilian economies over the last 100 years increased the concentration of resources in a few locations. Studies which control for geographical scale and borders, such as Duranton and Overman (2005), also show that economic activity is heavily concentrated.

South Asia is no exception. Measures of firm concentration (the locational Gini, which is calculated in the same way as the Gini coefficient used to measure income distribution) in manufacturing in India, Sri Lanka and Bangladesh are quite high (0.48 in Sri Lanka, 0.53 in Bangladesh and 0.67 in India).[26] In India, the five largest districts account for 18 percent of total employment, a share that has not moved appreciably over time, although which districts were in the top five has changed as the emergence of fast-growing cities like Coimbatore and Gurgaon replaced earlier centers of economic activity (Table 4.1).[27] In Bangladesh, the share of the five largest districts—much greater than in India (partially because Bangladesh has only around 60 districts while India has nearly 400)—increased

more than 10 percentage points between 1995 and 2012, with most of the increase coming from areas outside Dhaka.[28] In Sri Lanka, the five largest (out of 18 total analyzed) districts account for three-quarters of total employment, a share that has declined somewhat since the mid-1990s.[29]

Table 4.1. Employment across South Asia is concentrated in a few districts
(top five districts as percent of total employment)

Rank	District Name		District Name		
India		**1991**		**2009**	**Rank in 1991**
1	Greater Bombay	5.0	Madras	4.7	3
2	Nizamabad	4.1	Bangalore	4.4	4
3	Madras	3.3	Coimbatore	3.7	8
4	Bangalore	2.6	Mahendragarh/Gurgaon	2.9	77
5	24 Parganas (North)	2.5	Rupnagar/Patiala	2.8	6
	Total (top five)	17.4	Total (top five)	18.5	
Bangladesh		**1995**		**2012**	**Rank in 1995**
1	Dhaka	36.6	Dhaka	35.4	1
2	Chittagong	15.9	Gazipur	16.6	6
3	Narayanganj	8.6	Chittagong	16.2	2
4	Sirajganj	5.0	Narayanganj	9.3	3
5	Khulna	3.8	Sirajganj	2.8	4
	Total (top five)	69.8	Total (top five)	80.4	
Sri Lanka		**1995**		**2009**	**Rank in 1995**
1	Colombo	37.4	Gampaha	27.7	2
2	Gampaha	29.7	Colombo	24.1	1
3	Galle	3.9	Kurunegala	9.4	5
4	Kandy	3.8	Kalutara	7.2	9
5	Kurunegala	3.1	Kandy	5.9	4
	Total (top five)	77.9	Total (top five)	74.2	

In most countries, modern manufacturing has tended to initially develop in very concentrated locations, often on the coast with access to international markets. As development proceeds, large coastal cities become congested, high-cost locations, while at the same time the scale externalities they offer dissipate as manufacturing processes become more standardized with less need for the learning benefits of large cities. Manufacturing plants move first to suburban or nearby satellite locations and then to secondary cities in the hinterland. Yet, the degree of geographic concentration of manufacturing activities in South Asia has not changed substantially in the last two decades (Table 4.2).

Table 4.2. Spatial concentration of manufacturing in South Asia has not changed much over time

	India: State		India: District		Bangladesh: District		Sri Lanka: District	
	Raw Index	EG Index	Raw Index	EG Index	Raw Index	EG Index	Raw Index	EG Index
1994	0.001	−0.000	0.006	0.005				
1996	−0.013	0.001	−0.012	0.001			0.001	−0.009
1997					0.029	0.056	0.007	−0.011
1998							0.021	−0.001
1999					0.008	−0.025	0.030	−0.010
2000	0.009	0.018*	0.012	0.021**			0.026	−0.011
2001					−0.006	0.005	0.044	0.056
2002							0.044	0.056
2003							0.019	−0.023
2005					0.009	−0.036		
2006	−0.009	−0.001	−0.013	−0.005			0.071**	−0.504
2007							0.073**	−1.660***
2008							−0.000	−0.330
2009	0.019	0.012	0.016	0.003			−0.004	−0.167
2012					0.047	−0.084		
N	351	348	351	348	123	118	263	260

Note: *p < 0.1; **p < 0.05; ***p < 0.01.

The raw concentration index in Table 4.2 measures the degree to which the geographic pattern of employment in the industry departs from the geographic pattern of manufacturing employment in the country as a whole, with larger values indicating greater concentration of activity.[30] The Ellison-Glaeser (1997) index corrects for a potential bias in the raw index, as the value is larger in industries with only a small number of very large plants—and allows for comparisons across industries. In any event, neither measure of agglomeration has changed significantly over time (with the exception of one year in India and two years in Sri Lanka), suggesting that more productive locations have generally not been successful in attracting additional resources at the expense of less productive locations, therefore inhibiting overall productivity growth. Ghani et al. (2012) provide one explanation for this: the authors suggest that a compositional change may be under way, with larger manufacturing entities moving out of city centers and a greater number of smaller service establishments moving into South Asia's cities.

Agglomeration economies raise firm productivity

Evidence shows that agglomeration is positively associated with firm performance in South Asia (for example, Glaeser and Kerr, 2009, Ghani et al., 2011, and Mukim, 2011). Proximity to cities had a positive impact on non-farm employment in Nepal (Fafchamps and Shilpi, 2005). Similarly, households in Bangladesh with better access to major urban centers achieved higher returns to nonfarm activities (Deichmann et al., 2008). The concentration of high-return economic activities around Bangladesh's growth poles (Dhaka and Chittagong) led to higher productivity in the eastern part of the country (World Bank 2008). Therefore, the ongoing urbanization process in South Asia (see World Bank, 2015) is likely to increase productivity due to agglomeration, which may reinforce the rise in productivity as workers move from lower-productivity agriculture to higher-productivity manufacturing and services (see above).

Evidence from the industry studies confirms the importance of agglomeration. The biggest benefits from agglomeration economies were found in the automotive industry, where geographic proximity to the customer has supported efforts to upgrade product, process and function. There is a high, robust correlation between productivity and the propensity of automotive firms of being located next to other automotive firms. While this correlation may in part reflect the selection of higher-productivity firms to participate in clusters, interviews suggest substantial benefits from being located in clusters. The location of leading firms in close proximity to suppliers and clients also has been important in apparel and agribusiness, although it is early to see agglomeration effects in the small electronics sector in the region.

Agglomeration is usually discussed in terms of localization (firms in the same industry locating close to one another) or urbanization (firms in diverse industries locating in the same area—see Box 4.1). However, other indicators have also been used to measure the productivity benefits of agglomeration. Two measures of agglomeration at the plant level– market access and proximity to transport hubs—were correlated with productivity in 4 out of the 9 sectors in India investigated by Lall et al. (2004). By contrast, they find that measures of localization are correlated with productivity in only two sectors, and measures of urbanization in none. These findings, however, rely on estimating the effects of agglomeration economies jointly with the estimation of the production function, potentially widening uncertainty around the estimates (see, for example, Beveren, 2010; Combes et al., 2011). Moreover, correlation between measures of urbanization and of market access can be high, as both indicators are derived from the urban population in the same district.

Box 4.1. Agglomeration and productivity

Economic growth and geographical concentration of economic activities reinforce each other (Baldwin and Martin 2004, and Martin and Ottaviano 2001) through the forces of localization and urbanization. Localization economies are the productivity gains obtained by firms in the same industry locating close to one another and benefitting from sharing inputs, labor market pooling, and knowledge spillovers (Marshal, 1920). Urbanization economies are the productivity gains obtained by firms in other industries locating in the same area (Jacobs, 1969). These can arise when a diverse range of industries in a particular location enables firms to access suppliers from different industries, or when firms can benefit from R&D spillovers and/or access a generally higher-quality labor market. Recently, other sources have been suggested, such as home market effects (concentration of demand encourages agglomeration) and economies of consumption (consumers enjoy variety).

According to a survey by Rosenthal and Strange (2004), whether localization or urbanization has the larger impact on a firm's productivity is one of the oldest debate in this literature. Recent work (for example, Martin et al., 2011) suggests that localization economies tend to be more effective in raising productivity than are urbanization economies (by 3-8 percent). However, most of these empirical studies are based on developed countries, and there is little evidence for developing countries.

In South Asia, much of the economic activity tends to cluster (localize) either naturally or in response to policy distortions. In India's automotive industry, the physical distribution of activities has been almost entirely subordinated to overcoming logistical difficulties. For example, in the early 2000s, Maruti Suzuki—India's largest carmaker—relied on some 400 major suppliers located across the country, with some almost 2,500km distant from its main plant in Haryana. Its total logistics costs were up to four times as high as its wage bill and it had to carry large buffer stocks. In 2013, buffer stocks were brought down to zero and logistics costs slashed by requiring almost all suppliers to build, warehouse or locate within a few hours' radius of the plant; today, approximately 80 percent of Maruti Suzuki's suppliers are located within a 100km radius of the plant. In Pakistan, the thriving light manufacturing clusters in Sialkot show the benefits from labor pooling and knowledge diffusion. Furthermore, firms in Sialkot privately financed an international airport and exhibition center for the convenience of global buyers.

On the other hand, empirical evidence shows that urbanization economies appear to have had a larger impact on plant productivity than localization economies from 1995 to 2009 in India and Bangladesh (Table 4.3). The estimation approach follows the two-step strategy of Martin et al. (2011): first deriving plant-level estimates of TFP and then assessing the impact of various aspects of agglomeration economies while also controlling for geographical location, industrial diversity, and the degree of competition (with the former measured at the state level and the latter two at district/industry level).[31,32] Although statistically significant, the effects are relatively small and, in the case of India, seem to decline

over time. In 1991, an increase of 10 percent in the number of employees in sectors other than where the firm operates was associated with a 0.5 percent increase in plant productivity in India; by 2009, the productivity impact halved to 0.2 percent. In contrast, in Bangladesh the effect has ranged from 0.2 to 0.4 percent.

Table 4.1. Agglomeration economies are associated with higher firm productivity in India and Bangladesh

	India						Bangladesh					
	1991	1994	1996	2000	2006	2009	1995	1997	1999	2001	2005	2012
Localization	0.01	0.00	−0.01	0.01	0.00	0.01	0.06***	0.04*	0.01	0.03**	0.08***	0.02
Urbanization	0.05***	0.05***	0.00	0.03**	0.00	0.02**	0.03**	0.03**	0.03**	0.02**	0.04***	0.03***
Diversity	0.06***	0.03**	0.11***	0.05**	0.10***	0.03	−0.02	−0.12	0.01	0.08**	−0.18***	0.03
Competition	0.02**	0.02***	0.02*	−0.01	0.02*	0.01	−0.12***	−0.02	−0.02	−0.05**	−0.05**	−0.02
Observations	41,539	42,565	40,876	25,435	39,462	36,020	3,417	3,178	2,931	3,940	3,155	7,119
R-squared	0.05	0.05	0.02	0.03	0.04	0.03	0.03	0.02	0.01	0.02	0.03	0.01

Note: Robust standard errors in parentheses. Constant and state dummies included but not shown.
***p < 0.01, **p < 0.05, *p < 0.1.

In Sri Lanka, the data allow for even more stringent controls by estimating an unbalanced panel with plant fixed effects (Table 4.4). With this specification, the impact of urbanization economies on plant productivity is positive, particularly in the earlier part of the sample. Looking at the overall picture (from 1995 to 2009), a 10 percent increase in the number of employees in other sectors leads to an increase in productivity of 0.86 percent—higher than the cross-sectional estimates for India and Bangladesh. This suggests that our results using cross-section data might be underestimated and the effects of urbanization economies might be higher than our preliminary estimative.

Table 4.4. Agglomeration economies increase firm productivity in Sri Lanka

Variables	1995–2003	2006–2009	1995–2009
Localization	0.0315	−0.0300	−0.0002
Urbanization	0.1916***	−0.0410	0.0855***
Diversity	0.1207**	0.0217	0.0560
Competition	0.0159	0.0420	0.0141
Observations	17,125	4,873	21,998
R-squared	0.0044	0.0027	0.0014
Number of id	4,877	3,528	8,405

Note: Robust standard errors in parentheses. Constant term included but not shown.
***p < 0.01, **p < 0.05, *p < 0.1.

These results are for an average firm, while the impact of urbanization on firm productivity is greater for more productive firms and is not significantly different from zero for less productive firms.[33] For example, in Bangladesh, the impact of urbanization at the 75th percentile for firm productivity is more than twice as large

as at the 50th percentile (Table 4.5). In contrast to earlier results, this approach also identifies significant positive effects of localization economies on firms' productivity, although results differ qualitatively for the two countries. While less productive firms in Bangladesh benefit from localization effects, in India it is the most productive firms that do so.[34]

Table 4.5. More productive firms derive greater benefits from agglomeration economies
(estimation results at different quantiles of firm distribution)

	India/2009			Bangladesh/2012		
Variables	**25%**	**50%**	**75%**	**25%**	**50%**	**75%**
Localization	−0.0060	−0.0010	0.0109*	0.0179***	0.0049	−0.0079
Urbanization	0.0107	0.0207**	0.0119*	0.0022	0.0280***	0.0674***
Diversity	0.0385***	0.0505***	0.0293*	0.0930***	0.0308	0.0220
Competition	0.0299***	0.0124*	0.0023	0.0231*	0.0063	−0.0150
State Dummies[35]	Yes	Yes	Yes	No	No	No
Testing (p-value)	25% = 75%	25% = 50%	50% = 75%	25% = 75%	25% = 50%	50% = 75%
Localization	0.7%	25.5%	2.3%	4.7%	17.7%	22.6%
Urbanization	85.0%	7.0%	10.3%	0.0%	0.0%	0.0%
Observations	36,020	36,020	36,020	7,119	7,119	7,119

Note: Robust standard errors in parentheses. Constant term included but not shown.
***p < 0.01, **p < 0.05, *p < 0.1.

Overall, these findings show that agglomeration economies matter in South Asia, and the magnitude of the estimated impact of agglomeration on firm productivity is similar to that found in previous research focused on developed countries. But unlike the evidence for high income countries, urbanization economies in South Asia seem to matter more than localization economies—although the two are not mutually exclusive. Evidence from the case studies underlines the importance of large cities for specialization by firms, as well as the emergence of specialization within smaller cities—for example, the apparel cluster in Lahore, and the automotive clusters in Pune and Aurangabad. In part this is a natural response to increasing congestion and costs in the primary cities, a transition that also has been observed in China. It is important to emphasize that these correlations do not indicate causality, because data limitations have prevented us from addressing endogeneity when estimating the impact of agglomeration economies on productivity. Furthermore, the analysis did not take into account the potentially negative effects of agglomeration, such as congestion. Addressing such negative externalities might indicate that agglomeration promotes productivity, regardless of whether the effects are through localization or urbanization.

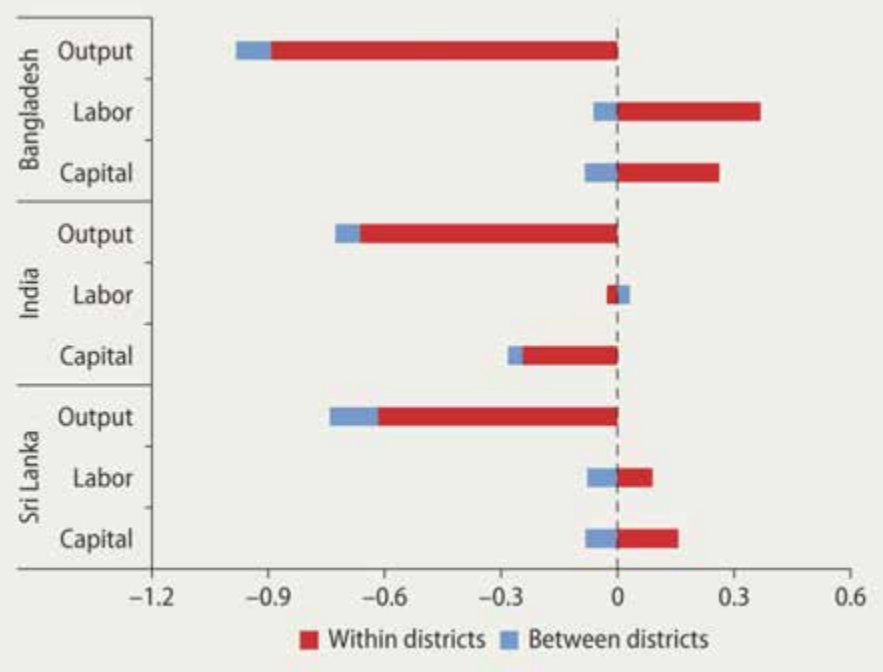
Resources do not flow easily to more productive firms

Despite the productivity-enhancing benefits of agglomeration, there appear to be significant barriers to resources moving freely across internal geographical borders in South Asian countries. Duranton et al. (2015) propose an empirically-motivated counterpart to the misallocation measure of Hsieh and Klenow (2009), defining misallocation as the (negative of) correlation between firm productivity and some measure of firm performance: be it output, employment, the use of capital, or land and other resources. With this definition, Duranton et al. (2015) are able to decompose overall misallocation at the country level into contributions from different factors of production, as well as distinguish between misallocation of resources within entities (for example, states or districts) and between them.

Calculating misallocation in this way for three South Asian countries for which requisite data are available reveals that, in most cases, district or state borders in the region are "thick" in the sense that impediments to efficient allocation of resources between districts are stronger than distortions within districts. This holds true for all countries in markets for goods, and in India in markets for labor and capital as well (as evidenced by a relatively small contribution of the between-district component to overall efficiency plotted in Figure 4.1). Moreover, the results in Figure 4.1 show that across South Asia, factor (labor and capital) markets are more distorted than goods markets (this is evidenced by more negative values for misallocation of output than for misallocation of labor and capital—a more negative number means less misallocation).

While the empirically-motivated measure of misallocation used here does not readily lend itself to calculating productivity gains from reduced misallocation (as done in Hsieh and Klenow, 2009), regression analysis by Duranton et al. (2015) for India suggest that a 1 percent decrease in the index of employment misallocation could raise output per worker in manufacturing by about 0.3 percent, and in services by about 0.9 percent (the difference is because labor is a relatively more important input in services than in manufacturing). Therefore, reducing factor market distortions to improve the ability of more productive firms to access inputs could have important consequences for overall productivity.

Figure 4.1. "Thick" district borders prevent efficient allocation of resources
(decomposition of total misallocation into between- and within-district components)



Note: A more negative number means more efficient allocation of resources (less misallocation); zero means no correlation between productivity and output or employment; a positive number means less productive firms attract more labor or capital than more productive firms. Numbers in the figure are averages across various years, calculated from the data in Annex Table 6.5.

INDUSTRY CASE STUDY B: Better cities and trade logistics are needed for the electronics sector to thrive

Electronics is one of the largest and fastest growing industries in the world and has played an important role in the development trajectories of several newly industrialized economies. Surprisingly, South Asia is not currently a significant player in the sector despite very competitive labor costs and the fact that leading firms are achieving world class productivity in the region.

What is missing are urban eco-systems providing thick markets for skilled labor, the amenities that make them attractive to engineers together with large tracts of industrial land for clusters to thrive and world class logistics to be able to import and export hundreds of components and products seamlessly. Some locations in South Asia are on the edge of being able to provide such conditions. Electronics clusters have emerged in Bangalore, Chennai, Colombo and Delhi-Noida with growing interest from leading global investors for Chittagong and Mumbai-Pune. Much progress has been achieved on the regulatory and policy front—some issues related to "inverted tariffs" remain to be addressed in India. Progress has also been made to make customs and ports more efficient but more efforts are needed to bring them to East Asian's level of efficiencies. Similarly,

efforts are being made to improve internal trade logistics. Governments are investing in skills in partnership with the private sector. Livability of large cities is a well-known challenge and steps are being taken. In Bangladesh, a key constraint is the limited supply of large tracts of well-located and readily-available industrial land for large investors and their suppliers.

The Opportunity: South Asia on the edge of becoming globally competitive in one of the world's most important and fastest growing industry

The electronics sector is one of the world's largest industrial sectors and has made a substantial contribution to global growth. Global trade in electronic products, including communications and information communication technology (ICT) equipment and electronics-based consumer products, was estimated at US$1.4 trillion in 2012, having grown 5.9 percent a year between 2008 and 2012.[36] Electronics production is an important source of employment—18 million people worldwide in 2010.[37]

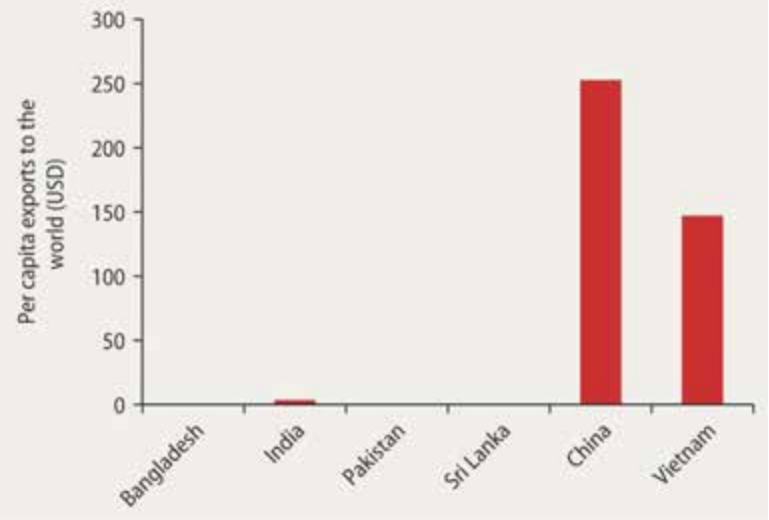
The sector presents growth opportunities for developing countries. An important feature of the sector is that production is highly fragmented, with value often added in a variety of countries before goods and services make their way to end consumers.[38] The ability to shift parts of the value chains to low-cost locations has created opportunities for developing countries to participate. Electronics companies from the developed world first started relocating to Malaysia, Singapore, Taiwan and Thailand during the 1970s and early 1980s, followed by China, Indonesia and the Philippines, primarily to take advantage of lower labor costs. In recent years, Vietnam has become an important producer for similar reasons. In 2013, information technology and electronics accounted for 7 percent of Vietnam's exports. Asia has been a major beneficiary and has become an important manufacturing hub, mainly due to its low labor costs, established supply base and proximity to key final markets.[39]

However, South Asia has yet to benefit from the global shift of electronics manufacturing. Other countries that started from a much weaker position have forged ahead and established themselves as new global players in electronics manufacturing exports. For example, electronics exports in South Asia are almost invisible compared to that in East Asian countries (Figure 4.2). India is only the 14th largest electronics producer globally, behind countries such as Mexico (8th), Brazil (10th) and Thailand (12th).

This is surprising given South Asia's growing labor cost advantage over East Asia and the fact that leading firms in South Asia achieve productivity performance comparable to Chinese levels. Samsung mentioned that their Noida plant is among their three most productive units worldwide. Similarly, the World Bank Enterprise Surveys show that productivity in Sri Lanka is higher in the electronics sector than China (US$24,701 vs. US$22,382). Cost comparisons, obtained from a global manufacturer with facilities around the world, shows that

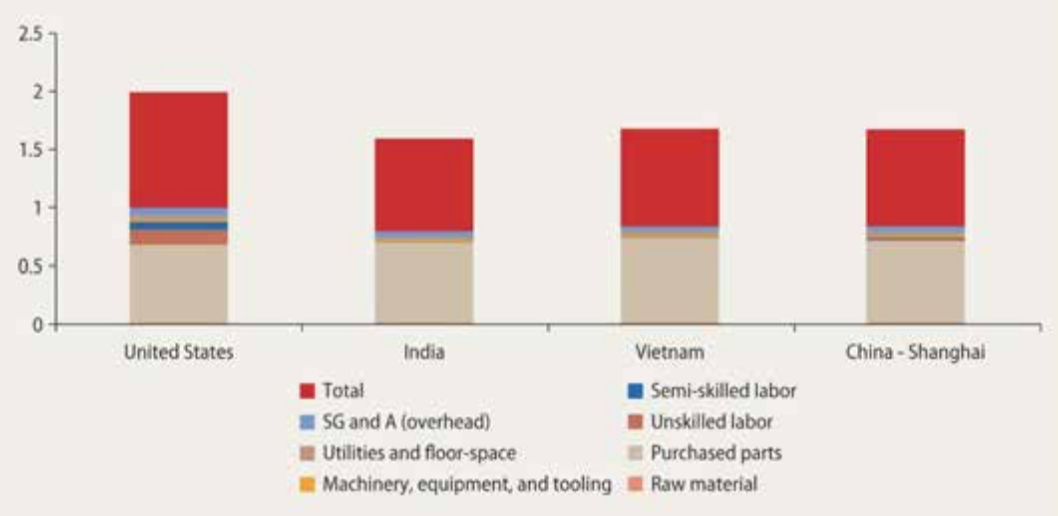
manufacturing costs in India are 80 percent of those in the United States, and importantly, slightly lower than in China and Vietnam (Figure 4.3).

Figure 4.2. Electronics production is low in South Asia



Source: UN COMTRADE; Staff estimates based on WBG Enterprise Surveys.

Figure 4.3. India has a cost advantage in labor intensive processes



Note: Data is from auto parts manufacturer but is representative of costs in electronics sector.

So what is missing for South Asia to make it big in electronics?

Achieving low production cost at the plant level is not enough to be competitive in the electronics industry. An electronic product consists in the assembly of hundreds of components coming from multiple suppliers and locations/countries produced by skilled workers and engineers.

Industrial clustering is a key feature of the electronics because it helps reduce transaction and logistic costs between dozens of related firms. It also helps

facilitate quality control and reduce transport-related uncertainties in the supply chain. For example, 76 Korean suppliers co-located next to Samsung following its investment in Vietnam, similar dynamics can be observed around Samsung's main plants in Noida and Chennai. Clustering next to large cities also facilitates access to a large pool of skilled workers and engineers as well as ancillary service providers required by this fast moving, constantly innovating industry.

Thus by its nature, the electronics industry requires urban eco-systems combining a deep pool of skilled workers, amenities that make them attractive to engineers and large tracts of industrial land that can host clusters with very good internal and external connections, in particular to world class ports. Because it is so globally competitive, it also requires a low cost of doing business and an enabling trade policy environment.

South Asia has made significant progress in terms of regulations and trade policies (some inverted tariff issues are left to be addressed in India[40]), the main challenge left to be addressed is to provide the urban eco-systems (including seamless internal/external trade logistics) for world class electronics clusters to emerge and thrive.

(i) Barriers to clustering

Although clustering is happening around a few locations, access to land remains a challenge. The electronics industry in India initially grew around three major centers, Bangalore, Chennai and Delhi-Noida. Bangalore emerged as a hub early on, with major public sector plants in defense and telecommunication being located there. In recent times, Bangalore also has attracted private sector firms in computer and industrial products. The Delhi region, in particular, has a large concentration of small scale factories making consumer electronic products and computers. More recently, Hyderabad, Chennai and the industrial corridor between Mumbai and Pune have become important manufacturing locations.

Few industrial areas have been able to provide what investors require in the right locations. Interviews suggest that manufacturers seeking to link up to global supply chains prefer to locate in areas that are close to ports, to speed up supply chains and reduce dependence on local infrastructure. Setting up clusters in such areas—either as SEZs or industrial parks—that are large enough to house lead firms and suppliers would help attract electronic manufacturers. Investors would also like to see world class infrastructure developed around and within the cluster, especially to link it with the port and to major markets. Another requirement, particularly from SMEs, is for common facilities for R&D and testing facilities, waste dumping, and recycling. Provisions for worker housing within or close to the cluster is important. Manufacturing facilities tend to be located outside urban areas to take advantage of lower land costs. However, ensuring an adequate supply of labor requires them to pay to transport workers to the sites or to create facilities for them to stay close by, both of which raise costs.

Clustering in South Asia is rendered difficult because buying land at suitable locations is often an arduous and expensive task. Verification of titles is complex and procedures for purchasing land take time. It is difficult for large companies to assemble enough small plots of land. The scarcity of adequate land is also reflected in very high prices. Companies prefer to locate close to major markets or ports, but some Indian and Sri Lankan peri-urban areas are among the most expensive in the world.[41] The practical solution to these issues has been industrial zones, which played a central role in the development of manufacturing, electronics in particular, in East Asia. The lack of readily-available and well-located industrial land is probably the main constraint on the development of the sector in Bangladesh which came very close from breaking into the global electronics industry like Vietnam did (Box 4.2).

Box 4.2. How Bangladesh missed the opportunity to break into the global electronics industry

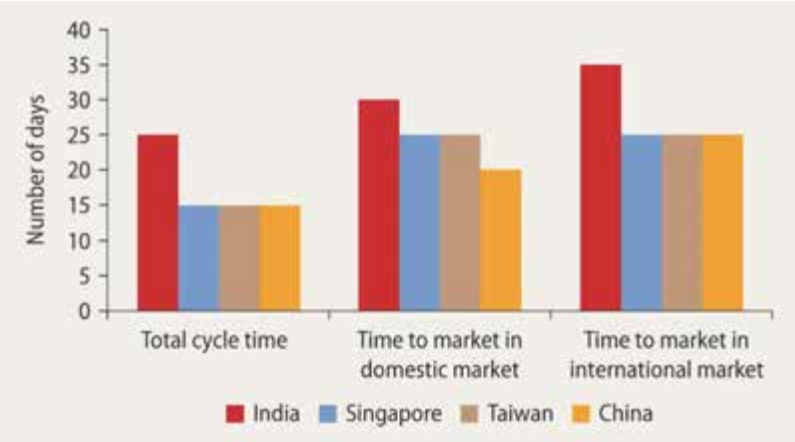
In 2011 Samsung requested 250 acres in an EPZ to develop an electronics hub in Chittagong (US$1.25 billion investment, 50,000 workers). The investment did not materialize largely because no more sizeable land was available in the BEPZA zones, and land in the mostly empty 2,500-acre Korean Export Processing Zone in Chittagong has been under dispute for more than 15 years. By contrast, Vietnam has been able to provide large, readily-available tracts of land to large investors as well as their suppliers. One of these, Samsung was able to locate there along with 76 of its Korean suppliers, and now directly employs 100,000 workers.

Source: Financial Express.

(ii) External and internal trade logistic issues

Countries that are able to achieve faster turnaround time gain significant competitive advantage, especially in the more innovative, cutting edge products. This is where South Asia is at a disadvantage. Processing time is higher in India than in China, Singapore & Taiwan (Figure 4.4).

Figure 4.4. Process times for IT hardware and electronics



Source: D&B Analysis.

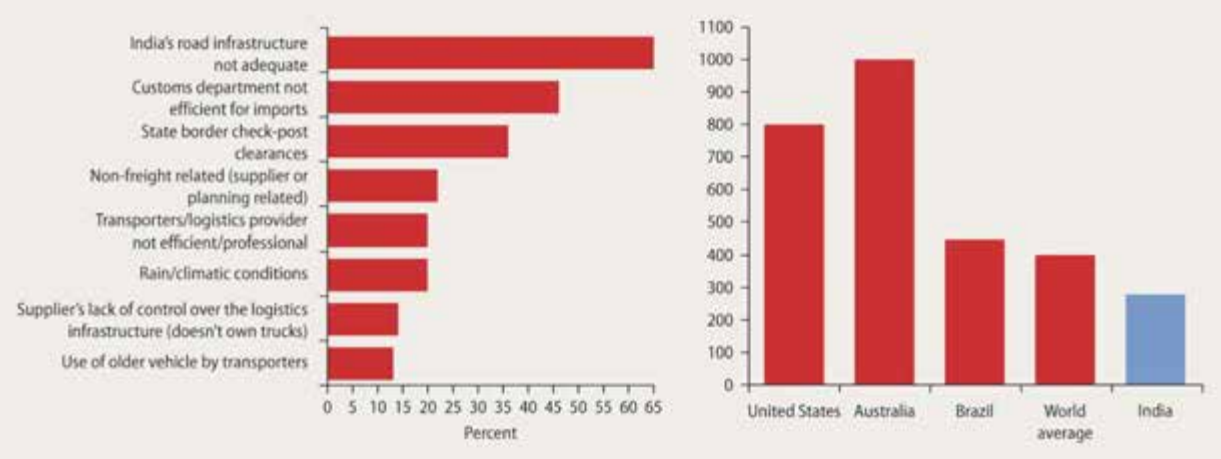
While much progress has been made, South Asian firms continue to report long and unpredictable delays in customs clearance. In India, the average time reported to clear customs varied from 2-10 days for large firms, and 14-21 days for SMEs. Remaining issues include ambiguities in product classification and difficulties to obtain exemption 25/99 on import tariffs on raw materials and parts & components. Grievances also can take considerable time, and companies fear reprisal, for example through losing their trusted trader credentials.

Issues also remain with internal logistics. Indian firms reported that while it takes 11 days for a container to travel from Shanghai to Mumbai, it takes 20 days to travel from Mumbai to Delhi. A survey shows that a quarter of the journey time is spent at check posts, state borders, city entrances, and other regulatory stoppages (Figure 4.5). In order to deal with the resulting uncertainty, firms in four industries (auto components, textiles, electronics, and heavy engineering) report maintaining 27 percent higher inventories on average. Total logistics costs- including inventory costs and lost sales- account for 14 percent of total costs for electronics firms, high by international standards.[42] The recently passed reform of the Goods and Services Tax (GST) in India should improve matters considerably.

(iii) Access to skilled workers

The availability of cheap and adaptable labor is one factor that makes South Asia attractive as a manufacturing destination. However, capitalizing on South Asia's advantage in workers requires significant investment in training and improving people's productivity. The returns can be large—international evidence shows that a 1 percent increase in training is associated with 0.6% increase in value added per hour.[43]

Figure 4.5. Customs clearance in India



Source: Jordan and Kamphuis (2014).

The question is who makes this investment? In South Asia public investment on training has been low and of poor quality, comparing unfavorably with other competitor nations. For example, vocational education programs in India can accommodate only 5% of secondary school graduates, while China has the infrastructure to train half of all secondary school graduates. The quality of training is also an issue. Across the region, the development of new programs and curricula is difficult in public institutions. Quality is further hampered by the lack of industry participation in training.[44] Samsung reported that it takes a full year of training to bring its workers in India to global standards. Tos Lanka, Sri Lanka's leading electronics company has also to make large investments in training (Box 4.3).

Box 4.3. How Tos Lanka is developing the skills of its workforce

Tos Lanka is Sri Lanka's largest electronic assembling solution company. It commenced operations at the Biyagama EPZ in 1998, with an initial investment of Rs 220 million. Tos specializes in the Surface Mounted Technology (SMT) assembly of printed circuit boards, electronic guitar tuners and effectors, coils and electronic components for the automotive industry. The products are exported to Japan, the United States and the EU.

The factory has manual and automated electronic assembly lines, supported by chip mounting and wave soldering plants, together with extensive testing facilities. Female workers dominate the 240-strong workforce. The company has invested in training and development of staff to manufacture electronic products and components to international standards. Workers at Tos Lanka undergo training in Japan for a period between three months to a year. The majority of the work force has been trained in Japan under AOTS/JASTECA scholarships in quality-oriented manufacturing processes.

The company has also established its own Research and Development section, and looks forward to accessing the huge Indian market through the Comprehensive Economic Partnership Agreement (CEPA).

Source: Tos Lanka.

In China, Government supports vocational education with extensive industry participation. Curricula are flexible and to make sure that the faculty always keeps abreast of the latest industry practices, the Chinese government made it compulsory for vocational trainers to spend at least a month every year in manufacturing companies. To facilitate access to labor, the government also supports employee housing next or within well-located industrial parks with technical and vocational colleges and secondary schools. Vietnam provides subsidized training for employees. Programs include soft skills, technical English, technical skills as well as on-demand training. Further, companies can set aside 10% of annual taxable income for R&D. This sharing of skilling costs between the state and private companies can significantly encourage investment, especially for companies with a long term vision.

South Asia is on the edge of breaking into the global electronics industry

As shown by the missed Samsung opportunity in Bangladesh (Box 4.2), South Asia is very close to making it big in the global electronics industry. This will require continued improvements in the urban eco-systems with respect to access to industrial land, internal/external trade logistics and skilled labor.

Global investors are anticipating and are on the move. Several multinational electronics firms (e.g. Samsung, HP, IBM, Motorola, Lenovo, Flextronics and Foxconn) are present, or have announced plans to invest in the region (Box 4.4), and many large firms have set up R&D centers with world class capabilities in South Asian countries to support global operations. This activity has been encouraged by South Asia's large, fast-growing markets (for example, the electronics market in India is expected to grow at 24 percent p.a. to reach a market size of US$400 billion by 2020)[2] and the potential of the South Asian diaspora with deep knowledge and extensive networks in the global electronics industry.

Box 4.4. Foxconn enters India

Foxconn, the world's largest contract electronics manufacturer, has signed a $5 billion deal to set up R&D and hi-tech manufacturing facilities in western India within the next five years. The firm, which manufactures for a host of global device brands like Apple, BlackBerry, Amazon, Motorola, Xiaomi and Sony, has the bulk of its factories in China. Separately, leading Chinese smartphone maker Xiaomi announced that it will now manufacture its devices in India in partnership with Foxconn in Andhra Pradesh. Reports suggested that another Foxconn joint venture with billionaire Gautam Adani's Adani Group could focus on making iPhones and iPads.

Foxconn said it intends to set up 10-12 plants and employ a million workers in India by 2020.

Source: Forbes Asia.

Indian exports of components and products have started to grow in areas such as mobile telephones, audio players, and display technologies. Indian companies like Micromaxx, Deltron, TVS Electronics and Sahasra are increasing their presence.

The extended version of this case study is available on-line at:
www.worldbank.org/SouthAsiaCompetes

Chapter 5. Limited success in linking to global value chains

Part 1 of this report argued that global trade and investment integration is important for productivity growth. In the 21st century, this is manifested through global value chains (GVCs) which are characterized by the division of the production process into stages, and the distribution of these stages across different countries. This process, variously known as "production fragmentation" (Arndt and Kierzkowski, 2001), "processing trade" (Görg, 2000), "vertical specialization" (Hummels, Rapoport and Yi, 1998), "slicing up the value chain" (Krugman, Cooper and Srinivasan, 1995), or "the second unbundling" (Baldwin, 2006) has been made possible by major changes in logistics and managerial organization in the last third of the 20th century.

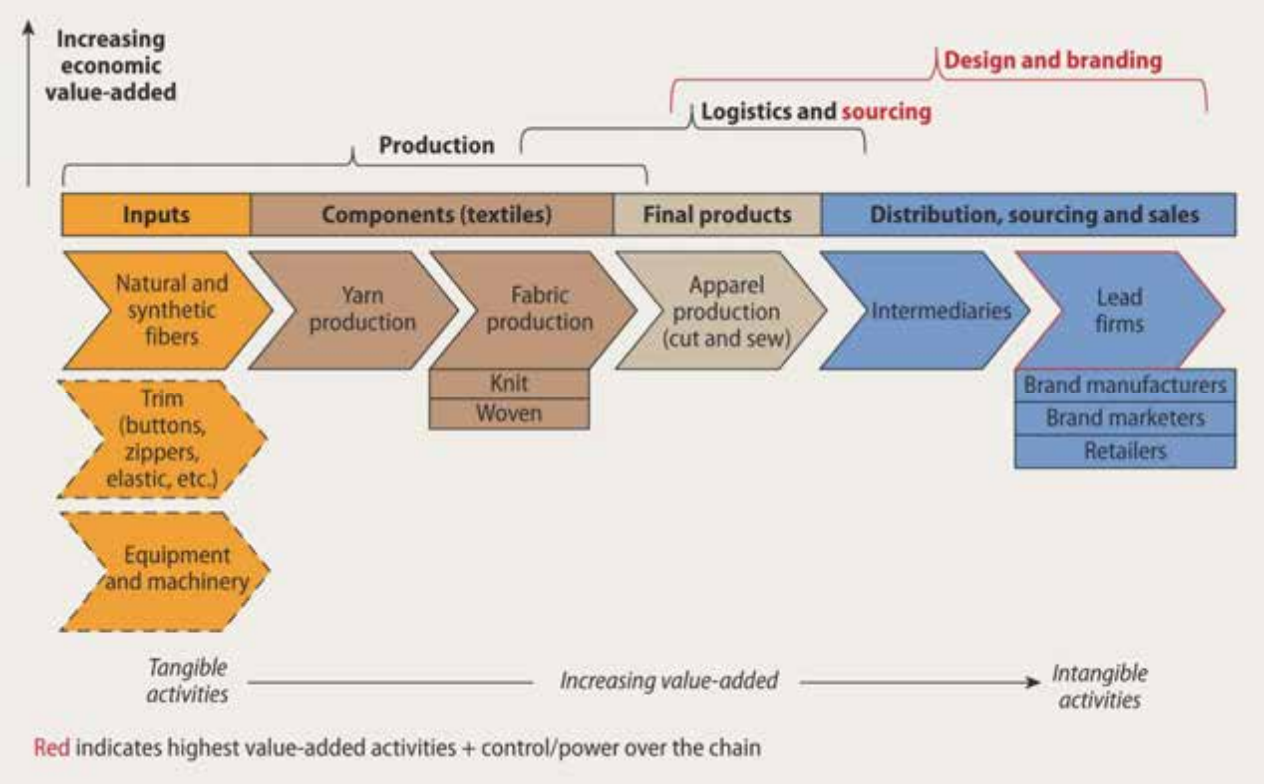
At the firm level, various aspects of GVC participation, such as imports of parts and components, entry into export markets, and knowledge spillovers from tie-ins with lead firms, have been associated with higher productivity. However, South Asia's participation in GVCs largely remains confined to apparel. And even in this sector, the sophistication of the region's products declined between 2000 and 2010. To take better advantage of the productivity-enhancing opportunities offered by participation in GVCs, South Asia needs to further develop capabilities that matter for GVCs, including human capital, institutions, logistics, and removal of trade barriers. The following discussion develops these observations in more detail.

GVC participation supports productivity

GVCs make it possible for firms in developing countries to participate in producing the world's most complex and sophisticated products, by specializing in a piece of the production process where firms have a comparative advantage and produce at the necessary large scale to be competitive globally (Figure 5.1). Lead firms, typically located in advanced economies, perform the higher value-added activities (such as design, branding, and retail), but outsource most or all of the manufacturing to a global network of producers. Beyond their direct contributions, leading firms also have major positive effects through the knowledge and support they provide to suppliers and the competitive pressure they put on all firms in the industry. Their example and competition compel other firms to improve, and signal to the international investor community what can be achieved in the country. Foreign firms' subsidiaries in South Asia play a particularly important role in complex, capital- and knowledge-intensive activities such as car assembly (for example, Maruti Suzuki in India and Toyota in Pakistan)

and electronics (Samsung in India and Tos Lanka, a subsidiary of Toslec from Japan, in Sri Lanka) The relationships between foreign and domestic firms provide a vital first step towards increasing productivity and producing goods that meet world-market specifications with regard to technological content, quality and design (Helpman, 1984). Nowhere is this more evident than in East Asia, where the transfer of technology and knowledge facilitated through GVCs made it possible for countries at initially low levels of income—such as China, Hong Kong, South Korea, Singapore, and Chinese Taipei—to move up the ladder in terms of productivity, capital intensity and quality (Kimura, 2005; Konings, 2007; Kee and Tang, 2015).

Figure 5.1. Highest value added is concentrated at the top of the global apparel value chain



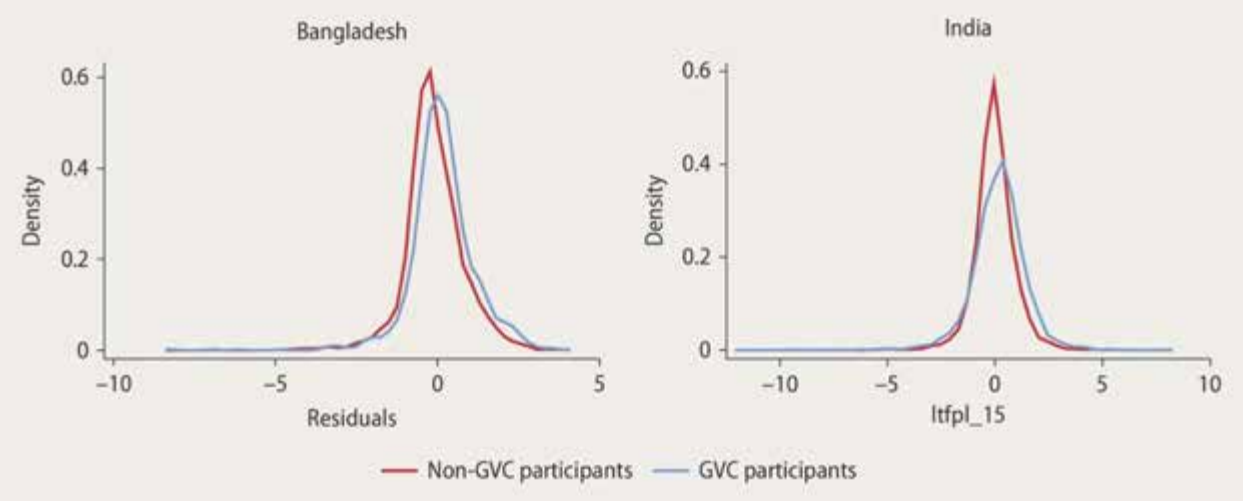
Source: World Bank (2016).

A large literature documents firm-level productivity benefits from various aspects of GVC participation such as access to larger markets, learning-by-exporting, and knowledge spillovers from FDI—although recent evidence suggests that the contribution of these forces to productivity growth declined in the period 2004-2011 compared to 1995-2003, primarily on account of the global trade slowdown (Constantinescu, Mattoo and Ruta, 2016). Causality is difficult to establish, as firms that are already more productive are more likely to enter export markets than less productive firms (Melitz, 2003; Clerides et al., 1998; Wagner,

2007; Abraham et al., 2010; Amiti and Konings 2007; Goldberg et al. 2010; Atkin et al. 2014). Empirical studies have used a variety of statistical techniques to control for this selection bias. In a sample of Indonesian firms, Arnold and Javorcik (2009) find evidence of increased labor productivity due to capital investment as well as organizational and management restructuring following acquisition by a foreign affiliate. In South Asia, evidence suggests that FDI-receiving firms in Bangladesh are more productive (Kee, 2005). In a review of such studies, Havranek and Irsova (2011) conclude that a 10 percent increase in foreign presence is associated with a 9 percent increase in the productivity of local suppliers through their exposure to foreign firms. This evidence suggests that firms often participate in GVCs first and then become more productive, rather than the other way around.

Classifying firms with a share of imported raw material in total raw material greater than 10 percent as GVC participants, we find that the TFP of GVC participants in India, Bangladesh and Sri Lanka tends to exceed that of non-participants (Figure 5.2). The picture remains more or less the same when GVC participants are classified as firms with a share of imported raw material in total raw material greater than 20 percent. The same pattern is identified for participation in international markets more generally: firms with a trade share (exports plus imports) greater than 10 percent of value added are associated with, on average, higher levels of TFP across India, Bangladesh and Sri Lanka. And this picture remains robust to different trade shares being used to define GVC participant firms. It should therefore come as no surprise that GVC participants, as reflected in evidence from India and Bangladesh, are associated with a higher share of exports in value added.[45]

Figure 5.2. Firms that participate in GVCs also have higher productivity



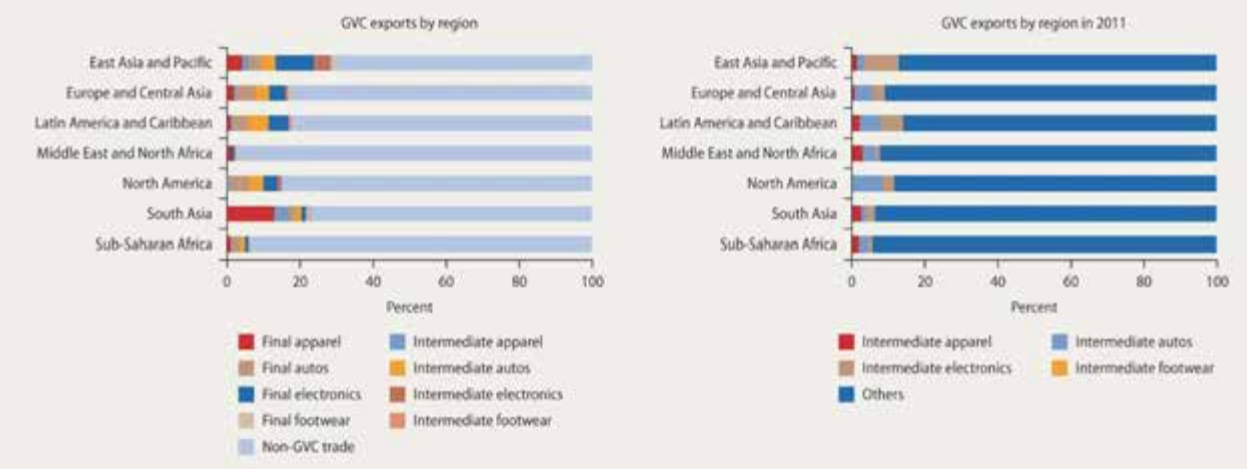
Various efforts have been made to pinpoint the source of productivity benefits from exporting. Increases in productivity following entry into foreign markets are attributed to greater scale economies in Sub-Saharan Africa (Van Biesebroeck,

2005) and Slovenia (De Loecker, 2007). Evidence from a randomized trial in Egypt indicates that substantial productivity gains from exporting were due to knowledge transfers (Atkins et al., 2014). In South Asia, studies have found that "learning-through-exporting" has boosted productivity of firms in India that enter export markets (Mukim, 2011), in part through scale effects.[46] Similarly, firms in Bangladesh with more export experience exhibit higher productivity (Fernandes, 2008). Among domestic producers of apparel inputs in Bangladesh, even those firms that do not export and do not supply to exporters can experience productivity spillovers by learning from the experience of other firms that are part of a shared supplier network that supports exporters (Kee, 2015). On the import side, access to imported intermediate inputs can also boost firm productivity: for example, when India liberalized its tariff regime, access to a greater range of intermediate goods at lower overall prices made manufacturing firms more productive (Goldberg et al., 2010). Case studies document the important productivity benefits from interactions with foreign firms in the context of global value chains. For example, the Desh-Daewoo joint venture, which included the intense technical and managerial training of 130 Bangladeshi in Daewoo's Pusan plant in 1979, established the foundation for the next generation of Bangladeshi entrepreneurs.

South Asia's success in global and regional GVCs is limited to apparel

South Asia has the second-highest level of GVC exports in total exports among developing regions, but almost entirely because of the large share of final and intermediate apparel products (reinforcing the findings on global market shares in Part 1 of the report). Around half of GVC exports from South Asia are in final apparel whereas East Asia specializes in electronics, and Europe, North America and Latin America in autos (Figure 5.3). In imports, South Asia is relatively less integrated in GVCs: firms making final products tend to obtain inputs from domestic sources (or themselves), indicating a lower level of GVC integration than implied in the export data.[47] In the case of apparel, however, local sourcing of intermediates combined with the predominance of final apparel exports is consistent with FDI-led GVC activity in South Asia, i.e. global lead firms set up factories and use local materials to manufacture and export final apparel.

Figure 5.3. South Asia's strength in apparel explains the region's high GVC integration



Box 5.1. Measuring GVC participation

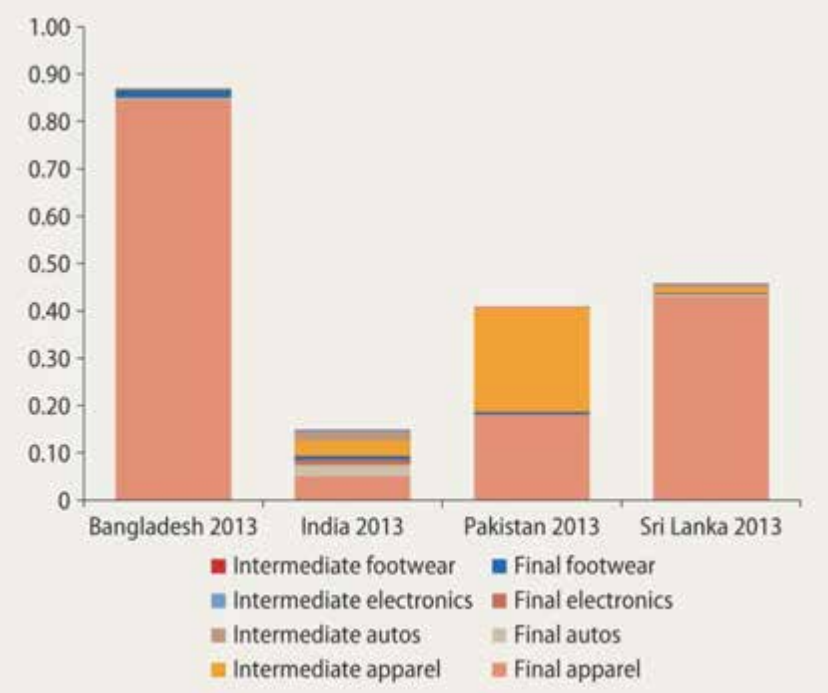
There are a number of ways to measure participation in GVCs. Some analyses, especially those which focus on tracking global flows of value-added through input-output methods, essentially view all trade as GVC-oriented (Mattoo, Wang, and Wei, 2013). A country that only exports crude oil or metallic ores may have a high degree of GVC participation of a sort, since these crude materials are eventually transformed into sophisticated goods or parts of other goods in some other country.48 However, linkages with lead firms that lead to technology transfer or deeper interactions with final markets are more likely to take place when countries are engaged in the middle or later stages of the production process.

GVCs in vehicles, electronics and apparel/footwear are characterized by a lead-firm network structure, and have been much studied. The share of total global merchandise exports accounted for by these three GVCs has fluctuated between around 14 percent and 28 percent since 1990. Studying the similarities and differences in the organization of these three GVCs can improve our understanding of GVCs, or as they are sometimes called "global supply chains" (USITC, 2011). These three sectors differ in the methods used to coordinate activity over long distances, and in the extent to which they tend to be coordinated by traditional manufacturers (autos), owners of brand names with strong research capabilities (electronics), or buyers of final products working with global middlemen (apparel).

This report uses a modified version of the definition of the three classic GVCs in Sturgeon and Memedovic (2011). Products are classified as belonging to one of the three GVCs based on a combination of expert opinion and their position in the U.N. Statistical Division's Broad Economic Categories (BEC), which help to distinguish between intermediate and final goods. This leads to a list of over 400 traded goods, identified in the SITC Rev. 3 classification at the four-digit or five-digit level. Each of the GVCs is then divided into two sub-sectors to reflect intermediate and final goods (for example, intermediate electronics and final electronics), making six GVC sectors in all. For the purposes of this analysis of South Asia, the Sturgeon and Memedovic (2011) categories are modified in two ways. First, the footwear sector, both intermediate and final, is separated from apparel, making eight categories instead of six. Second, the definition of the "autos" sector, which originally included only passenger motor vehicles and motorcycles, is broadened so as to encompass other road vehicles (for example, trucks, buses and trailers).

Within the region, countries vary greatly in terms of the extent to which they are integrated into GVCs (Box 2.3). In 2013, the share of total merchandise exports in major GVC products (apparel, autos, electronics and footwear) was around 80 percent for Bangladesh, 45 percent for Sri Lanka, 40 percent for Pakistan, and 15 percent for India, while participation of the remaining regional countries is negligible (Table 5.1). By this metric, Bangladesh has one of the highest GVC participation rates in the world, although it reflects the fact that Bangladesh exports are heavily concentrated in apparel (Figure 5.4). India's participation in GVCs, by the same token, is low precisely for the reason that it has a more diversified export basket that consists of a wide variety of products—some of which may also have some of the characteristics of GVC production, but are not included in this analysis.[49]

Figure 5.4. Apparel accounts for the lion's share of South Asia GVC exports



In terms of products, each of the four South Asian countries have significant export positions in final apparel, covering nearly the full range of garment products, while the intermediate apparel—dominated by cotton textiles—is particularly important in India and Pakistan. Bangladesh's exports of final apparel in 2013—which have nearly tripled since 2007—amounted to over US$26 billion, making it the second largest exporter of final apparel in the world next to China. Sri Lanka and Bangladesh, due in particular to effective import facilities for exporters, perform at East Asia's level in terms of exports per capita (US$216 and US$147, respectively), while India and Pakistan are at an order of magnitude lower (US$10 and US$23, respectively). Annual growth rates of exports over 2003-2013

in India (9.6 percent) and Sri Lanka (5.3 percent) were modest, and in Pakistan were sluggish (2.7 percent). These rates of growth, however, may not necessarily reflect productivity improvements because the region benefited from the 2005 elimination of the Multi-Fiber Agreement (MFA), which had restricted textile imports from developing countries to developed countries (World Bank, 2015).

Table 5.1. Outside of apparel, US$ per capita GVC exports from South Asia lag well behind East Asia

	Afghanistan 2013	Bangladesh 2013	Bhutan 2012	India 2013	Nepal 2013	Pakistan 2013	Sri Lanka 2013	China 2013	Vietnam 2013
Final apparel	0.0	170.1	0.0	13.1	2.7	24.7	210.3	125.4	189.1
Final autos	0.0	0.0	0.0	6.5	0.0	0.1	1.9	23.6	4.7
Final electronics	2.0	0.0	0.5	3.7	0.2	0.6	6.9	252.8	274.1
Final footwear	0.0	3.2	0.0	1.8	0.0	0.6	1.1	35.5	93.6
Intermediate apparel	0.0	0.5	0.9	6.1	2.3	30.4	6.2	42.3	29.9
Intermediate autos	0.0	0.1	0.1	5.0	0.0	0.3	2.6	39.5	40.3
Intermediate electronics	0.0	0.1	0.0	1.0	0.0	0.0	1.1	67.5	16.2
Intermediate footwear	0.0	0.1	0.0	0.3	0.0	0.0	0.4	1.9	3.6
Total	2.0	174.1	1.5	37.5	5.2	56.1	230.5	588.5	651.5

Note: Data for Bangladesh 2013 are mirror data.

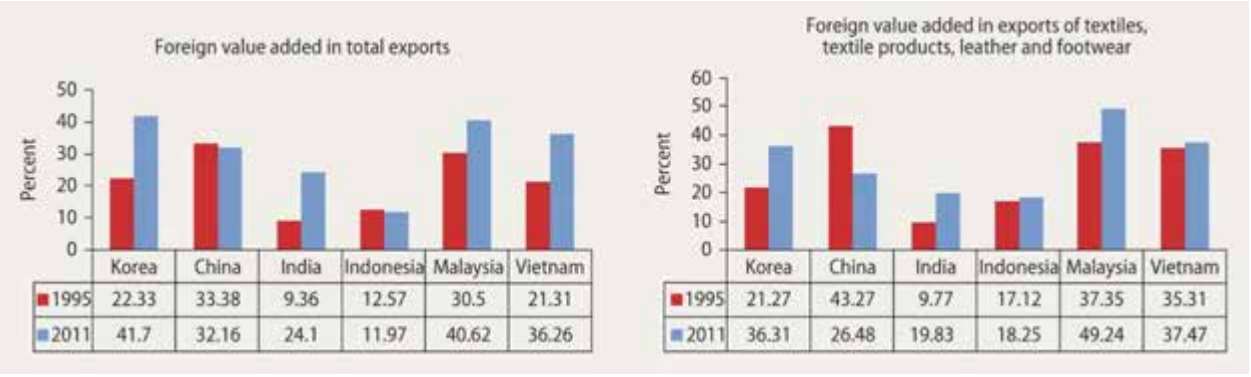
Most South Asian countries have negligible exports of GVC products other than apparel, with India accounting for almost all of the region's exports of autos and electronics. India has a large auto parts industry, with growth assisted by increased exposure to international competition after the lowering of trade barriers. India's auto parts exports doubled in the last ten years to reach US$6.4 billion in 2013, reaching sophisticated markets such as the United States, the United Kingdom, Italy, and Germany.[50] India already exports more auto parts than Indonesia, Vietnam or Morocco, but only about one-tenth of China (Table 2.8). India is also one of the largest and most rapidly growing developing country exporters of final autos: it exports to middle-income countries (for example, South Africa, Mexico and Algeria) as well as high-income countries (for example, the United Kingdom and Australia), and, at current growth rates, its exports of final autos may exceed those of China well before the end of the decade. In final electronics, India's exports have quadrupled in the six years ending in 2013—but growth is coming from a small base with China's exports dwarfing India's by a factor of 20.

India's rapid exports growth has come largely from penetrating developing country markets with lower-priced products (Figure 5.5).[51] Seventy-one percent of India's exports of passenger motor vehicles go to the Middle East/North Africa, Latin America-Caribbean, rest of South Asia, and Sub-Saharan Africa. Similarly, the largest destinations for Indian cell phone exports are Argentina, Russia, South Africa, and the United Arab Emirates. So on average, India's exports of GVC products are skewed more towards more middle income countries than exports of, say, Germany or Japan, which are geared more towards OECD markets.

Figure 5.5. **India's auto and electronics exports have focused on the lower end of the market**

Trade data don't provide a full picture of GVC integration, because many GVC-related sales take place within national borders. Measures of foreign value added in exports that draw on multi-regional input-output tables are useful indicators of the extent to which countries are engaging fully in the international division of labor that GVCs make possible.[52] The OECD-WTO TiVA (Trade in Value Added) data, for example, show that the share of foreign value added in India's exports rose from 9.4 percent in 1995 to 24.1 percent in 2011, exceeding Indonesia's share but continuing to lag behind Korea, China, Malaysia and Vietnam (Figure 5.6). This suggests that India is less integrated in GVCs than comparator countries in East Asia when domestic value added is taken into account. Focusing on textiles and apparel as a unified sector, the pattern is similar: India relies less on foreign inputs than its comparators, but that reliance has increased in recent years. By contrast, China's foreign value added in textiles and apparel has declined, perhaps indicating the country's growing position in upstream activities.

Figure 5.6. **India relies less on foreign inputs than its comparators**



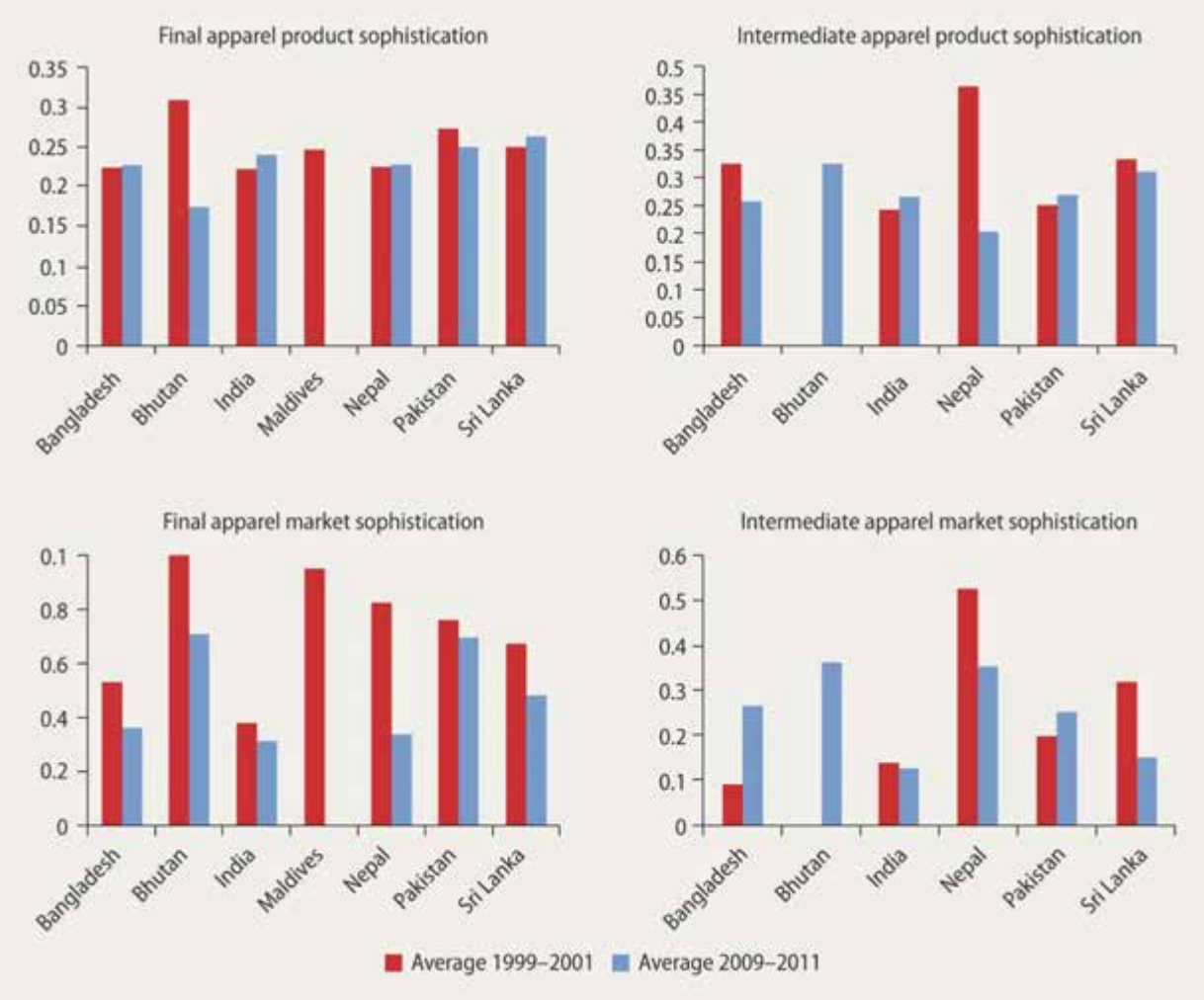
Countries in South Asia vary in the extent to which they are "upstream" (specialize in intermediate goods) or "downstream" (specialize in final goods) GVC participants. Pakistan is the furthest upstream (54 percent of its GVC exports are intermediates), followed by India (37 percent). By contrast, Sri Lanka is much further downstream (4.6 percent of its GVC imports are intermediates), and Bangladesh is even further downstream (0.4 percent). These characterizations have been rather stable over time and may be related to the market structure of GVC sectors. In apparel, Bangladesh and Sri Lanka are dominated by large, formal firms that are geared towards the global market. On the other hand, India and Pakistan have a sizeable informal apparel sector where firms employ fewer than 10 workers. Yet, none of the four countries are fully specialized. For example, Bangladesh imports significant amounts of cotton yarn from India but does not export very much fabric because the transformation of yarn into fabric is to a significant extent absorbed by the domestic apparel industry. Furthermore, both Pakistan and India have significant exports of both intermediate and final goods, so they are upstream in some product lines and downstream in others.

The sophistication of South Asia's exports has improved in some respects. One way to assess sophistication is by measuring the typical income level associated with countries that export a similar basket of goods as the country in question (analogous to PRODY).[53] In the decade between 2000 and 2010, product sophistication of final apparel increased in India, Sri Lanka and Bangladesh but declined in Pakistan (Figure 5.7). However, product sophistication for cloth, yarn and other apparel inputs converged over the decade of the 2000s, with sophistication increasing in India and Pakistan and declining in Sri Lanka and Bangladesh.

Indicators of market sophistication, measured by the average income level of the destination markets, are more varied across countries in South Asia than indicators of product sophistication.[54] Although final apparel in Sri Lanka and Pakistan is directed at higher-income markets than apparel from Bangladesh and India, market sophistication declined between 2000 and 2010 in all four countries (Figure 5.7). This could reflect either increased sales to middle-income markets or more intense competition in high-income markets, or both. In the case of intermediate apparel market sophistication, Pakistan and Bangladesh have shown gains between 2000 and 2010, indicating an increasing ability to penetrate high-income markets.

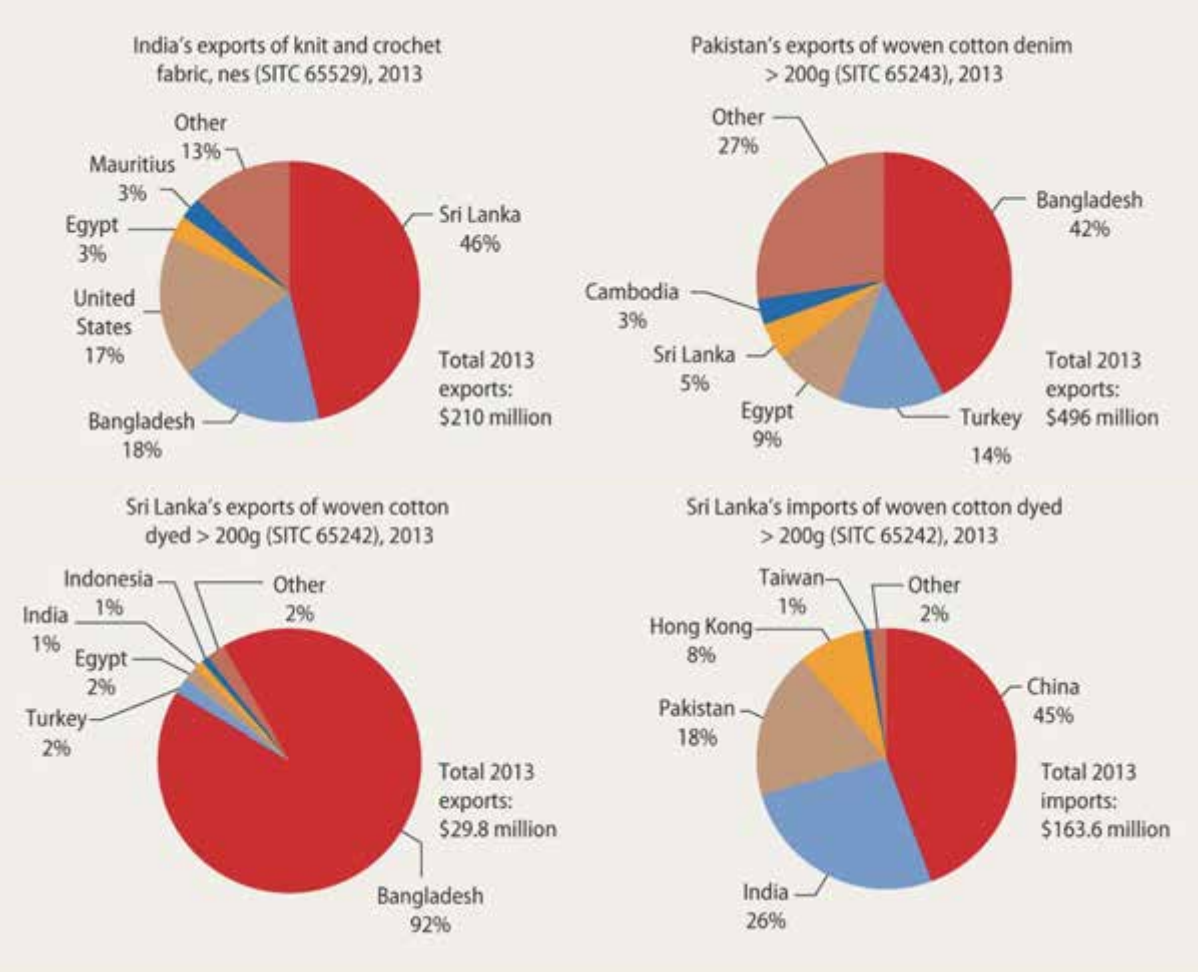
Even though it is more feasible than ever to produce complex goods on a "made-in-the-world" basis, considerations of transport and other transactions costs, as well as timely delivery, often cause value chains to cluster on a regional basis. The best-known of these clusters are the East Asian RVCs in electronics and the US-Germany-Japan automotive RVCs.

Figure 5.7. While product has increased in some instances, market sophistication of South Asia's textile and apparel exports has gone down



In South Asia, a regional value chain is emerging in intermediate apparel: intra-South Asian apparel trade amounted to US$2.5 billion in 2013, up sharply from US$400 million in 2003, and 24 percent of imported intermediate apparel inputs come from within the region, up from 18 percent ten years ago. In the region, Bangladesh and Sri Lanka have the highest share of final apparel goods (86 and 44 percent of total exports), and source many apparel inputs from Pakistan and India who focus relatively less on final products (18 and 6 percent of total exports). In 2013, two-thirds of India's exports of knit and crochet fabric were destined for Sri Lanka and Bangladesh, while nearly half of Pakistan's exports of woven cotton denim were destined for Bangladesh and Sri Lanka (Figure 5.8).

Figure 5.8. **South Asia is developing a regional GVC in apparel**

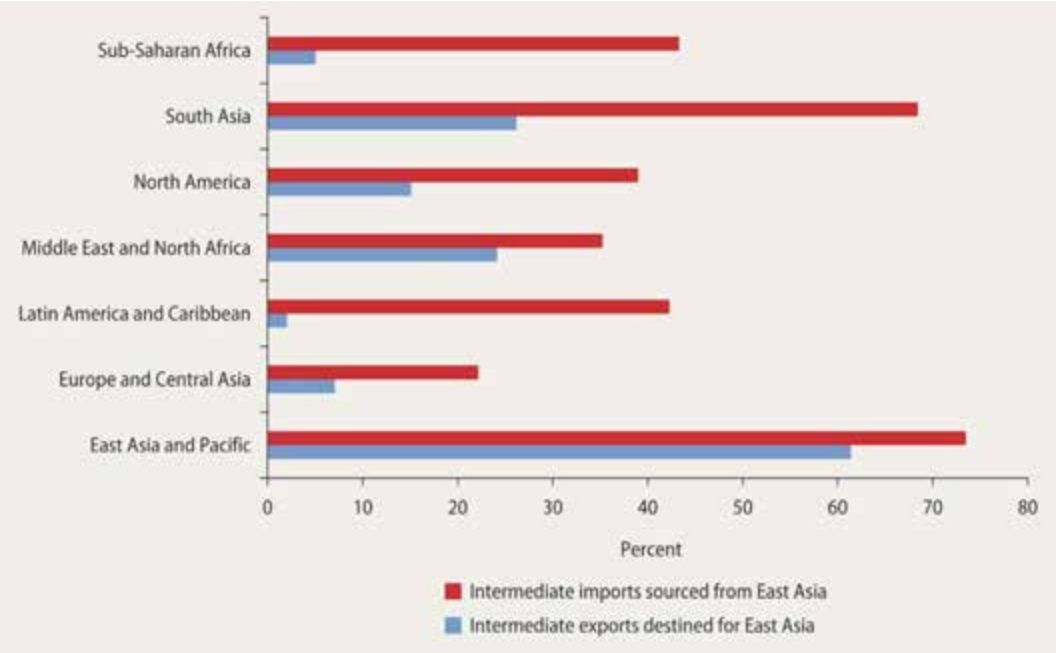


There also is evidence of an "East Asia/South Asia" regional value chain. 70 percent of South Asia's imported apparel inputs come from East Asia, having grown about as rapidly as the intra-South Asian trade. Overall, South Asia sends 26 percent of its exports of GVC intermediates to East Asia, and purchases 68 percent of its extra-regional inputs from East Asia—this extent of orientation of South Asia's exports of intermediates to East Asia is well above global averages in apparel, autos and electronics. South Asia's reliance on intermediates from East Asia cuts across sectors, although it is not quite as large as for exports (Figure 5.9).

Most policy determinants of GVC participation are lacking

Although a number of studies have looked at the determinants of production fragmentation (for example, Hillberry, 2011) and supply chain trade (for example, Rahman and Zhao, 2013), the literature is yet to give a clear picture of the drivers of GVC participation and competitiveness.

Figure 5.9. Integration with East Asia in apparel inputs is growing



At the level of the firm, local businesses need to have reasonably high productivity, a capacity to absorb new technologies (skill and capital intensity), and ideally experience with trading across borders in order to be qualified suppliers.[55]

The lack of such firm-level capabilities can inhibit the extension of GVCs to certain countries (see Farole and Winkler, 2014 for the case of Africa). Other studies have tested the importance of specific drivers of GVCs, including trade policy (Orefice and Rocha, 2014), transport (Hummels and Schaur, 2014), trade logistics (Saslavsky and Shepherd, 2012), and time zones (Dettmer, 2014). While these and other studies give us a sense of what factors are likely to be important in determining GVC dynamics, the question of which specific drivers matter most for country-level participation in GVCs remains open.

In a recent study, Farole and Pathikonda (2015) find a greater intensity of GVC products compared to non-GVC products[56] across a sample of over 100 countries for a range of capabilities that are most common in the theoretical, policy, and empirical literature on GVC trade.[57] They divide capabilities into three categories: (a) fixed (b) long-term policy variables and (c) short-term policy variables. Fixed capabilities include proximity to markets and natural (resource) capital. Policy variables that can be changed gradually over a relatively long period of time include human capital, physical capital and institutional capital. Policy variables that can be changed directly through a policy shift or negotiations in the short to medium term include logistics/connectivity, wage competitiveness, market access and access to inputs.

South Asian countries vary on these capabilities (Table 5.2). Sri Lanka scores highest on the level of human capital as measured by the average years of schooling. India's total natural capital far outpaces other countries, with Pakistan

a distant second. Bhutan's institutions are rated ahead of the other countries, followed by India, with Pakistan and Bangladesh lagging behind considerably. Geographically, Afghanistan and Pakistan in the region's north-west appear the most disadvantaged, whereas Sri Lanka seems closest to markets. India is a much more sophisticated logistical hub, whereas some countries—Nepal, Bhutan, and Afghanistan—are in some of the most challenging logistics environments in the world. The minimum wage is not very different across the "South Asian 4."

Table 5.2. Many GVC capabilities and endowments in South Asia are limited

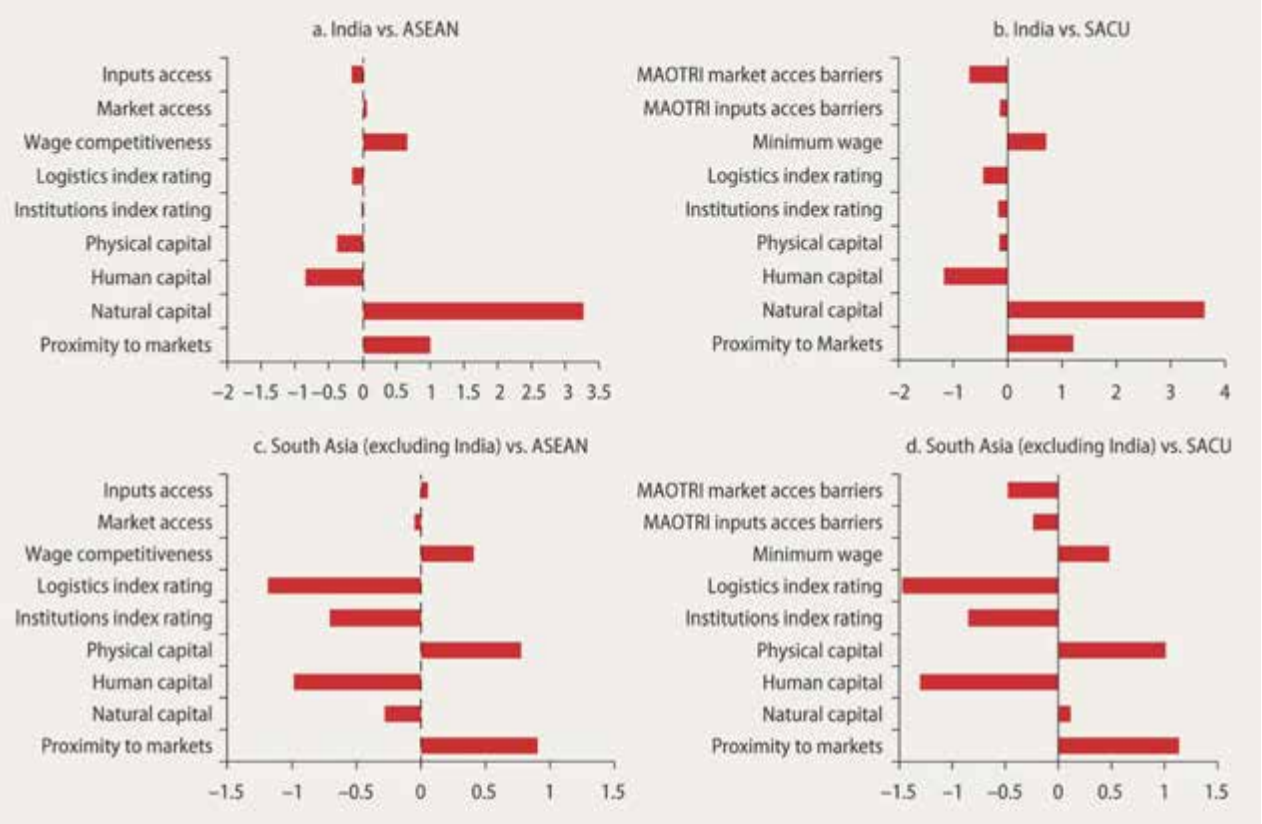
Category	Capability	Indicator	Afghanistan	Bangladesh	Bhutan	India	Sri Lanka	Maldives	Nepal	Pakistan
Fixed	Proximity to markets	Proximity to Markets (GDP-weighted distance index; 0 to 1)	0.59	0.43	0.47	0.51	0.33	0.32	0.48	0.57
	Natural capital	Total value of natural capital		197.74	8.92	2,959.7	40.71	0.33	66.83	522.55
Long-term	Human capital	Average years of schooling (>15 years old population)	3.85	5.91		6.24	10.06	6.02	4.23	5.02
	Physical capital	Capital stock (US$ per capita)				2,764.3				
	Institutional capital	Rule of Law (Rating from −2.5 to 2.5)	−1.90	−0.79	0.12	−0.04	−0.08	−0.33	−1.01	−0.74
Short-term	Logistics/ connectivity	Logistics Performance Index (Rating; 1 to 5)	2.24	2.74	2.38	3.12	2.29	2.40	2.20	2.53
	Wage competitiveness	Minimum wage for a 19-year old worker or an apprentice (US$)		38.57		28.37	38.55		75.90	41.59
	Market access	Overall Trade Restrictiveness Index (of Trading Partners)	23.49	16.87	1.68	8.37	18.47	34.23	1.68	14.73
	Access to inputs	Overall Trade Restrictiveness Index				14.90	7.42	20.20	12.63	7.37

Note: The values for natural capital, wage competitiveness and the two access indices correspond to, respectively, 2005, 2014 and 2009. In the indices measuring market/input access, a higher number indicates lesser access.

In terms of access to foreign markets, India faces fewer trade barriers than Bangladesh, Sri Lanka and Pakistan. On the flipside, in terms of trade barriers on imported inputs, India appears to be more restrictive. To put these figures in context, Figure 5.10 shows the standardized capability levels compared to two regional blocs: ASEAN which is already of major importance in GVCs and SACU (Southern African Customs Union) which is a potential competitor to South Asia looking ahead. Data on India is shown separately from the rest of South Asia, given its size and level of industrialization.

India has several advantages relative to ASEAN and SACU: natural capital, wage competitiveness, and proximity to markets. Yet, it lags behind the two other blocs in terms of physical capital, human capital, institutions and logistics. In terms of access to imported inputs, India erects higher barriers compared to both ASEAN and SACU. At the same time, on the export side, India faces lower barriers relative to ASEAN but higher barriers relative to SACU. Similarly, Pakistan, Bangladesh, Sri Lanka, Nepal, Bhutan and Maldives are on average more wage competitive than ASEAN and SACU and are closer to markets. Their level of natural capital is higher than SACU, but lower than ASEAN. This group of South Asian countries (excluding India), on average, fares worse than SACU and ASEAN countries on other capabilities, including logistics, institutions, human capital and access to markets overseas. Last, but not least, they have better access to imports of intermediate inputs than ASEAN on average, but lower than SACU on average.[58]

Figure 5.10. GVC capability gaps vs. ASEAN and SACU are concentrated in areas amenable to policy intervention



Note: A positive number indicates an advantage for South Asia vis-à-vis the other regions.

INDUSTRY CASE STUDY C: Trade barriers hold back the apparel sector

(Based on the Stitches to Riches report)

With rising labor cost in East Asia, South Asia has an historic opportunity to capture its fair share of the global apparel market (it has only 12 percent compared to 41 percent for China alone), pulling in the process millions out of poverty, especially women.

However, taking advantage of lower labor cost will not be sufficient as global buyers have ever more stringent conditions in terms of quality, lead time, reliability and social/environmental compliance. Lead firms from across South Asia show that it can be done. A key reason for their success was their ability to connect to global value chains—both in terms of being able to source world class fabrics and serve demanding customers which pushed them to ever greater heights.

Trade barriers are the main constraints standing in the way of South Asia realizing its great potential in apparel. In particular, problematic duty drawback schemes in India and Pakistan make it difficult for exporters to import textiles, imposing delays that are unacceptable to global buyers and cutting them off from the increasingly important man-made fiber segment. These issues have been resolved in Sri Lanka (which has no import duties on textiles) and Bangladesh (which has a very effective system of bonded warehouses to facilitate duty free import of textiles). This is one of the main reasons for why Sri Lanka and Bangladesh export ten times more apparel than India and Pakistan (once adjusted for population size).

South Asia's historic apparel opportunity

The apparel sector is one of the most important employers in developing countries. Export-oriented apparel production has the potential to generate 'good' jobs that contribute to rising living standards and poverty reduction. In particular, increased apparel exports tend to boost female employment in the formal sector, and provide workers with higher wages than they can earn in agriculture or other informal sectors (Lopez Acevedo and Robertson, 2012). Women employed in the formal sector tend to have fewer children, which reduces population growth and improves children's health status, while women are more likely than men to dedicate their income to the health and education of children (The World Bank, 2015).

Rising wages in China may improve South Asia's competitive position in the global apparel market. China accounted for 41 percent of global apparel exports in 2012 (up from 25 percent in 2000), compared to only 12 percent for South Asia. A 2013 survey of leading global buyers in the sector found that 72 percent of respondents planned to decrease their share of sourcing from China over the next five years.

The challenge: meeting ever more stringent demands from global buyers on factors other than cost

To seize this opportunity, South Asia will need to compete not only on cost but also on quality and lead time as well as on social and environmental compliance, which are increasingly important for buyers.

Surveys of global buyers show that East Asian apparel manufacturers rank well above South Asian firms along these increasingly important dimensions (Table 5.3).

Table 5.3. South Asia is less competitive than Southeast Asia in non-cost areas

Country	Buyers' Perceptions of:		
	Quality	Lead Time & Reliability	Social Compliance & Sustainability
China	1	1	3
Bangladesh	5	5	6
India	6	6	5
Vietnam	2	2	2
Cambodia	4	4	4
Indonesia	3	3	1

Source: Based on data from (Birnbaum, 2013) and stakeholders' surveys conducted for this study. Countries were ranked from 1-6 on each factor, with 1 being the best and 6 being the worst. Green indicates the factor is not a constraint; yellow indicates some problems; red an important constraint.

Quality: Besides being cost-competitive, suppliers must also be able to consistently offer quality products. Quality is influenced by the raw materials used, the skill level of the sewing machine operator, and the thoroughness of the quality control team. Based on combined results from the buyer surveys and interviews, countries can be placed in three groups according to the quality of apparel production, in order of strongest to weakest: (1) China, Vietnam, and Sri Lanka; (2) Indonesia, Cambodia, and Bangladesh; and (3) India and Pakistan.

Lead time and reliability: Lead time and reliability are greatly affected by the efficiency and availability of transportation networks and customs procedures. Based on survey and interview results (Birnbaum, 2013; Global Apparel Buyers, 2014), the countries can be placed in three groups, in order of strongest to weakest: (1) China, Vietnam, and Indonesia; (2) Sri Lanka and Cambodia; and (3) Bangladesh, India, and Pakistan. China has consistently had the shortest lead times throughout the last decade (Muzzini & Aparicio, 2013; World Bank, 2005, 2013b).

Social compliance and sustainability: These criteria have become central to buyers' sourcing decisions in response to pressure from corporate social responsibility (CSR) campaigns by NGOs and compliance-conscious consumers. Non-compliant countries risk damaging their country brand. In Bangladesh, concerns over factory safety and the associated adverse publicity have deterred some buyers (Birnbaum, 2014a).

The key to the success of lead firms: connectivity to global value chains

Lead apparel firms in South Asia (e.g. Pacific Jeans from Bangladesh, MAS from Sri Lanka, Orient Craft from India and US Apparel from Pakistan) show that world class performance can be achieved in the region. Their success was not only based on high labor productivity, but also on their capacity to source high quality fabrics as well as learn from suppliers and demanding global customers.

High labor productivity was achieved through training and performance incentives, for example incentives to reduce absenteeism. Computerized cutting machines are essential in reducing material waste, and also are used for grading and marking (for example, Pacific Jeans of Bangladesh). Technology is also used to increase compliance with environmental standards (a must to sell to leading brands). For example, Pacific Jeans recycles its waste water through a very efficient effluent treatment plant. Orient Craft of India, like most Chinese apparel manufacturers, helped reduce costs and motivate workers by setting up housing close to the factory, which reduced the time and money involved in commuting and facilitated the employment of migrant workers including female workers.

Companies relied on foreign experts (for example, Bangladesh benefited from Sri Lankan expertise) to develop technical and managerial skills, or benefited from training abroad (for example, a generation of Bangladeshi entrepreneurs were trained in South Korea by Daewoo in the 1980s). Skills were also acquired through the machine suppliers (for example, Orient Craft).

Innovation was often generated through interactions with leading global buyers and suppliers. For example, Pacific Jeans and MAS developed their new products in partnership with leading brands from the United States, the EU and Japan. MAS of Sri Lanka has been developing innovative, high performance sport gears by investing heavily in research and development, as well as by importing world class textiles from around the world. On the other hand, leading firms from India and Pakistan (like US Apparel and Orient Craft), which had difficulties in importing high performing textiles, were either limited to source fabric locally (mostly cotton based fabric) or had to develop their own textile production. When asked what was his main constrain, the senior executive from Orient Craft said: "the difficulty to import man-made fiber in India".

Trade barriers hold back the growth of the sector—especially in India and Pakistan[59]

Raw materials and other inputs to production, over which each apparel supplier has limited influence, make up two-thirds of total costs. Fabrics are the most

expensive input in apparel production, and the quality of textiles is directly related to the quality of the final product. Furthermore, the global apparel industry is quickly diversifying across a broad range of textiles (man-made fibers in particular) in which the most efficient producers are located overseas. Thus, efficient import regimes, characterized by rapid clearance through customs and low duties (or effective duty drawback systems) are critical for export competitiveness. Sri Lanka and Bangladesh have achieved considerable progress in improving their import regimes, while India and Pakistan have yet to do so.

High import tariffs on cotton and man-made fibers (Table 5.4) combined with ineffective duty drawback mechanisms, have been the main constrain to the growth of the apparel sector in India and Pakistan.

In India, manmade fiber imports are subject to a customs duty of 10 percent,[60] in the mid-teens for imports from Korea, China and other principal producers due to anti-dumping measures. Furthermore, excise duties on the production of manmade fibers are 12 percent, while natural fibers are exempt.[61] Total duty and tax rates for some fabrics reach about 30 percent.[62] Exporters can be competitive in global markets only if they are exempt from these taxes on inputs. However, the provision of exemptions is prone with difficulties. The categorization of different inputs is subject to interpretation and negotiation, creating risks for firms importing critical inputs for the production of garments with tight production schedules. When duties are paid up-front and exporters apply for a drawback, problems arise because the drawback is calculated on the cost of materials less the amount of duty paid—and no drawback on trim items is permitted. Administrative procedures are quite rigid. For example, one firm described how it might obtain pre-clearance to import synthetic fabric listed at a certain weight, but since fabric production is inherently unpredictable, the actual consignment could contain a few items at a slightly different weight. Rather than accepting minor differences from the original application, customs officers would hold up the consignment on the grounds of applying a different tariff rate, or on suspicion of tariff violation (which carries very heavy fines). In the meantime, the firm would be unable to complete production, even if these fabrics were only a small share of inputs (Jordan, Kamphuis, 2014). Similarly, in the advance license scheme no duty is paid on imports used in export products, but compliance with procedures is extremely difficult and any error results in heavy fines (Birnbaum, 2013; National Stakeholders, 2014).

Import barriers also affect the textiles industry which can only source purified terephthalic acid (PTA), which is essential to the production of polyester or synthetic fibers, from two Indian firms (one of them owns 79 percent of production capacity) (Jordan et al., 2014).

Table 5.4. South Asia has higher import tariffs than Southeast Asia (in percent)

Product Category	Bangladesh	India	Pakistan	Sri Lanka	Cambodia	China	Indonesia	Vietnam
Yarn								
Cotton (5203–5207)	5–10	10	5–25	0	0	5–6 (2)	5	5
MMF (5401–5406/ 5501–5511)	5–25	10 (1)	0–10	0	0	5	0–5	0–5
Woven fabric								
Cotton (5208–5212)	25	10 (1)	15–25	0	7	10–14	10–15	12
MMF (5407–5408/5512–5516)	25	10–12.5 (1)	15	0–15	7	10–18	10–15	12
Knit Fabric (60)	25	10 (1)	20–25	0	7	10–12	10	12
MFN Avg. Applied Duties (2014) Textiles	19.4	12.2	16.6	3.5	5.5	9.6	9.2	9.6
			12.9				8.5	

Source: OTEXA (2014); WTO (2014).

The duty and tax remission for export program (DTRE) in Pakistan is also problematic (Box 5.2). It can take two to four months for textile imports, which is not acceptable to global buyers (Nabi & Hamid, 2013). As a result, the Pakistani apparel industry is dominated by the production of low value, cotton-based garments, using poor quality textiles sourced domestically.

Box 5.2. Expert evaluation of the duty drawback system in Pakistan

"The present system of suspension of duties and taxes is governed by several Statutory Rule Orders (SROs) issued under Customs Rules 2001 for 'DTRE and Manufacturing Bond Licensing' and 'DTRE Approval'. The approval process involves multiple, parallel and overlapping regimes; plethora of steps at each stage of which concerned officials have wide discretions; the system itself is not clear and with no standard operating procedures; intermediaries falsify the supporting documentation which maximizes the economic rent. The system involves physical verifications of business premises; calculation of 'input wastages' through physical checking by the Input Output Co-efficient Organization (IOCO); drawing of samples of imported input goods and output goods meant for exports at the time of import and export—an archaic procedure; suspension or cancellation of DTRE by the Regulatory Collector as he may deem fit; extensive documentation requirements, and centralization of authority and approvals.

The system complexities have led to extensive delays in processing of applications for DTRE, Manufacturing Bonds Licensing, and payment of DTRE claims resulting in the firms being unable to: timely import the quality inputs and meet their export orders; receive their blocked funds as well as pay the economic rent to the concerned officials rendering these enterprises (and the export sector as a whole) non-competitive—hence, there is need for fundamental changes in the present DTRE system."

Source: Ahmad Khan (2014).

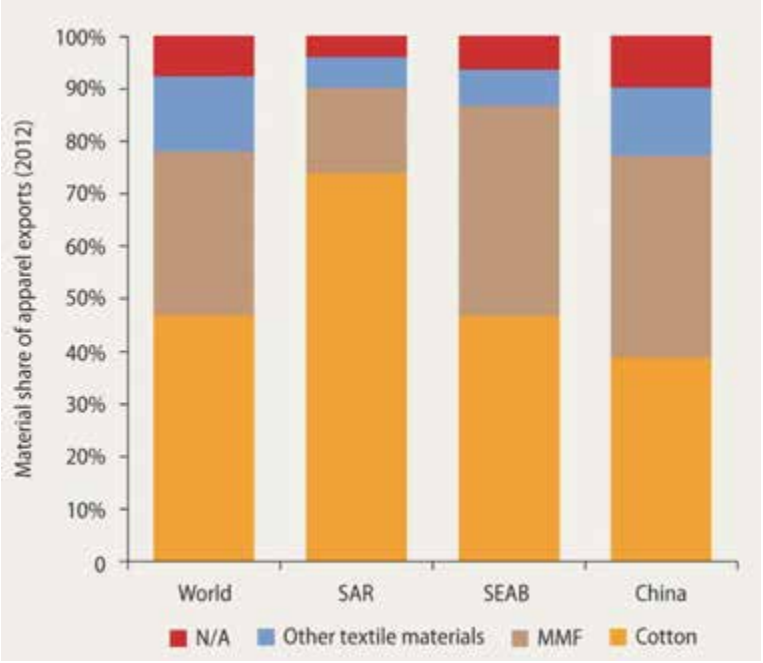
The apparel export associations of India and Pakistan have put the reform of the import regime for textiles on top of their "wish lists" to the government. The first proposal submitted by India's Apparel Export Promotion Council (AEPC) during an inter-ministerial workshop held in April 2013 reads as follow:

> "Enlargement of the garment export basket by manufacturing garments (knitted and woven) from fabrics which are not widely available in India—Issuance of duty credit scrip (offsetting custom duties) on import of specialty fabrics at the rate of 5 percent for the export performance in the year 2012-13 and in the entire 12th five year plan."

In contrast, Sri Lanka eliminated all import tariffs on textiles while Bangladesh put in place 2000 bonded warehouses enabling rapid, duty-free import of textiles for exporters (including SMEs). When asked what had been the keys to its success, the founder of Pacific Jeans (Bangladesh) answered: "the system of bonded warehouses put in place by the government together with back to back letters of credit"[63].

As a result of these constraints on the import of man-made fiber in India and Pakistan, the industry in the region is excessively concentrated on cotton fibers (Figure 5.11). This is an issue because cotton-based apparel has been losing global market share to man-made fiber based apparel. It also limits the capacity of firms to diversify their offering and innovate. Finally, cotton based apparel are mostly sold in the global spring/summer season while man-made fiber based apparel are sold mostly during the fall/winter season. Thus, not being present in the man-made fiber market reduces capacity utilization—apparel factories in India operate only 6.5 months annually, while the global average is 9 months (Jordan et al., 2014).

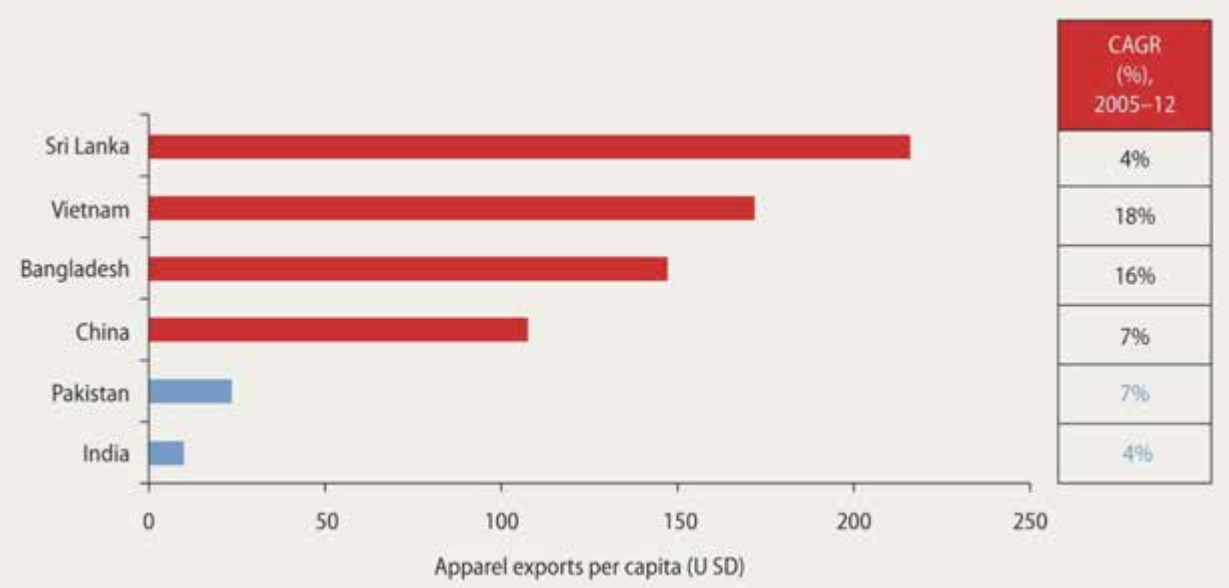
Figure 5.11. South Asia is excessively concentrated on cotton based apparel



Source: UNSD (2014c).
Note: SAR = South Asia. SEAB = Cambodia, Indonesia and Vietnam). MMF = Man-made fiber.

Thus, the much greater ease at which firms in Bangladesh and Sri Lanka can import fabrics goes a long way in explaining why they export so much more than firms in India and Pakistan and at levels comparable to East Asian countries (on a per capita basis) (Figure 5.12).

Figure 5.12. India and Pakistan are far behind in apparel exports



The extended version of this case study is available on-line at:
www.worldbank.org/SouthAsiaCompetes

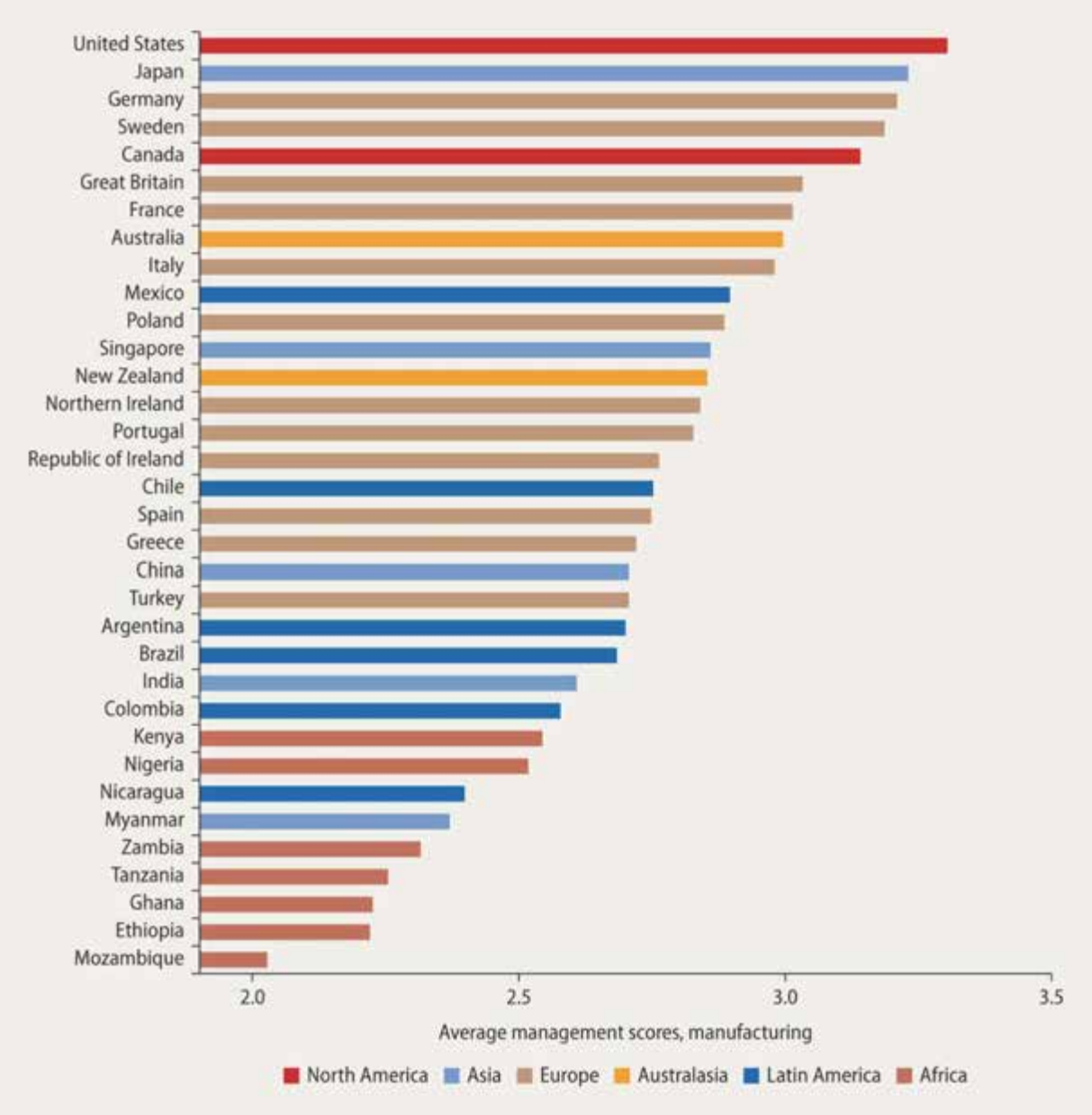
Chapter 6. Firm capabilities are constrained

An average firm in South Asia does not operate at optimum efficiency. Counter-intuitively, the region's firms over-employ relatively scarce capital and under-employ labor, South Asia's abundant resource. Performance varies more widely with regard to knowledge inputs—ranging from extensive technology use in India to limited ICT adoption in Bangladesh and Nepal—but even among leaders, the use of e-commerce and other productivity-enhancing online business tools is relatively low. When it comes to innovation, the region again has both leaders and laggards, but generally innovation tends to be concentrated in few, mature firms and even then, it is more likely to be of the imitation, catching-up to the frontier variety. Having said this, innovation—to a large extent enabled through ICT adoption—is an important driver of productivity at the firm level. This suggests that further investments in firm capabilities, including better resource management, improving skills, deepening technology adoption, and nurturing innovation, could raise productivity in South Asia. The following discussion develops these observations in more detail.

Firms lack in managerial quality and do not use resources efficiently

Differences in management practices can account for as much as 30 percent of cross-country differences in total factor productivity (Bloom et al., 2016). In South Asia, organizational factors such as skills and management practices hold back firm productivity (Bloom et al. 2010). For example, management practices in India are weaker than those in the United States, Brazil, and China (Bloom and Van Reenen, 2010), as well as many other developing countries (Figure 6.1) due to Indian firms' tendency not to collect and analyze data, set and monitor clear performance targets or explicitly link pay with. Conversely, improved management practices in South Asia have led to increased profitability and productivity. Bloom et al. (2013) perform an experiment providing management consulting to large textile firms in Maharashtra, India, and find that the intervention led to an 11 percent improvement in firm productivity. McKenzie and Woodruff (2015) show that business practices matter as much for microenterprises as for larger firms—boosting productivity, profits, survival rates, and sales growth—and the positive effects of improved practices are robust to numerous measures of owners' human capital. Formal managerial training is limited in South Asian firms. For example, only 43 percent of nonproduction workers in the automotive sector in India are formally trained, compared to nearly 70 percent in China.

Figure 6.1. Management capabilities in South Asia are relatively weak



Source: World Management Surveys.

An indirect way to assess managerial capabilities is to look at how firms utilize resources available to them. For example, profit maximization requires that firms employ resources such as labor and capital until the additional contribution of these factors to firm revenue (marginal revenue product) equals the going wage/rental rate. Of course, firms often do not observe the marginal products directly; however, in the absence of major distortions (physical, regulatory, or information asymmetries), an average firm should employ something close to an optimal factor mix—if this were not so, firms could gain by hiring (relatively)

cheaper resources and factor owners could gain by commanding returns above their productivity levels until marginal products and costs were equalized.

In South Asia, many firms do not appear to employ efficient combinations of factors. Case studies reveal low capacity utilization in India and Pakistan among apparel makers (operating at 6.5 months annually vs. the global average of 9 months) and auto makers (66 and 44 percent, vs. more than 75 percent in China). Only four of the 18 OEMs in the auto sector in India and Pakistan operate at the industry standard for efficiency of 100,000 units per model. Previous research on India and Sri Lanka has attributed weak performance of the manufacturing sector to firms consistently under-employing relatively abundant labor and over-employing relatively scarce capital (Fernandes and Pakes, 2008; Dougherty et al., 2009; Hasan et al., 2013).[64] In India, these results suggest that the optimal level of employment was 3-6 times the actual level, whereas in Sri Lanka, the optimal level of labor was 1.1 times the manufacturing employment in 2003.[65] Repeating this analysis with the most recent data available for Bangladesh, India, Nepal, Pakistan, and Sri Lanka reveals that under-utilization of labor remains a persistent feature of the operating environment for firms in most of South Asia.[66] The optimal level of employment of firms in India and Sri Lanka is 3.3 times current employment levels, while estimates for Nepal and Pakistan suggest under-utilization on the order of 7-16 times the existing workforce respectively. Bangladeshi firms, on the other hand, appear to over-utilize labor: firms hire approximately 18 percent more workers than would be optimal at the prevailing wage rate.[67]

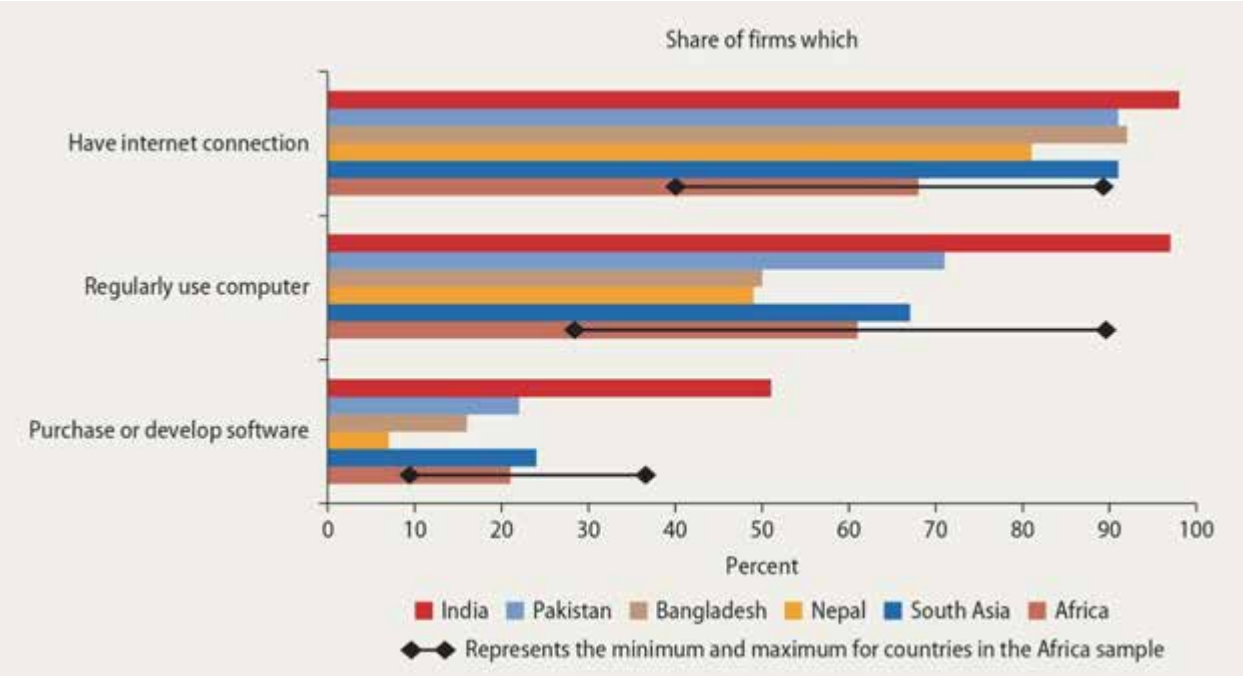
Although the data include businesses as small as 5 employees, larger firms make up the majority of the sample. However, this makes the findings of even greater concern, since larger firms could be expected to have greater capacity to manage resource use, leverage economies of scale, and be closer to the knowledge frontier. Instead, most large firms in South Asia do not operate close to what would be considered optimum efficiency levels given the prevailing factor prices, costing themselves lost profits and bringing down aggregate productivity.

Knowledge and technology adoption are low

Firms rely on technology to enhance efficiency of production processes and to connect more effectively with customers and suppliers. In particular, information and communication technology (ICT) is a major potential enabler of productivity growth, especially in countries/locations further away from the technological frontier. In this report, ICT is defined as the use of computers and other electronic equipment and systems to collect, store, use, and send data electronically. Therefore, ICT is an umbrella term that includes any communication device or application, such as cellular phones, computer and network hardware and

software, as well as various services and applications associated with them, such as internet and videoconferencing.

Figure 6.2. ICT adoption varies substantially across countries in South Asia



In high-income countries, penetration of ICT is by now nearly universal: 97.9 percent of businesses with ten or more employees in OECD countries have an internet connection (OECD 2012). Many developing countries also have a high percentage of firms using ICT: for instance, the percentage of Turkish and Mexican firms using the internet is over 90 percent (OECD 2012). However, adoption of ICT in South Asia is uneven. Only half of Nepalese and Bangladeshi firms use computers in their business, which is lower than the average in Africa (Figure 6.2).[68] On the other hand, nearly all Indian firms use computers, similar to what is observed in the European Union. Twice as many Indian firms use computers and software than firms in Nepal and Bangladesh, and 30 percent more firms use computers and software in India than in Pakistan. Pakistani firms lie in between the two sets of countries, with around 71 percent of firms having at least one worker using a computer. ICT adoption rates also vary considerably by sector within and across countries. For example, the use of ICT in electronics is much higher than in apparel in most South Asian countries, ICT use is higher in sectors more exposed to international competition, for example apparel and some automotive sectors, than sectors that are less exposed to competition, for example agribusiness.

Box 6.1. Data on ICT adoption in South Asia

The analysis of ICT and innovation practices is based on the data collected by the Enterprise Surveys, which were implemented mainly in 2013 and 2014.[69] Overall, the dataset has around 5,500 observations unevenly distributed between four countries in South Asia (for example, the number of firms surveyed in India exceeds the number surveyed in the other three countries). More than 4,000 manufacturing firms were surveyed, compared to 1,266 service firms. The survey is mainly representative of medium, and to a lesser extent larger, firms although a few firms in the survey were *de facto* micro when surveyed as they had less than 5 employees.

The innovation module from the World Bank Enterprise Survey (ES) includes questions on ICT use, although the survey does not report how much firms invest in ICT. Specifically, the ICT section of the innovation module provides information on two aggregate dimensions of ICT use: (i) computer and software use and (ii) different types of internet use. Computer and software use is a critical channel to improve the production process, and internet use can be a critical tool to improve performance via reducing information costs, enabling e-commerce and facilitating communication. The table below provides an overview of the main questions of interest formulated in the survey:

Table B6.1.1. ICT questions from the Innovation Module

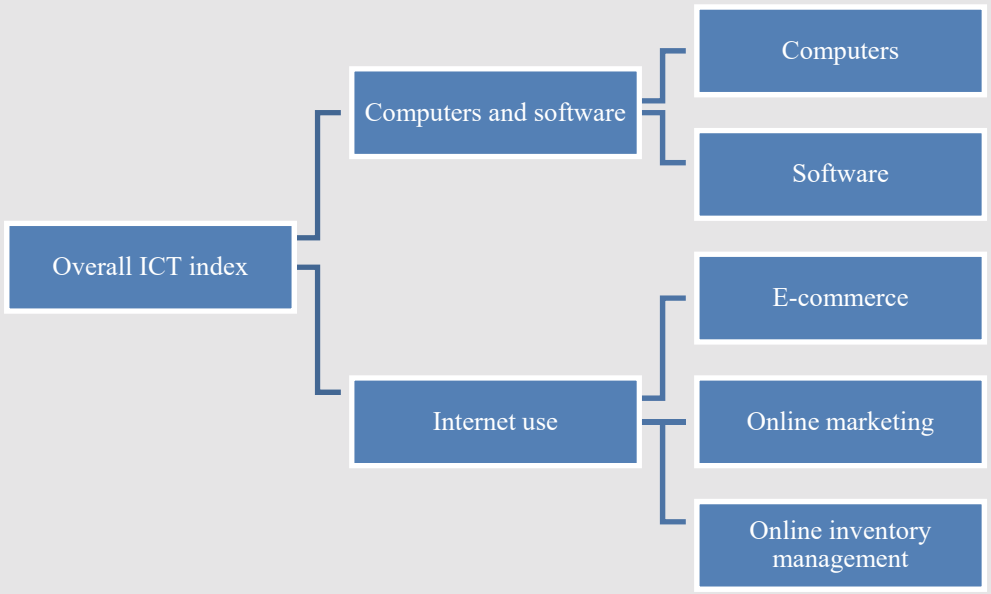
Computer and Software Use	Percentage of workers' using a computer regularly
	Whether a firm has purchased or developed any software in house
	Whether a firm has IT staff
	Total cost spent on hiring an external computer or software consultant
Internet Use	Communication: whether a firms uses internet for internal communication among its employees or with clients and suppliers
	E-commerce: whether a firm uses internet for online purchases or sales
	Information: whether a firm uses the internet for managing inventory, marketing products or researching of developing ideas on new products and services

In order to obtain a meaningful measure of ICT use, and given the lack of information on what specific sub-dimensions of ICT use are more important for performance, this report calculates a synthetic index for each ICT use using the average of the normalized sub-components in each country. For computer use, we use four variables: two indicator variables and two continuous variables (percentage of workers' using a computer regularly and total cost spent on ICT consultants). Given the potential for large sector differences in these continuous variables, we re-scale the values as the ratio to the sector mean and then we normalize them by subtracting the sample mean and divide them by the standard deviation.

(Continues next page)

Box 6.1 (continued)

Seven indicators are available for internet use: two for communication (whether a firm uses internet for internal or external communication), two for e-commerce (buying or selling online) and three for information (management of inventory online, marketing online and research online)—which are then normalized and averaged an internet use index. Finally, an aggregate ICT total index is calculated as the average of the computer and internet indexes.

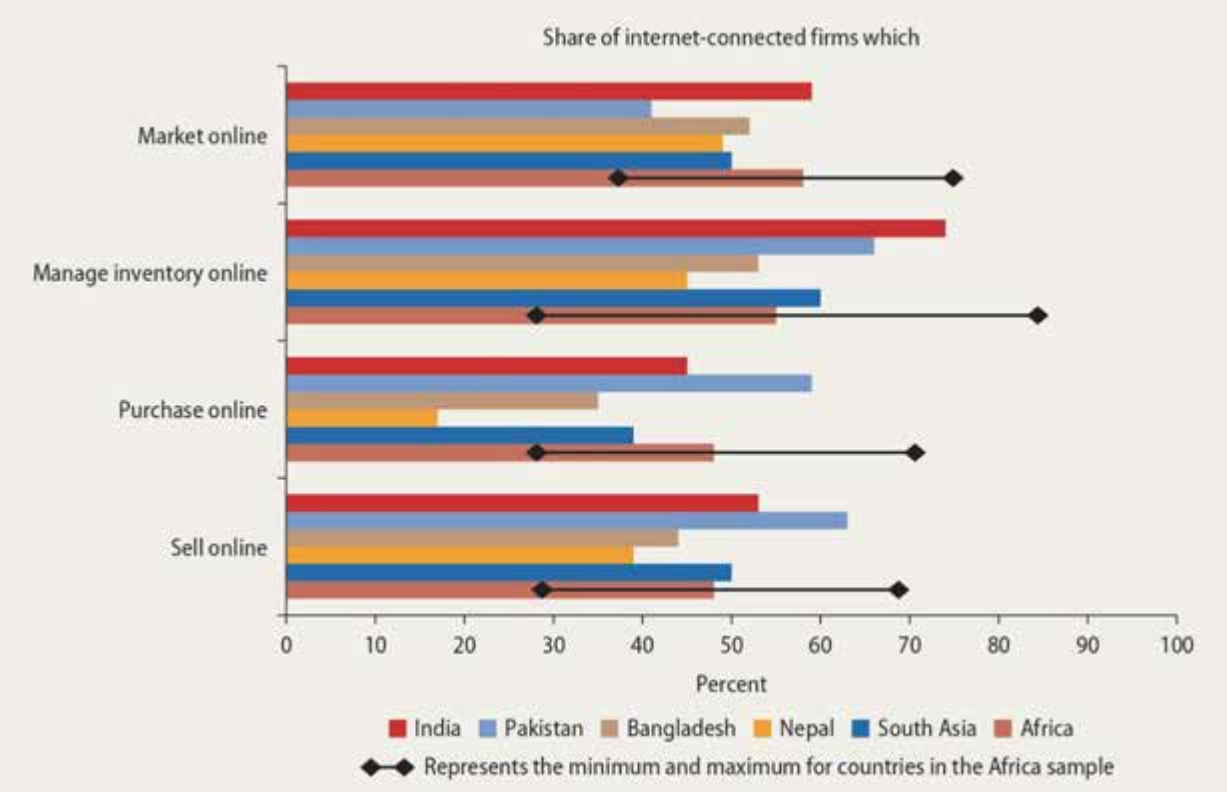


As expected, almost every firm using a computer also uses the internet (Figure 6.2). Only one out of five firms with computers in Nepal does not use the internet, the lowest ratio in the four countries. Similar to computer use, internet use is higher in larger and more foreign-exposed firms. However, while the difference in the share of internet use in large and small firms in India is around 6.5 percentage points (99.6 percent to 93.1 percent), it increases to 23.4 percentage points in Nepal and 18.1 percentage points in Bangladesh. In Nepal, internet use appears to increase with age: only half of firms less than 5 years old use the internet, while 88 percent of those older than 20 years do. The picture in Pakistan is, however, the opposite; younger firms are more likely to use the internet. In all countries, service sector firms are more connected to the internet than are firms in manufacturing, although the difference is not large.

Firms appear to use the internet more to reach customers rather than connect with suppliers (Figure 6.3). Given the high rates of connectivity in South Asia (and particularly in India), it is striking that South Asian firms are doing less e-commerce than African countries in most cases. In all four countries, the share of firms selling goods on the internet is higher than the share of firms purchasing online, which is a different pattern to what is observed in Africa. South Asian firms tend to do less marketing on the internet than African countries; 58 percent of

firms in African countries do marketing online, but only Indian firms (the highest share in the region) advertise on the web at the same rate. Although internet use for marketing increases with size, large firms do less marketing online than large firms in African countries, with the exception of Nepal. Overall, and given the relatively high internet access in South Asia, there is a great opportunity to promote the use of important internet management strategies such as e-commerce and marketing.

Figure 6.3. Firms use the internet more to reach customers rather than connect with suppliers



Overall, data reveal three important patterns with regard to ICT use in South Asia. First, ICT adoption varies significantly across countries: India scores very high on multiple dimensions of technology use and Pakistan is in line with global peers, but ICT adoption in Bangladesh and Nepal is very low and lower than in African countries. Second, India is a regional leader in computer and software use among firms, suggesting that there are potential spillovers from the country's strong software industry. Third, given the prevalent internet use, the adoption of internet commercialization practices for marketing products (e-commerce) has great growth potential, particularly in the case of India.

What determines such different rates of ICT adoption? The literature identifies four sets of factors: firm characteristics, market structure, demand-side variables, and complementary factors such as skills, other technologies, and agglomeration economies that may facilitate diffusion (Box 6.2). All seem to be

important in South Asia. Larger firms and exporters are more likely to adopt ICT practices, with the size of each coefficient inversely related to the country's economic development, suggesting larger effects in poorer countries in the region (see Table 6.6 in the Annex for detailed regression results). [70] Younger firms are more likely to adopt ICT practices only in the case of India, which contrasts with the results of Commander et al. (2006), and foreign owned firms are not more ICT intensive. The link between importing and ICT adoption, suggested in Hollenstein (2004) or Haller and Siedschlag (2011), is only statistically significant for India and Bangladesh.

Box 6.2. Determinants of ICT adoption

The literature has identified a number of firm characteristics that are important for adoption of ICT at the firm level (some of these parallel the observations from the World Bank Enterprise Surveys discussed in the preceding section). For example, a number of studies find a positive correlation between firm size and the adoption of ICT (Teo and Tan, 1998; Thong 1999; Fabiani et al., 2005; Giunta and Triveri, 2007; Haller and Siedschlag 2011). Walczuck et al. (2000) have pointed out that small firms in the Netherlands are not adopting internet at the same speed as larger firms.[71] Beyond size, some studies suggest that adoption and use of ICT is higher in younger firms (Commander et al. 2006; Haller and Siedschlag 2011). Some studies have examined the role of education or skills (human capital) in the process of adopting new technologies (Bartel and Lichtenberg, 1987; Chun, 2003), while others have shown that the demand for educated workers rises with the use of the new technology (Berman et al., 1994; Doms et al., 1997 and Haskel and Heden, 1999, Bugamelli and Pagano, 2004).

The environment in which the firm operates also matters for ICT adoption. Firms facing stronger competition are more inclined to innovate and adopt new technologies, such as ICT, in order to improve their performance and chances of survival. Some studies show that competitive pressure is positively associated with ICT adoption (Dasgupta et al. 1999; Kowtha and Choon, 2001; Hollenstein, 2004; Kretschmer, Miravete, & Pernías 2012). Firms exposed to international competition in export markets may be more inclined to adopt new technologies (Hollenstein, 2004; Lucchetti and Sterlacchini, 2004; Bayo-Moriones and Lera Lopes; 2007; Giunta and Trivieri 2007; Haller and Siedschlag 2011). Similarly, foreign-owned firms are more likely to be early adopters of new technology as well as potentially important channels of new technology diffusion (Keller, 2004; Narula and Zanfei, 2005).

Consistent with the complementarity between technology and skills observed in OECD countries (Berman et al., 1994; Doms et al., 1997 and Haskel and Heden, 1999, Bugamelli and Pagano, 2004), skills matter critically for technology adoption in South Asia. The share of high school graduates in firm employees is positively and significantly associated with ICT adoption in the region pooled sample, and in all the country estimations except for Pakistan. In Bangladesh and Nepal, access to finance also matters, while in India, access to foreign technology via licensing is an important channel. Agglomeration matters for ICT diffusion only partially: in

India (but not in other countries) firms in the main business cities are more likely to adopt ICT, while in Nepal city size matters a great deal. Results for individual components of ICT adoption largely parallel those for the aggregate index.

These findings suggest different policy priorities for countries within the region. Nepal and Bangladesh could concentrate on supporting the adoption of internet and computers in the private sector. The public sector can play a role by investing in infrastructure, especially in Nepal where diffusion is higher in larger cities, by helping to train skilled workers, and by supporting the diffusion of technology. Once this more basic ICT adoption is mainstreamed across all firms in these countries, the focus should shift towards greater integration of ICT practices that improve management and performance, in our indices represented by the use of software and the use of the internet for the commercialization of products. In the case of India, where the use of ICT is pervasive in the private sector, the focus could be on the use of the internet for the commercialization of products, facilitated by improved access to finance. Given the large extent of software development and the availability of IT engineers, it is likely that improving access to finance and establishment of broad-based online financial transactions platforms could help broaden e-commerce use.

Innovation is widespread but novelty is limited

As with ICT use, adoption of innovation practices differs significantly across South Asian countries. Bangladesh and India have a larger percentage of firms conducting R&D than the average of the Eastern Europe & Central Asia (ECA) and Africa, while Nepal and Pakistan display a lower percentage (Table 6.1). When it comes to R&D expenditures per employee, however, South Asia's performance across the region is below both ECA and Africa. Thus, even though many firms invest in R&D, the average intensity of R&D is low. There are some exceptions, of course. For example, Bangalore, India, is home to one of Bosch's global R&D centers (where it employs 15,000 personnel) and a recently-opened IBM enterprise mobility platform for developing iOS applications.

Investment in innovation differed significantly across firms. Small, non-exporting, national and very young firms are more R&D intensive in India, while in Bangladesh, large, exporting, foreign and old firms are significantly more R&D intensive. In Pakistan, there is a very large concentration of R&D activity in a very small number of firms. Investment in innovation in the GVC sectors discussed in the case studies is greater in large firms. In the automotive sector, for example, field interviews show that large firms spend more on innovation and R&D than do smaller firms. And in agribusiness, 65 percent of large firms reported expenditures on innovation, compared to only 49 percent of SMEs. Some large multinationals have set up R&D centers with world class capabilities in South Asian countries to support global operations. Overall, however, investment in

innovation is low as found in the industry case studies. For example, innovation expenditures in electronics were low in a global context: only 1.1 percent of sales in large firms employing more than 100 workers, and 4.7 percent in small firms. Nevertheless, the return to innovation in South Asia is high. In agribusiness, for example, every 1 percent spent in innovation generated around 2 percent of participation of new products in firms' sales.

Table 6.1. Knowledge capital intensity in South Asia is lower than in other regions

Type	Indicator	Bangladesh	Pakistan	India	Nepal	South Asia	ECA	Africa
R&D	percent firms	19	6	56	4	21	9	19
	US$ per worker (median)	8	—	14	6.5	14	498	18
Equipment	percent firms	75	17	68	23	46	—	29
	US$ per worker (median)	92	197	227	130	179	—	180
Licensing	percent firms	5	3	4	1	3	—	8
	US$ per worker (median)	6	82	25	234	27	—	21
Training	percent firms	19	6	56	4	21	9	19
	US$ per worker (median)	12	107	21	73	21	—	47

Source: Authors' elaboration from Enterprise Survey (2014).
Note: Intensity is calculated only for firms engaged in R&D (only 23 firms reported this information in Pakistan).

Box 6.3. Innovation activities and outputs in the Enterprise Survey

Innovation can be measured by looking at innovation inputs, innovation outputs, or both. However, the subjective nature of many of the questions used in innovation surveys presents a challenge. The Oslo manual, which is the main reference for these type of surveys, defines innovation as "….the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practices, workplace organization or external relations." Most surveys use this definition to identify innovations by directly asking firm managers and owners whether they have implemented "new" or "significant" changes or improvements in the last three years. This is problematic since "significant" improvement is a highly subjective term, and is also self-reported. In general, any sound analysis of innovation activity should combine a focus on both knowledge capital inputs and innovation outputs. In the World Bank Enterprise Surveys, the following information on various sources of knowledge capital and innovation outputs is available:[72]

Innovation or knowledge inputs:

(Continued next page)

Box 6.3 (continued)

(a) *Research and development:* source of R&D (internal versus external) as well as expenditure.
(b) *Capacity building*: training provided as a result of new innovations as well as expenditure.
(c) *Purchase/licensing of inventions or other knowledge forms*. Firms reported on the expenditure on the purchase of inventions or intellectual property that helped them come up with innovations.
(d) *Acquisition of business intelligence*. Interviewed firms reported on what were the key sources of information and ideas for their innovative activities.
(e) *Intellectual property.* Firms reported on whether they applied for patents, utility models, trademarks, or copyright design, or registered an industrial design.

The Enterprise Surveys innovation module differentiates between two types of technological innovations (product and process) and two types of non-technological innovations (organization and marketing):

(a) *Product innovations*. These are essentially new, redesigned, or substantially improved goods or services. In the context of the survey, there are 3 metrics used:
- Products new to the firm;
- Significantly improved products;
- Products new to the market.

(b) *Process innovations*. These include the implementation of new or significantly improved production or delivery methods (including significant changes in techniques, equipment, and/or software). Minor changes or improvements; an increase in production or service capabilities through the addition of manufacturing or logistical systems that are very similar to those already in use; ceasing to use a process; simple capital replacement or extension; changes resulting purely from changes in factor prices, customization, regular seasonal and other cyclical changes and trading of new or significantly improved products are not considered to be innovations. The aspects considered include:
- Innovation methods for manufacturing products or offering services,
- Innovative logistics, delivery, or distribution methods for inputs, products, or services,
- Innovative supporting activity for processes, such as maintenance systems or operations for purchasing, accounting, or computing.

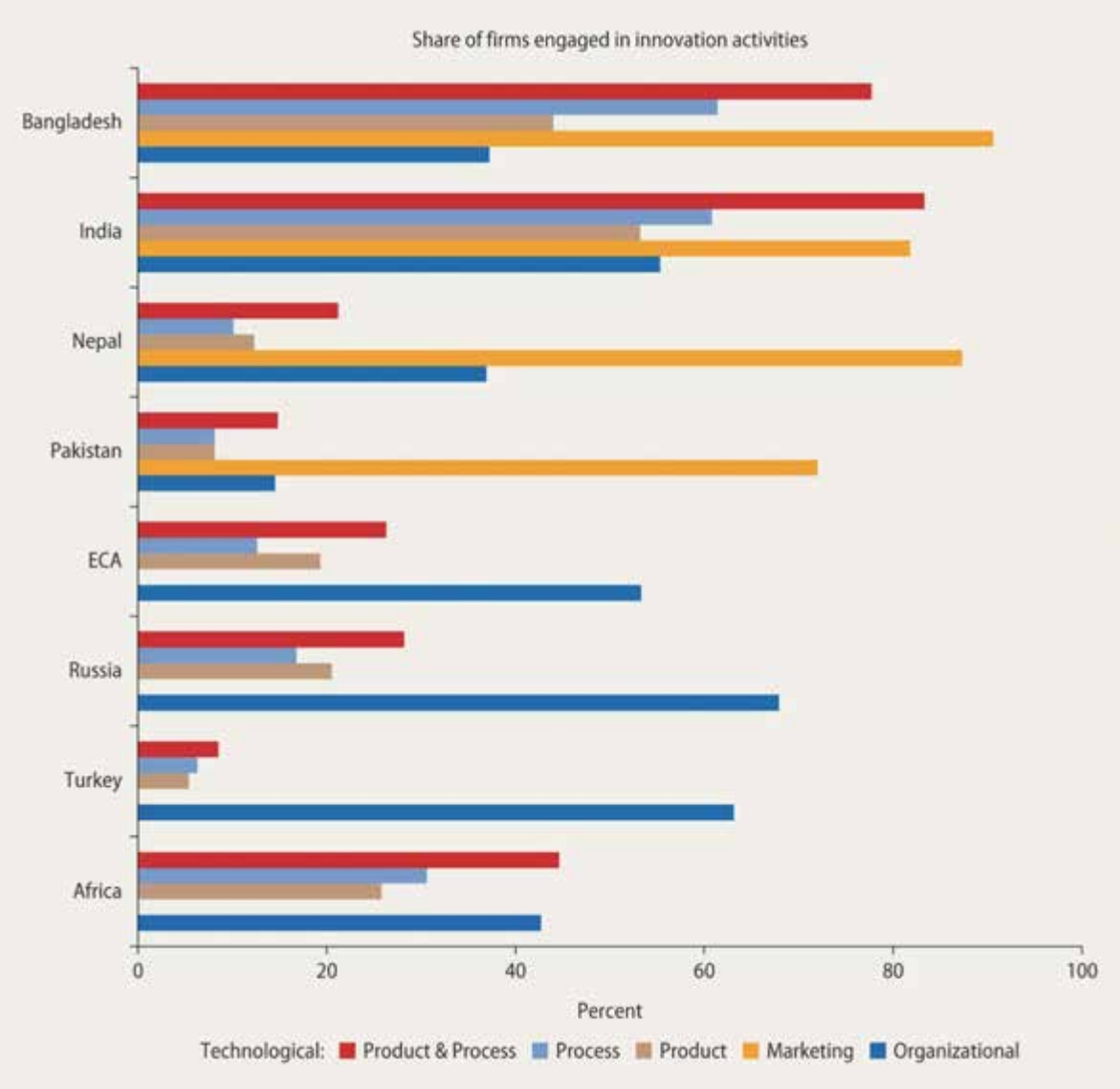
(c) *Organizational innovations*. These include the implementation of a new organizational method in business practices, workplace organization, or external relations. The form of innovation is grouped into two categories. First, structural innovations affect responsibilities, accountability, command lines, and information flows, as well as the number of hierarchical levels, the divisional structure of functions (research and development, production, human resources, financing, and so on) or the separation between line and support functions. And second, procedural innovations consist of changes to routines, processes, and operations of a company. Thus, these innovations change or implement new procedures and processes within the company, such as simultaneous engineering or zero buffer rules.

(d) *Marketing innovations*. These include changes made to incorporate advances in marketing science, technology or engineering to increase the effectiveness and efficiency of marketing, to gain competitive advantage.

Studies show that training and R&D are complementary in supporting productivity outcomes; however, firms across South Asia spend relatively little on training.[73] Still, leaders do substantially more training than laggards, although training amounts are challenging to compare because so few firms in the laggard group extend training to their employees.

Turning to innovation outputs, the region's leaders exhibit innovation rates around 80 percent, well above the average of the ECA and Africa regions, while Pakistan and Nepal have innovation rates of 15 percent and 21 percent (Figure 6.4). Process innovation is more important in Bangladesh and India, while product innovation is more important in Nepal and Pakistan. Consistent with the earlier discussion of firm capabilities, firms in all countries are more likely to innovate in marketing than in organizational issues.

Figure 6.4. Innovation rates vary significantly across South Asia



As suggested by the literature (for example, Hall and Lerner, 2009; Kerr and Nanda, 2014), technological and non-technological innovation rates are significantly higher for larger firms, consistent with evidence from ECA and Africa.[74] On the other hand, the evidence on the relationship between innovation and firm age is mixed: in India, younger firms display significantly higher rates of organizational innovation and marketing while the opposite is true in the rest of the region. Trader firms (i.e., exporter, importer or both) have higher rates of technological and non-technological innovation, again consistent with the literature (Lileeva and Trefler, 2010), although the differences are statistically significant in few cases. In all countries except Pakistan, exporters are more innovative than importers in terms of creating new products; but importers and two-way traders are more innovative than exporters regarding process and organizational innovation (with the exception of Nepal). With the exception of Pakistan, foreign-owned firms are also more innovative (Brambilla, 2009; Aghion et al., 2013), although the differences are relatively minor.[75]

Few firms engage in disruptive innovative activities such as introducing new products to the country or to the world, while the majority of firms conduct incremental innovations or pure imitation—either by upgrading the quality of existing goods or introducing new products to the firm (Cirera et al., 2015). This tendency, observed in ECA and Africa, also holds in South Asia: despite high average innovation rates in the region, there is only a low degree of novelty in innovation (Table 6.2). Most of the inventions of the region's innovation leaders (Bangladesh and India) involve the imitation of existing products and/or processes. In these countries, firms that introduce radical innovations are young, middle or larger sized, exporters, and domestically-owned. At the other end, Nepal and Pakistan show very low innovation rates in general, including imitation activities. In these countries, innovating firms tend to be older, larger, non-exporters, and more likely foreign. In general, firms that have a higher level of R&D intensity tend to introduce more radical innovations.

Table 6.2. Imitation is the most common form of innovation in South Asia

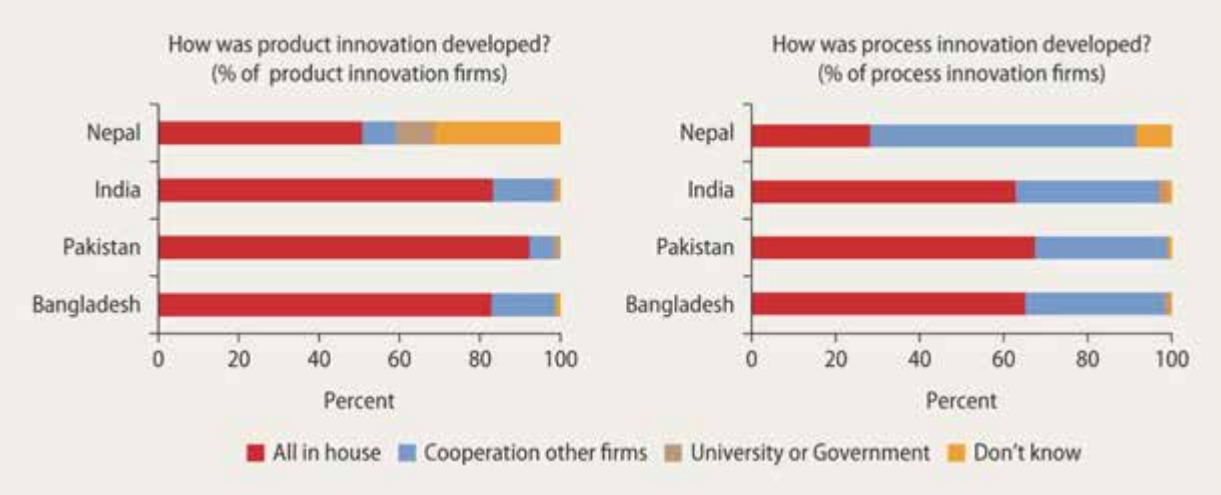
(types of innovation undertaken, percent of all firms)

	Bangladesh	Pakistan	India	Nepal	South Asia	ECA	Africa
New to firm	44	8	54	12.3	30	18	25
Of which new product	20	38	56	0	29	74	68
Of which product upgrade	80	62	44	100	72	26	32
Imitator(new to firm/local market)	37	6	47	12	26	10	20
New to national market	4	2	4	0.3	3	6	3
New to international market	3	0.5	2	0.03	1	2	2

Source: Authors' elaboration from Enterprise Survey (2014).

Most of the product and process innovations in the region are in-house (Figure 6.5). External cooperation is in most of the cases linked to other firms, although cooperation with the private sector plays a more important role for process innovation than for product innovation. Successful firms do report that in-house R&D capability has been an important driver of competitiveness, enabling them to compete on quality as well as cost. Nevertheless, this high reliance on in-house innovation development—larger than in Africa and much larger than in the ECA region—implies limited scope to introduce more novel products, and likely underpins the large imitation rates in India and Bangladesh.

Figure 6.5. The majority of innovation takes place in house rather than collaboratively



Innovation activity is also spatially concentrated, but only when considering the novelty of innovation. While in general, R&D investments and innovation are more concentrated than employment (Carlino and Kerr, 2014) with patents mostly originating in few and large cities (Forhnahl and Brenner, 2009; Bairoch, 1988), innovation activities in South Asia are less concentrated than employment, except in Pakistan (Table 6.3). However, higher degrees of novelty, such as products that are new to the national or international market, are more concentrated than employment. Thus, agglomeration in South Asia may matter mostly for more radical innovation than for imitation.

Table 6.3. Agglomeration in South Asia matters mostly for radical innovation
(concentration of economic and innovative activities, Herfindahl index)

	Employment share	Firms share	Innovators (product or process)	Innovators (product)	Radical (national /international)	R&D
Bangladesh	0.390	0.280	0.280	0.280	0.400	0.240
India	0.017	0.006	0.006	0.009	0.040	0.007
Nepal	0.510	0.310	0.270	0.220	0.630	0.700
Pakistan	0.260	0.170	0.440	0.550	0.420	0.290

Source: Author's elaboration from Enterprise Survey (2014).

Returns to innovation are high

Innovation is a key determinant of firm-level productivity. Process innovation increases firm productivity through more efficient use of intermediate inputs and factors of production, while organizational innovation encourages the reallocation of inputs and factors of production across activities within firms. Product innovation increases learning-by-doing and helps firms to offer new and upgraded products, while marketing innovation and innovative branding strategies allow firms to differentiate their products from those of their competitors and gain market share. Precise estimation of the impact is clouded by complementarities across different innovation concepts and issues of causality and endogeneity. However, once these are addressed in a convincing fashion, the estimated impact of innovation on productivity can be substantial. In a survey of evidence, Mohnen and Hall (2013) show that the most common value of the elasticity of firm-level productivity with respect to the intensity of product innovation—measured as the contribution of new products developed in the last three years to total sales—is 0.25, suggesting that an increase of 10 percent in the latter raises productivity by 2.5 percent. This relationship is stronger in manufacturing than in services (Criscuolo, 2009).

The approach pioneered by Crepon et al. (1988), which links knowledge inputs (for example, R&D and ICT adoption) to innovation outputs (for example, better machines or more efficient managerial practices), and innovation outputs to productivity, generates several insights concerning the sources and effects of innovation in South Asia (Box 6.4). Beginning with knowledge inputs, the most important determinant of R&D adoption for all countries in South Asia is firm size, with larger firms more likely to engage in R&D activities. Having a license to use foreign technology increases R&D in all countries but Bangladesh. Exporters in India and older firms in Pakistan are also more likely to engage in R&D activities than non-exporters and young firms, respectively. Further, financial constraints are associated with lower investments in R&D activities for all countries except Bangladesh. Market structure appears to affect R&D only through informal sector competition in India, while other variables related to market structure are not significant– perhaps because less than 9 percent of the sample firms compete in an oligopolistic or monopolistic market.

Box 6.4. The CDM model

The CDM model explores the relationship between the basic determinants of firms' investment in knowledge and productivity. Firms invest in knowledge inputs that can be transformed into innovation outputs. At a later stage, these outputs affect firm-level productivity, contingent on the capacity of firms to transform innovation outputs into improvements in product quality and efficiency (Crepon, Duguet, and Mairesse, 1988). The CDM model requires the estimation of three main components: (i) the knowledge function, which involves estimating the determinants of R&D and ICT adoption, (ii) the innovation equation, and (iii) the productivity equation. The model is a recursive system of four blocks of equations, where each endogenous variable is determined sequentially. Firms first decide the intensity of two input choices—R&D and ICT. These input choices along with other factors feed into different types of innovation outcomes (product and/or process, or innovation sales). Finally, innovation drives productivity (measured as output per worker) at the firm level through an augmented Cobb-Douglas production function which includes innovation outcomes as inputs.

The determinants of the adoption of knowledge inputs include firm characteristics, market conditions and structure, and technology push factors. The first set includes variables capturing firm size, age, and financial constraints (measured by the share of internal sources used to finance working capital). With regard to market structure, early empirical evidence provided by Porter (1990), Geroski (1990), Baily and Gersbach (1995), Nickell (1996), and Blundell, Griffith and Van Reenen (1995) supports the view that competitive pressures encourage innovation, while more recent evidence by Aghion, Bloom, Blundell, Griffith, and Howitt (2005) shows that the relation is inverted U-shaped. In terms of composition, Cusolito (2009) shows that competition induces firms to specialize vertically by upgrading the quality of existing goods. To account for these effects, the model includes variables measuring whether competition from informal firms is an obstacle for the firm, if the sector in which the firm operates has a duopoly structure, and the extent of integration into international markets through trade. With regard to technology, the model considers whether the firm recently upgraded some of its working capital, and whether the firm has a license to use foreign technology, as these variables can make investments in knowledge capital more attractive.

Moving on to the determinants of innovation outputs, R&D drives the intensity of innovation (i.e., the share of company's sales that can be attributed to the introduction of product or process innovation) but does not impact the probability of adopting a technological innovation. ICT is significantly related to innovation intensity only in India and in the adoption of technological innovations in Nepal, but not in the case of Pakistan or Bangladesh. Lack of complementary factors such as skilled labor reduces innovation intensity, although marginally, in all countries except Bangladesh. However, other constraints, for example access to external sources of funding, do not appear to play a significant role. Knowledge spillovers have a positive effect on innovation-induced turnover for leading firms, but they are insignificant for laggards. Further, agglomeration or urbanization effects do not appear to be an important determinant of innovation, with most of the innovation activity occurring outside business cities in Nepal. Demand pull

factors, which reflect consumers' willingness to pay a higher price for a given quantity, are important in explaining innovation-induced sales gains in India, Pakistan and Bangladesh.

Results from the final stage, which links innovation outputs to labor productivity, show that the impact of innovation on productivity in Nepal and Bangladesh is positive, statistically significant, and larger than in OECD countries (Table 6.4). In India, the large number of observations allows for separate estimation of product and process innovation, with both coefficients positive and statistically significant. The degree of novelty does not introduce any additional effect on productivity, and the returns are the same as imitation. Thus, the evidence suggests that there are positive returns to imitation in South Asia, mostly coming from very incremental innovations in Bangladesh and India, but radical innovations do not increase firm performance above and beyond the gains from imitation.[76]

Table 6.4. Innovation helps increase firm productivity

	Bangladesh		India		Nepal	
Log(L)	0.1429***	0.1416***	0.0886***	0.0901***	0.3769***	0.3586***
Log(K/L)	0.2827***	0.3006***	0.1567***	0.1567***	0.2369***	0.2421***
Product &/or process	0.5544*	0.6902**			1.3959***	1.5707***
Product innovation			1.2050***	1.2146***		
Process innovation			0.9759***	0.9739***		
Prod &/or proc*national		0.0094				0.2742
Prod &/or proc*intl		−0.0103				0.4718
Product*national				0.0233		
Product*intl				−0.0972		
Process*national				−0.0273		
Process*intl				−0.1172		
				(0.128)		
Observations	990	990	3,481	3,481	470	470

Note: Constant and sector dummies included but not shown.
***p < 0.01, **p < 0.05, *p < 0.1. Constant and sector dummies included but not shown.

Annex to Chapter 6

Table 6.5. Output and factor misallocation in South Asia

		Bangladesh: Districts			India: Districts			Sri Lanka: Districts		
		Misallocation	Within	Between	Misallocation	Within	Between	Misallocation	Within	Between
1991	Output				−0.907	−0.842	−0.065			
	Labor				−0.042	−0.059	0.017			
	Capital				−0.341	−0.318	−0.024			
1994	Output				−1.322	−1.245	−0.077			
	Labor				−0.003	−0.039	0.036			
	Capital				−0.391	−0.375	−0.015			
1995	Output	−1.791	−1.692	−0.099				−0.820	−0.689	−0.131
	Labor	−0.015	0.066	−0.081				0.038	0.123	−0.085
	Capital	−0.030	0.032	−0.061				−0.046	0.073	−0.119
1996	Output				−1.034	−0.990	−0.044	−1.010	−0.898	−0.113
	Labor				0.019	0.004	0.015	0.043	0.125	−0.082
	Capital							−0.134	−0.057	−0.077
1997	Output	−3.021	−2.902	−0.119				−0.869	−0.714	−0.154
	Labor	1.212	1.233	−0.022				0.093	0.169	−0.076
	Capital	−0.258	−0.177	−0.081				0.074	0.180	−0.106
1998	Output							−0.913	−0.777	−0.136
	Labor							0.131	0.221	−0.090
	Capital							0.876	0.980	−0.104
1999	Output	−1.275	−1.175	−0.100				−1.447	−1.307	−0.140
	Labor	0.542	0.614	−0.072				0.017	0.115	−0.098
	Capital	−0.209	−0.136	−0.073				−0.126	−0.030	−0.097
2000	Output	−0.883	−0.763	−0.119	−1.318	−1.192	−0.126	−0.725	−0.516	−0.209
	Labor	0.064	0.14	−0.076	0.020	−0.021	0.041	−0.013	0.138	−0.151
	Capital	0.016	0.072	−0.056	−0.369	−0.288	−0.081	−0.026	0.136	−0.162
2001	Output							−1.130	−0.948	−0.182
	Labor							0.057	0.160	−0.103
	Capital							−0.087	0.065	−0.152
2002	Output							−1.644	−1.477	−0.167
	Labor							0.132	0.249	−0.117
	Capital							−0.063	0.046	−0.108
2003	Output							−1.677	−1.632	−0.045
	Labor							0.047	0.067	−0.020
	Capital							−0.265	−0.257	−0.008
2005	Output	−1.594	−1.488	−0.105	−1.075	−1.030	−0.045			
	Labor	−0.083	0.01	−0.093	0.017	−0.046	0.063			
	Capital	1.473	1.681	−0.208	−0.233	−0.230	−0.003			
2006	Output							−1.964	−1.780	−0.184
	Labor							−0.186	−0.161	−0.025
	Capital							−0.417	−0.389	−0.027
2007	Output							−1.523	−1.448	−0.075
	Labor							−0.181	−0.168	−0.013
	Capital							−0.012	0.027	−0.039
2008	Output							−1.368	−1.237	−0.132
	Labor							−0.068	0.002	−0.070
	Capital							−0.390	−0.281	−0.109
2009	Output							−1.226	−1.103	−0.123
	Labor							0.066	0.135	−0.069
	Capital							1.585	1.542	0.043
2010	Output				−1.362	−1.266	−0.097			
	Labor				0.019	−0.003	0.022			
	Capital				−0.071	−0.007	−0.065			
2012	Output	−0.557	−0.505	−0.052						
	Labor	0.111	0.135	−0.025						
	Capital	0.069	0.096	−0.027						

Note: A more negative number means more efficient allocation of resources (less misallocation); zero means no correlation between productivity and output or employment; a positive number means less productive firms attract more labor or capital than more productive firms.

Table 6.6. Determinants of overall ICT adoption

	South Asia	Nepal	Bangladesh	India	Pakistan
Firms Size	0.1807***	0.3598***	0.1654***	0.1198***	0.1908***
	(0.0072)	(0.0529)	(0.0244)	(0.0170)	(0.0412)
Age	−0.0033	−0.0055	0.0021	−0.0759***	−0.0106
	(0.0108)	(0.0602)	(0.0308)	(0.0276)	(0.0812)
Exporter	0.1603***	0.2770**	0.4836***	0.1230***	0.2857**
	(0.0223)	(0.1368)	(0.1275)	(0.0426)	(0.1132)
importer	0.2058***	−0.1158	0.1757*	0.3120***	0.0431
	(0.0273)	(0.1121)	(0.0937)	(0.0655)	(0.1278)
Foreign	0.1074	−0.0688	−0.0127	−0.1115	−0.5897*
	(0.0799)	(0.3687)	(0.1162)	(0.1373)	(0.3173)
New Capital t-1	0.0174	0.2311**	0.1194**	−0.0138	−0.1777
	(0.0166)	(0.0910)	(0.0607)	(0.0342)	(0.1101)
Informal Sector Obstacle	−0.0146	0.0013	−0.1220**	0.0417	0.2723**
	(0.0240)	(0.0885)	(0.0537)	(0.0575)	(0.1088)
license tech foreign	0.0528*	−0.0136	0.0291	0.1753**	0.1072
	(0.0288)	(0.1703)	(0.0775)	(0.0880)	(0.1210)
share working cap	−0.0004*	−0.0012	−0.0004	−0.0001	−0.0041**
	(0.0002)	(0.0011)	(0.0006)	(0.0006)	(0.0021)
duopoly/monopoly	0.0499*	0.4256**	0.2233**	0.0540	−0.1430
	(0.0274)	(0.1867)	(0.1117)	(0.0508)	(0.1164)
Business City	0.0163	0.1664	0.0562	0.0990**	0.0633
	(0.0209)	(0.1018)	(0.0689)	(0.0498)	(0.1344)
City > 1 million	0.1332***	0.4064***	−0.1652*	0.1399	−0.4271
	(0.0510)	(0.1483)	(0.0943)	(0.1051)	(0.3941)
City 250.000 to 1 million	0.1050**	0.4660***	−0.0674	0.0888	−0.5418
	(0.0503)	(0.1548)	(0.0939)	(0.1083)	(0.4103)
City 50.000 to 250.000	0.0583	0.3629***	−0.1528	0.1335	−0.1968
	(0.0506)	(0.1234)	(0.1034)	(0.1092)	(0.4049)
High School workers	0.0017***	0.0045***	0.0058***	0.0009*	0.0013
	(0.0003)	(0.0013)	(0.0013)	(0.0006)	(0.0014)
Observations	5116	470	967	3318	361

Note: Robust standard errors in parentheses. Estimates use sampling weights, and country dummies are included in regional pooled estimates. Constant term not shown.
***p < 0.01, **p < 0.05, *p < 0.1.

Table 6.7. Determinants of innovation

	Nepal		Bangladesh		India		Pakistan	
	Technol. Innovation	Innovation Sales	Technol. Innovation	Innovation Sales	Technol. Innovation	Innovation Sales	Technol. Innovation	Innovation Sales
Firms Size - in log	−0.5037***	−0.0190	0.2318	0.0055	0.2800***	−0.0504***	0.3496***	0.0124
	(0.118)	(0.035)	(0.228)	(0.054)	(0.028)	(0.016)	(0.048)	(0.010)
Invests in R&D	0.2946	0.1817***	−1.1062***	0.4595***	−1.8674***	0.1978**	0.1914	0.0924***
	(0.375)	(0.025)	(0.339)	(0.033)	(0.066)	(0.096)	(0.451)	(0.035)
ICT Index	1.9345***	0.0497	−0.5478	−0.1465	0.2354	0.1908***	−1.5988***	−0.0468
	(0.197)	(0.096)	(0.911)	(0.203)	(0.239)	(0.062)	(0.122)	(0.043)
Log Firm Age	−0.1699*	−0.0126	0.0246	−0.0085	−0.0697	−0.0088	0.2090**	0.0152
	(0.089)	(0.010)	(0.063)	(0.015)	(0.043)	(0.006)	(0.085)	(0.011)
Education as Obstacle	−0.0404	−0.0280*	0.2207*	−0.0045	−0.0412	−0.0218*	−0.1052	−0.0310**
	(0.117)	(0.016)	(0.124)	(0.022)	(0.041)	(0.013)	(0.109)	(0.015)
Firm Exports	−0.4398***	−0.0475*	0.3432	−0.0309	0.1827***	0.0290*	0.4155***	−0.0076
	(0.151)	(0.027)	(0.288)	(0.076)	(0.053)	(0.016)	(0.159)	(0.021)
Demand Pull Effect	−0.0611	−0.0173	0.1592*	−0.0526***	0.0376	0.0220**	0.0413	0.0264**
	(0.098)	(0.015)	(0.095)	(0.019)	(0.037)	(0.010)	(0.061)	(0.013)
Working capital	−0.0005	−0.0001	−0.0017	0.0008**	−0.0005	−0.0001	−0.0059*	−0.0001
	(0.002)	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)	(0.003)	(0.000)
Duopoly / Monopoly	−0.1417	0.0355	−0.2531	0.0467	0.0796	0.0133	−0.0351	0.0061
	(0.226)	(0.030)	(0.350)	(0.069)	(0.065)	(0.015)	(0.140)	(0.017)
business	−0.2419**	−0.0294*	−0.0306	0.0253	0.0177	0.0020	0.1533	0.0204
	(0.118)	(0.017)	(0.097)	(0.020)	(0.023)	(0.010)	(0.154)	(0.022)
spillover	−2.8679	−0.1570	2.4450*	−0.7407***	8.4422	3.1811**	1.5389	0.3170
	(1.877)	(0.274)	(1.482)	(0.284)	(7.763)	(1.536)	(1.258)	(0.205)
Constant	2.2236***	0.1590	−0.3917	−0.0933	−0.8571***	0.2784***	−1.7833***	−0.0998
	(0.433)	(0.189)	(1.426)	(0.296)	(0.241)	(0.063)	(0.569)	(0.087)
Observations	470	470	990	990	3,481	3,480	499	502
Sector dummies	ISIC-1digit	ISIC-1digit	ISIC-2digit	ISIC-2digit	ISIC-2digit	ISIC-2digit	ISIC-1digit	ISIC-1digit

Note: "Technological innovation" is a dummy variable with value 1 if any new or significantly improved product, service or process introduced by this establishment in last three years. Innovation sales is the share of sales that can be attributed to the introduction of a new or upgraded innovation process.
Standard errors in parentheses.
***p < 0.01, **p < 0.05, *p < 0.1.

INDUSTRY CASE STUDY D: Protections from global good practices limit the spread of world class firm capabilities in the automotive industry

The automotive sector is one of the most important industries globally and in South Asia, contributing 19 million of direct and indirect jobs in India alone. The potential for South Asia to become globally competitive in this sector is shown by the experience of Indian auto-parts manufacturers who became world leaders by having first acquired technical and managerial skills from leading original equipment manufacturers (OEMs) established in India, followed by a process of serving increasingly discerning customers in competitive export markets. Although level of investment in R&D remain low, a few leading global manufacturers are moving their R&D centers to India pointing to the region's potential to be at the heart of the technological revolution taking hold in this critical industry with important ramifications to many others—e.g. electronics, machining and tooling.

The challenge for the region is two-fold. First, to spread these world class firm capabilities throughout the industry, from OEMs and tier 1s to tier 2 and tier 3 suppliers. In effect, large productivity gaps persist in the sector, with most OEMs (together with their suppliers) having subscale/fragmented operations with low capacity utilization, quality levels and investments in skills below international benchmarks. A second—and connected—challenge is moving up the global value chain through greater innovation, investment in R&D and commercialization of new products which remain below global average, with local suppliers primarily relying on build to print models.

Policies such as high import tariffs on completely built units (CBUs) of passenger cars, which helped attract market-seeking OEMs in the 1990s and 2000s, are now slowing down the spread of world class managerial good practices. The situation is worse in Pakistan than India because only a few OEMs are "competing" behind even higher import tariffs on both CBUs and auto-parts. The experience of the Indian auto parts and commercial vehicle sectors shows that a gradual reduction of import tariffs, far from leading to the debilitation of an industry, could be a powerful catalyst to its global success. Converging towards international environmental and safety standards, as the Indian government is planning to do, would further encourage automotive firms in South Asia to adopt (and contribute to) international good practices.

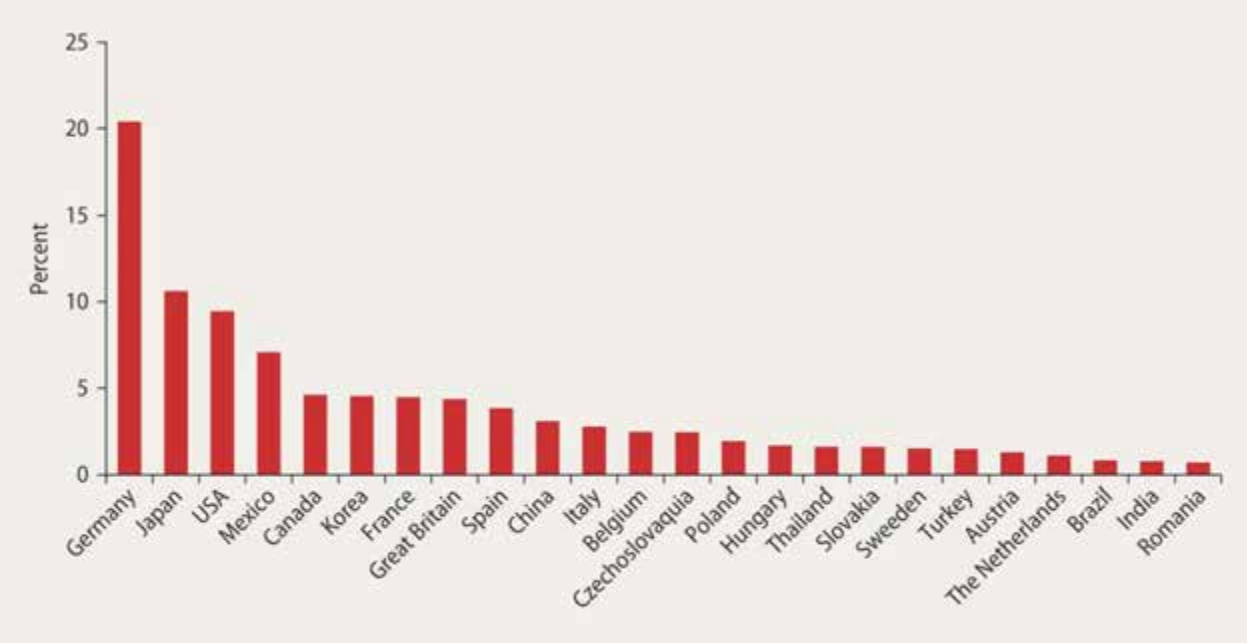
South Asia's opportunity: become globally competitive in a major industry

The automotive sector (including the auto parts industry) is a key contributor to jobs and economic growth in India and Pakistan with significant domestic growth potential. Around 19 and 2.5 million are (directly and indirectly) employed in the Indian and Pakistan auto industry respectively. There is much scope for further growth with rising income. At around 20 cars per 1,000 inhabitants, the car

penetration rate in India is at one sixth the Chinese level, itself at one sixth the US level! Car penetration is 30% lower in Pakistan vs India due to higher prices resulting from less competition and lower productivity.

The sector has also a lot of room to grow in export markets. Even though India is the world's sixth largest auto producer by volume, it owns less than 1 percent of global export markets compared with more than 3 percent for China, 4.5 percent for Korea and 7 percent for Mexico (Figure 6.6). The average auto firm in India exported only 5 percent of its total sales, compared to 16 percent in China. Intra-region trade is not significant, with the closest largest automaker Pakistan, being a relatively closed market. Pakistan did not feature in the top 40 exporters in 2014.

Figure 6.6. Share of exports in production in the automotive sector (in %, 2014)



Source: WITS, 2013-2014.

The export performance of the auto parts industry in India shows the potential of the region. 44 percent of auto parts produced in India are exported. Exports of auto components increased by 15 percent a year from 2009-2014[77]. OEMs and Tier 1 firms accounted for 80 percent of end customers with share of sophisticated end markets rising, indicating high quality exports. Less than a decade ago, only 35 percent of parts were going to the OEMs, with the rest going to the much less demanding after-sale market. An increasing number of Indian auto-parts are becoming first class global players—such as Bharat Forge and Motherson Sumi, which supply most global car companies and has developed world class capabilities.

In fact, India is showing that leading edge R&D can be done in South Asia at a fraction of the price. This is the reason why leading foreign companies such as

BMW, Mercedes, Renault-Nissan, Volvo, GM, and Honda are in the process of setting up R&D centers in India, emulating Bosch which is already conducting most of its global R&D in India with 15,000 workers based in Bangalore. A similar trend is happening in the electronics industry which is increasingly important to the automotive industry—e.g. Samsung has one of its three global R&D centers in Noida, India. The region's global preeminence in the ICT industry is no doubt a key explanation for the arrival of these global manufacturing R&D centers, as R&D in manufacturing increasingly relies on ICT skills.

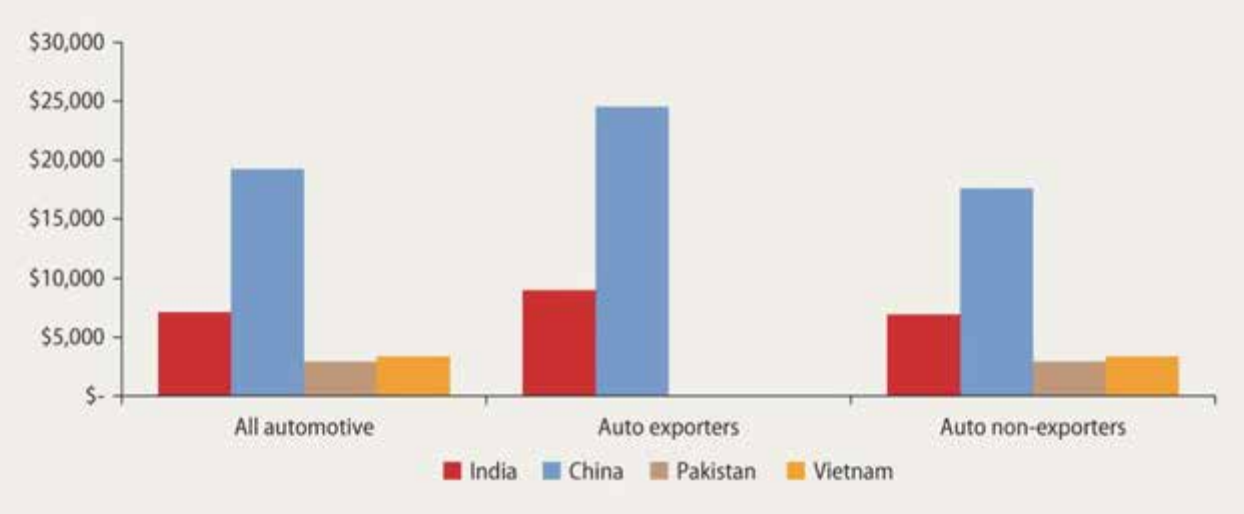
This is all very good news for the region, which could thus position itself as being able to offer a combination of strong R&D and manufacturing capabilities with competitive labor cost together with a very large and fast growing market.

South Asia's challenge: (i) spreading strong capabilities to the rest of the industry; and (ii) moving up the global value chain in design and R&D capabilities

(i) Spreading strong capabilities evenly to the rest of the industry

Unfortunately, most of the automotive industry in South Asia does not achieve these levels of manufacturing excellence. The average labor productivity of the 500 automotive firms surveyed in India by the World Bank was less than one-third the level in China, with Pakistan further behind (Figure 6.7). Firm size, export orientation, and share of foreign ownership are positively associated with productivity in both India and Pakistan.

Figure 6.7. Value added per worker in automotive (US dollars)



Source: World Bank Enterprise Surveys (India 2014, Pakistan 2013, China 2013, Vietnam 2009).

The first explanation for low productivity is low scale at the plant level. In India, only four of the 18 OEMs operate at the industry standard for efficiency of 100,000 units per model. In contrast, at least 3 Maruti models achieve more than

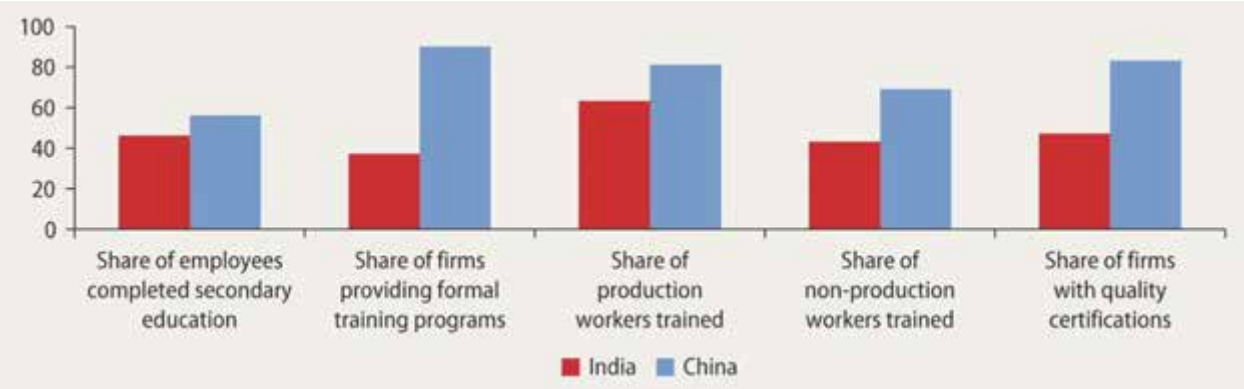
200,000 units annually and are profitable. Hyundai, Honda, and Mahindra & Mahindra also have managed to cross the 100,000 efficiency mark. Except for tractors, Pakistan also suffers from subscale production in all segments. By contrast, in China, 25 out of 27 OEMs are functioning above this level. In 2014, 47 models were produced at annual volumes higher than 100,000 units, including 22 models at more than 200,000 units.[78]

Low scale is compounded by low capacity utilization in many OEMs. India produced 4 million cars in 2013, compared to production capacity of 6 million—this 66% capacity utilization compares with 90% in China. Capacity utilization among the OEMs in Pakistan is below 50 percent. Furthermore, low capacity utilization among OEMs in a vertically-integrated industry like auto is often reflected in low capacity utilization among suppliers.

The next explanation for low productivity is low quality, especially among tier 2 and tier 3 suppliers. External rejection rates are one good measure of quality. As external rejection rates tend to be product specific, we draw on the example of seat makers in India.[79] The international best practice standard for seat makers is between 100 and 500 defect per million produced (ppm). In India, while some leading suppliers were nearing 120 ppm, one-fifth were experiencing rates as high as 2,000 ppm.[80] As 40 percent of the value added of a car lies in the Tier 2 and Tier 3 segment, the competitiveness of the auto industry depends on its ability to improve quality, deliveries, and efficiency in these segments.

Many of these quality issues can be related to large skill gaps which are prevalent among production as well as nonproduction workers, particularly managers. With the final products becoming more complex, the manufacturing processes now increasingly require a diverse range of problem-solving skill sets instead of just linear, traditional ones. In China, 90 percent of auto firms provide training to their employees, as opposed to 37 percent in India. Only 43 percent of nonproduction workers in auto are formally trained in India, compared to nearly 70 percent in China (Figure 6.8). When asked about its main challenge to growth, the chairman of Bharat Forge said, "*Talent*." Even though there were numerous publicly-subsidized training programs, leading firms invested in their own training programs to ensure a constant supply of talented line managers, business managers, and technical floor-level workers.

Figure 6.8. Overview of skills in Indian and Chinese firms

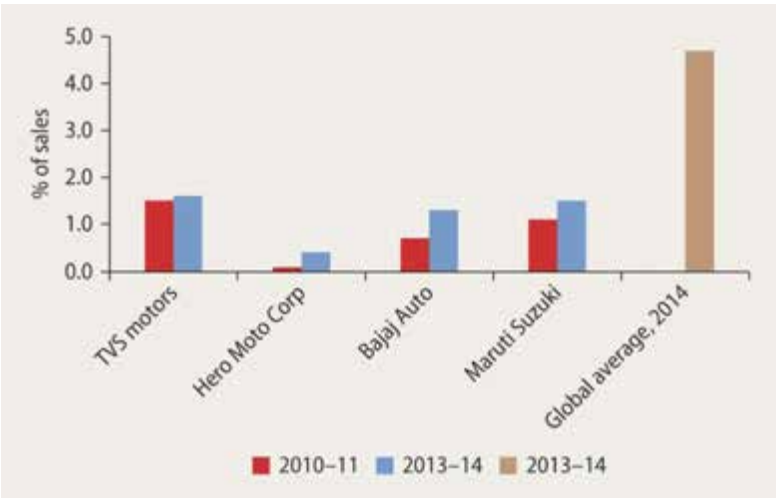


Source: Enterprise Survey (India 2014, China 2013).

(ii) Moving up the global value chain in design and R&D capabilities

Although increasingly important, R&D capabilities are spread thin across the automotive industry in South Asia. Global OEMs now expect design capabilities from firms at all levels of the value chain, because subcontracting makes sense only when the supplier can be held responsible for entire modules of tasks. During interviews, global Tier 1s mentioned that design capabilities are becoming critical factors in selecting Tier 2 subcontractors. With a few exceptions, firms in India and Pakistan are not demonstrating sufficient and quick uptake of design capabilities. In most cases, specifications are provided by the customer and the execution is done by the local firm based on build to print plans provided by the OEM or Tier 1. Design abilities are closely linked to a firm's R&D capabilities. The average expenditure on R&D in Indian auto firms ranges between 0 percent and 2 percent of sales, which is much lower than the global average of 4.7 percent (Figure 6.9).

Figure 6.9. Expenditure on R&D in India



Source: Odgets Berndtson Search Intelligence 2014

How leading South Asian firms built their capabilities: through exposure to global good practices

The world class Indian auto parts firms have acquired their capabilities by linking with leading global firms, either as suppliers or through technology agreements—many of India's world class auto-parts suppliers started as suppliers to Maruti-Suzuki which transferred its technical and operational know-how, and above all, according to its past Chairman, its management ethic. Co-location as part of clusters also facilitated greatly these transfers. Subsequent exposure to demanding customers in competitive export markets had the added benefits of increasing economies of scale and induced quicker adoption of modern, international standards, leading to faster and deeper knowledge transfers and technological spillovers than available in the less advanced and competitive South Asian automotive markets (Box 6.5).

Box 6.5. How leading Indian automotive firms acquired their world class skills

Alliances with OEMs for early capability acquisition: Leading suppliers in India first acquired their technical and managerial capabilities from leading domestic OEMs like Maruti Suzuki and Hero Honda. According to a senior executive at Motherson Sumi (MSSL), "We did not have a background in automotive pre-Maruti. Through a technical collaboration (TC) with Sumitomo, we set up a wiring harness in India. Within 1–2 years, the TC became a JV leading to MSSL". At that time, more than 85 percent of MSSL's sales were to Maruti. Similarly, in the 1980s, Maruti was the key customer for Bharat Forge. The story is similar for firms involved in two-wheelers. HTGL started as a preferred supplier of gear cutting tools to Hero Honda. After landing their first order with Hero Honda, HTGL moved into tubular parts, both aluminum- and steel-based. The choice of this product segment was driven by the fact that steel (of the standard required by the OEM) was not available in India and hence, HTGL worked with the OEM to locate two steel suppliers. They climbed a steep learning curve to meet the high standards demanded by the OEM. At the same time, Honda was getting some of its own suppliers to locate in India and the "interactive working relationship between HTGL, Honda's suppliers, and the OEM helped HTGL learn rapidly," mentioned HTGL.

(Continued next page)

Box 6.5 (continued)

Rapid absorption/adaptation of technologies to upgrade: Leading firms became expert at absorbing the technology acquired through TCs/JVs to expand production of related products—forward and backward. For instance, if they were making interior locks and needed zinc parts, Sandhar would improve their ability to work with zinc. "If we do a good job with locks, we would suggest we could handle the client's plastic needs," said the senior executive at Sandhar. Once MSSL had acquired a new technology and delivered to the customer, management would ask their engineers, "What more could we do with it?" MSSL expanded from basic plastic components to building tooling and injection molding machines, to deliver complex plastic products. MSSL initially imported wires for their wire harness products, but then started to buy copper to manufacture wires. This allowed them to increase sales to existing customers and enter new products. Bharat Forge is an example of a leading firm that has managed to break into design, engineering, testing, and other higher value-added services through such approaches and in-house R&D.

Colocation to facilitate learning and business development: Physical proximity to the customer helped upgrade products and processes, Co-location allowed MSSL to hold frequent meetings with the OEM, and new requirements would sometimes emerge during the course of these discussions. "We make the decision to co-locate based on several factors. Is the job big enough in size to justify co-location? Is the OEM reputed enough to learn from? Is there potential to increase share of wallet? Is there potential to learn something new completely?" said the MSSL senior executive. Similarly, proximity to the customer helped Sandhar become a supplier of locks and mirrors, including design. As told by the Sandhar senior executive, "A leading OEM was having trouble with one of its Indian suppliers which wasn't meeting delivery or quality standards. During a lunch with the client I proposed myself even though we had never made locks before." One thing led to another, and pleased with Sandhar's performance in metal sheets, Hero Honda helped them set up a technical collaboration with one of their lock suppliers in Japan. Sandhar became their single-source supplier of locks. Bharat Forge bought plants in Germany to be physically closer to its leading customers.

Diversifying to more sophisticated and demanding export markets: Many auto-parts suppliers increased production and productivity by serving sophisticated and competitive export markets. "Many players at that time went into aftermarkets because barriers to entry were low and there was promise of high margins, but we avoided this route like the plague." shared the MSSL senior executive. Working for a demanding customer meant that the firm was forced to be efficient, adopt international standards, and keep costs down. For Bharat Forge, exports started as early as 1995. "Exports challenged us to design, develop, manufacture, and supply products to discerning customers in global markets. This in turn motivated us to scale up the value chain and adopt new technologies," said the Bharat Forge senior executive. HTGL senior executive shared that, "I wanted to find the most discerning customers, whether in India or abroad. I would bend over backwards to work with them because I found we learnt the most when we worked with OEMs who held very high standards."

Source: Author's interviews from fieldwork in India.

The spread of world class capabilities, including in design and R&D, limited by protection from global good practices

High levels of import tariffs for final cars in India and Pakistan contributed to attract foreign OEMs, but now these protections are reducing their incentives to export and slow down the diffusion of good practices. The situation is worse in Pakistan, where only three OEMs "compete" domestically behind even higher import tariffs (76% vs 60% in India). The experience of the Indian auto parts and commercial vehicle sectors shows that a gradual reduction of import tariffs, far from leading to the debilitation of an industry, could be a powerful catalyst to its global success and support the adoption and spread of world class capabilities. In effect, tariffs on auto parts and commercial vehicles in India have gradually fallen since the 1990s with a concomitant sharp rise in production and exports (Figure 6.10). Competition exposed the auto parts sector to global good practices and pushed them to improve productivity and build design skills to compete in world markets. Exports now comprise more than 40 percent of production. Millions of local jobs were created. Similarly, the decline in import duties on commercial vehicles led to increases in production and employment, and the sub-sector currently shows a trade surplus (Figure 6.11).

Figure 6.10. Domestic production of auto parts and nominal tariff reduction in India

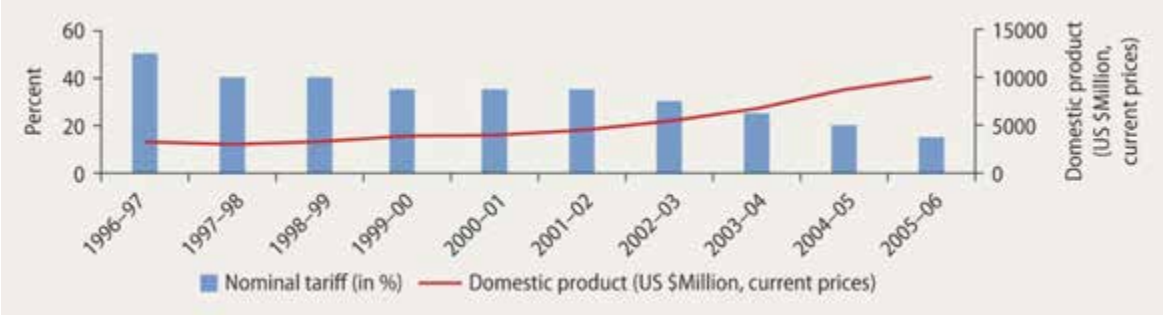
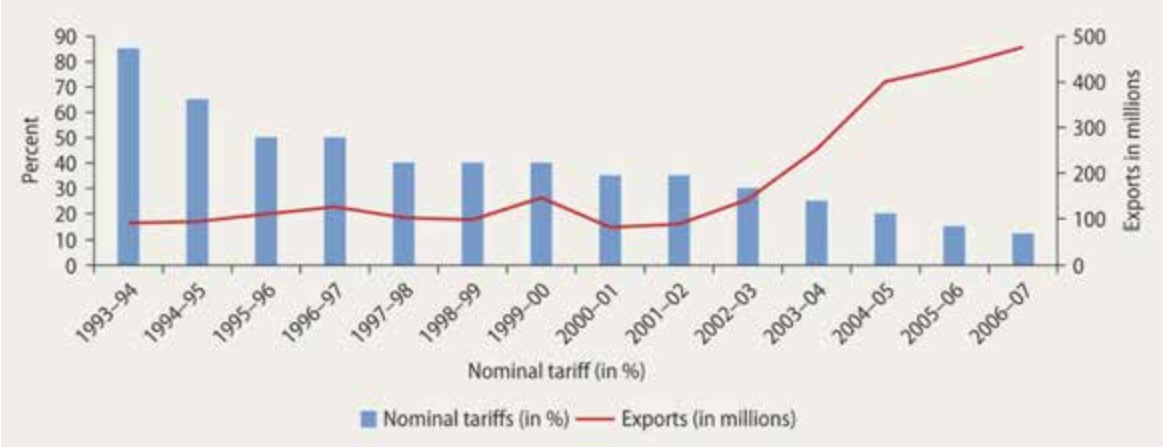


Figure 6.11. Exports of commercial vehicles and nominal tariff reduction in India



Source: WITS Database; ACMA; Narayan and Vashisht 2008.

International experiences shows the positive impact trade liberalization can have. A large and globally competitive automotive industry rapidly developed in Mexico following NAFTA. More recently, China reduced import tariffs from 90 to 25 percent between 2002 and 2005. Subsequent competitive pressure was felt throughout the automotive value chains. Net trade in cars rose from US$672 million to US$5.3 billion while output among suppliers increased by 25 percent a year.

Obsolete safety and environmental standards have also shielded the South Asian automotive industries from global good practices and have reduced the incentives on firms to invest and export. Euro I, introduced in the EU in 1983, came to India in 1996. While Euro II was introduced in the EU in 1997, it was only applied throughout India by 2005. Europe has now moved to Euro VI while India has adopted Euro IV in the major cities and Euro III across the country – Pakistan has not yet adopted Euro II norms. Recognizing the issue, the Indian government is asking the industry to adopt Euro VI norms by 2020, leaping over Euro V norms.

The extended version of this case study is available on-line at:
www.worldbank.org/SouthAsiaCompetes

PART III: THE WAY FORWARD

Chapter 7. Potential for increased growth through policy reforms

The potential benefits of becoming more competitive (productive) are discussed at the macro, sectoral and firm level in turn below. The policy actions underlying these scenarios are discussed in the next chapter.

Macro benefits: faster exports growth through higher productivity

South Asia has tremendous potential to increase incomes through policies that enhance productivity and gain market share in exports. One approach to assessing the economy-wide implications of such policies is with a global computable general equilibrium (CGE) model, which is used here to consider how a reduction in both international and domestic trade costs could raise income growth in South Asia through 2030. The key assumptions are calibrated to the latest Global Trade Analysis Project (GTAP) dataset with a 2011 base year (the chapter appendix provides a brief introduction to the model). Most importantly, productivity in South Asia is calibrated to contribute an average of 2 percentage points to total GDP growth through 2030—consistent with what the region was able to achieve during its best recent decade of growth in the 2000s but well above the experience thus far in the current decade (about 0.9 percentage points per year).

In this baseline scenario, South Asia's relatively young population and strong productivity growth achieve a substantial rise in per capita income through 2030. Unlike China, where total population is projected to decline after 2025, South Asia's population is expected to continue growing, with India becoming the world's most populous country shortly after 2020. The number of skilled workers—those with a secondary degree or higher—is expected to rise by 84 percent by 2030, ranging from 42 to 125 percent across the countries. The shift from agriculture to industry and services is expected to accelerate, driven by rising incomes and much lower wages in agricultural versus non-agricultural activities. While the agricultural workforce only increases by 10 percent, the labor force in non-agricultural activities rises by some 60 percent (the average increase in the labor force is 30 percent). Consequently, the share of the region's workers employed in non-agricultural activities increases from 40 to 50 percent.

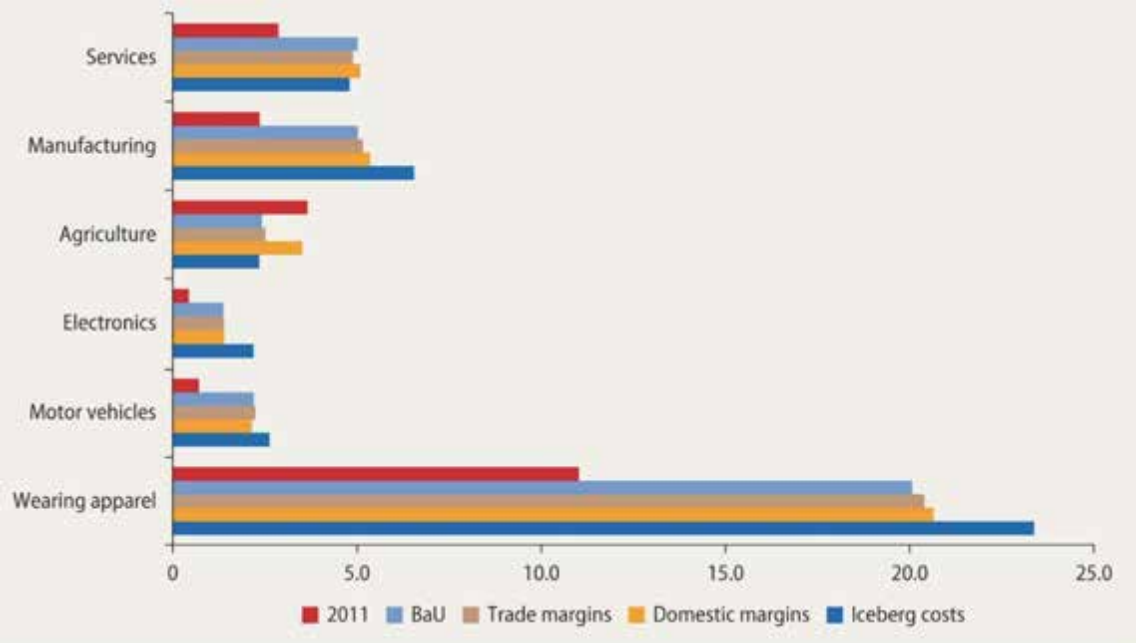
Real GDP in the region would rise by 6 percent per year (tripling by 2030), and South Asia would have one of the highest GDP growth rates in the world,

more or less mirroring the growth in East Asia. Per capita income would rise from around US$1,400 in 2011 to around US$3,400 in 2030 (in 2011 prices and market exchange rates), but still well below the average of US$55,000 in high-income countries. Despite rapid gains in productivity, increases in the number of workers and in the volume of capital (particularly the latter) represent the most important source of growth, as in the past.

Under these assumptions, South Asia becomes the world's fastest-growing region in terms of exports. Merchandise exports (in constant US dollars) rise by 264 percent between 2011 and 2030, compared with a 138 percent increase for all developing countries and 83 percent for the world. The majority of this growth comes from manufacturing and service exports, whereas exports of agricultural goods (excluding processed food) rise by a much more moderate 27 percent. This reflects a limited rise in the agricultural labor force and availability of land, some deceleration in yield growth, and relatively high income growth which shifts demand towards higher valued agricultural goods (fruits, vegetables, dairy, and so on) and non-agricultural goods. On the other hand, services exports more than triple and manufacturing exports rise by nearly 300 percent, as South Asia's rapid labor force growth, rising skill endowments, and rapid productivity growth (implicit in the baseline growth scenario) capture a growing share of the global market in higher value added products (Figure 7.1). Overall, the region more than doubles its global export share in manufacturing, and increases its global share of services exports by 75 percent.

Figure 7.1. Continued productivity growth could lead to substantial gains in global market share

(South Asia's global market share, 2011 and 2030 under various scenarios)



Within manufacturing, more skill-intensive sectors account for a larger portion of the overall growth: export growth rates range from 193 percent for textiles to 220 percent for wearing apparel to 400 percent for motor vehicles to 435 percent for electronics. Starting from a relatively low base, by 2030 South Asia more than triples its share in global exports of electronics and motor vehicles, and comes close to doubling its already significant market share in wearing apparel (excluding textiles and leather). Within the two former sectors, nearly all the growth comes from India while other countries—despite rapidly increasing their exports—remain small players in global markets. Even though India's exports of electronics and motor vehicles increase more rapidly than China's, by 2030 India's exports of motor vehicles only just approach China's current levels, and its 2030 electronics exports remain an order of magnitude below what China exports today. In wearing apparel, performance is more equal across the region. By 2030, Bangladesh and India account for 7 and 8 percent, respectively, of global exports in this category, while Pakistan and Sri Lanka each add another 2 percent of global exports.

If productivity growth were instead closer to what the region has been able to achieve in the current decade, the growth of exports and incomes would be significantly slower. Exports would rise by 5.7 percent year, compared to 6.9 percent in the baseline, and gains in global market share of manufacturing and services would be significantly lower. However, even with lower productivity growth, real GDP in the region would still expand by 5.0 percent per year—on par with the developing country average and well above the 2.0 percent GDP growth in high income countries. The region still increases its share of global export markets, although its performance suffers vis-à-vis China and the rest of East Asia. Slower productivity growth reduces South Asia's share of the global wearing apparel market by nearly 4 percentage points, and its shares of automobiles and electronics by 0.5 percentage points each, compared to the baseline scenario.

On the other hand, productivity enhancing improvements in trade facilitation and the functioning of domestic markets could generate additional gains in exports. A scenario which lowers the region's high logistics costs due to weak port infrastructure, burdensome customs regulations, and inefficient warehousing (for example, comparable to improved performance on the domestic component of the Logistics Performance Index (LPI)) could raise total export growth over the forecast period from 256 percent in the baseline to nearly 340 percent, and increase the trade to GDP elasticity from 1.1 to 1.5. A different scenario which targets the international component of the LPI through more rapid implementation of ongoing improvements in the port-to-port trade and transportation costs would generate lower impacts, as according to the GTAP database the FOB/CIF margins are already low (4 to 8 percent on average). Exports increase by 11 percent in 2030 relative to the baseline, or roughly half the increase in exports generated by the first scenario.

The scenarios give rise to increased labor demand in manufacturing. Employment rises relative to the baseline in agribusiness and falls in sectors such as agricultural crops, fossil fuels, and trade, transport and business services–the latter due to increased efficiency in providing trade and transport services. The results differ across scenarios, in part reflecting the initial level of openness to trade—both on the import and export side. As the aggregate supply of labor is the same across simulations, rising demand for labor due to lower trade costs increases wages.[81] Reductions in logistics costs and in domestic trade costs raise the average wage by around 12 percent, while the fall in international trade costs increases the average wage by only 1 percent. The average wage of unskilled workers rises by 17 percent, compared to 8 percent for skilled workers, compared to the baseline.

The efforts required to achieve the cost reductions differ across the three scenarios. Thus, while the scenarios indicate the magnitude of the effect of policy improvements, decisions on what policies to undertake would also require identifying the needed measures and quantifying their costs.

Sectoral benefits: more jobs, higher earnings, greater inclusion

An additional perspective on how productivity improvements could affect the domestic economy can be gained by estimating an "elasticity of substitution" for South Asia's exports—that is, an expected increase in the region's exports given a change in relative prices vis-à-vis South Asia's competitors (see the appendix for the methodology used). The advantage of this partial equilibrium approach, compared to the general equilibrium approach used immediately above, is that estimates can be obtained at a detailed product level and with much higher precision. To keep the exercise manageable, the analysis focuses on apparel, which accounts for 12 percent of the region's merchandise exports and employs 3 percent of the region's workers, and only on exports to the United States and EU-15 markets.

South Asian exports could increase sharply if prices were to rise more rapidly in China than in South Asia (Table 7.1 combines the coefficients estimated by the procedure outlined in the appendix with import shares of each country to generate the elasticity of substitution). A 10 percent increase in Chinese prices would reduce US imports from China by 7.9 percent (almost US$700 million), while exports from Bangladesh, India, and Pakistan would increase by 13.6 percent (US$519 million), 14.6 percent (US$414 million), and 25.3 percent (US$336 million).[82] South Asia's emerging competitors could benefit even more: Vietnam's exports could increase by 37.7 percent (US$2.2 billion) and Cambodia's by 51.3 percent (US$1.1 billion). The same relative price increase in the EU markets would have little effect on exports from Bangladesh and Pakistan, but would raise exports from India and Sri

Lanka by 19.0 percent and 22.5 percent, respectively –consistent with the current production relationships between these countries and the EU. These results suggest that competition in the apparel markets is intense, with buyers highly sensitive to price changes. Thus, policies that increase productivity in apparel may be effective in generating large export gains.

Table 7.1. Rising prices in China could hike demand for products from South and Southeast Asia

(elasticity of substitution for US and EU apparel imports)

	Bangladesh	Cambodia	India	Pakistan	Sri Lanka	Vietnam
US	1.36***	5.13***	1.46***	2.53***	0.02	3.77***
EU	−0.24	2.53	1.90***	−0.06	2.25***	1.64***

Source: Author's calculations using data from OTEXA.
Note: SUR with homogeneity and symmetry and fixed effects and weights. A negative value means a decline.
*** = statistically significant at 1 percent.

Increases in exports in the apparel and textile sector would boost South Asian employment. As the textile and apparel sectors are relatively labor intensive, the rise in output would generate a larger increase in employment than on average across sectors (the procedure used to estimate labor demand is explained in the appendix). These jobs are also more likely to be formal. Evidence from Bangladesh suggests that permanent employment is more sensitive to increases in output than is informal employment: although formal workers are more expensive, they are also more productive (Diaz-Mayans and Sanchez, 2004).[83]

Increased employment and wages also would particularly benefit women (Box 7.1). The demand for female labor in Bangladesh's garment sector is more elastic than the demand for male labor—a 1 percent increase in foreign sales is associated with 0.04 percent increase in female and 0.02 percent increase in male labor demand. In 2012, a 1 percent increase in expected wages was associated with an 89 percent increase in the probability of female labor force participation in Sri Lanka, 31 percent in Bangladesh, 19 in India, and 16 in Pakistan—although the importance of this channel seems to have declined over time (see appendix for the estimation procedure and Table 7.2 for results).[84] This is particularly important for South Asia, which has a large pool of potential female workers as its female labor participation rate is only 32 percent, compared to 58 percent in Latin America and the Caribbean, 62 percent in Europe and Central Asia, and 67 in East Asia (World Bank 2014c). Since apparel is a relatively low-skilled industry, employment opportunities in apparel that pay more than agriculture could potentially draw South Asia's non-participating women into the labor force.

Table 7.2. Female labor participation is highly responsive to increases in wages

(elasticities of female labor force participation with respect to changes in expected wages)

	1995	2000	2005	2012
Bangladesh	n.a.	1.646***	0.141***	0.306***
India	0.551***	0.426***	0.410***	0.189***
Pakistan	0.085***	0.194***	0.188***	0.163***
Sri Lanka	1.011***	0.939***	0.696***	0.892***

Note: Expected wages are measured in logarithms. Bangladesh—the last column is 2010, India—the first column is 1994, second—2001, last—2010, Pakistan—the first column is 1996, second—2001, Sri Lanka- first column is 1996, third—2006.

*** = statistically significant at 1 percent.

Box 7.1. Why focus on women?

There is growing evidence that gender gaps in the labor market and low female labor force participation rates have a major impact on incomes. Lower employment and wage rates for women are estimated to reduce GDP per capita by as much as 27 percent in some regions (Cuberes and Teignier, 2012). Another study estimates that raising the female labor force participation rate to the same level as males would raise the GDP in the United States by 5 percent, in Japan by 9 percent, in the United Arab Emirates by 12 percent, and in Egypt by 34 percent (Aguirre et al., 2012). A third study finds that countries with a comparative advantage in female-labor intensive goods are characterized by lower fertility, likely indicating women delay marriage and child-bearing, which can result in better pregnancy outcomes and better health (Do, Levchenko, and Raddatz (2014).

At the microeconomic level, some studies show that female labor force participation and employment is beneficial for a number of household indicators, including children's health and education and decision-making about fertility and marriage.

- In India, a randomized experiment finds that an increase in labor market opportunities for women raised their labor force participation and their probability of going to school instead of getting married or having children, along with better nutrition and health investments for school-aged girls (Jensen (2012).
- Also in India, a recent study on women employed in the textile industry finds that those with a longer history of employment tended to delay marriage and have a lower desired fertility rate. Moreover, these effects had spillovers within the family—the younger sisters of women who worked in textiles also married later, and their younger brothers were less likely to drop out of school (Sivasankaran (2014).
- In Bangladesh, a study shows that the growth of the garments sector was associated with a 0.27 percentage points increase in girls' school enrollment over 1983-2000—a more sizeable effect than a simultaneous supply side intervention of providing a subsidy for girls to remain in school (Heath and Mobaraq (2012). Girls who live near a garment factory are 28 percent less likely to be married and 29 percent less likely to have given birth than those living in villages farther away from a factory.

(Continued next page)

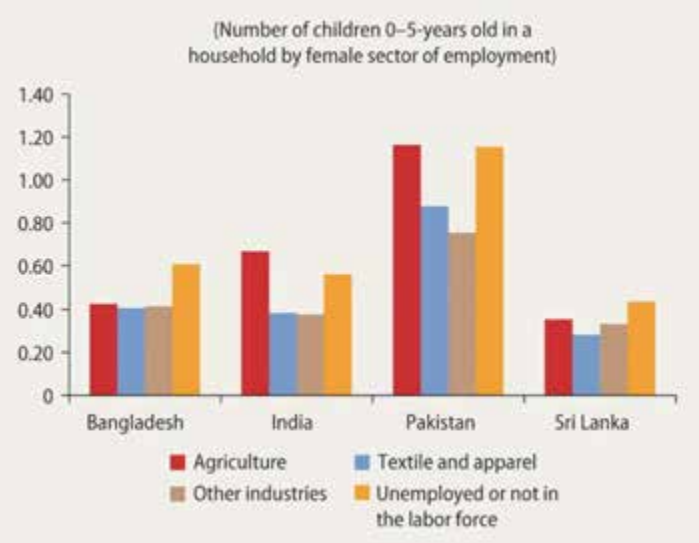
Box 7.1 (continued)

- Also in Bangladesh, a recent study finds that formally employed women had fewer children and possessed greater decision-making power over their own health expenses and formal savings (either through insurance or a bank account). (Kabeer et al. (2013).

Our own estimates confirm that South Asian households with women working, especially in the textile and apparel sector in India and Pakistan, tend to have fewer young children on average than women working in agriculture and women who are not in the labor force or unemployed. Also, in Sri Lanka they spend almost twice as much (SLR 1,112) a month on education per student than households with women working in agriculture (SLR 657) (Sri Lanka household survey, 2008).

Figure B7.1.1. Working in garments with fewer children

(Number of children 0–5-years old in a household by female sector of employment)

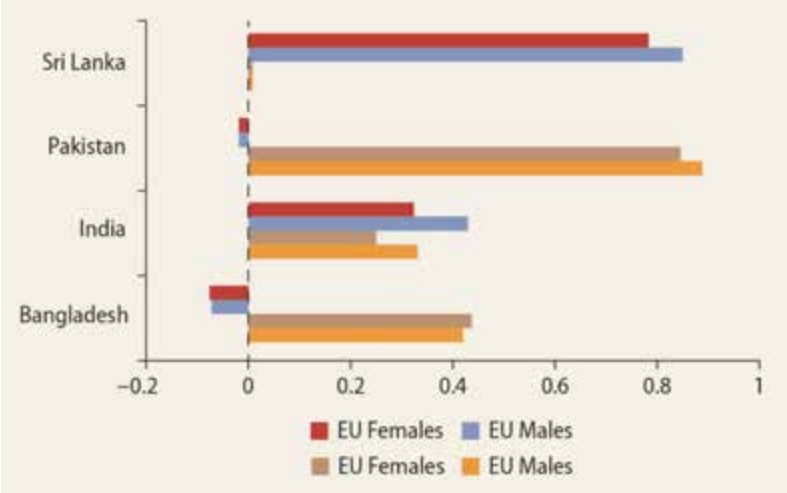


Source: Authors' estimates from household data.

Combining the empirical evidence presented so far in this section—the price sensitivity of South Asian apparel exports to high income markets and the responsiveness of employment to apparel output—provides an estimate of the potential number of jobs that South Asia could generate through greater apparel exports. For the U.S. market, a 10 percent increase in Chinese apparel prices would increase apparel employment in Pakistan for males by 8.93 percent—by far the largest increase among South Asian economies—followed by Bangladesh and India (Figure 7.2). The gains for Sri Lanka are less than 1 percent, but it is important to keep in mind that these estimates are for exports to the United States only. For the EU market, a 10 percent increase in Chinese apparel prices would increase

male apparel employment by 8.55 percent in Sri Lanka and 4.30 percent in India, but Bangladesh and Pakistan would experience small decreases because their products are not close substitutes for Chinese apparel in the EU. All of the results are qualitatively similar for females.

Figure 7.2. Rise in China apparel prices could drive up employment in South Asia



Firm benefits: greater density of successful firms

At the firm level, the potential is exhibited by the achievements of leading firms in the region which have managed to rise to standards of global excellence. The experience of these leading firms, as shown in the case studies, demonstrates that world class levels of operational performance, efficiency, and innovation can be achieved with the right management, scale/technology and worker training. These firms managed to flourish because they were operating in countries and sectors (for example, apparel in Bangladesh and Sri Lanka) or sub-sectors (for example, auto parts in India) where the policy environment was conducive or because they were able to internalize some of the constraints in their external environment (for example, through vertical integration in the case of agribusiness as well as apparel in Pakistan and India). These examples show, at the firm level, the impact that more conducive and supportive policies could have by increasing the number of successful firms and broadening their impact.

Leading firms play a critical development role by being major sources of productive employment, exports and innovation; helping improve the performance of suppliers by providing them with access to high value markets, technology, skills and financing; increasing competitive pressures on other firms; and through example providing a source of inspiration for local players and sending a strong message to potential international investors. This section summarizes the experience from more than 100 leading firms in South Asia

interviewed in the context of the industry case studies—apparel, automotive, electronics and agribusiness.

The case studies reveal that many of South Asia's top firms are indigenous. These include most of the leading firms in apparel (for example, US Apparel from Pakistan, Orient Craft from India, Pacific Jeans from Bangladesh and MAS from Sri Lanka) and a growing number of auto parts suppliers (for example, Bharat Forge, Hi-Tech Gear and HTGL from India). Notable leading South Asian firms in agribusiness include Fauji Foundation (food conglomerate from Pakistan), Dilmah (high value tea from Sri Lanka) and KRBL (Basmati rice from India). Even in the relatively new (to the region) electronics sector, there are examples of emerging world class South Asian firms (for example, Dixon Technologies and Micromax from India). Most of these firms started from modest beginnings but expanded substantially over time; for example, Dilmah started with 18 staff in 1974 and has grown to 35,000 employees.

The experience of these leading firms demonstrates that world class levels of operational excellence, efficiency, and innovation can be achieved with the right management, scale/technology and worker training. For example, the Samsung plant in NOIDA (outside New Delhi, India) ranks second in terms of efficiency out of thirty comparable Samsung plants from around the world, Dilmah and KRBL are recognized as premium tea and rice brands globally, while MAS has developed a range of high performance sportswear based on their innovative synthetic fabric. Some of these firms are turning global through the acquisition of other leading firms abroad: for example, Bharat Forge—a company that has managed to break into design, engineering, R&D, testing, calibration and other higher value-added services, and integrated these with their existing manufacturing product lines—has acquired automotive companies in Germany.

In order to acquire these capabilities, South Asia's leading firms pursued international integration, reaped the productivity gains generated by locating close to suppliers and clients, invested in skills and improved management practices, and benefitted from public investments in trade logistics and innovation. For example:

- *Global linkages:* Many of South Asia's leading firms actively sought to connect with global leaders through supplier linkages. Examples include Bharat Forge and MSSL with Maruti-Suzuki, Hi-Tech Gear with Hero-Honda, and MAS with Victoria Secret). Over time, these companies challenged themselves further through exposure to export markets and/or very competitive domestic markets (for example, auto parts following the reduction in import tariffs and electronics).

- *Agglomeration economies:* Geographic proximity to the customer appears to have aided efforts to upgrade products, process and functions for these firms. Their close location enabled MSSL to hold frequent meetings with the OEM on existing products; at times during the course of these

discussions, a new need would reveal itself. This would lead to subsequent meetings to identify the OEM's requirements.

- *Skills:* To compete in global markets, these firms made significant investments in acquiring skilled manpower at all levels and meeting international standards. For example, workers at Tos Lanka undergo training in Japan for a period ranging from three months to one year. The Chairman of Bharat Forge said: "*We have leveraged our tie-ups with leading academic institutions to create a strong talent pipeline. Our efforts have resulted in creation of an over 7,000-strong global pool of skilled engineers and technicians*". According to a senior executive from Hi-Tech Gear: "*We train workers and lose them to OEMs. But we still train because the ones who stay are crucial for our productivity. Unskilled workers are cheaper but costs match up when their mistakes are financially accounted for."*
- *Innovation:* For MSSL, once they had successfully acquired a new technology and delivered to the customer, they would ask their engineers, "*How can we leverage this technology for adjacent products? What more could we do with it? What would that take?*" There are several instances where MSSL upgraded products or began to produce inputs to their existing products. It expanded from producing basic plastic components to building tooling and injection molding machines to deliver on a range of complex plastic products. This enabled MSSL to deepen relationships with and increase sales to existing customers, enter new product categories, and expand their participation in global value chains.
- *Public investments* in trade logistics and innovation capacity have also been important to these firms' success. For example, Pacific Jeans from Bangladesh said that the system of bonded warehouses and back to back letters of credit provided by the government in the 1970s got the industry going by providing it access to critical imported inputs. In the case of KRBL, the Indian government played a critical role in the development of the PUSA-1121 Basmati rice variety.

Chapter 8. Need for greater emphasis on trade policies, spatial policies and firm capabilities

We consolidate in this subsection the policy recommendations emanating from the analysis in this report. There are four main policy levers to boost South Asia's competitiveness. The first one is to improve the business environment which is well-known—more emphasis should be given to industry specific business environment issues (product market regulations) as shown by the Agribusiness industry case study at the end of Chapter 3. The other three are also critical, and underutilized: (i) Policies to better connect to Global Value Chains, (ii) Policies to maximize agglomeration benefits and (iii) Policies to support innovation and productivity. We discuss each of these three levers in turn below.

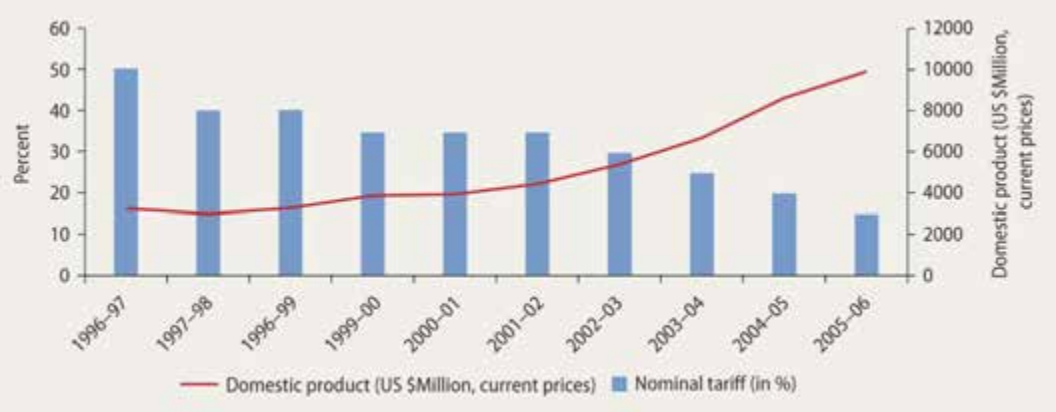
Policies to better connect to Global Value Chains (GVC)

Trade related issues have been found to be the most important constraints on competitiveness/productivity in the four industry case studies—for example, difficulties exporters face in importing inputs in a timely manner at world market prices (apparel and electronics), poor trade logistics and inverted tariffs (electronics) and high effective protection rates (automotive assembly and agribusiness).

When it comes to trade and trade-related policies, South Asia does not fare favorably compared to ASEAN and SACU countries. In 2010, trade costs within South Asia were almost double those in East Asia, and trade costs between the two regions were almost as high as those within South Asia.[85] Part 1 of this report described how tariffs, para-tariffs,[86] non-tariff measures and logistics inefficiencies boost trade costs; in GVCs—which by definition require parts and components to move back and forth across international borders—the effect of a marginal increase in trade costs is much larger than in "regular" trade flows. For example, MFN tariffs on intermediate apparel goods average from 15-21 percent in Bangladesh, Pakistan and Maldives.[87] Duties exceed 30 percent on auto parts in Pakistan and MFN tariffs are high on final autos (23 to 100 percent and, in some cases, higher) in all regional countries. Electronics is treated most favorably among the GVC sectors, with single-digit tariffs in most cases. Non-tariff barriers in the region are also pervasive, including in GVC sectors: motorcycles and vehicles in Pakistan face the largest number of NTMs. While both tariffs and NTMs matter for GVC participation (Ferrantino 2012, 2013), Kee (2013) finds that tariffs are the main policy-induced obstacle, at least for regional trade.[88]

Hence, *gradually reducing import tariffs and non-tariffs barriers towards a common low baseline to increase exposure and access to global good practices and remove inverted tariff structures* is a policy priority that could reap substantial productivity gains. Tariffs should be gradually reduced in the cases where high tariffs shield industries from international good practices. Such cases have been found and discussed in the automotive assembly industry (23 percent to 100 percent on final autos in all regional countries except Sri Lanka) as well as in the agribusiness industry (7 to 30 percent applied, 16 to 190 percent bound tariffs). Reducing tariffs on final goods would improve incentives for innovation, and shift labor and capital from low-productivity firms that cannot survive in a more competitive environment to high-productivity firms. Tariffs should also be reduced on intermediate goods in the cases where they are higher than on final goods leading to an "inverted tariff structure" which discourages domestic manufacturing.[89] The auto-part industry in India shows that a gradual reduction can lead to increased growth and competitiveness (Figure 8.1).

Figure 8.1. Tariff reduction and faster growth of auto parts production in India went hand-in-hand



Given that tariffs and trade related taxes still account for a significant portion of government revenues, the proposed gradual reduction will need to be accompanied by the development of other fiscal resources such as VAT/sales and property taxes in line with the experience of other successful economies.

There is also substantial room for improvement with regard to trade facilitation. The poor efficiency of customs and other clearance procedures for traded goods, as well as inadequate logistic services, are major impediments to firms' ability to sell to external markets and source inputs efficiently. In India, the average time reported to clear customs varied from 2 to 10 days for large firms, and 14 to 21 days for SMEs. Firms are often forced to hold higher inventories to compensate for lengthy and unpredictable delays in customs, and nevertheless may be forced to delay shipments, both of which can severely erode competitiveness.

However, external challenges are often dwarfed by internal ones. Indian firms reported that while it takes 11 days for a container to travel from Shanghai to Mumbai, it takes 20 days to travel from Mumbai to Delhi. Firms in auto components, textiles, electronics, and heavy engineering report maintaining 27 percent higher inventories to cope with these internal obstacles. Poor infrastructure is one reason for these delays, but a survey shows that a quarter of the journey time is spent at check posts, state borders, city entrances, and other regulatory stoppages. In India, differences in tax regimes between states are important reasons for the need for, and time consumed by, internal clearances.

An improvement in all trade facilitation measures could raise South Asian exports by 40.3 percent—the largest increase among global regions, followed by ECA at 30.0 percent (Wilson, Mann, and Otsuki 2005). Within South Asia, India has the highest increase in dollar terms (US$10.4 billion), and Bangladesh obtains the highest percentage increase (68.3 per cent). These high export gains in the region result more from improvements in port efficiency and service sector infrastructure, than from improvements in the regulatory environment and the customs environment. Regional differences in trade gains (in percentage terms) are much smaller for imports, but South Asia remains one of the biggest beneficiaries.

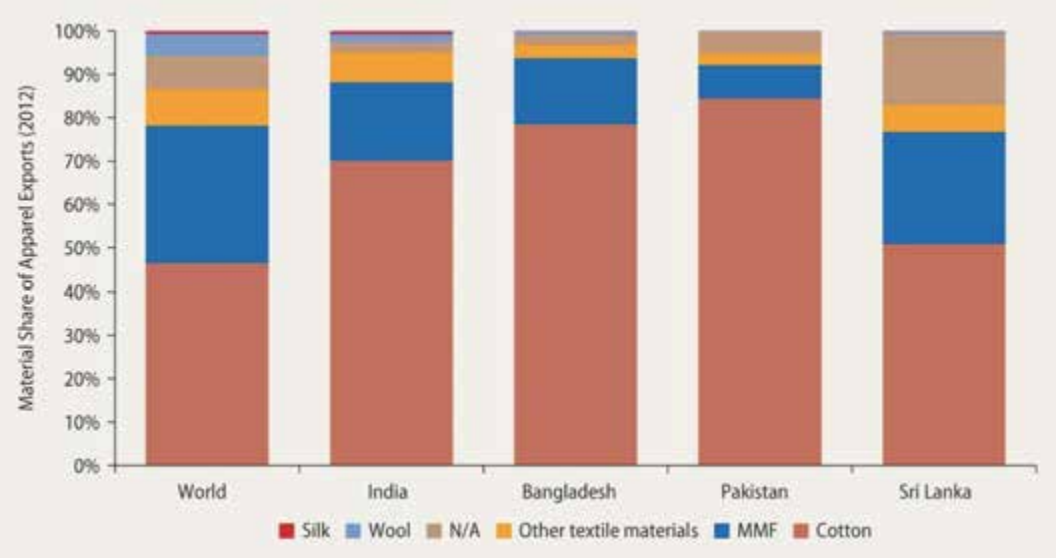
A tangible step to improve trade facilitation could be *reforming the Duty and Tax Remission for Export (DTRE) schemes to facilitate access to imported inputs for exporters*. These schemes are supposed to enable exporters to import key inputs free of duties and taxes, but in practice they seldom work with the result that exporters are limited to exporting products with locally sourced inputs which greatly constrain their capacity to expand and/or improve quality. The apparel case study is the best illustration of the importance of such schemes as shown by the superior performance of the Bangladesh apparel industry (the apparel industry is the only industry which enjoys extensive access to bonded warehouses and accounts for almost 90 percent of its exports) and the Sri Lanka apparel industry (which does not require such scheme as Sri Lanka has zero tariffs on textiles) as compared to the India and Pakistan apparel industries where such schemes are plagued with red tape.[90] It is thus no surprise that India's and Pakistan's apparel export associations have put liberalizing the import regimes for inputs at the top of their list of policy recommendations.

A longer-term solution to trade facilitation issues must include *strengthening the soft and hard infrastructure for domestic and external trade*. Important steps to speed clearance at the border include providing for fully electronic submission of documents (single electronic window), putting in place a risk based inspection system for imported containers (reducing the need to physically inspect all of them), improving coordination of border management agencies, and establishing an effective and quick grievance redress mechanism - the current administrative mechanisms take very long, and firms are scared of reprisals. Implementation of a unified goods and services tax would eliminate the cascading effect of the Central

Sales Tax (CST), and ensure that inter-state and intra-state transactions incur the same tax liability by allowing firms to claim full credit on input purchases. Improvements in port efficiency and service sector infrastructure will also be critical, in particular the capacity for ports to handle larger, more sophisticated vessels. When asked as to why he was not investing in Bihar where most of its labor comes from, a leading apparel player from Rajasthan answered: "fix the Calcutta port."

Improvements in *product market regulations* are also critical. For example, in apparel, South Asia's GVC success story, the input mix is not fully consistent with global demand patterns. While 32 percent of apparel globally is made from synthetic materials, the share of synthetics in South Asian exports ranges from 5 percent in Sri Lanka to 18 percent in India (Figure 8.2). Synthetic or man-made fibers (MMF) are increasingly in demand for high-performance garments such as sport uniforms and protective gear, and require a greater degree of technological sophistication than products with traditional fibers. Anecdotal evidence suggests that either high tariffs or NTMs may be reducing the supply of synthetics in South Asia. Such protection, to the extent it exists, could be due to the interests of the cotton industry, or of the small import-competing synthetics industry in India. For example, in 2011–12 India produced 6.1 million tons of raw cotton fiber, compared to just 1.2 million tons of MMF staple fibers (Saheed, 2012a). [91]

Figure 8.2. South Asia's apparel input mix is not fully consistent with global demand patterns



Source: World Bank (2016).

Firms also cite problems in domestic product markets, including controls on prices, inappropriate product standards, other constraints on markets and administrative requirements related to the transport of goods as important constraints on production. Agribusiness firms state that restrictions on markets

limit their operations. Outdated regulatory barriers hinder the development of storage and processing infrastructure. In particular, stock limits and price caps can be imposed with penalties that include potential jail sentences of up to seven years, which severely limits private sector interest in participating in these markets. Market committees impose strict controls on the marketing of agricultural produce. Produce can only be traded through the market, or for some crops (for example, sugar cane) direct purchases are allowed but are subject to a fee. As a consequence, there is no competition from private markets, services are poor, and the setting of fees is opaque. Price caps combined with minimum support prices on commodity products discourage investments in higher quality products, and subsidies on fertilizers and water tend to benefit larger farmers and sustain low productivity and environmentally damaging practices.

Product market standards that are unnecessarily restrictive, do not reflect the latest technology, or are seriously out of line with international standards particularly limit productivity in sophisticated industries. For example, the failure to update technical standards to those accepted by the EU and the United States means that automotive firms in South Asia are not prepared for the latest international standards, and thus face difficulties in competing in global markets. The plan by the Indian government to adopt the global Euro VI norms by 2020 (leaping over Euro V norms) is a key step forward. In the agribusiness industry, processors and traders consulted for this report felt that food safety regulations often are rigid, not in pace with scientific advancements, and not in line with WTO's Agreement on Sanitary and Phyto-Sanitary measures. Overlapping responsibilities among government bodies responsible for food safety, coupled with a lack of coordination, impairs transparency and the ability of firms to comply with regulations in Bangladesh, India, and Pakistan. Enforcement of regulations is reportedly inefficient or lacking, and food safety laboratories are not recognized by international bodies and lack the capacity for certain tests, such as for pesticide, mycotoxin and antibiotic residues. As a result, the system fails to effectively protect consumers and impedes firms' access to foreign markets.

The development of capabilities for GVC participation could help raise South Asian participation in GVCs beyond just apparel. Simulations carried out in Part 3 of the report show that while South Asia is projected to more than triple its share in global exports of electronics and motor vehicles by 2030, countries other than India will remain small players in these industries. Even India in 2030 will only just approach China's current levels of exports of autos and electronics. To achieve more rapid growth in GVC products, countries in South Asia will need to substantially enhance GVC-relevant capabilities where they currently lag behind potential competitors in ASEAN and SACU. Improvements in logistics alone are unlikely to offset the competitiveness challenges faced by the region; deeper institutional reform and human capital development will be equally crucial.

A pragmatic approach to increase participation in GVCs is to focus on developing specific characteristics that lead firms prioritize when selecting

suppliers. Surveys of global apparel buyers (Birnbaum, 2014b; Daher and Chmielewski, 2013; KSA-AM, 2007-2013; Nathan Associates, 2005) and interviews reveal the following key factors:

- *Cost and quality*. These two firm-specific criteria ranked the highest in all buyer surveys reviewed over the last decade. Local firms can enhance their ability to meet the cost/quality/timeliness standards of MNCs through investments in firm capabilities and innovation—whether of processes, products, organization or managerial capacity/skills.
- *Lead time/reliability, including access to inputs*. The increasing importance of lead time is related to the shift toward lean retailing and just-in-time delivery, where buyers reduce the inventory risks associated with supplying apparel to fast-changing, volatile markets by replenishing items on their shelves in very short cycles (Abernathy et al., 2006). Access to and availability of fabric inputs locally, or at least regionally, is also closely related. However, fabric production needs to be competitive in terms of price, quality, lead time, and variety. In this context, the ability to import inputs duty-free is advantageous.
- *Full package services*. Full package capabilities refers to offering accompanying services that increase the value added of manufactures. The buyer surveys show that the most important services include input/material sourcing and financing, and apparel product development services. Buyers' desire to reduce the complexity of their supply chains has spurred this shift from working with assembly suppliers (cut, make, and trim or CMT assembly) to full package suppliers.
- *Social and, to a lesser extent, environmental compliance and political stability and predictability*. As buyers play a limited role in the actual production process, country-specific factors are generally less important compared to firm-specific factors in the supplier selection process. However, social compliance has increased in importance in response to pressure from corporate social responsibility (CSR) campaigns by NGOs and compliance-conscious consumers.

Policies to maximize agglomeration benefits

Agglomeration benefits, or the benefits that accrue to firms and workers from locating close together in cities or clusters, are important for productivity. While measures of concentration are high in South Asia, concentration has not increased substantially over the past two decades, suggesting that more productive locations have generally not been successful in attracting additional resources at the expense of less productive locations. This reflects significant barriers to movements of goods, labor and capital across internal borders in South Asian countries. Indeed,

impediments to efficient allocation of resources between districts are stronger than distortions within districts, indicating significant barriers to firms reaping the benefits of agglomeration.

The industry case studies confirm that, when it is allowed to happen, agglomeration is positively associated with firm performance in South Asia. For example, interviews suggest that automotive firms gain substantial benefits from being located in clusters given the importance of frequent technical interactions, and location next to other automotive firms is highly correlated with productivity levels. Another interesting case is the light manufacturing cluster in Sialkot (Pakistan) where agglomeration benefits more than compensated for a challenging investment climate in this distant location (1000 km from the Karachi port). The Sialkot cluster derives its competitive advantage from the ability of firms to hire workers from a large pool of skilled labor as well as from the ability to offer a one stop solution to global buyers—the private enterprises in the cluster financed the development of an international airport which provides direct connections to Dubai as well as the development of new industrial zones to accommodate their growth and help comply with ever more string social and environmental norms.

Restrictions on land markets in South Asia discourage domestic and foreign investment and limit the benefits firms can gain through agglomeration and clustering. Firms mention the difficulty in accessing industrial land in Bangladesh as an important constraint on development. Inadequate space in well-serviced clusters also impairs productivity in apparel SMEs that are stranded in congested city centers across South Asia. Difficulties in the land market that will take a long time to resolve (for example, lack of secured land titles), the need to provide infrastructure and overcome coordination issues, as well as the need to overcome negative externalities (for example, pollution) and foster positive externalities (for example, help attract leading investors and generate agglomeration economies and cluster effects) underlines the importance of public interventions in improving access to land. Historically, public support has been provided in most countries through industrial zone developments. These have had a mixed record of success, as many of the public zones were not in appropriate locations or have been poorly managed (for example, PSIC zones in Pakistan Punjab), while not enough quality industrial land was provided in the most suitable areas.

The lack of well-located and well-serviced industrial land limits export oriented FDI in electronics and apparel—this is problematic as export oriented FDI have a choice of countries in which to invest, for example Vietnam which has readily available industrial land in prime locations. For example, Samsung's decision to withdraw a planned US$1.25 billion investment in Bangladesh which would have employed 50,000 workers was largely because the company could not obtain 250 acres in an export processing zone—Samsung is now a major investor in Vietnam where it contributed to launch the electronics industry. Conversely and unfortunately, Indian states have competed fiercely to attract major OEMs with tax incentives and land deals—with the risk of leading to a "fiscal race to the

bottom", sub-optimal investment locations and industry fragmentation. So it is ironic that governments are not providing sufficiently good land to export oriented FDI (which have a choice of country to invest in) while they provide too much land and incentives to market oriented FDI which would have invested in any case.

Cooperation with the private sector can play an important role in improving the efficiency and availability of clusters for industrial development. Industrial zones can help SMEs cluster around their main customers (for example, automotive and electronics) as well as have access to common facilities for R&D and testing facilities, waste disposal, and recycling—for example, the Combined Effluent Treatment Plants in the upcoming leather and apparel parks in Punjab, Pakistan. An important lesson for South Asia can be gained by China's cooperation with private firms to develop "Plug and Play" industrial zones, which provide SMEs with ready to use standardized industrial buildings, and provide decent worker housing close to the factories.

India has developed an interesting public private partnership solution to address the coordination and financing issues associated with moving an urban SME cluster to an industrial estate outside the city. In the Scheme for Integrated Textile Parks, ILFS (a company of mixed public and private ownership) helps SME clusters set up Special Purpose Vehicles, find appropriate land and secure the required financing. ILFS also provides managerial and technical training to the members of the cluster.

It is interesting to note that many of the modern industrial clusters in South Asia remain located within or near large urban centers (for example, Dhaka and Chittagong for apparel in Bangladesh, Delhi/Noida and Chennai for electronics in India, Karachi and Lahore for automotive in Pakistan).

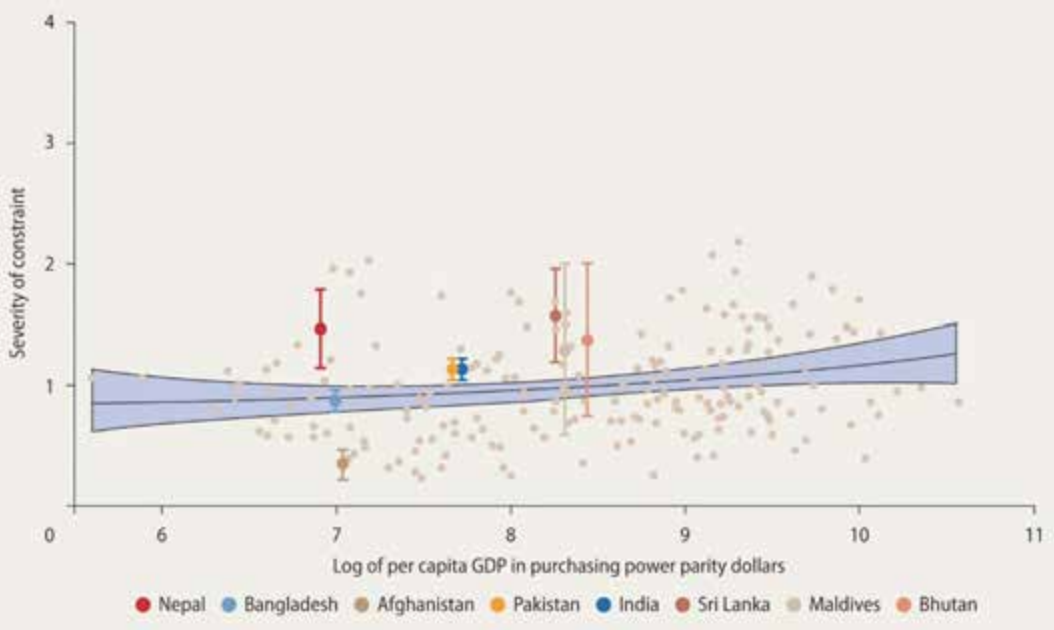
This helps explain the result at the aggregate level that agglomeration benefits in South Asia come primarily from urbanization rather than specialization effects, as the industry case studies show that most specialization happen within the context of large cities. The cases also show the emergence of specialization within smaller/specialized cities—for example, the light manufacturing cluster in Sialkot, the automotive clusters in Pune and Aurangabad. This is the prelude to the next wave of economies of agglomeration which should be driven by smaller/specialized cities like it happened in China and more developed regions as primary cities become too congested and expensive.

To enable this natural/desirable evolution and as discussed in the World Bank's South Asia Urbanization Flagship Report (2016), South Asian governments should continue to invest in infrastructure to better connect and equip secondary cities as well as pursue the decentralization agenda. One critical aspect of this decentralization will be to delegate authority over land markets (including over property tax) to (elected) local governments to provide them with the authority, the resources and incentives to promote industrial development by facilitating private sector led industrial zones. This is indeed the path followed by China,

which started with five Special Economic Zones launched by the Central Government followed by thousands of industrial zones launched by the private sector with the support of local governments which financed the infrastructure and facilitated access to land.

In addition to land market reforms, improving the flexibility of markets for labor and capital is likely to facilitate further gains from agglomeration. In particular, policies to increase the flexibility of labor markets, especially for women—who face particularly high discrimination in South Asia's labor markets (World Bank, 2012a)—are likely to substantially reduce misallocation of labor and improve productivity. Additional flexibility could also improve labor mobility, which is relatively low in the region: Glaser, Chauvin and Tobio (2011) found that only 0.4 percent of the population in South Asia lived in a different state five years earlier, compared with 9 percent in the United States. Labor market policies in the region remain an important constraint, especially as per capita incomes rise (Figure 8.3). While hiring rules in the region are rather flexible, dismissal procedures in South Asia are among the most onerous in the world (World Bank, 2012b).

Figure 8.3. Labor regulations are a more important constraint in South Asia than in other regions



Source: Carlin and Schaffer 2011 (based on World Bank enterprise surveys).
Note: The cross-country regression line shows the relationship between the reported severity of the constraint for a benchmark firm and the log of per capita GDP. The shaded area is the 95 percent confidence interval band around the regression line. Vertical bars show confidence intervals of 95 percent around the reported severity of the constraint for countries in South Asia. The lack of overlap between the South Asian country confidence interval and the regression line confidence interval is a conservative test of the statistically significant difference between the reported severity of a constraint for the South Asian country and the average reported severity of constraint for countries at the same level of per capita GDP. The reported severity could still be significantly different even with overlap. Analysis is based on pooled sample of enterprise surveys conducted between 2000 and 2010. The severity of constraint is rated by firms on a 5-point scale, with 0 being no obstacle, 1 being a minor obstacle, 2 being a moderate obstacle, 3 being a major obstacle, and 4 being a very severe obstacle.

Minimizing the misallocation of labor and capital, and maximizing the benefits of agglomeration economies therefore go hand-in-hand. Policies directed at improving urban governance and bridging the region's infrastructure gap will ensure that firms and workers will be matched more easily. Achieving this will require tackling congestion issues head-on (Box 8.1). In particular, investments in improved urban connectivity (going beyond roads to make investments in public transit),[92] provision of quality affordable housing and other basic infrastructure services, and reducing the negative social impact of agglomeration (for example, crime),[93] should be high on the policymakers' agenda.

Box 8.1. Leveraging urbanization in South Asia

The World Bank's 2016 South Asia flagship "Leveraging Urbanization" urges policy action to reduce the high costs of urban congestion in the region. To address key congestion constraints, the report calls the attention of policymakers to three fundamental urban governance deficits: an empowerment deficit, a resource deficit, and an accountability deficit.

- *Empowerment*. Most urban local governments in South Asia suffer from unclear institutional roles, limited functional and revenue assignments, and limited control over human resources. Empowering urban local governments in South Asia will require a dedicated commitment to clarifying intergovernmental fiscal legal frameworks by amending existing laws, enforcing them, and in some cases, establishing new and simple laws. Significant effort will also be required to establish and align incentives for urban management, governance, and finance.
- *Resources*. Revenue mobilization and management are difficult for most urban local governments in South Asia. Revenue mobilization is constrained by established fees and tax rates, narrow tax bases, and weak administrative capacity to fully utilize the existing revenue opportunities. Budgetary transfers, while officially unconditional, often come with higher-level rules and "guidance" on use. Improved design, implementation, and effectiveness of intergovernmental fiscal transfers are required to close the resource gap.
- *Accountability*. While formal administrative accountability systems generally exist in the region, many are fairly weak or little used. Even though audits are legally mandated, poorly performing local governments continue to receive transfers without penalty. Bridging the accountability deficit requires the development of better systems and practices and building the capacity of both government (at all levels) and citizens, including nurturing the social contract between local governments and citizens and clarifying fiscal relations between local governments and higher tiers of government.

(Continued next page)

Box 8.1 (continued)

The report also raises three additional, and interrelated, areas for policy action:

- *Connectivity and planning*. Decision makers should focus on strengthening transport links that improve connectivity between urban areas (for example, between large and secondary cities, and secondary cities and towns), adopt forward-looking planning approaches to guide expansion on city peripheries (where it is most rapid), revitalize city cores by investing in better-quality public urban spaces to enhance pedestrian walkability and livability, and adopt granular spatial planning approaches that permit greater variation in land uses and development intensities.
- *Land and housing*. City and suburban governments need to go beyond slum upgrading and embrace measures to stimulate the supply of affordable housing and offer more options to both low- and middle-income households. The supply of affordable housing can be increased over time through more permissive land-use and development regulations. Also needed is Infrastructure investment to open up land for residential development, easy-to-use land titling and registration systems, and greater access to construction and mortgage finance. In addition, government regulations need to be revised to foster the provision of more affordable rental housing.
- *Resilience to disasters and climate change effects*. Cities in South Asia are particularly exposed to disaster shocks. The first step in developing a resilience strategy is to accurately identify and quantify the national, subnational, and city risks, and build national geo-referenced hazard exposure databases. With the help of urban planners, engineers, and academics, cities should revisit the design and enforcement of building codes and land-use plans to avoid further building in risk-prone areas and to reinforce structures so they are resilient to various hazards. In addition, national disaster risk-financing frameworks need to be developed based on risk layering to match risks with appropriate financing instruments.

Source: Ellis and Roberts (2016).

Policies to strengthen firm capabilities

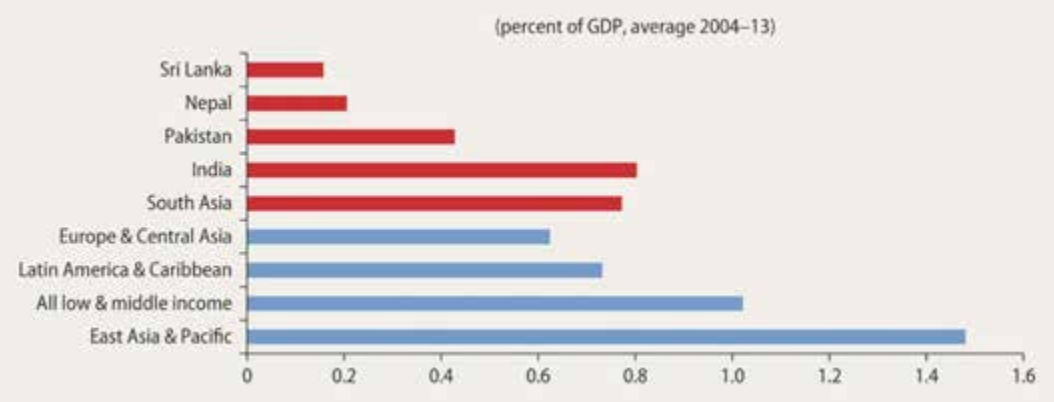
Many firms in South Asia are at a disadvantage vis-à-vis competitors in other countries when it comes to innovation, managerial capabilities, technology adoption, and worker skills—while evidence shows that relaxing these constraints can lead to substantial improvements in productivity. The findings of this report suggest different approaches to innovation policy for countries that are innovation leaders versus laggards. For leaders, the critical challenge is how to generate novel, and if possible radical, innovations. Here, a focus on enhancing complementary factors—skills and finance—but more importantly breaking the nature of inward innovation development by supporting cooperation with other firms and institutions is warranted. On the other hand, for laggards the policy focus needs to concentrate on increasing the number of firms engaged in incremental innovation.

Box 8.2. Public support to the development of Pusa-1121 basmati

At the turn of the century, managers at KRBL attended a demonstration by the Indian Agricultural Research Institute (IARI) where a new "evolved" variety of basmati rice, numbered 1121, was presented. KRBL staff were shown the extraordinary cooking characteristics which resulted in the longest cooked grain of any basmati type. Subsequently, KRBL acquired a small sample of 3.5kg from IARI, and in 2001 began growing it for multiplication even before the line had entered national trials. Three seasons later, when the variety was officially released as Pusa-1121, KRBL had 20,000 tons ready. Over the next three seasons a portion of the crop was saved for multiplication and a portion milled for test marketing. KRBL had already established a network of farmers through their attempts at contract production. The knowledge that KRBL would buy 1121 in the local wholesale markets took the marketing risk away from the farmers growing the new variety. The results of testing were overwhelmingly positive, both from the growers, who recognized the higher returns with higher yields on a shorter growing cycle with a lower water requirement, and from the consumers in the Gulf markets who found that a cup of milled rice gave 4.5 cups of boiled rice as against the more typical 4 cups. From there, adoption of the new variety spread rapidly to cover 84 percent of basmati plantings in Punjab and 68 percent in Haryana by 2013.

Public support to innovation can take various forms. Investments in R&D are an important determinant of innovation and productivity, and there are multiple examples of public R&D interventions catalyzing firm growth in the region, especially in agribusiness where research needs to be localized and spread widely among a large number of farmers (Box 8.2). Yet, overall (public and private) investment in R&D in South Asia is low (Figure 8.4) and has remained relatively unchanged over the past decade, while Latin America and particularly East Asia have increased their investments in R&D. The growing gap is particularly worrisome in light of empirical evidence which shows that social returns from R&D are at least twice as high as private returns (Bloom et al., 2013) and may be even higher in developing countries further away from the technological frontier (Griffith et al., 2004). However, as shown by Goni and Maloney, 2014, returns to formal R&D are likely to be extremely low in the absence of complementary factors such as education and quality of the private sector, including managerial capabilities. Therefore, authorities should focus on enhancing inputs—technology, skills, and finance—that are complementary to R&D investments. Given the varying rates of technology adoption in the region, increasing the limited adoption of internet and computers among private firms, and then turn to increasing the use of ICT to improve management and performance is particularly important in Nepal and Bangladesh. By contrast, the use of ICT is common in Indian firms, so efforts should be devoted to increasing the use of the internet for the commercialization of products (e-commerce).

Figure 8.4. South Asia invests relatively less in R&D



Source: World Development Indicators.

Public support to improving firm capabilities through technology extension, access to consulting services, networking, and information has a long history in high income countries, where returns on investment in providing these services to SMEs have been estimated to be as high 10-30 times (Ezell and Atkinson, 2011). Although most of these programs have not been evaluated in a RCT setting, a recent rigorous evaluation in Indian textiles found an 11 percent increase in productivity over one year in response to management consulting (Bloom et al., 2013). Recognizing the importance of these investments, governments in Latin America and Africa, authorities are piloting interventions which provide SMEs with access to individualized consulting services, as well as more novel approaches of providing group consulting services, which can be delivered at lower cost and leverage group-learning dynamics (similar to agricultural extension services). Since much of the original research and experimentation into the importance of managerial capabilities for firm performance originates in East and South Asia, there is much scope for authorities to learn from ongoing efforts and implement their own pilot initiatives.

Skills matter critically for technology adoption in South Asia, and worker skills are an important complement to firm investments in technology, research, and management capabilities. The share of high school graduates in firm employees is positively and significantly associated with ICT adoption in the region as a group, and in all the country except for Pakistan. Many of the lead firms interviewed for the industry case studies cited the low level of skills as a major constraint on productivity. For example, skills were viewed as a key factor in the success of firms in the automotive industry. The lack of adequate managerial skills was seen as a serious problem. For example, only 43 percent of nonproduction workers in the automotive sector in India are formally trained, compared to nearly 70 percent in China.

Governments can and should play a leading role in the development of technical, managerial, and vocational skills. Establishing educational partnerships, as well as upgrading university and vocational curricula in relation to

procurement, supply chain and marketing competencies including e-marketing and e-commerce, will be important to create a generation of business managers who can successfully communicate with global firms. Firms should forge more robust linkages with local universities and technical universities. Training, however, cannot be limited to pre-service training from public TVET institutes, which has shown mixed success in India and Pakistan as compared to China where vocational training benefit from extensive industry participation (Box 8.3). On-the-job training (including apprenticeships) is also a very effective way to acquire skills (often superior to government-led programs and own investment of the worker) although it has some skill bias towards existing needs. Company-led training programs by Samsung, LG and Intel in Vietnam and by Daewoo in Bangladesh have addressed important skill gaps. Large Pakistani apparel firms report that they carry out in-house training for most of their workers (Nabi & Hamid, 2013).

Box 8.3. China's approach to skilling its workforce

China has taken effective steps to deal with the demand-side challenges associated with training and skilling of its industrial workforce. Over the years, the Chinese government has invested extensively in vocational education. As a result, nearly 50 percent of the secondary level students in China have access to vocational education. The quality of training in Chinese vocational institutions is good, mainly due to extensive industry participation, favorable government policies and a flexible curriculum. The key stakeholders in the ecosystem work hand-in-hand. Chinese courses mandate students to undergo one year of training to get the diploma- ensuring faster absorption into the job market.

Similarly, to make sure that the faculty keeps abreast of the latest industry practices, the Chinese government has made it compulsory for vocational trainers to spend at least a month every year in manufacturing companies. Additionally, China has made it very easy for vocational students to move back into general academic programs by sufficiently covering general academic skills in vocational curricula. Chinese firms take employee training, This is reflected in the fact that Chinese manufacturers spend twice the amount on training and development than their Indian counterparts.

Source: BCG (2013).

LESSONS FROM THE FOUR INDUSTRY CASE STUDIES: Drivers and constraints of competitiveness as seen by the managers of leading firms

This section summarizes the experience from the more than 80 leading firms in South Asia interviewed in the context of the four industry case studies. Many of them are from South Asia and include some of the main apparel exporters (for example, US Apparel-Pakistan, Orient Craft-India, Pacific Jeans-Bangladesh and MAS-Sri Lanka), leading auto parts manufacturers (for example, Bharat Forge, Hi-Tech Gear, MSSL and HTGL from India), notable agribusiness firms (for example, Fauji Foundation - Pakistan, Dilmah - Sri Lanka and KRBL - India) as well as emerging world class South Asian firms even in the relatively new electronics sector (for example, Dixon Technologies and Micromax from India). Most of these firms started from very modest beginnings—for example, Dilmah started in 1974 with 18 staff but now has 35,000 employees, while US Apparel started with four sewing machines in the 1930s.

Foreign firms continue to play an important role in complex, capital- and knowledge-intensive activities such as car assembly (e.g. Maruti Suzuki in India and Hyundai in Pakistan), electronics (Samsung in India and Tos Lanka, a subsidiary of Toslec from Japan, in Sri Lanka) and agribusiness (Hindustan Lever, Nestle and Pepsico, which have transmitted leading edge knowledge to tens of thousands of farmers).

Beyond their direct contributions, leading firms are also having major positive effects through the knowledge and support they provide to suppliers and the competitive pressure they put on all firms in the industry. Their example and competition compel other firms to improve, and signals to the international investor community what can be achieved in the country.

These leading firms have demonstrated that world class levels of efficiency and quality could be achieved in South Asia across all the studied industries. This section presents their experience with respect to the drivers and constraints of competitiveness.

Technology adoption and innovation

Leading firms are demonstrating that world class and innovative products can be developed in South Asia by South Asian firms—for example, Dilmah and KRBL are recognized as premium tea and rice brands globally, and MAS has developed a range of high performance sportswear based on their innovative synthetic fabric. Some of these firms are turning global through the acquisition of other leading firms abroad—for example, Bharat Forge has acquired automotive companies in Germany and has managed to break into design, engineering, R&D, testing and calibration. In electronics, Dixon is leading a new generation of productive and innovative Indian firms in home appliances, with two R&D centers located around Delhi.

In some cases, the government played an important facilitating role. For example, Pacific Jeans from Bangladesh said that the system of bonded warehouses and back to back letters of credit provided by the government in the 1970s got the industry going by providing it access to critical imported inputs. In the case of KRBL, the Indian government played a critical role in the development of the PUSA-1121 rice.

Agglomeration economies and diffusion of knowledge through clustering

Agglomeration economies are the benefits that arise when firms and people locate near one another (for example, in cities and industrial clusters). There are five sources of agglomeration economies: access and sharing of inputs/services (increasing returns to scale), labor market pooling (better match between employers and employees), knowledge spillovers (exchange of ideas), market effects (concentration of demand encourages agglomeration) and economies of consumption (consumers enjoy variety).

The biggest benefits from agglomeration economies were found in the electronics and automotive industry, where geographic proximity to the customer has supported efforts to upgrade product, process and function. It is already possible to see agglomeration effects in South Asia's nascent electronics industry in clusters around Bangalore, Chennai and Delhi. But these effects can be seen in the rapidly growing electronics industry in Vietnam. Quoting an executive from a lead automotive firm in India:

"*We make the decision to collocate based on several factors. Is the job big enough in size to justify colocation? Is the OEM reputed enough to learn from? Is there potential to increase share of wallet? Is there potential to learn something new completely?*" said the MSSL senior executive (auto parts). In fact, the Indian and Pakistan automotive industries are concentrated in major clusters (for example, Karachi, Lahore, Chennai and Pune).

Leading firms (for example, the Mahr Group and Wolplus Incorp) and their suppliers in the leather apparel cluster in Sialkot (Pakistan) benefit from close proximity, which facilitates labor pooling and knowledge diffusion. As a cluster, they also provide international buyers with a critical mass of offerings facilitated by a privately financed international airport and exhibition center.

Leading firms' linkages with local suppliers also has a positive impact on firms in the agribusiness industry. In the case of the basmati rice variety Pusa 1121, KRBL transferred crucial market information to farmers by ensuring that they produced the "right" product for the overseas markets. In Bangladesh, Aftab Bahumuki Farms Limited (ABFL) introduced contract farming with poultry farmers, and contracted farmers recorded a significantly higher level of output (11,783 kg/year) than the non-contract farmers (6,763 kg/year).[94] In Bhutan, Mountain Hazelnut Ventures (MHV) was established in 2010 to plant and process hazelnuts. The company imports hazel tissue cultured plantlets and seed from a related operation in China, which are distributed among farmers. After three years of operation, 2,000 ha have been planted and 5,000 farmers trained. Nestle in India

has helped 190,000 farmers increase the quality of their milk and access/develop formal dairy markets in urban areas.

Learning from the best and improving continuously by linking to global value chains

Some of the leading South Asian entrepreneurs acquired their knowledge by studying and working abroad (for example, the founder of Dilmah Tea). The Desh-Daewoo joint venture, which included the intense technical and managerial training of 130 Bangladeshi in Daewoo's Pusan plant in 1979, established the foundation for the next generation of Bangladeshi entrepreneurs. Similarly, many of the leading Indian auto part companies acquired their knowledge as suppliers to foreign companies (for example, Bharat Forge and MSSL from Maruti-Suzuki and Hi-Tech Gear from Hero-Honda). The same is true of MAS through its close partnership with its main customer (Victoria Secret).

These companies grew and continued to develop their capabilities over time by participating in export markets (for example, apparel) or very competitive domestic markets (for example, auto parts and electronics following the reduction in import tariffs). Quoting from a senior executive at Hi-Tech Gear: "*From an operational perspective, exports challenge companies to design, develop, manufacture and supply products to discerning customers in global markets. This in turn motivates companies to scale up the value chain, I wanted to find the most discerning customers, whether in India or abroad. I would bend over backwards to work with them because I found I learnt the most when I worked with OEMs who held very high standards*."

Developing trusted relationships with leading international customers also provided the platform for further expansion. MSSL, for example, expanded from basic plastic components to building tooling and injection molding machines.

To compete in global markets, these firms made significant investments in acquiring skilled manpower at all levels and meeting international standards. Workers at Tos Lanka undergo training in Japan for a period ranging from three months to one year. Just as many of these leading firms acquired their capabilities as suppliers to original leading firms, these firms in turn are having a major positive impact on their own suppliers. For example, MSSL requests their CTO to visit the supplier and work closely with them to define and guide product specifications.

The main constraints reported by these leading firms are (see the industry case studies for more details):

The main constraints found across the four industry case studies (apparel, electronics, automotive and agribusiness) are industry-specific policies, also called product market regulations. These policies include restrictions on trade, prices, products (standards) and markets that have protected firms from exposure to global good practices (automotive and agribusiness) or have limited firms' capacity to adopt these practices (apparel and electronics). These constraints can be summarized as follows (Table 8.1):

Table 8.1. Main constraints to competitiveness identified in the industry case studies

	Apparel	Electronics	Automotive	Agribusiness
Trade barriers	**Very important**	**Very important**	**Very important**	Important
Product standards and market restrictions			Important	**Very important**
Lack of technical and managerial skills		Important	**Very important**	Important
Difficulties to access well located industrial land	Important	Important	Important	

(a) Trade related issues were the most important constraints mentioned by the leading firms:

- Difficulties exporters face in importing inputs at world market prices (apparel) - Orient Craft (India) and US Apparel (Pakistan) mentioned the difficulties they have in importing man-made fiber as their number one constraint—echoing the voice of the apparel export associations in these two countries. This led them to focus on cotton based textiles and integrate vertically to ensure quality textiles—a costly solution not available to SMEs in the sector. Conversely, Pacific Jeans (Bangladesh) and MAS (Sri Lanka) reported that the ability to import fabric duty free was critical to their success.
- Poor trade logistics and inverted tariffs (electronics)—Samsung mentioned the inverted tariff structure in India—and very high effective protection rates (automotive and agribusiness). Trade related issues also include major barriers to regional trade as well as barriers to internal trade within India, which affects all industries.

(b) Industry-specific product market regulations are important constraints in automotive (standards) and agribusiness (standards, subsidies and restrictive regulations on prices and markets).

(c) The lack of managerial and technical skills is a constraint in automotive and electronics, as well as agribusiness in the case of farmers. When enquired about their main challenge to growth, the Chairman of Bharat Forge (auto-parts) said, "*Talent*."—echoing the voices of other leading auto-part manufacturers.

(d) Difficulties to access well located and well serviced industrial land is a very serious issue for FDI (electronics and apparel, especially in Bangladesh) and for clusters of SMEs stranded in city centers in all countries (apparel). Samsung could not invest in Bangladesh largely because it could not find the 250 acres it needed for itself and its suppliers around Chittagong.

Notes

[1] A slightly different picture emerges if, when measuring the export and import orientation of countries in the SAR region, we control for some non-policy determinants of openness. For example, larger countries tend to trade less with the rest of the world, because they face more domestic trade opportunities than small countries. Similarly, landlocked or island states face higher transportation costs and hence tend to trade less. Once size and whether the country is landlocked or an island state are taken into account, most SAR countries remain less integrated into the global marketplace, both in terms of export and import orientation, than the average. However, India, the largest economy in the region, appears to be more integrated than the average (see plots of these export and import orientation indices in Figure 1.7 and Figure 1.8 in the Annex).

[2] The Services Trade Restrictions Database (used to calculate the Indexes) collects and makes publicly available information on services trade policy assembled in a comparable manner across 103 countries, five sectors (telecommunications, finance, transportation, retail and professional services) and the key modes of service supply from the perspective of a foreign supplier who wishes to provide services to consumers in a particular country, with a focus mainly on policy measures that discriminate against foreign services or service providers. See Borchert et al (2012) for more details.

[3] A similar result was previously reported by Amiti & Konings (2007) for the case of Indonesia.

[4] This is consistent with cross-country evidence presented by Bolaky and Freund (2004) that the growth effect of trade depends on a country's business regulations.

[5] In the EXPY indicator, each export good is assigned the value of the average per capita income of other countries exporting that good; the country's EXPY is the average of these values, weighted by the good's share of total exports (Hausmann et al. 2006). The EXPY indicator has to be interpreted with caution, because it reflects the product exported rather than the stage of production (the actual task). In today's increasingly fragmented production processes, a country may export a sophisticated product (for example, a computer) but only carry out low-skilled assembly activities while the high-tech activity of making the parts is done elsewhere.

[6] PRODY is a weighted average of the per capita GDP of countries producing auto goods (including auto parts), with weights derived from Revealed Comparative Advantage calculations.

[7] IMF Working Paper 2015.

[8] The unit values secured by exporters are used here as a proxy for product quality given that true product quality is unobserved. It is worth mentioning, however, that differences in unit values may also reflect differences in manufacturing costs observed across firms or even across countries (see a discussion in Khandelwal, 2010).

[9] The Indian government's "Make in India" initiative has industry competitiveness at its core. The Sri Lankan government has set up a National Productivity Secretariat to help "enhance Sri Lankan productivity by energizing the sector to face international competition" (Ministry of Productivity Promotion, Sri Lanka).

[10] Hsieh and Klenow (2009), Pages (2010), and others document that productivity dispersion between top and bottom firms is particularly large in developing countries. The positive (albeit weaker in developing countries) correlation between firm size and

productivity, and the fact that medium and large firms are under-represented in South Asia, suggests the existence of major opportunities for improving productivity (i.e., the preponderance of small firms drags down aggregate productivity).

[11] It is worth mentioning that TFP is measured as a residual: the portion of output that is not explained by increases in physical capital stocks or in labor (both measured in quality or quantity). In fact, three important critiques have been leveled at this growth accounting framework. First, TFP is measured as a residual, providing an imperfect measure of shifts in the production function, which can reflect many determinants (e.g.: technical change, but also sustained political turmoil, external shocks, institutional changes or measurement errors). Second, the data are calculated by assuming a sufficient degree of competition in factor markets so that factor earnings are proportional to factor productivities. Third, growth accounting cannot measure the fundamental causes of growth (policies, institutions, and history), but simply examines the proximate causes. While these critiques have merit, the framework provides a simple and internally consistent way to organize data, and is useful in generating insights into the process of economic growth.

[12] Note that the analysis does not distinguish between a structural decline in TFP growth and a decline from idle or poorly-allocated factors of production during cyclical periods of economic slowdown.

[13] Sectoral employment shares data for Afghanistan, Bhutan, Maldives, and Nepal are available for very few years, and has not been used in this analysis.

[14] The economic development literature has long recognized the role of structural transformation in boosting aggregate productivity. Baumol (1967), Dekle and Vandenbroucke (2012), Ngai and Pissarides (2004), Acemoglu and Guerrieri (2008), and others have shown that differential productivity growth across sectors will attract resources to more productive parts of the economy.

[15] A simple reduced form model is used to quantify the role of productivity in driving the process of structural transformation. The movement of labor from one sector to another is a function of productivity differentials across sectors (see Annex for the description of the model). The natural rate of structural transformation is measured by the coefficient on the share of employment lagged one period. The coefficient on the lagged employment share is always positive, significant, and significantly less than one, indicating a "natural" downward trend in the employment share of agriculture

[16] This fictional example is taken from Hsieh and Klenow (2009).

[17] Both examples from Lewis (2004), pp 14-15 and OECD FDI Restrictiveness Indicators.

[18] In theory, with no distortions firms producing similar products would have the same level of productivity. If that were not the case, then resources would move from the low productivity firm to higher returns in the high productivity firm, driving productivity of the former upward, and of the latter downward. Given that factors omitted in the model may be responsible for productivity differences, the benchmark for comparison is not 'zero' productivity dispersion, but that of the US—a relatively undistorted market.

[19] As argued by Li and Rama (2015), because micro and small firms are generally underrepresented in datasets like Enterprise Surveys, these indicators of dispersion of productivity likely underestimate true dispersion.

[20] The WB enterprise surveys collect information about firms in different countries around the world in a harmonized way providing comparable cross-country information. The dataset includes only formal firms with at least 5 employees. The reader should keep in mind this truncation when interpreting results.

[21] This conclusion holds even when restricting the sample to small and micro firms. Among these, the larger did better at business practices within a sample of small firms in Bangladesh, Chile, Ghana, Kenya, Mexico, Nigeria and Sri Lanka (McKenzie and Woodruff []).

[22] Note that this calculation is based on the World Bank Enterprise Surveys, which do not include most micro firms, so it most likely underestimates productivity differences that would be observed if firms of all sizes were considered.

[23] An important caveat is that it is possible that the value added per worker differences between firms within different size classes are to some extent explained by differences in average worker quality, as workers with higher abilities or skills may self-select into larger firms.

[24] There are two exceptions in the case of India, but neither is fully satisfactory for this type of analysis. India's Annual Survey of Industries (ASI) data is available with panel identifiers starting from 1998-99; however, firms below a certain size threshold (100 employees) are only sampled once every 4-5 years making it difficult to determine whether a firm exited or was not sampled in a given year. The Prowess database by the Centre for Monitoring Indian Economy (CMIE) has data for more than 10,000 manufacturing firms dating back to 1990 but these are mostly large, publicly listed companies.

[25] Begum, I.A. 2008. Prospects and potentialities of vertically integrated contract farming in Bangladesh. Department of Agricultural Development Economics, Hokkaido University, Japan.

[26] These are calculated as simple averages of locational Gini coefficients for two-digit ISIC industries.

[27] Only two of the top five districts in 1991 remained in the top five in 2009, and employment in the five largest districts in 1991, which comprised 17.4 percent of total employment, amounted to a much lower 14.0 percent in 2009. For the purposes of spatial analysis, the report consistently uses India's 1989 districts, mapping new districts in later years to their 1989 "parent" districts.

[28] Dhaka continues to dominate in levels, accounting for more than 35 percent of total employment.

[29] While there are 25 total districts in Sri Lanka, 7 of these (Jaffna, Mannar, Vavuniya, Mullativu, Batticaloa, Ampara, and Trincomalee) had too few observations to be analyzed individually and were therefore grouped together into a single residual district.

[30] This index is calculated as $G_i = \sum_{s=1}^{N} \left(\frac{L_{i,s}}{L_i} - \frac{L_s}{L}\right)^2$, where i refers to a two-digit (ISIC) industry, s is location (district or state), and L is employment.

[31] Note that, due to data limitations, the report cannot adequately address the issue of input endogeneity (especially capital) in the production function following the traditional approaches in the literature, such as Levinshon and Petrin (2003) and Olley and Pakes (1996). However, Van Beveren (2012) showed that differences between most parametric or semi-parametric methods to estimate TFP (including L&P and O&P) and OLS are minimal. Therefore, the approach taken here is to estimate the production function by OLS, allowing the parameters for capital (α) and labor (β) to vary for each two-digit ISIC sector.

[32] Localization economies are defined as the log of the sum of all employees from sector s in region z apart from the number of employees in plant i plus one, while urbanization economies are defined as the log of the sum of all employees in region z apart from the employees in sector s plus one (this is done to ensure the inclusion of all plants in the

estimation, since the existence of only one plant in a particular region would be discarded as log of zero is not defined). More specifically, the indices are defined as follows for each plant *i*, sector *s*, location *z*, and time period *t*:

$$Localization_{it}^{sz} = \ln(employees_t^{sz} - employees_{it}^{sz} + 1)$$

$$Urbanization_t^{sz} = \ln(employees_t^z - employees_t^{sz} + 1)$$

$$Diversity_t^{sz} = \ln\left(\sum_{s' \neq s}\left(\frac{employees_t^{s'z}}{employees_t^z - employees_t^{sz}}\right)^2\right)^{-1}$$

$$Competition_t^{sz} = \ln\left(\sum_{j \in S_t^{sz}}\left(\frac{employees_{jt}^{sz}}{employees_t^{sz}}\right)^2\right)^{-1}$$

[33] To assess this, we estimate quantile regressions which the impact of the regressors conditional to the median or to other quantiles of the response variable rather the mean. The results are estimated at three quantiles (25 percent, 50 percent and 75 percent) for the last available year.

[34] Results using other years show similar results.

[35] Model did not achieve convergence using Bangladesh state dummies.

[36] Staff calculations based on UN COMTRADE data. The classification of electronic products is from Sturgeon and Memedovic ([not in references]).

[37] ILO, 2014 (A)

[38] See for example Fernandez-Stark et al., 2011;Sturgeon and Kawakami et al., 2011

[39] ILO, 2014 (B).

[40] Subramanian and Modi, 2015

[41] Saleman and Jordan (2013)

[42] World Bank (2014)

[43] Dearden, Reed, and Van Reenen, 2006

[44] BCG (2013)

[45] In India, the share of exports in value added is, on average, 12.9 percent for GVC participant firms and 2.4 percent for non-participant firms. The corresponding figures for Bangladesh are 47.6 percent and 17.4 percent respectively.

[46] On the other hand, a recent a study based on a panel of 10,685 Indian manufacturing firms between 1990 and 2011 found that businesses tend to experience productivity growth a year prior to entering export markets rather than after entering—pointing to potential reverse causality (Gupta et al. 2013).

[47] Bangladesh, India, Pakistan, and Sri Lanka (the "South Asian 4") run a substantial trade surplus in final GVC goods (US$68.0 billion of exports vs. US$23.8 billion of imports) and have approximately balanced trade in intermediate goods (US$24.3 billion of exports vs. US$25.1 billion of imports): they are significant net importers of electronics intermediates, modest net importers of automotive intermediates, and net exporters of apparel and footwear intermediates.

[48] In particular, exporters of primary products experience the sort of GVC participation described as "forward linkages" in international input-output databases. Countries which export final goods requiring large amounts of imported intermediate goods are said to experience "backward linkages."

[49] India's largest exports at the detailed (HS6) level are refined petroleum, diamonds, jewelry e.g. of gold, pharmaceuticals for retail sale, and processed rice. All of these lie outside the scope of this analysis.
[50] India exports chassis and engines, including spark-ignition auto engines, diesel engines and aircraft engines, as well as a variety of smaller parts.
[51] It is a stylized fact of international trade that rich countries import goods with higher unit values than poorer countries, presumably because their consumers can afford higher-quality varieties of products (Ferrantino, Feinberg and Deason, 2012; Manova and Zhang, 2009; Bastos and Silva, 2010).
[52] In the archetypal case of China, foreign value added is highest in those sectors with the highest degree of foreign investment and in more technologically progressive sectors such as computers and telecommunication equipment (Koopman, Wang, and Wei 2012). By contrast, products like steel and ceramics tend to have higher domestic value added in exports. Similarly, in international comparisons, the share of foreign value added is higher for East Asian countries and Mexico, which are deeply imbedded in GVCs, and lowest for primary-product exporters like Russia, Brazil, and Saudi Arabia (Koopman, Powers, Wang and Wei 2010).
[53] PRODY (as well as EXPY, described in an earlier section) is an index that measures the quality of export baskets. The index, proposed by Hausmann et al. (2007), is a weighted average of per capita incomes of countries producing a given product (with global export shares as weights). A higher PRODY for a given product means that this product is associated with a higher level of per capita income (it is more likely to be exported by a richer country). For South Asia, this means that the product sophistication of each South Asian country's bundle corresponds to a level of income significantly higher than the South Asian countries themselves.
[54] Both sophistication measures are normalized with the US = 1. The relative income levels for South Asian countries are as follows: Bangladesh 0.04, Bhutan 0.11, India 0.07, Maldives 0.16, Nepal 0.03, Pakistan 0.06, Sri Lanka 0.11.
[55] See, for example, Corcos et al. (2013), Defever and Toubal (2013), and Jabbour (2012)
[56] As defined by combining lists generated by Athukorala (2010) and Sturgeon and Memedov (2011)
[57] 102 countries, which together represent 81 percent of world trade in 2012.
[58] These comparisons remain unchanged when South Asia (excluding India) is defined by the country-group formed by Bangladesh, Pakistan and Sri Lanka.
[59] Other, less important, barriers also hold back the sector—they are discussed in the extended version of the case available at www.worldbank.org/SouthAsiaCompetes.
[60] CBEC, "Custom Tariffs 2012-2013," http://www.cbec.gov.in/customs/cst2012-13/cst1213-idx.htm.
[61] Central Board of Excise and Customs (CBEC), "Central Excise Tariff 2012-2013," http://www.cbec.gov.in/excise/cxt2012-13/cxt_1213-idx.htm.
[62] E.g., polyester staple plain weave and polyester filament. Birnbaum, "Benchmark Study India," p. 101.
[63] The system of bonded warehouses in Bangladesh caters mostly to the apparel industry. Other high potential industries would greatly benefit from it –e.g. footwear which has great difficulties importing leather (DTIS, 2016)
[64] The analysis is based on the 2002 and 2005 rounds of the Investment Climate (Enterprise) Survey in India, and the 2005 round of the Investment Climate (Enterprise) Survey in Sri

Lanka. The authors measure factor under/over-utilization by estimating a Cobb-Douglas production function to calculate the marginal products of labor and capital, and comparing these marginal products with factor costs (wages for labor and interest and depreciation rates for capital). The estimation approach followed Olley and Pakes (1996) to correct for entry/exit (selection) and the endogeneity of input use (inputs may be selected at the same time as output).

[65] The reported under-utilization rates do not imply that employment would rise by the indicated factor if firms were able to use factors optimally: as firms would hire more labor, wages would rise, putting downward pressure on optimal employment levels.

[66] These estimates are based on the 2010 Enterprise Survey data for Pakistan, 2011 for Sri Lanka, 2013 for Bangladesh and Nepal, and 2014 for India.

[67] To obtain these estimates, similar to the approach of Fernandes and Pakes (2008), marginal products of labor and capital are estimated using country-specific Cobb-Douglas production functions with sector dummies, and then compared with the prevailing wage and rental rates for each country. However, due to the absence of panel data, the estimation approach does not explicitly account for firm selection and endogeneity of input choices. While the extent of the implied basis is difficult to judge, results reported by Fernandes and Pakes (2008) for India show that coefficient estimates obtained by OLS lie within two standard errors of results obtained with the Olley-Pakes estimator when firms are allowed to optimize labor volumes in every period, even when controlling for firm exit.

[68] In the discussion that follows, South Asia's performance is benchmarked against the average in the Africa region, which includes ten other countries where the same innovation questionnaire was implemented: DRC, Ghana, Kenya, Namibia, Nigeria, South Sudan, Sudan, Tanzania, Uganda and Zambia. Although South Asia and Africa are very different in many respects, levels of GDP per capita are similar among the sampled countries.

[69] India is the only country in which an enterprise survey took place in 2014 instead.

[70] All equations control for sector effects using 2-digit ISIC dummies, and we estimate the different models individually for each country using ISIC-2 digits controls and for the whole region using also country dummies. Given the large number of observations in India, the pooled sample for the South Asia region is largely dominated by India. All country individual estimates use sampling weights. Based on the earlier discussion we use two specifications, one parsimonious specification with only a few key variables and an extended version that includes all the elements described earlier.

[71] Other studies find a weak or insignificant relationship (Teo et al., 1997, Lefebvre et al., 2005, Love et al., 2005). Hollenstein (2004) argues that the relationship between ICT adoption and firm's size might be non-linear, which explains partially the cause of weak or insignificant relationship.

[72] The distinction between types of innovations, while clear in theory, can be a matter of some confusion for survey respondents. For example, new marketing processes, like discounts, new packaging or new client segments, are sometimes confused with process or product innovations. The fact that interviewees provide a recorded description of product and process innovations allows the user to verify the identified innovations and reclassify wrongly attributed cases to their respective category, and to invalidate cases that do not constitute an innovation at all. This exercise has been conducted by Cirera et al. (2015), who kindly provide us with "clean innovation data." For the overall sample of South Asia firms, the cleaning exercise conducted by the authors has decreased the rate of product innovation - from 53 percent to 51 percent - and the rate of process innovation -

from 64 percent to 58 percent. Although the cleaning exercise reduced innovation rates for most countries, in Nepal the rate of product innovation increased from 10 to 12 percent as the result of reclassification from process innovations.

[73] In a study for Mexico, Lopez-Acevedo and Tan (2003) found that training had large and statistically significant wage and productivity outcomes, that joint training and R&D yielded larger returns than investments in just one or the other, and that both training and technology investments enabled firms to improve their relative position in the wage and productivity distribution.

[74] These differences are statistically different for almost all types of innovation in India and Nepal, for product and marketing innovation in Bangladesh and for organizational innovation in Pakistan.

[75] Foreign-owned firms are those that have over 25 percent ownership by private foreign individuals, companies or organizations. The differences are statistically significant for product and process innovation in Bangladesh, product and process innovation simultaneously in India, marketing in Nepal, and process innovation and marketing in Pakistan.

[76] The estimates are robust to alternative methodologies. Since the GSEM methodology is more robust with large samples and well specified models, we also estimate the same models using three-stage least squares (3sls). One disadvantage of this methodology is that it uses the sample of the stage with lower number of estimates and also does not allow for a mixed process, since all the stages have to be estimated linearly. On the other hand, it is computationally less demanding than FIML and still addresses the issue of endogeneity instrumenting at each stage. The results for the returns to innovation, although larger in size to GSEM, are identical in terms of statistical significance.

[77] ACMA and McKinsey Report 2014; WITS-UNCTAD puts auto part exports at US$2 billion in 2009 and US$6 billion in 2014.

[78] Maruti Suzuki Annual Reports (till 2015).

[79] Sutton 2004.

[80] Ibid; Bank site visits to Indian auto clusters in December 2014.

[81] By design, there is no change in the aggregate level of employment across scenarios. More plausibly, the changes induced by the scenario would most likely lead to changes in labor force participation rates: in aggregate as real wages increase; and perhaps across gender to the extent that there is potential expansion of sectors such as wearing apparel with a higher concentration of female employment.

[82] Sri Lanka would experience an increase in exports of less than 1 percent in this scenario.

[83] Results for India—the only other country where the data distinguish between permanent and temporary employees—suggest that the elasticities for the two types of labor are about the same.

[84] There are a number of potential explanations for this, most involving some sort of a U-shaped relationship between female labor force participation and economic development (Goldin, 1995; Verik, 2014). For example, female participation rates may be highest in the poorest countries, where many women are engaged in subsistence activities. Countries with somewhat higher incomes could have lower female participation rates, because of the transition of (mainly) men to industrial jobs. At some point in the developmental process, however, higher female education levels, lower fertility, and a larger share of services in output that opens up opportunities for women results in higher female participation rates. There is also evidence for India that labor market outcomes depend in part on differences

in the level of urbanization, with relatively few employment opportunities for women in the growing areas that are more urbanized than villages but less so than large cities (Chatterjee et al., 2015). Other factors might be limited availability of transportation to work, bad working conditions, and a lack of institutions for early childhood education.

[85] Author's calculations from ESCAP-World Bank International Trade Costs Database. South Asia is represented by India, Pakistan and Sri Lanka. East Asia is represented by China, Japan, Malaysia, Thailand and Vietnam.

[86] On para-tariffs, see Bangladesh Economists' Forum 2014 for Bangladesh, Pursell and Ahsan 2011 for Sri Lanka, and Reis and Taglioni 2013 for Pakistan.

[87] In some cases, these may be offset by duty drawbacks.

[88] Taking into account the estimated price elasticity of demand, the gap between the actual and the predicted volumes of trade can be used to calculate the AVE of trade barriers for every product and every pair of countries. The results also suggest that NTMs which are not WTO-compliant represent a bigger obstacle to trade than those that are compliant.

[89] Such cases were found on yarn in Nepal; 15-21 percent tariffs on intermediate apparel goods in Bangladesh, Pakistan and Maldives; more than 30 percent tariffs on auto parts in Pakistan; in India, 7.5 percent tariff on materials for medical equipment while final goods face tariff of 5 percent; in Pakistan, finished poultry products are imported at zero duty from Malaysia and at 16 percent duty from China, yet duties on the inputs for local poultry processors are 15-30 percent, in addition to the sales tax of 17 percent; in India electronics, high tariffs on 'dual use' materials under ITA, as process for obtaining exemption from duty is cumbersome; and in India automotive, zero tariffs on final goods under bilateral trade agreements (e.g. with Thailand) while intermediate inputs still face tariffs.

[90] Difficulties with duty drawback schemes were also found to affect the electronics industry in India (the extremely cumbersome procedures around notification 25/99 discourage firms from using it) and the auto parts industry in Pakistan.

[91] Globally, MMF apparel experienced a growth rate of 6.7 percent over the 2005—2012 period and increased its share of world apparel trade from 26 percent to 32 percent, while cotton's share of the global market decreased from 51 percent to 46 percent over the same time period (UNSD, 2014c).

[92] Duranton and Turner (2011) find that in US cities, improved road provision eases traffic congestion only in the short run, which means that expansion of roads is unlikely to relieve congestion in the long run. Public transport improvements appear to be the most powerful tool to alleviate the inconvenience of commuting in urban areas.

[93] Using Brazilian city-level data, Lage de Sousa (2014) showed that migration is negatively affected not only by local crime rates but also by those occurring in neighboring areas.

[94] Begum, I.A. 2008. Prospects and potentialities of vertically integrated contract farming in Bangladesh. Department of Agricultural Development Economics, Hokkaido University, Japan.

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South Asia Development Matters

South Asia is undergoing a rapid economic transformation and has the potential to become the next major middle-income region of the world, on the footsteps of East Asia. More than a million young people are reaching working age every month, and the population of the region's mega agglomerations and sprawling cities is expanding at roughly the same pace. By 2030 more than a quarter of the world's working adults will live in South Asia. But the region has not been particularly successful in integrating within itself and with the global economy. The demographic transition and poor competitiveness are South Asia's greatest opportunity and greatest challenge. At a time when the growth rate of international trade has dramatically slowed down, what will determine the region's ability to become an exports powerhouse, create jobs, reduce poverty, and boost shared prosperity? A new report from the World Bank Group – "South Asia's Turn: Policies to Boost Competitiveness and Create the Next Export Powerhouse" – looks for answers in the dynamics of firms, clusters, value chains and cities across the region. The report identifies several factors that limit the ability of South Asia to compete with the rest of the world, and proposes avenues to boost productivity, take advantage of rising costs in East Asia and connect to global markets.

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