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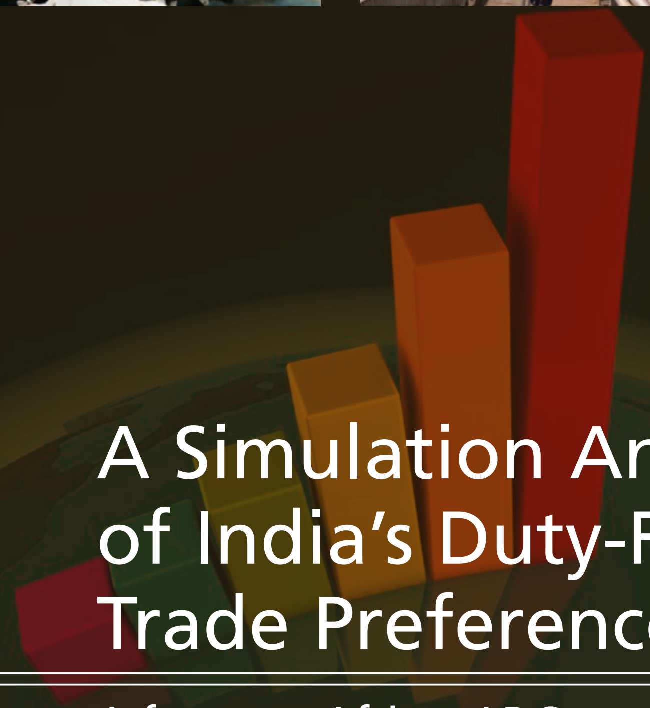

A Simulation Analysis of India's Duty-Free Trade Preference Scheme

A focus on African LDCs

By **National Council of Applied Economic Research (NCAER)**

ICTSD
International Centre for Trade
and Sustainable Development

Issue Paper No. 34

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LIST OF ACRONYMS AND ABBREVIATIONS

DFQF	Duty-free and Quota-free
AFLDCs	African least-developed countries
CES	Constant elasticity of substitution
CGE	Computable general equilibrium
CII	Confederation of Indian Industry
CRS	Constant returns to scale
DFQF	Duty-free quota-free
DFTP	Duty-Free Tariff Preference
DRC	Democratic Republic of the Congo
EU	European Union
EXIM	Export-Import
GDP	Gross domestic product
GTAP	Global Trade Analysis Project
HS	Harmonized System
ITC	International Trade Centre
LDC	Least-developed country
MAcMap-HS6	Market Access Map database
MENA	Middle East and North Africa
MFN	Most-favoured nation
MIRAGE	Modelling International Relationships in Applied General Equilibrium
MOP	Margin of preference
NAFTA	North American Free Trade Agreement
NEC	Not elsewhere classified
OECD	Organisation for Economic Co-operation and Development
PPP	Public-private partnership
S&D	Special and differential treatment
LDCs	Least developed countries
US	United States
WITS	World Integrated Trade Solution
WTO	World Trade Organization

FOREWORD

It has long been recognised that, if trade can contribute to economic development, then trade preferences granted to developing countries' exports can be a potent means of achieving that goal. This was the rationale for the Generalized System of Preferences (GSP) when it was launched in 1971. There has been a constant call since then to improve upon the GSP and to provide more meaningful preferences to the least developed countries (LDCs). Over time, new schemes have emerged. Several of these schemes combine trade preferences with aid and technical assistance to ensure that preferences are effectively utilized. The evidence by and large suggests that those countries that have made optimal use of trade preferences have seen their exports increase significantly, boosting economic growth and reducing poverty.

While trade preference schemes have become more inclusive over the years, and rules of origin less onerous, the demand for improved preferences has not waned. Partly in response to this demand, WTO members, at the 2005 Ministerial Conference in Hong Kong, agreed that: "Developed-country members shall, and developing-country Members declaring themselves in a position to do so should, provide duty-free and quota-free (DFQF) market access on a lasting basis, for all products originating from all LDCs by 2008..." (emphasis added).

India was the first among the emerging economies to propose a duty-free market access scheme for LDCs following the Hong Kong Ministerial Declaration of 2005. The duty-free trade preference (DFTP) scheme, launched in August 2008, initially offered preferential tariffs on 94 percent of Indian tariff lines. A revision to the scheme in April 2014 extended duty treatment to 98 percent of tariff lines; yet it continues to exclude several products of export interest to LDCs. While the revised scheme goes in the direction of ICTSD's recommendations, the remaining exclusions point to some disconnect between the scheme's intent and its actual impact.

Little is known about the effectiveness of the recent initiatives by emerging economies, such as India and China, arguably because it is too early to assess their impact. In the case of the Indian scheme, however, more than five years after its launch, it is useful to take stock of how it has affected LDC exports, identify potential impediments and propose remedial measures for enhancing the scheme's effectiveness. This is the motivation behind this paper, and five other papers in a project that examines how India's engagement with LDCs – especially African LDCs – can be strengthened through trade relations and technological collaboration with a view to supporting growth and structural transformation in Africa's poorest economies.

In future work, ICTSD intends to apply the methodology used in this project to a thorough analysis of the Chinese trade preference initiative. The scheme, launched in January 2008, initially provided DFQF market access on select products to 33 African LDCs enjoying diplomatic ties with China; it was expanded in terms of product coverage and extended to all LDCs in July 2010.

At a time of little progress on the duty-free quota-free market access proposition of the Hong Kong Ministerial – other than the decision being reiterated in Bali in December 2013 –, the analysis and findings of this paper suggest that, not only should the major developing countries that have yet to come up with a trade preference scheme for LDCs do so in earnest, but those that already offer such preferences – both developed and developing countries – should reassess their schemes with a view to enhancing their effectiveness.

Ricardo Meléndez-Ortiz
Chief Executive, ICTSD

EXECUTIVE SUMMARY

Africa has become a region of special focus for India since the early 2000s. The basic motivation has been to enhance Africa-India cooperation in a wide range of activities, including economic, political, science and technology, health, tourism, infrastructure, and energy and environment.

Stronger economic and trade partnership is envisioned with African least-developed countries (AFLDCs). The World Trade Organization (WTO), at its Sixth Ministerial Conference in Hong Kong in 2005, called on developed countries, and developing countries that were in a position to do so, to provide enhanced, duty-free quota-free (DFQF) market access to least-developed countries' (LDCs) exports. India became the first developing country to announce the launch of a Duty-Free Tariff Preference (DFTP) Scheme for LDCs in 2008. In the context of Africa, the anticipation was that India's preferential import access to the AFLDCs would lead to increases in their exports to India as well as their economic growth and welfare.

The objective of this study is to analyse the likely impacts of the trade preference scheme on India and the AFLDCs. The scheme, in its current design, offers duty-free access to 85 per cent of Indian tariff lines but excludes, partially or fully, some products of critical export value to AFLDCs. This may be hindering the scheme's overall effectiveness. Hence, it is useful to understand the impacts of an expanded scheme so that appropriate policy recommendations could be made to the Government of India. The study is premised on the view that an enhanced engagement of India with AFLDCs will allow India to deepen South-South trade cooperation.

The analysis of potential impacts of Indian trade liberalisation for AFLDCs is carried out using a general equilibrium Global Trade Analysis Project (GTAP) model developed by Purdue University. Under the scenarios considered in this study, it is assumed that all AFLDCs benefit from the DFTP scheme. This includes the ones that are not formally current beneficiaries. This assumption is necessary since, under the GTAP database classification of countries/regions, some of the beneficiary AFLDCs are included in 'grouped regions' along with other non-beneficiary countries. The modelling analysis helps assess the impact of liberalisation of India's import tariff barriers on imports from AFLDCs. We assess the potential gains to AFLDCs under two scenarios:

a) Partial liberalisation: India offers duty-free entry to imports of goods from AFLDCs under duty-free or partial duty-free lists except on the items under the exclusion list (base tariff rates of 2007); and

b) Complete liberalisation: India offers duty-free entry to all imports, including items that are currently on the exclusion list.

The modelling results demonstrate that the welfare change is potentially positive for all AFLDCs under the partial liberalisation scenario. It increases further under the complete liberalisation scenario. The extent of the increase in welfare gains under partial and complete liberalisation scenarios depends on the share of imports that fall under the exclusion list. The total welfare of AFLDCs is expected to increase by USD 1,008 million under partial liberalisation and by USD 1,201 million under complete liberalisation. The welfare loss to India is much smaller: USD 144 million under partial liberalisation and USD 171 million under complete liberalisation.

The DFTP scheme adopted by India for LDCs has the potential to benefit AFLDCs. The countries are expected to gain in terms of gross domestic product (GDP), returns to the factors of production, allocative efficiency, and exports. The gains are expected to be higher if commodities currently under the exclusion list are also made duty free. While 21 AFLDCs have already formally joined the scheme, others may be in the process of joining.

A major policy recommendation that comes out of this study is that India should go all the way towards a 100 percent duty-free scheme since the gains to LDCs from such a move would far exceed the loss to India. A revision of the DFTP scheme was announced in August 2014 (effective April 2014). The new scheme extends duty treatment to 98 percent of tariff lines, up from 85 percent initially. This is very much in line with this paper's recommendation, and is therefore welcome. However, the revised scheme continues to exclude a number of products of export interest to African LDCs. Hence, even the improved scheme may not allow its full potential impact on LDCs' exports to play out.

1. BACKDROP

India's political and economic engagement with Africa entered a new phase in the 2000s with active participation by the government as well the private sector. The Indian government envisions a stronger partnership with Africa in the 21st century based on a new paradigm of cooperation, taking into account pan-African development programmes with a special emphasis on AFLDCs. There have been two Africa-India Forum Summits between the Heads of States held in New Delhi (April 2008) and Addis Ababa (May 2011). The 2008 Summit outlined the 'Africa-India Framework of Cooperation' and announced the launch of India's DFTP scheme for LDCs in the hope that it would help boost AFLDCs' exports to India. At the second summit, foreign ministers from the two sides also adopted a follow-up 'Africa-India Framework for Enhanced Cooperation,' the main focus of which is to enhance cooperation in a wide range of activities, including economic, political, science and technology, health, tourism, infrastructure, and energy and environment.

The Second Meeting of the India-Africa Trade Ministers held in March 2012 in New Delhi set the target for India-Africa trade for 2015 at USD 90 billion, up from the previous year's target of USD 70 billion. The Third India-Africa Trade Ministers Meeting, held in Johannesburg in October 2013, focused on preparations for the Ninth WTO Ministerial Conference — which was held in Bali in December 2013 — by identifying the need to coordinate views on the concerns of developing countries with respect to trade facilitation, agriculture, a 'special package of measures for LDCs,' and special and differential treatment (S&D) provisions in favour of developing countries.

Since 2005, the Confederation of Indian Industry (CII) has played an active role in bringing India's private sector organisations to work with counterpart organizations and governments in Africa on trade and investment issues. CII and the Export-Import (EXIM) Bank of India jointly organise annual 'India-Africa Project Partnership Conclaves' to provide a platform for business entities and government departments and agencies in Africa and India to interact with each other. Ten such conclaves have been held since 2005. The most recent was in New Delhi in March 2014. Various initiatives have been taken to mobilise government, private sector, and institutional resources and forge public-private partnerships (PPPs) and joint ventures between African and Indian firms.

1.1 Objective

This study is motivated by the recognition that India can play a significant role in fostering economic development and structural transformation in AFLDCs by encouraging them to export a larger volume and wider range of products under an improved trade preference regime. The study is further premised on the view that an enhanced engagement of India with AFLDCs will allow India to deepen South-South trade cooperation.

The objective of this study is to undertake a simulation analysis of the trade preference scheme provided by India to AFLDCs to determine the likely economic impacts on India and AFLDCs of an expanded scheme. This is motivated by the observation that the current design of the scheme, which offers duty-free access to 85 per cent of Indian tariff lines, but excludes some products of critical export value to AFLDCs, may be hindering the scheme's overall effectiveness. Hence, it is useful to understand the impacts of an expanded scheme so that appropriate policy recommendations could be made to the Government of India.

For the purposes of the simulations, we use the GTAP model, which provides an integrated and up-to-date data set for a large number of the countries in focus.

Section 3 provides an outline of India's DFTP scheme of preferential imports from LDCs. A survey of the literature is discussed in Section 4. Section 5 provides details on the direction and composition of AFLDCs' exports to India. The structure of the model and simulations designed for the purpose are outlined in Section 6. Section 7 provides the results of the simulations. Concluding remarks are provided in Section 8.

2. OUTLINE OF INDIA'S DFTP SCHEME

When WTO members launched the Doha Round in November 2001, they committed to providing DFQF market access to LDC exports.[1] At the Sixth Ministerial Conference of the WTO held in 2005 in Hong Kong, it was agreed that developed countries should extend DFQF market access to LDCs. Developing countries may also do so according to their capacity.[2] India became the first developing country to announce the launch of a DFTP scheme for LDCs in 2008.[3] In the context of Africa, the anticipation was that India's DFTP scheme would lead to increases in AFLDCs' exports to India as well as their economic welfare.

India's DFTP Scheme for LDCs[4] (DFTPI-LDC) provides for:

(i) **Duty-free access**: On about 85 per cent of India's total tariff lines, applied customs duties have been removed over a period of 5 years with a 20 per cent reduction each year.

(ii) **Positive list**: In addition to the 85 per cent duty-free tariff lines, preferential market access as per margin of preference (MOP) is available on about 9 per cent of tariff lines (458 items). The MOP ranges from 10 per cent to 100 per cent on different items and is available on the applied rate of duty as on the date of imports.

(iii) **Exclusion list**: Contains only 6 per cent of total tariff lines (326 items) on which no tariff preference is available and imports are allowed at most-favoured nation (MFN) rates.

The scheme has been implemented over a five-year period, 2008-2012. The preferential import benefits are currently available to 21 AFLDCs that have joined the scheme.

Africa's merchandise exports to India increased from USD 18.1 billion in 2007 to USD 43 billion in 2012. The share of AFLDCs in Africa's exports to India increased from about 13.8 per cent in 2007 to 26.3 per cent in 2012. The corresponding share of oil exports increased much faster and doubled up from 16.4 per cent in 2007 to 31.9 per cent in 2012. Non-oil exports of LDCs accounted for 10.4 per cent of Africa's exports to India in 2007. The share has risen to 16.4 per cent in 2012.

The bilateral trade data are from the World Bank's World Integrated Trade Solution (WITS).[5] We find a consistent underreporting or nil-reporting by AFLDCs, probably due to a lack of comprehensive procedures to capture trade data. The data on exports to India reported by the AFLDCs do not match the corresponding data on imports reported by India. Of the 33 AFLDCs, 12 have not reported any data for 2009-2011. For the sake of consistency and reliability in this study, we use mirror data, that is, data on imports from AFLDCs reported by India, as an estimate for AFLDCs' exports to India. Thus, the terms 'imports from AFLDCs by India' and 'exports of AFLDCs to India' are used interchangeably in this study.

In 2007, AFLDCs accounted for 42.3 per cent of total LDC exports to India. The share has nearly tripled – to 75.9 per cent in 2012. The corresponding shares of oil exports by LDCs and AFLDCs are 54 per cent and 92.7 per cent, respectively; non-oil export shares are 29.1 per cent and 47.1 per cent, respectively. These figures highlight the heavy concentration of AFLDC exports in oil.

Among non-oil products, significant exports are registered in categories such as vegetable products, base metals, mineral products, chemical products, textiles, and pearls and precious stones.

It should be noted that a revision to the scheme was officially announced in August 2014 (effective April 2014). The new scheme (see Box 1 for details) provides duty treatment to a larger number of tariff lines - 98 percent compared to 86 percent previously. This change came when the bulk of the analysis of this paper had been completed. However, it should not affect the findings or recommendations of the paper in any way since the scenarios modeled in this paper are still very relevant.

Box 1. The Revised DFTP Scheme

On April 1, 2014, the Government of India published in the Gazette of India a notification that brought further amendments to the DFTP scheme announced on August 13, 2008. The notification includes two tables that are meant to replace the corresponding lists of preference products (that is, products on which lower-than-MFN tariffs are applied) and excluded products in the original notification. Both lists are significantly shorter than their original versions. With these changes, the DFTP scheme will now effectively provide duty treatment to about 98 percent of tariff lines, up from 85 percent initially.

The number of tariff lines in the exclusion list has shrunk from 326 to 97; the new MOP list features 114 tariff lines compared to 468 originally. This means that 229 products have been moved out of the exclusion list. The majority of them now enjoy duty-free status; only a few products – notably fresh tomatoes, almonds (shelled) and walnuts – have been shifted from the exclusion list to the "positive list" with a margin of preference (MOP) of 25 percent. Among the products that have been fully liberalized are rice, maize, most fruits and vegetables (except fresh apples and onions), and waste and scrap of most metals (except copper).

Nevertheless, the new scheme continues to exclude a number of products of key export interest to LDCs, especially African LDCs. These include milk and cream (with sugar), whole milk powder, some fruits and vegetables (e.g. apples and onions), cashew nuts, coffee, tea, some spices and oilseeds (e.g. linseed, sesame), wheat flour, beer, wine and spirits, tobacco and cigarettes, and copper and related products (e.g. bars, rods, cathodes, waste and scrap).

Finally, while over 350 tariff lines from the MOP list are now 100 percent duty-free, it appears that both the exclusion list and the positive list feature products that were not there initially. While this could be a statistical anomaly (we notice, for example, that many of these products are at the 8-digit HS level instead of the traditional 6-digit level), we suspect that some tariff lines from the duty-free list may now be subject to tariffs, or excluded altogether. Further analysis is needed to confirm if this is indeed the case.

Source: Authors' analysis based on information on the changes to the DFTP scheme published in the Government of India gazette. Available at http://www.cbec.gov.in/customs/cs-act/notifications/notfns-2014/cs-tarr2014/cs08-2014.htm.

3. LITERATURE SURVEY

Notwithstanding the recent interest in India-Africa relations, there is limited research on the potential and actual impact of India's DFTP scheme for ALDCs.

A notable exception in this regard is Kallummal *et al*,[6] which provides a detailed discussion on the analysis of the export trends of 29 LDCs benefiting from India's scheme. These include 21 AFLDCs. It outlines the relevance of the structure of India's scheme for the exports of beneficiary LDCs. It compares the volume and shares of LDCs' global exports of various products in the three categories of the scheme: duty-free, positive, and excluded. Products that constitute a high share of LDC exports to India but appear on the exclusion list may not benefit from the scheme. Fortunately, the study finds that India's scheme is significantly inclusive, because about 85 per cent of world exports of the beneficiary LDCs are in products that receive tariff preferences in India. About 93 per cent of India's imports from the beneficiary LDCs are covered under India's preference products. The findings of the study suggest that the overall exports of beneficiary LDCs have benefited from the scheme. However, 7 of 29 beneficiary LDCs appear to be severely disadvantaged, because their key exports are excluded. These countries include Afghanistan and six AFLDCs: Burundi, Ethiopia, Malawi, Rwanda, Uganda, and Zambia – less than 60 per cent of their global exports are eligible for tariff preference in India. Four other LDCs – Samoa, Eritrea, Rwanda, and Zambia (the last three of which are AFLDCs) – have failed to benefit from the scheme, mainly owing to a decline in exports of their preference products to India.

There are at least three major limitations of this study. First, the study does not assess the scheme's impact using an econometric model that could control for exogenous factors, other than the DFTP scheme, affecting LDC exports to India. It simply undertakes an ex post analysis of export trends and attributes cases of significant increases in exports after 2008 (the date the scheme was launched) to the scheme. Second, while it analyses the export performance of 29 LDCs, it does not analyse the potential of export gains for the remaining 20 LDCs once they join the list of beneficiary countries. The third, but more important, limitation is that the study does not have the analytical tools to understand the impact of increases in exports on the GDP, economic welfare, and returns to the factors of production in the beneficiary LDCs.

The WTO-CII study *India-Africa: South-South – Trade and Investment for Development*[7] provides a comprehensive view of the growing partnership between India and Africa in trade and investment. This partnership may spur economic growth in AFLDCs and make a dent on poverty alleviation in Africa. The study is based on a survey of 60 major Indian and African companies and business associations. It identifies the factors that hinder the expansion of bilateral trade and investment. Two of the major concerns of African exporters are lack of access to the Indian market and lack of trade finance. Indian traders and investors lament the difficulties in transport and logistics and a poor business environment. The study makes various recommendations for smoothing the potential bottlenecks to enable a more sustainable investment- and trade-led growth relationship between India and Africa. Development assistance by India to its African partners could play a major role in this process.

Laird[8] examines the implementation of the different preferential market access schemes offered by Canada, China, the European Union (EU), India, Japan, South Korea, and the United States (US) to LDCs. Using the WITS-SMART partial equilibrium model, the study aims to estimate potential gains for LDCs from the across-the-board implementation of a 100 per cent DFQF trade preference scheme. One of the major findings of this study is that LDCs make further gains when DFQF schemes become more inclusive. The total export gains to these markets are 2.9 per cent, with wide variations across the seven above-mentioned markets. While the gains in exports to Canada, the EU, Japan, and China are positive but modest, the study shows significant export gains to Indian, South Korean, and US markets, with gains of 21.7 per cent, 12.9 per cent, and 11.8 per cent respectively, amounting to about USD 5.5 billion. The gains to India could even prove to be larger, since – by design – this study considers only 10 of the 48 LDCs.

Bouet *et al*[9] studied the potential costs and benefits of DFQF market access for LDCs using the Modelling International Relationships in Applied General Equilibrium (MIRAGE) model, a multi-sector, dynamic, multi-region computable general equilibrium (CGE) model used for trade policy analysis. The potential gains for LDCs' exports were analysed under different DFQF liberalisation scenarios laid out by the Organisation for Economic Co-operation and Development (OECD) and three developing countries, Brazil, China, and India. The results suggest that the LDCs would benefit from the removal of the remaining trade barriers, but only if all products are covered, since tariff peaks and exclusions in the OECD's current trade preference schemes affect some of the LDCs' most important export sectors. According to the study, the gains for LDCs, especially in Africa, increase significantly if Brazil, China, and India also provide 100 per cent DFQF market access.

Vanzetti *et al*[10] have used the GTAP model to analyse the gains for LDCs when developed countries and a selection of developing countries provide preferential market access to them. The study finds that exports from LDCs increase by USD 4.1 billion when developed countries provide DFQF market access to them. There are additional gains of USD 1.9 billion when the selected developing countries (Brazil, China, and India) also provide DFQF market access. In addition, this study shows that DFQF programmes could boost LDCs' economic welfare by USD 1.8 and USD 2.6 billion, proving immensely beneficial for both LDCs' exports and welfare.

4. DIRECTION AND COMPOSITION OF AFLDC EXPORTS

Exports of the AFLDCs to India based on an annual average for 2009-2011 are dominated by oil (Table 1).[11] Oil constituted more than 77 per cent of the average annual exports to India of USD 6.5 billion. Angola is the largest oil-exporting AFLDC, accounting for 95 per cent of the total AFLDC oil exports. The other four oil-exporting AFLDCs are Guinea, Guinea-Bissau, Equatorial Guinea, and the Democratic Republic of the Congo (DRC), which together account for the remaining 5 per cent share. In Angola's case, oil constitutes more than 99 per cent of its exports to India. The corresponding shares are 99.7 per cent for Equatorial Guinea, 82.7 per cent for DRC, 51.7 per cent for Guinea, and 22.4 per cent for Guinea-Bissau.

Table 1. India's Average Total Imports from AFLDCs 2009-2011 (USD)

Countries	Oil	Non-oil	Total
Angola	4,718,380	27,673	4,746,053
Senegal	-	267,056	267,056
Tanzania	-	259,526	259,526
Guinea	94,195	88,141	182,336
Benin	-	179,136	179,136
Guinea-Bissau	38,474	133,400	171,874
Zambia	-	110,087	110,087
Togo	-	99,661	99,661
Equatorial Guinea	89,104	294	89,398
Mozambique	-	84,284	84,284
Congo, Dem. Rep. (DRC)	42,905	8,985	51,890
Malawi	-	45,614	45,614
Madagascar	-	35,170	35,170
Gambia, The	-	26,005	26,005
Ethiopia	-	25,492	25,492
Liberia	-	24,606	24,606
Uganda	-	13,742	13,742
Burkina Faso	-	9,633	9,633
Sierra Leone	-	5,361	5,361
Somalia	-	5,349	5,349
Comoros	-	3,740	3,740
Mali	-	3,730	3,730
Djibouti	-	2,088	2,088
Mauritania	-	2,085	2,085
Chad	-	1,570	1,570
Lesotho	-	1,267	1,267
Eritrea	-	1,220	1,220
Central African Republic	-	1,202	1,202
Burundi	-	565	565
Rwanda	-	162	162
Niger	-	156	156
Sao Tome and Principe	-	53	53
Total	**4,983,058**	**1,467,049**	**6,450,108**

Source: Calculations based on WITS online database.

While oil is on the duty-free list, it is pertinent to study the shares of non-oil exports by AFLDCs to India distributed under three categories of the DFTP scheme: excluded, positive, and duty-free.

The top 10 exporting AFLDCs to India (excluding oil) are Senegal, Tanzania, Benin, Guinea-Bissau, Zambia, Togo, Guinea, Mozambique, Malawi, and Madagascar (Table 2). Together, these countries account for about 90 per cent of the total non-oil exports to India (annual average during the period 2009-2011). Even though only 6 per cent (or 326) of the tariff lines fall under the exclusion list, the coverage in terms of imports is much higher at about 32.5 per cent. Likewise, 9 per cent of the tariff lines under the positive list cover about 15.9 per cent of imports. The remaining 51.6 per cent of imports come under the duty-free category (Table 4).[12]

The major share of exports under the exclusion list originates from Senegal, Togo, Benin, Angola, and Tanzania (Table 3). The major share of imports under the positive list originates from Tanzania, Malawi, and Mozambique. The major contributors to imports under the duty-free list include Benin, Tanzania, Guinea-Bissau, Zambia, and Togo.

With respect to the country-by-product coverage category, all exports from DRC and Lesotho fall under the duty-free list (Table 4). The corresponding shares are high for Guinea-Bissau (98.1 per cent); Gambia (95.8 per cent); Zambia (86.1 per cent); and Guinea (86.1 per cent).

It is important to look at the distribution of the major products exported by AFLDCs to India according to the three categories of tariff treatment. Tables 15 and 16 in the Annex provide details of the major products (HS 6-digit tariff lines) imported into India. While Table 15 provides details of the major products exported by AFLDCs, Table 16 provides the countries of origin of India's top 50 imports, broken down into excluded, positive, and duty-free categories. These tables provide important insights into the country-by-product concentration of AFLDC exports to India.

Table 2. Country-Wise Value of AFLDC Exports to India in Top 100 Products, Excluding Oil, 2009-2011 (USD)

Countries	Excluded	Positive	Duty-free	Total
Senegal	246,381	567	18,234	265,181
Tanzania	23,752	98,475	132,330	254,558
Benin	34,088	4,264	139,024	177,376
Guinea-Bissau	2,461	78	129,862	132,401
Zambia	14,836	442	94,276	109,554
Togo	58,698	4,993	35,227	98,918
Guinea	11,912	163	74,944	87,019
Mozambique	5,106	39,951	36,840	81,896
Malawi	1,429	43,274	457	45,160
Madagascar	10,087	17,016	5,073	32,176
Angola	25,860	-	1,110	26,971
Gambia, The	1,075	-	24,751	25,826
Liberia	9,628	1,166	12,700	23,494
Ethiopia	2,653	8,652	12,056	23,361
Uganda	7,893	3,136	1,455	12,483
Burkina Faso	570	2,437	6,598	9,605
Congo, Dem. Rep.	3	-	8,856	8,859
Somalia	3,242	94	1,699	5,035
Sierra Leone	4,075	-	649	4,724
Comoros	372	1,002	2,317	3,691
Mali	101	1,343	1,538	2,982
Mauritania	1,762	-	151	1,912
Djibouti	855	68	937	1,861
Chad	8	1,229	-	1,237
Eritrea	647	-	514	1,161
Lesotho	-	-	1,160	1,160
Central African Republic	234	-	710	944
Burundi	110	-	425	535
Equatorial Guinea	190	-	11	201
Niger	27	-	92	120
Rwanda	56	-	58	114
Sao Tome and Principe	17	-	27	43
Total (Top 100)	**468,130**	**228,349**	**744,081**	**1,440,560**

Source: Calculations based on WITS online database.

Table 3. Shares of Countries Across Preferences, Excluding Oil, 2009-2001 (%)

Countries	Excluded	Positive	Duty-free	Total
Senegal	52.6	0.2	2.5	18.4
Tanzania	5.1	43.1	17.8	17.7
Benin	7.3	1.9	18.7	12.3
Guinea-Bissau	0.5	0.0	17.5	9.2
Zambia	3.2	0.2	12.7	7.6
Togo	12.5	2.2	4.7	6.9
Guinea	2.5	0.1	10.1	6.0
Mozambique	1.1	17.5	5.0	5.7
Malawi	0.3	19.0	0.1	3.1
Madagascar	2.2	7.5	0.7	2.2
Angola	5.5	0.0	0.1	1.9
Gambia, The	0.2	0.0	3.3	1.8
Liberia	2.1	0.5	1.7	1.6
Ethiopia	0.6	3.8	1.6	1.6
Uganda	1.7	1.4	0.2	0.9
Burkina Faso	0.1	1.1	0.9	0.7
Congo, Dem. Rep.	0.0	0.0	1.2	0.6
Somalia	0.7	0.0	0.2	0.3
Sierra Leone	0.9	0.0	0.1	0.3
Comoros	0.1	0.4	0.3	0.3
Mali	0.0	0.6	0.2	0.2
Mauritania	0.4	0.0	0.0	0.1
Djibouti	0.2	0.0	0.1	0.1
Chad	0.0	0.5	0.0	0.1
Eritrea	0.1	0.0	0.1	0.1
Lesotho	0.0	0.0	0.2	0.1
Central African Republic	0.0	0.0	0.1	0.1
Burundi	0.0	0.0	0.1	0.0
Equatorial Guinea	0.0	0.0	0.0	0.0
Niger	0.0	0.0	0.0	0.0
Rwanda	0.0	0.0	0.0	0.0
Sao Tome and Principe	0.0	0.0	0.0	0.0
Total	**100.0**	**100.0**	**100.0**	**100.0**

Source: Calculations based on WITS online database.

Table 4. Shares of Preferences Across Countries, Excluding Oil, 2009-2011 (%)

Countries	Excluded	Positive	Duty-free	Total
Senegal	92.9	0.2	6.9	100.0
Tanzania	9.3	38.7	52.0	100.0
Benin	19.2	2.4	78.4	100.0
Guinea-Bissau	1.9	0.1	98.1	100.0
Zambia	13.5	0.4	86.1	100.0
Togo	59.3	5.0	35.6	100.0
Guinea	13.7	0.2	86.1	100.0
Mozambique	6.2	48.8	45.0	100.0
Malawi	3.2	95.8	1.0	100.0
Madagascar	31.4	52.9	15.8	100.0
Angola	95.9	0.0	4.1	100.0
Gambia, The	4.2	0.0	95.8	100.0
Liberia	41.0	5.0	54.1	100.0
Ethiopia	11.4	37.0	51.6	100.0
Uganda	63.2	25.1	11.7	100.0
Burkina Faso	5.9	25.4	68.7	100.0
Congo, Dem. Rep.	0.0	0.0	100.0	100.0
Somalia	64.4	1.9	33.7	100.0
Sierra Leone	86.3	0.0	13.7	100.0
Comoros	10.1	27.1	62.8	100.0
Mali	3.4	45.0	51.6	100.0
Mauritania	92.1	0.0	7.9	100.0
Djibouti	46.0	3.7	50.4	100.0
Chad	0.6	99.4	0.0	100.0
Eritrea	55.7	0.0	44.3	100.0
Lesotho	0.0	0.0	100.0	100.0
Central African Republic	24.8	0.0	75.2	100.0
Burundi	20.5	0.0	79.5	100.0
Equatorial Guinea	94.4	0.0	5.6	100.0
Niger	22.8	0.0	77.2	100.0
Rwanda	49.3	0.0	50.7	100.0
Sao Tome and Principe	38.4	0.0	61.6	100.0
Total	**32.5**	**15.9**	**51.7**	**100.0**

Source: Calculations based on WITS online database.

5. MODEL AND SIMULATIONS

The present study examines the likely impact of India's DFTP scheme on the exports and welfare of AFLDCs. We used the GTAP model for the purposes of this study.

5.1 Model Structure and Assumptions

The GTAP model is a multi-region, multi-sector CGE model.[13] It analyses trade flows across countries/regions of the world. Each country/region is divided into sectors of production. The interlinkages across these sectors are captured through input-output databases specific to these countries/regions. Each region is assumed to have a single household that represents a consumer as well as a provider of factor services.

The model makes a number of assumptions:

- Goods produced by a specific industry are imperfect substitutes between domestic and imported categories; that is, domestically produced and imported goods in each industry are treated as imperfect substitutes. The composite of domestic and imported goods is a constant elasticity of substitution (CES) function. These composites are used by households, firms, and the government for consumption, production, and capital formation.

- Taxes are collected by the government and spent on public goods.

- The model assumes constant returns to scale (CRS) production technology. The inputs are used as composites of intermediate inputs and primary factors of production. While the intermediate inputs are used in fixed proportions, the primary inputs are substitutable.

- The five primary factors of production are skilled and unskilled labour, capital, land, and natural resources. While labour and capital are mobile across domestic sectors of production, domestic land and natural resources are used in fixed proportions only in the mining and agricultural sectors. The primary factors of production are mobile within a region but immobile across regions.

- We use the comparative static version of the GTAP model, which provides post-simulation results of a new equilibrium.

5.2 Aggregation

In this study, we use the GTAP version 8.1 database as documented in Narayanan, Aguiar, and McDougall.[14] It has 57 sectors of production and 134 countries/regions. For the purposes of this study, the database includes 45 sectors of production (including 3 service sectors) and 30 regional groups. Each of the 42 sectors, other than services, is mapped one-to-one with the corresponding GTAP sectors. The remaining model sectors are the 15 GTAP services sectors mapped into three categories: 'air transport services' (sector 50); 'business services,' including communications, financial services, insurance, and other business services (sectors 51 to 54); and the remaining 10 service sectors put together under one category – 'other services' (Annex,-Table 17).

With regard to the regions, 134 countries/regions have been aggregated into 30 groups; all the AFLDCs/regions have been mapped one-to-one (representing 17 countries/ regions), while the rest of Africa has been categorised as one region (Annex,Table 18).

Under the scenarios considered in this study, we assume that all AFLDCs —including the ones that are not formally current beneficiaries — benefit from the DFTP scheme. This assumption is necessary, since some of the beneficiary AFLDCs are included in the 'grouped regions' along with other, non-beneficiary countries, and there is no way to identify them separately in the current GTAP database. For example, the 'Rest-of-Eastern Africa' group includes Burundi, Comoros, Eritrea, Somalia, and Sudan as well as Mayotte and Seychelles (Annex, Table 18). The last two are not LDCs.

One of the limitations of having very few sectors of production (45, including 3 services sectors), compared with 5000-plus 6-digit Harmonized System (HS) codes, is the difficulty of mutual concordance, or matching. Such concordance is important, since the three lists are constituted according to the 6-digit tariff line details. For the purpose of creating policy shocks, we have grouped AFLDCs' exports to India into 42 (goods) sectors used in this exercise by creating a concordance between 5000-plus 6-digit codes and the 42 sectors modelled in our study.[15] The results are presented in Table 5. This table provides information on the share of exports from AFLDCs to India under the DFTP exclusion list for two different time periods: the average for 2005-2007 and the average for 2009-2011. Averages were used to smooth the effect of outlier data values. While the average values for the period 2005-2007 indicate the import basket in the pre-DFTP scheme period (even though such a list was not defined in this period), those for 2009-2011 indicate the import basket in the post-DFTP scheme period.

With respect to the 'share column' of Table 5 for 2009-2011, the following examples facilitate understanding:

a) All imports (100 per cent) of oilseeds are covered under the exclusion list;

b) Leather products are not covered under the exclusion list;

c) In the case of forestry, only 3.1 per cent of imports are excluded from preferential tariffs;

d) The corresponding percentages are 50.7 per cent for food products, not elsewhere classified (NEC); 73.2 per cent for petroleum and coal products; 92.3 per cent for chemicals, rubber and plastic products; 98.1 per cent for ferrous metals; 60.8 per cent for metals NEC; and so on.

Table 5. Average Total Imports to India from All AFLDCs and Shares of Value of Excluded Items, GTAP Sectors

All AFLDCs			Averages-Total Imports ('000 USD)		Shares-Excluded Imports (%)		Tariff Cuts for Preferential Liberalisation
S.no	Code	Description	2005-2007	2009-2011	2005-2007	2009-2011	
1	PDR	Paddy rice	0	0	-	-	-
2	WHT	Wheat	0	0	-	-	-
3	GRO	Cereal grains NEC	0	0	-	-	0
4	V_F	Vegetables, fruit, nuts	241448	597560	0.1	0.2	-99.8
5	OSD	Oil seeds	3023	7786	100	100	0
6	C_B	Sugar cane, sugar beet	0	0	-	-	-
7	PFB	Plant-based fibres	18530	19718	0	0	-100
8	OCR	Crops NEC	20347	45389	23.4	20.3	-79.7
9	CTL	Bovine cattle, sheep and goats, horses	0	0	-	-	-
10	OAP	Animal products NEC	7441	4229	0	0	-100
11	RMK	Raw milk	0	0	-	-	-
12	WOL	Wool, silk-worm cocoons	8	1210	0	0	-100
13	FRS	Forestry	41463	26386	1.4	3.1	-96.9
14	FSH	Fishing	119	128	0	0	-100
15	COA	Coal	989	2683	0	0	-100

Table 5. *Continued*

16	OIL	Oil	675856	4983058	0	0	-100
17	GAS	Gas	0	0	-	-	-
18	OMN	Minerals NEC	155959	236536	24.1	20.7	-79.3
19	CMT	Bovine meat products	0	0	-	-	-
20	OMT	Meat products NEC	0	22	-	0	-100
21	VOL	Vegetable oils and fats	10	3738	96.9	14.7	-85.3
22	MIL	Dairy products	0	195	-	100	0
23	PCR	Processed rice	0	0	-	-	-
24	SGR	Sugar	1773	0	0	-	-
25	OFD	Food products NEC	75	669	63.9	50.7	-49.3
26	B_T	Beverages and tobacco products	51	40	98.1	100	0
27	TEX	Textiles	254	1619	0	1.6	-98.4
28	WAP	Wearing apparel	10	21	0	0	-100
29	LEA	Leather products	3455	11849	0	0	-100
30	LUM	Wood products	2517	13218	0	0	-100
31	PPP	Paper products, publishing	695	1488	2	4.8	-95.2
32	P_C	Petroleum, coal products	656	14448	4.5	73.2	-26.8
33	CRP	Chemical, rubber, plastic products	164831	247781	94.9	92.3	-7.7
34	NMM	Mineral products NEC	809	465	0	3.4	-96.6
35	I_S	Ferrous metals	80890	104462	99.1	98.1	-1.9
36	NFM	Metals NEC	31571	94256	67	60.8	-39.2
37	FMP	Metal products	181	580	0	0	-100
38	MVH	Motor vehicles and parts	27	652	0	0	-100
39	OTN	Transport equipment NEC	53461	17356	0	11.3	-88.7
40	ELE	Electronic equipment	966	1890	0	0	-100
41	OME	Machinery and equipment NEC	2910	8687	0.2	0.3	-99.7
42	OMF	Manufactures NEC	1530	1988	0	0	-100
43	ATP	Air Transport	0	0	-	-	-
44	BSR	Business Services	0	0	-	-	-
45	OSR	Other Services	0	0	-	-	-

Source: Calculations based on WITS online database.

5.3 Tariff Barriers

We have used the International Trade Centre (ITC) Market Access Map MAcMap-HS6 database (MAcMap-HS6) measure of applied protection in 2007. Compared with the GTAP database, the MAcMap-HS6 database matched India's tariff protection rates better (Table 6).[16]

Table 6. Sectoral Tariff Rates (%)

Sectors	Code	GTAP	ITC - MACMAP
Paddy rice	pdr	38.0	80.0
Wheat	wht	99.8	37.5
Cereal grains NEC	gro	23.2	15.0
Vegetables, fruit, nuts	v_f	35.3	32.4
Oil seeds	osd	44.6	36.2
Sugar cane, sugar beet	c_b	0.0	30.0
Plant-based fibres	pfb	9.6	18.0
Crops NEC	ocr	47.1	32.6
Cattle, sheep, goats, horses	ctl	18.0	21.1
Animal products NEC	oap	6.9	19.9
Raw milk	rmk	0.0	0.0
Wool, silk-worm cocoons	wol	15.7	9.2
Forestry	frs	6.3	17.2
Fishing	fsh	15.6	29.0
Coal	coa	31.5	6.7
Oil	oil	9.9	7.5
Gas	gas	9.9	5.0
Minerals NEC	omn	9.0	4.7
Meat: cattle, sheep, goats, horse	cmt	17.6	29.0
Meat products NEC	omt	26.0	35.7
Vegetable oils and fats	vol	82.5	58.8
Dairy products	mil	31.9	32.9
Processed rice	pcr	41.0	75.0
Sugar	sgr	81.7	82.0
Food products NEC	ofd	37.0	31.1
Beverages and tobacco products	b_t	112.2	112.0
Textiles	tex	15.9	16.0
Wearing apparel	wap	13.9	22.9
Leather products	lea	12.9	10.0
Wood products	lum	13.8	9.8
Paper products, publishing	ppp	13.6	8.8
Petroleum, coal products	p_c	13.8	8.9
Chemical, rubber, plastic prods	crp	13.8	8.5
Mineral products NEC	nmm	14.3	9.3
Ferrous metals	i_s	19.0	10.0
Metals NEC	nfm	14.8	6.1
Metal products	fmp	14.9	9.8
Motor vehicles and parts	mvh	25.4	25.0

Table 6. *Continued*

Transport equipment NEC	otn	6.5	15.1
Electronic equipment	ele	2.3	8.0
Machinery and equipment NEC	ome	13.9	7.6
Manufactures NEC	omf	14.8	10.0
Air Transport	atp	0	0
Business Service	bsr	0	0
Other Services	osr	0	0

Note: We adapted the base tariff in the GTAP data from the MAcMap tariff rate except for the following sectors: sugar (sgr), beverage and tobacco products (b_t), and electronic equipment (ele) where we retain the original tariff from the GTAP database.

Source: GTAP Version 8,1 database; and International Trade Centre MAcMap (Market Access Map) data accessed November 19, 2013.

5.4 **Modelling Scenarios / Policy Simulations**

The purpose of this study is to assess the impact of the liberalisation of India's import tariff barriers on imports from AFLDCs. We assess the potential gains to AFLDCs under two scenarios:

c) Partial liberalisation: India offers duty-free entry to imports of goods from AFLDCs (excluding services) under the MFN list as well as of items on the positive list except for items that fall under the exclusion list (base tariff rates of 2007); and

d) Complete liberalisation: India offers duty-free entry to all imports, including items currently on the exclusion list.

The first simulation (partial liberalisation) is implicitly based on the proportions of excluded and non-excluded imports in different sectors (average for 2009-2011). This means that, rather than providing 100 per cent market access to a specific sector, it would liberalise imports that fall under non-exclusion lists (MFN and positive) (Table 5). For example, the average tariff in sector 'crops' (ocr) is 32.6 per cent, and the share of excluded imports is 20.3 per cent. The partial liberalisation shock would imply a reduction of 79.7 per cent (100 minus 20.3 per cent) on a tariff of 32.6 per cent. Similarly, all the partial liberalisation shocks have been computed as 100 minus the share of excluded imports.

5.5 **Closure Rule**

We have modified the standard GTAP model closure to allow for unemployment of unskilled labour in AFLDCs. This is done by exogenously fixing the real wage and allowing the supply of unskilled labour to be determined endogenously.[17]

6. RESULTS

The results of our simulation exercise are provided in Tables 7 to 14. Tables 7 and 8 present changes in the macro variables from the two simulations. Table 7 relates to the partial liberalisation scenario and Table 8 to the complete liberalisation scenario. Table 7 shows that the welfare change is positive for all AFLDCs under partial liberalisation. As expected, the aggregate welfare change is positive and even larger under the complete liberalisation scenario (Table 8).

The welfare gain from a policy simulation in the GTAP model refers to a money metric measure of the consumer's real consumption and saving due to changes in the prices of commodities. We have computed four components of such change: allocative efficiency, endowment effect, terms of trade effect, and investment-saving effect.

Consumers are affected by resource allocation in the economy. More efficient allocation of resources adds to consumer welfare. The endowment effect is measured through changes in the economy's productive capacity resulting from changes in the quantity of factors of production: land, labour, and capital. The terms of trade effect refers to the gain from a reduction in the domestic price vis-à-vis the world price, and vice versa. The investment-saving effect arises from changes in domestically produced capital goods relative to the price of savings (that is, interest rate) in the global bank.

The countries/regions with the potential maximum welfare gains (absolute terms) under partial liberalisation (Table 7) include Benin, Rest-of-West Africa, and South Central Africa. The total welfare gains for the AFLDCs are estimated at USD 1,008 million. India is likely to lose welfare albeit by a much smaller amount (USD 144 million). India's GDP is expected to post a marginal increase, while GDP increases are expected for all AFLDCs. The five large GDP (per cent) gainers are Benin, Rest of West Africa, Togo, Guinea, and Madagascar. The changes in exports and imports given in this Table refer to the countries' world trade. The changes in the real returns to the factors of production show an interesting pattern. The real return to land increases in all the AFLDCs, since their major export goods are relatively land intensive. The real returns to skilled labour and capital increase for all AFLDCs, except Madagascar, Mozambique, Tanzania, and Rwanda.

The pattern of results remains similar under the complete liberalisation scenario (Table 8). A major difference, however, is that Togo, Senegal, Madagascar, Tanzania, and Uganda move up in terms of expected gains in welfare and GDP. Part of the explanation lies in the fact that some of the major excluded items of export interest to these countries (Annex, Table 15) now get duty-free access to India. Some of the examples are ferrous waste and scrap (Madagascar, Senegal, and Togo); aluminium waste and scrap (Senegal and Togo); phosphoric acid and polyphosphoric acids (Senegal); and coffee for Uganda. India's welfare is expected to decline by USD 171 billion compared with a gain of USD 1,208 million for AFLDCs. The deterioration in India's welfare originates mainly from the loss of USD 180 billion, owing to adverse terms of trade. However, India reaps gains in terms of its allocative efficiency.

The decomposition of welfare gains under the two liberalisation scenarios are illustrated in Tables 9 and 10.

Benin is the major gainer in welfare under both scenarios (partial and complete trade liberalisation). It gets gains from increases in all of the four components of welfare decomposition with the increase in allocative efficiency topping the list. Its gains are higher under the second scenario. Five other countries that gained relatively highly in the second scenario vis-à-vis the first scenario include Togo, Senegal, Madagascar, Tanzania, and Uganda. They are expected to have additional gains in their welfare components. The additional welfare gains for Togo and Senegal originate from increases in all four components of welfare. Endowment and terms of trade effects dominate the increase in welfare of Madagascar and Uganda. Tanzania's additional gains are accounted for by an increase in its allocative efficiency and endowment and terms of trade effects.

It can be observed that the welfare in China, the North America Free Trade Agreement (NAFTA) region, and the EU declines (Tables 9 and 10). Such welfare losses originate mainly owing to a decline in their terms trade. NAFTA and the EU also get a hit on their investment-saving effects. In addition, the EU suffers from a decline in its allocative efficiency. The endowment effect does not affect welfare in these countries. However, these changes are too small to have any significant effect on these big economies. Such effects show up due to the general equilibrium effects of the model simulations.

It may be observed from Table 11 that India's sectors of production get affected owing to its DFTP scheme. The sectors in which output declines include paddy and processed rice; vegetables, fruits and nuts; crops NEC; cattle, sheep and horses; forestry; and crude oil and gas. However, in percentage terms, the declines are marginal.

The major categories of exports from AFLDCs to India are highlighted in Tables 12, 13 and 14. Table 12 provides the base values (2007) of exports of select major commodities from Africa, including AFLDCs, to India. The Middle East and North Africa (MENA) and non-LDC Africa, though not included in AFLDCs, are major oil exporters to India. India imports USD 3.5 billion worth of goods from AFLDCs, of which 69 per cent is oil. As per GTAP sector categories, non-oil imports worth USD 1.1 billion from AFLDCs include minerals (USD 272 million); vegetables, fruits and nuts (USD 208 million); chemicals, rubber, and plastic products (USD 113 million); forestry (USD 87 million); non-ferrous metals (USD 81 million); ferrous metals (USD 74 million); and crops NEC (USD 36 million).

Under the preferential trade liberalisation scenario, the exports of AFLDCs to India increase in all the major categories (Table 13). The major gaining sectors include oil (USD 1,835 million); vegetables, fruits and nuts (USD 249 million); crops NEC (USD 167 million); and forestry (USD 66 million). Tariffs on these sectors were reduced by large proportions (Table 5). The tariffs on oil were removed. Tariffs on fruits, nuts, and vegetables have also been reduced by about 100 per cent. The corresponding reduction was 97 per cent on forestry and 80 per cent on crops NEC.

The results of complete trade liberalisation are given in Table 14. The increase in exports of AFLDCs to India is more dispersed across other sectors. The following sectors in which tariffs had been removed did not gain more than corresponding gains made under preferential trade liberalisation: oil; fruits, nuts and vegetables, and forestry. Crops NEC gained more than under partial liberalization, since their tariffs, which were reduced by 80 per cent, have now been reduced by an additional 20 per cent. Hence, the expected gain on exports of crops increases from USD 167 million under partial liberalisation to USD 290 million under complete liberalisation. The other major gaining sectors include chemicals, rubber and plastic products (USD 87 million); ferrous metals (USD 52 million); and non-ferrous metals (USD 50 million). Large proportions of these sectors were previously under excluded categories.

6.1 **Limitation of CGE Model Simulation Results**

Computable general equilibrium models, like all other models, are subject to various limitations. The model used in this study provides results on potential gains (ex ante) but not real gains (ex post). This is not a forecasting model. There are issues of demand for goods from India and supply of goods from AFLDCs. The expected increase in demand from India for a particular product, due to preferential liberalisation for AFLDCs, may not occur in a manner that is consistent with the potential computed in the post-simulation equilibrium. Issues of quality are also important. There are also issues of non-tariff barriers. Likewise, the industries in AFLDCs may not have the requisite capacities to respond to the increased demand for their goods. Constraints related to infrastructure, new investments, and availability of additional labour resources may be serious burdens on increasing production capacities in AFLDCs. The results presented in this study must therefore be read as indicative but not as forecasts. Finally, there are too few GTAP sectors to study in detail the potential changes in products.

7. CONCLUDING REMARKS

India became the first developing country to announce the launch a DFTP scheme for LDCs in 2008. The expectation was that India's preferential access offered to the AFLDCs would lead to an increase in their exports to India as well as a boost to their economic growth and welfare. The objective of this study was to analyse the potential impact of India's preferential import regime on the exports and welfare of AFLDCs. This was done by considering welfare gains under two liberalisation scenarios.

The welfare change is potentially positive for all AFLDCs under the partial liberalisation scenario. It increases further under the complete liberalisation scenario. The extent of the increase in welfare gains under partial and complete liberalisation scenarios depends on the share of imports under the exclusion list. The total welfare of AFLDCs is expected to increase by USD 1,008 million under partial liberalisation and by USD 1,201 million under complete liberalisation. The welfare loss to India is much smaller, USD 144 million under partial liberalisation and USD 171 million under complete liberalisation.

Real GDP increases for all AFLDCs. The increase is higher under complete liberalisation than under partial liberalisation.

Exports to the world increase for all AFLDCs except Benin, even though Benin gains in terms of trade. However, the country is a clear winner in terms of welfare and GDP growth. All other AFLDCs gain in terms of trade.

The factors of production also gain. The real returns to land increase in all AFLDCs. However, the real returns to capital and skilled labour decrease in Madagascar, Mozambique, Rwanda, and Tanzania.

Exports of major commodities increase when India provides DFQF market access to AFLDCs. Exports of all AFLDCs, except Togo and Rwanda, increase.

Thus, India's DFTP scheme has the potential to benefit AFLDCs. The countries are expected to gain in terms of GDP, returns to the factors of production, allocative efficiency, and exports. The gains are expected to be higher if commodities under the exclusion list are also made duty free. While 21 AFLDCs have already formally joined the scheme, others may be in the process of joining.

Consistent with the recommendations of this paper, the Indian government announced a revision to the DFTP scheme in August 2014. The new scheme extends duty treatment to 98 percent of tariff lines, up from 85 percent previously. Yet, the 2 percent of excluded tariff lines relate to some products in which LDCs - especially African LDCs - have a demonstrated export interest.

This paper suggests that India could extend duty-free coverage to 100 percent without suffering any significant loss. The estimated loss of USD 27 million in that case will be more than offset by welfare gains to LDCs of the order of USD 200 million. Indian policymakers should bear this point in mind when they revisit the scheme next time - hopefully sooner rather than later.

Table 7. Change in Macro Variable Partial Liberalisation (% Change)

								Real Returns to Factors			
SrNo	Country/Region	Code	Welfare Change USD Million	Term of Trade	Real GDP	Exports	Imports	Land	Unskilled Labour	Skilled Labour	Capital
1	India	India	-144	-0.062	0.002	0.190	0.225	-0.429	0.086	0.103	0.101
2	China	CHN	-94	-0.008	-0.000	0.003	-0.001	-0.004	-0.004	-0.005	-0.004
3	Asian LDCs	AsiaLDC	1	-0.000	0.000	-0.019	-0.011	-0.214	0.017	0.025	0.023
4	Rest of Asia	ResofAsia	-19	-0.000	0.000	-0.000	-0.003	-0.046	0.001	0.001	0.001
5	Australia and New Zealand	ANZ	1	0.000	0.000	0.003	-0.001	-0.051	0.000	0.001	0.001
6	NAFTA	NAMERICA	-147	-0.004	-0.000	0.006	-0.003	-0.047	-0.002	-0.001	-0.001
7	Brazil	BRA	1	0.003	-0.000	0.010	0.003	0.024	-0.002	-0.002	-0.001
8	America_Less_North America	A_N	3	0.003	-0.001	0.003	-0.002	-0.002	-0.003	-0.003	-0.002
9	European Union -27	EUN27	-117	-0.001	-0.000	0.003	-0.001	0.041	-0.001	-0.002	-0.001
10	Rest of Europe	EUEFT	-1	0.000	-0.000	0.003	-0.000	0.073	-0.002	-0.002	-0.001
11	Middle East and North Africa	MENA	-43	-0.004	0.000	-0.002	-0.004	-0.016	0.000	0.000	0.000
12	Rest of West Africa	RestWAfrica	197	0.850	0.580	0.491	1.047	11.016	0.000	0.368	0.481
13	Benin	BEN	335	3.409	3.970	-4.784	6.392	15.764	0.000	7.017	6.434
14	Burkina Faso	BFA	6	0.072	0.073	0.445	0.437	1.153	0.000	0.057	0.036
15	Guinea	GIN	39	1.651	0.286	1.111	1.170	4.293	0.000	-0.030	0.143
16	Togo	TGO	15	0.259	0.376	0.103	0.524	0.768	0.000	0.546	0.765
17	Central Africa mainly LDCs	CenAfrica	33	0.131	0.029	0.157	0.138	0.218	0.000	0.024	0.039
18	South Central Africa	SouthCAfrica	190	0.388	0.049	0.414	0.343	1.088	0.000	0.157	0.173
19	Senegal	SEN	20	0.206	0.102	0.1056	0.264	2.003	0.000	0.105	0.101
20	Ethiopia	ETH	30	0.235	0.094	0.163	0.300	0.530	0.000	0.107	0.089
21	Madagascar	MDG	29	0.476	0.208	0.402	0.471	11.130	0.000	-0.319	-0.110
22	Malawi	MWI	4	0.140	0.052	0.158	0.157	0.942	0.000	0.031	0.059

Table 7. *Continued*

23	Mozambique	MOZ	15	0.178	0.085	0.066	0.046	6.221	0.000	-0.277	-0.215
24	Tanzania	TZA	57	0.605	0.158	0.415	0.548	4.840	0.000	-0.143	-0.052
25	Uganda	UGD	34	0.412	0.180	0.422	0.414	5.563	0.000	0.068	0.093
26	Zambia	ZAM	2	0.039	0.004	0.044	0.042	0.152	0.000	-0.002	0.007
27	Rwanda	RWA	0	-0.067	0.023	0.029	0.052	0.483	0.000	-0.033	-0.023
28	Rest of East Africa	RestEAfrica	2	0.033	0.016	0.074	0.077	0.184	0.000	0.023	0.023
	African LDCs	AFLDCs	1008	-	-	-	-	-	-	-	-
29	Africa -Other than LDC	OAFRICA	-19	-0.010	0.000	0.001	-0.003	0.001	-0.003	-0.004	-0.004
30	Rest of World	ROW	36	0.008	0.000	0.007	0.004	-0.004	-0.001	0.000	0.001
	World		469	0.000	0.000	0.007	0.007	0.000	0.000	0.000	0.000

Source: Authors' Computations based on model Simulations.

Table 8. Change in Macro Variable: Complete Liberalisation (% Change)

				% Change				Real Returns to Factors			
SrNo	Country/Region	Code	Welfare Change USD Million	Term of Trade	Real GDP	Exports	Imports	Land	Unskilled Labour	Skilled Labour	Capital
1	India	India	-171	-0.074	0.002	0.238	0.276	-0.571	0.101	0.123	0.120
2	China	CHN	-103	-0.008	0.000	0.003	-0.001	-0.003	-0.004	-0.006	-0.005
3	Asian LDCs	AsiaLDC	0	-0.002	0.000	-0.024	-0.014	-0.276	0.021	0.032	0.030
4	Rest of Asia	RestofAsia	-36	-0.001	0.000	0.000	-0.004	-0.053	0.001	0.001	0.001
5	Australia and New Zealand	ANZ	-1	0.000	0.000	0.003	-0.002	-0.053	0.000	0.000	0.001
6	NAFTA	NAMERICA	-161	-0.004	0.000	0.007	-0.004	-0.042	-0.002	-0.002	-0.002
7	Brazil	BRA	1	0.003	0.000	0.012	0.004	0.037	-0.002	-0.002	-0.001
8	America_Less_North America	A_N	4	0.004	-0.001	0.004	-0.002	0.005	-0.003	-0.003	-0.002
9	European Union -27	EUN27	-146	-0.001	0.000	0.003	-0.001	0.065	-0.001	-0.002	-0.001
10	Rest of Europe	EUEFT	-5	0.000	0.000	0.002	-0.002	0.132	-0.003	-0.003	-0.002
11	Middle East and North Africa	MENA	-39	-0.003	0.000	-0.002	-0.005	-0.017	0.000	0.000	0.000
12	Rest of West Africa	RestWAfrica	200	0.854	0.591	0.534	1.091	11.016	0.000	0.385	0.500
13	Benin	BEN	351	3.560	4.153	-4.896	6.721	16.029	0.000	7.377	6.786
14	Burkina Faso	BFA	6	0.061	0.073	0.478	0.470	1.082	0.000	0.066	0.044
15	Guinea	GIN	44	1.771	0.341	1.343	1.407	4.654	0.000	0.062	0.261
16	Togo	TGO	41	0.527	1.101	0.618	1.522	1.757	0.000	1.651	2.068
17	Central Africa mainly LDCs	CenAfrica	34	0.137	0.032	0.187	0.170	0.219	0.000	0.030	0.049
18	South Central Africa	SouthCAfrica	194	0.393	0.054	0.448	0.384	1.224	0.000	0.172	0.189
19	Senegal	SEN	76	0.907	0.302	0.764	1.169	1.866	0.000	0.672	0.722
20	Ethiopia	ETH	33	0.261	0.102	0.196	0.336	0.556	0.000	0.122	0.102
21	Madagascar	MDG	48	0.839	0.335	0.877	0.974	18.299	0.000	-0.486	-0.155
22	Malawi	MWI	8	0.282	0.099	0.302	0.301	1.685	0.000	0.068	0.129

Table 8. *Continued*

23	Mozambique	MOZ	15	0.186	0.087	0.154	0.136	6.272	0.000	-0.281	-0.204
24	Tanzania	TZA	78	0.784	0.226	0.650	0.790	5.594	0.000	-0.098	0.016
25	Uganda	UGD	65	0.846	0.329	0.824	0.810	10.474	0.000	0.135	0.185
26	Zambia	ZAM	5	0.075	0.014	0.095	0.092	0.206	0.000	0.012	0.023
27	Rwanda	RWA	2	-0.035	0.059	0.118	0.165	1.028	0.000	-0.048	-0.024
28	Rest of East Africa	RestEAfrica	4	0.073	0.044	0.162	0.170	0.127	0.000	0.073	0.074
	African LDCs	AFLDCs	1201	-	-	-	-	-	-	-	-
29	Africa -Other than LDC	OAFRICA	-20	-0.010	0.000	0.004	-0.002	0.013	-0.003	-0.005	-0.006
30	Rest of World	ROW	38	0.009	0.000	0.007	0.004	-0.003	-0.001	0.000	0.001
	World		561	0.000	0.000	0.011	0.010	0.000	0.000	0.000	0.000

Source: Authors' Computations based on model Simulations.

Table 9. Decomposition of Welfare Change: Preferential Liberalisation (Million USD)

SrNo	Country/Region	Code	Allocative	Endowment Effect	Terms of trade	Investment Saving Effect	Total
1	India	India	23	0	-152	-10	-139
2	China	CHN	-5	0	-84	-5	-94
3	Asian LDCs	AsiaLDC	0	0	1	-1	1
4	Rest of Asia	RestofAsia	0	0	-18	-1	-19
5	Australia and New Zealand	ANZ	2	0	1	-2	1
6	NAFTA	NAMERICA	-14	0	-88	-45	-147
7	Brazil	BRA	-3	0	4	-1	1
8	America_Less_North America	A_N	-9	0	13	-2	3
9	European Union -27	EUN27	-32	0	-66	-19	-117
10	Rest of Europe	EUEFT	-2	0	2	-1	-1
11	Middle East and North Africa	MENA	1	0	-46	2	-43
12	Rest of West Africa	RestWAfrica	51	60	74	12	197
13	Benin	BEN	127	95	29	84	335
14	Burkina Faso	BFA	2	3	1	0	6
15	Guinea	GIN	9	3	26	1	39
16	Togo	TGO	6	3	3	3	15
17	Central Africa	CenAfrica	5	7	26	-6	33
18	South Central Africa	SouthCAfrica	23	11	178	-21	190
19	Senegal	SEN	5	7	5	4	20
20	Ethiopia	ETH	6	12	7	5	30
21	Madagascar	MDG	1	15	12	1	29
22	Malawi	MWI	0	1	2	0	4
23	Mozambique	MOZ	2	5	8	0	15
24	Tanzania	TZA	9	18	26	5	57
25	Uganda	UGD	2	20	13	0	34
26	Zambia	ZAM	0	0	2	0	2
27	Rwanda	RWA	0	1	-1	0	0
28	Rest of East Africa	RestEAfrica	0	0	1	0	2
29	Africa -Other than LDC	OAFRICA	0	0	-19	-1	-19
30	Rest of World	ROW	2	0	39	-5	36
	World	World	210	262	-2	-1	469

Source: Authors' Computations based on model Simulations.

Table 10. Decomposition of Welfare Change: Complete Liberalisation (Million USD)

SrNo	Country/Region	Code	Allocative	Endowment Effect	Terms of trade	Investment Saving Effect	Total
1	India	India	23	0	-180	-15	-171
2	China	CHN	-6	0	-89	-7	-103
3	Asian LDCs	AsiaLDC	0	0	1	-1	0
4	Rest of Asia	RestofAsia	-3	0	-32	-1	-36
5	Australia and New Zealand	ANZ	1	0	0	-2	-1
6	NAFTA	NAMERICA	-15	0	-92	-54	-161
7	Brazil	BRA	-4	0	6	-1	1
8	America_Less_North America	A_N	-9	0	15	-2	4
9	European Union -27	EUN27	-39	0	-83	-24	-145
10	Rest of Europe	EUEFT	-3	0	-1	-1	-5
11	Middle East and North Africa	MENA	0	0	-41	1	-39
12	Rest of West Africa	RestWAfrica	53	61	73	13	200
13	Benin	BEN	133	100	30	88	351
14	Burkina Faso	BFA	2	3	1	0	6
15	Guinea	GIN	11	4	28	1	44
16	Togo	TGO	19	8	6	7	41
17	Central Africa	CenAfrica	6	8	28	-7	34
18	South Central Africa	SouthCAfrica	25	13	180	-23	194
19	Senegal	SEN	18	17	23	18	75
20	Ethiopia	ETH	6	13	7	6	33
21	Madagascar	MDG	1	24	21	2	48
22	Malawi	MWI	1	3	4	0	8
23	Mozambique	MOZ	2	5	8	0	15
24	Tanzania	TZA	14	24	33	6	78
25	Uganda	UGD	3	36	26	0	65
26	Zambia	ZAM	0	1	3	0	5
27	Rwanda	RWA	1	1	0	0	2
28	Rest of East Africa	RestEAfrica	1	1	2	0	4
29	Africa -Other than LDC	OAFRICA	1	0	-20	-1	-20
30	Rest of World	ROW	2	0	41	-5	38
	World	World	246	320	-1	-1	564

Source: Authors' Computations based on model Simulations.

Table 11. Sectoral Change on India Under Two Liberalisation Scenarios (% Change From Base)

SrNo	Sector	Code	Base	Partial	Complete
1	Paddy rice	pdr	14925	-0.008	1.069
2	Wheat	wht	15471	0.04	0.752
3	Cereal grains NEC	gro	7498	0.024	0.136
4	Vegetables, fruit, nuts	v_f	56804	-0.196	0.49
5	Oil seeds	osd	16776	0.112	0.474
6	Sugar cane, sugar beet	c_b	8950	0.036	0.668
7	Plant-based fibres	pfb	10626	0.037	0.775
8	Crops NEC	ocr	41727	-0.255	1.182
9	Cattle,sheep,goats,horses	ctl	10521	-0.023	0.27
10	Animal products NEC	oap	14481	0.045	0.285
11	Raw milk	rmk	44104	0.031	0.98
12	Wool, silk-worm cocoons	wol	3788	0.095	1.657
13	Forestry	frs	10843	-0.263	0.503
14	Fishing	fsh	10811	0.003	0.03
15	Coal	coa	8022	0.005	0.013
16	Oil	oil	14933	-0.108	1.802
17	Gas	gas	1786	0	-0.178
18	Minerals NEC	omn	16433	0.018	0.01
19	Meat: cattle, sheep, goats, horse	cmt	2469	0.24	0.491
20	Meat products NEC	omt	916	0.077	1.168
21	Vegetable oils and fats	vol	16911	0.146	0.383
22	Dairy products	mil	22438	0.025	0.577
23	Processed rice	pcr	33203	-0.006	0.335
24	Sugar	sgr	13766	0.044	0.3
25	Food products NEC	ofd	45292	0.047	0.334
26	Beverages and tobacco products	b_t	14647	0.012	0.112
27	Textiles	tex	59096	0.11	0.344
28	Wearing apparel	wap	15675	0.091	0.141
29	Leather products	lea	7432	0.362	0.586
30	Wood products	lum	6838	0.052	0.285
31	Paper products, publishing	ppp	16989	0.033	0.144
32	Petroleum, coal products	p_c	108881	0.276	0.713
33	Chemical, rubber, plastic prods	crp	116400	0.141	0.348
34	Mineral products NEC	nmm	33729	0.0141	0.056
35	Ferrous metals	i_s	58700	0.048	0.106
36	Metals NEC	nfm	21331	0.074	0.119
37	Metal products	fmp	45929	0.027	0.103
38	Motor vehicles and parts	mvh	32474	0.017	0.023

Table 11. *Continued*

39	Transport equipment NEC	otn	19571	0.022	0.067
40	Electronic equipment	ele	23288	0.025	0.04
41	Machinery and equipment NEC	ome	101379	0.032	0.053
42	Manufactures NEC	omf	52061	0.035	0.06
43	Air Transport	atp	5775	0.053	0.087
44	Business Service	bsr	224988	-0.004	-0.025
45	Other Services	osr	946164	0.009	0.029

Note: NEC = not elsewhere classified.

Source: Authors' Computations based on Model Simulations.

Table 12. Select Commodity Exports to India, Million USD Base Value (2007)

Country/Region	Code	Vegetables, fruit, nuts	Crops NEC	Forestry	Oil	Minerals NEC	Textiles	Chemical, Rubber Plastic prods	Ferrous metals	Metals NEC	Other	Total
Middle East and North Africa	MENA	63	20	2	41609	1894	97	3557	415	3995	14806	66459
Rest of West Africa	RestWAfrica	83	0	0	366	0	0	0	11	1	25	488
Benin	BEN	39	0	8	0	0	0	0	1	4	14	66
Burkina Faso	BFA	0	0	1	51	0	0	0	1	0	13	66
Guinea	GIN	5	0	7	245	69	0	0	10	0	4	340
Togo	TGO	0	0	16	0	40	0	0	9	0	4	68
Central Africa	CenAfrica	0	0	45	111	35	0	0	8	5	35	240
South Central Africa	SouthCAfrica	0	6	5	1439	38	0	1	7	34	20	1551
Senegal	SEN	6	0	0	0	0	0	103	7	2	17	134
Ethiopia	ETH	3	0	0	0	0	3	0	0	3	25	34
Madagascar	MDG	1	13	0	57	2	0	1	8	0	7	88
Malawi	MWI	2	1	0	14	0	0	0	0	0	4	22
Mozambique	MOZ	25	0	0	0	1	0	0	7	0	6	40
Tanzania	TZA	44	7	4	0	14	2	5	5	3	28	110
Uganda	UGD	0	9	0	95	0	0	0	1	0	9	114
Zambia	ZAM	0	0	0	0	61	0	0	0	21	3	85
Rwanda	RWA	0	0	0	27	0	0	0	0	0	2	30
Rest of East Africa	RestEAfrica	0	1	0	0	12	0	2	0	9	6	29
African LDCs	AFLDCs	208	36	87	2405	272	6	113	74	81	222	3505
Non_LDCAfrica	OAFRICA	136	29	123	8916	171	17	309	183	1968	1159	13010
Rest of World	ROW	1589	223	811	5514	12849	2858	19000	7281	13441	128372	191937
World		1996	308	1022	58444	15185	2978	22979	7953	19486	144558	274910

Note: Other stands for exports of other model sectors clubbed together. NEC = not elsewhere classified.

Source: Authors' computations based on Model Simulations.

Table 13. Select Commodity Exports to India, Million USD Absolute Change: Partial Liberalisation

Country/Region	Code	Vegetables, fruit, nuts	Crops NEC	Forestry	Oil	Minerals NEC	Textiles	Chemical, Rubber Plastic prods	Ferrous metals	Metals NEC	Other	Total
Middle East and North Africa	MENA	-3	-5	0	-1099	0	0	-2	0	0	-26	-1135
Rest of West Africa	RestWAfrica	100	0	1	280	0	0	0	0	0	16	397
Benin	BEN	40	0	5	0	0	0	0	0	-1	8	52
Burkina Faso	BFA	0	0	1	-11	0	0	0	0	0	13	3
Guinea	GIN	6	1	5	45	0	0	0	0	0	4	61
Togo	TGO	0	0	3	0	2	0	0	0	0	0	5
Central Africa	CenAfrica	0	0	43	117	0	0	0	0	1	0	161
South Central Africa	SouthCAfrica	0	5	4	1447	0	0	0	0	7	0	1463
Senegal	SEN	7	0	0	0	0	0	3	0	0	3	13
Ethiopia	ETH	4	0	0	0	0	14	0	0	1	5	24
Madagascar	MDG	0	57	1	-13	0	0	0	0	0	0	45
Malawi	MWI	4	8	0	-3	0	0	0	0	0	0	9
Mozambique	MOZ	32	0	0	0	0	2	0	0	0	0	34
Tanzania	TZA	56	25	3	0	1	5	0	0	1	9	100
Uganda	UGD	0	68	0	-21	0	0	0	0	0	4	51
Zambia	ZAM	0	0	0	0	2	0	0	0	5	0	7
Rwanda	RWA	0	3	0	-6	0	0	0	0	0	0	-3
Rest of East Africa	RestEAfrica	0	0	0	0	1	0	1	0	2	1	5
African LDCs	AFLDCs	249	167	66	1835	6	21	4	0	16	63	2427
Non_LDCAfrica	OAFRICA	-9	-7	-5	-239	0	0	0	0	-2	-1	-263
Rest of World	ROW	-97	-54	-31	-152	-2	-12	-15	-3	-4	-44	-414
World		140	101	30	345	4	9	-13	-3	10	-8	615

Note: Other stands for exports of other model sectors clubbed together.

Source: Authors' computations based on Model Simulations.

Table 14. Select Commodity Exports to India, Million USD, Absolute Change: Complete Liberalisation

Country/Region	Code	Vegetables, fruit, nuts	Crops NEC	Forestry	Oil	Minerals NEC	Textiles	Chemical, Rubber Plastic prods	Ferrous metals	Metals NEC	Other	Total
Middle East and North Africa	MENA	-3	-7	0	-1095	-1	0	-12	-1	-5	-29	-1154
Rest of West Africa	RestWAfrica	99	0	1	280	0	0	1	8	1	17	405
Benin	BEN	22	0	3	0	0	0	1	0	-1	3	28
Burkina Faso	BFA	0	0	1	-11	0	0	0	1	0	12	3
Guinea	GIN	6	2	5	46	0	0	0	8	1	2	69
Togo	TGO	0	0	-1	0	0	0	0	0	0	-1	-1
Central Africa	CenAfrica	0	0	45	117	0	0	1	7	3	-2	169
South Central Africa	SouthCAfrica	0	6	4	1445	0	0	1	6	21	-1	1481
Senegal	SEN	7	0	0	0	0	0	70	5	1	1	84
Ethiopia	ETH	4	0	0	0	0	15	0	1	2	6	27
Madagascar	MDG	0	92	1	-13	0	0	1	6	0	-1	87
Malawi	MWI	4	17	0	-3	0	0	0	0	0	1	18
Mozambique	MOZ	32	0	0	0	0	2	0	6	0	1	40
Tanzania	TZA	56	41	4	0	2	5	12	4	2	10	136
Uganda	UGD	0	126	0	-21	0	0	0	1	1	1	107
Zambia	ZAM	0	0	0	0	3	0	0	0	14	-1	16
Rwanda	RWA	0	5	0	-6	0	0	0	0	0	-1	-3
Rest of East Africa	RestEAfrica	0	0	0	0	2	0	2	0	6	-1	9
African LDCs	AFLDCs	230	290	63	1832	7	20	87	52	50	46	2676
Non_LDCAfrica	OAFRICA	-8	-10	-5	-238	0	-1	-1	-1	-6	0	-269
Rest of World	ROW	-88	-81	-28	-151	-1	-15	-66	-29	-21	-69	-548
World		131	192	30	348	6	4	8	21	17	242	998

Note: Other stands for exports of other model sectors clubbed together.

Source: Authors' computations based on Model Simulations.

ENDNOTES

1 World Trade Organization. "The Doha Declaration explained." http://www.wto.org/english/tratop_e/dda_e/dohaexplained_e.htm.

2 World Trade Organization. "Ministerial Declaration." WT/MIN(05)/DEC 22, December 2005. http://www.wto.org/english/thewto_e/minist_e/min05_e/final_text_e.htm.

3 Government of India. 2012.'"Duty-free Tariff Preference (DFTPI-LDC) Scheme announced by India for Least Developed Countries (LDCs)'", 2012. http://commerce.nic.in/trade/international_tpp_DFTP.pdf.

4 **AFLDCs**: Angola, Benin, Burkina Faso, Burundi, Central African Republic, Chad, Democratic Republic of the Congo, Djibouti, Equatorial Guinea, Eritrea, Ethiopia, The Gambia, Guinea, Guinea-Bissau, Haiti, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mozambique, Niger, Rwanda, Senegal, Sierra Leone, Somalia, Sudan, South Sudan, Togo, Uganda, Tanzania, and Zambia (underlined countries have joined the Scheme).

Asian LDCs: Afghanistan, Bangladesh, Bhutan, Cambodia, Lao People's Democratic Republic, Myanmar, Nepal, Yemen.

Island LDCs: Comoros, Kiribati, Samoa, Sao Tome and Principe, Solomon Islands, Timor-Leste, Tuvalu, Vanuatu (India considers Comoros as an African LDC and extends DFTP benefits to it).

Source: UNCTAD (2013).

5 The **World Integrated Trade Solution** (WITS) is a software developed by the World Bank, in collaboration with United Nations Conference on Trade and Development (UNCTAD), and in consultation with various International Organizations including the International Trade Centre (ITC), the United Nations Statistical Division (UNSD) and the WTO. It provides information on bilateral trade between countries based on various product classifications, product details, years, and trade flows http://wits.worldbank.org/wits/.

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11 The average of 2009-2011 has been taken to even out any fluctuation in a single year in the post-2008 period.

12 The corresponding values of imports under the Exclusion list, the Positive list and the Duty-free list were 36.4 per cent, 8.8 per cent and 54.9 per cent, respectively, on average during 2005-2007, i.e. the years before the DFTP Scheme was introduced.

13 A complete description of the GTAP model, developed and disseminated by the Centre for Trade Policy Analysis, Purdue University, is available in T. Hertel, ed. *Global Trade Analysis: Modelling and Applications* (London, Cambridge University Press, 1997). The GTAP model equations can be downloaded at: https://www.gtap.agecon.purdue.edu/resources/res_display.asp?RecordID=1367.

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15 The WITS database does not provide information on trade in services.

16 Goyal, Arun (2007): Customs Tariffs 2007-08, Academy of Business Studies.

17 See McDonald, Scott and Terrie Walmsley (2003a, b).

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ANNEX.

Table 15. Major Exports of AFLDCs to India*

Countries	Major Exports
Angola	Petroleum Oils
Benin	Cashew nuts, wood, Copper-waste and scrap, Aluminium-waste and scrap, Ferrous waste and scrap, Diammonium phosphate
Burkina Faso	Cashew nuts, cotton, Manganese ores and concentrates, Oil seeds and oleaginous fruits, Textile spinning machines
Burundi	Ball bearings with integral shafts, Oil seeds and oleaginous fruits, Raw skins of sheep or lambs, Whole bovine skin, Sheep or lamb skins, Spent primary cells
Central African Republic	Wood, Ferrous waste and scrap, Tropical wood, copper waste & scrap, Aluminium-waste and scrap
Chad	Cotton
Comoros	Vessels-designed for the transport of goods or persons, cloves, Ferrous waste and scrap
Congo, Dem. Rep.	Petroleum Oils, Cobalt ores and concentrates, Mint leaves
Djibouti	Ferrous waste and scrap, Sheep or lamb skins, Raw hides and skins of bovine or equine animals, Refined copper, Spent primary cells
Equatorial Guinea	Petroleum Oils, Ferrous waste and scrap
Eritrea	Ferrous waste and scrap, Precious stones (o/than diamonds) & semiprecious stones-unworked, Stainless steel waste and scrap, Waste and scrap of paper or paperboard, Lead ores and concentrates, copper waste & scrap, Hides and skins of goats
Ethiopia	Sheep or lamb skins, Seeds of kidney beans, Seeds of beans of a kind used for sowing, Ginger-not ground, Sesame seeds, Oil seeds and oleaginous fruits, Lead, Precious stones (o/than diamonds) & semiprecious stones- unworked
Gambia, The	Aluminium-waste and scrap, Ferrous-waste and scrap, Copper-waste and scrap
Guinea	Petroleum Oils, Copper ores and concentrates, Cashew nuts, Ferrous waste and scrap, Wood
Guinea-Bissau	Cashew nuts, Petroleum Oils, Copper ores and concentrates
Lesotho	Unimproved wool
Liberia	Vessels-designed for the transport of goods or persons, Ferrous waste and scrap, Light oil motor fuel from petroleum oils, Vessels-tugs and pusher craft, Floating docks, Cocoa beans
Madagascar	Cloves, Ferrous waste and scrap, Seeds of beans, Precious stones (o/than diamonds) & semiprecious stones-unworked
Malawi	Seeds of leguminous vegetables, Black tea
Mali	Cotton, Cashew nuts, Iron ores and concentrates , Distillate and residual fuel oil
Mauritania	Ferrous waste and scrap, Aluminium-waste and scrap, copper waste & scrap, Sheep or lamb skins
Mozambique	Seeds of leguminous vegetables, Cashew nuts, Seeds of beans, Synthetic rutile, Ferrous waste and scrap, Coal

Table 15. *Continued*

Niger	Sheep or lamb skins, Aluminium-waste and scrap, Hides and skins of goats, Waste and scrap of paper or paperboard, Lead
Rwanda	Coffee, Whole bovine skin, Hides and skins of goats, Precious stones (o/than diamonds) & semiprecious stones-unworked
Sao Tome and Principe	Waste and scrap of paper or paperboard, Ferrous waste and scrap
Senegal	Phosphoric acid and polyphosphoric acids, Ferrous waste and scrap, Cashew nuts, Aluminium, waste and scrap
Sierra Leone	Ferrous waste and scrap, Aluminium-waste and scrap, copper waste & scrap, Nonindustrial diamonds, Synthetic rutile, Cast iron waste and scrap
Somalia	Sesame seeds, Raw hides and skins of bovine or equine animals, Raw skins of sheep or lamb
Tanzania	Cashew nuts, Seeds of leguminous vegetables, Seeds of beans, Cotton, Seeds of chickpeas, Cloves, Precious stones (o/than diamonds) & semiprecious stones- unworked
Togo	Natural calcium phosphates, natural Aluminium calcium phosphates and phosphatic chalk, Ferrous waste and scrap, Wood, Cocoa beans, Cashew nuts, Alloy steel (o/than stainless) waste and scrap, Aluminium-waste and scrap
Uganda	Coffee, Cocoa beans, Cotton, Raw hides and skins (other than whole) of bovine or equine animals, Wood, Hides and skins of animals, Newsprint
Zambia	Copper ores and concentrates, Unrefined copper, Precious stones (o/than diamonds) & semiprecious stones-unworked, Refined copper cathodes and sections of cathodes, Manganese ores and concentrates, copper waste & scrap, Cobalt alloys

** For each country, export commodities are in declining order of the average imports of India during 2009-2011. These commodities cover more than 80% of their total exports to India.*

Table 16. List of AGLDCs Exporting Top 50 HS 6-Digit Products to India*

Preference category	6-digit HS code	Description	Countries
Excluded	280920	Phosphoric acid and polyphosphoric acids	Senegal
Excluded	720449	Ferrous waste and scrap nes	Angola, Senegal, Guinea, Madagascar, Benin
Excluded	251020	Natural calcium phosphates	Togo
Excluded	760200	Aluminium, waste and scrap	Benin, Senegal, Angola, Tanzania, Togo
Excluded	740400	Copper spent anodes; copper waste & scrap	Benin, Zambia, Angola, Tanzania, Liberia
Excluded	740311	Refined copper cathodes and sections of cathodes	Zambia, Tanzania
Excluded	090111	Coffee	Uganda, Guinea
Excluded	720410	Cast iron waste and scrap	Tanzania, Benin, Angola, Mozambique
Excluded	271019	Distillate and residual fuel oil (including blends)	Tanzania, Liberia, Mali
Excluded	120740	Sesame seeds	Somalia, Ethiopia, Tanzania, Burkina Faso
Excluded	271011	Light oil motor fuel	Liberia, Tanzania
Excluded	120799	Oil seeds and oleaginous fruits	Benin, Ethiopia, Burkina Faso, Burundi
Excluded	720429	Alloy steel (o/than stainless) waste and scrap	Togo, Benin, Sierra Leone, Senegal, Liberia
Excluded	090240	Black tea	Malawi, Tanzania, Mozambique, Senegal
Excluded	080132	Cashew nuts	Tanzania, Mozambique
Excluded	720421	Stainless steel waste and scrap	Angola, Benin, Eritrea, Tanzania, Togo
Excluded	130120	Gum Arabic	Ethiopia. Tanzania, Guinea, Mali, Togo
Excluded	740811	Refined copper, wire	Zambia, Malawi, Tanzania, Madagascar
Excluded	720441	Ferrous turnings, shavings, chips	Benin, Senegal, Togo
Excluded	720430	Tinned iron or steel waste and scrap	Madagascar, Angola, Senegal, Guinea, Eq. Guinea
Positive	071390	Seeds of leguminous vegetables	Tanzania, Malawi, Mozambique
Positive	071331	Seeds of beans of a kind used for sowing	Tanzania, Mozambique, Ethiopia, Madagascar
Positive	090700	Cloves	Madagascar, Tanzania, Comoros
Positive	520100	Cotton	Tanzania, Burkina Faso, Mali, Chad, Benin
Positive	071320	Seeds of chickpeas	Tanzania, Ethiopia
Positive	180100	Cocoa beans	Togo, Uganda, Liberia, Madagascar

Table 16. *Continued*

Positive	071339	Seeds of beans nes, of a kind used for sowing	Madagascar, Tanzania, Mozambique, Malawi
Positive	071333	Seeds of kidney beans	Ethiopia, Madagascar, Mozambique
Positive	091010	Ginger, not ground	Ethiopia, Benin, Djibouti
Positive	090411	Pepper of the genus Piper	Madagascar, Ethiopia, Benin, Mozambique
Duty-free	080131	Cashew nuts, fresh or dried, in shell	Guinea-Bissau, Benin, Tanzania, Mozambique, Gambia
Duty-free	260300	Copper ores and concentrates	Guinea, Zambia, Guinea-Bissau
Duty-free	710310	Precious stones (o/than diamonds)	Zambia, Tanzania, Madagascar, Ethiopia
Duty-free	251010	Natural calcium phosphates	Togo
Duty-free	440349	Wood in rough/roughly squared	Benin, Togo, Guinea, Tanzania, Central African Republic
Duty-free	260500	Cobalt ores and concentrates	Congo, Tanzania, Uganda
Duty-free	440729	Tropical wood	Tanzania, Benin, Mozambique, Central African Republic
Duty-free	260200	Manganese ores and concentrates	Zambia, Burkina Faso, Tanzania, Togo
Duty-free	410530	Sheep or lamb skins, without wool on	Ethiopia, Djibouti
Duty-free	810520	Cobalt alloys, unwrought	Zambia
Duty-free	410190	Raw hides and skins (other than whole) of bovine or equine animals	Tanzania, Somalia, Uganda, Djibouti, Madagascar
Duty-free	780199	Lead (o/than refined lead), bullion	Ethiopia, Mozambique, Benin, Tanzania, Zambia
Duty-free	440710	Coniferous wood sawn or chipped lengthwise	Tanzania, Benin, Guinea, Madagascar
Duty-free	320120	Wattle tanning extract	Tanzania, Mozambique
Duty-free	330129	Essential oils of eucalyptus	Tanzania, Madagascar
Duty-free	440792	Beech wood, sawn or chipped lengthwise	Tanzania, Benin, Mozambique
Duty-free	410419	Whole bovine skin upper or lining leather	Tanzania, Ethiopia, Somalia, Zambia, Uganda
Duty-free	121190	Mint leaves, crude or not manufactured	Tanzania, Congo, Madagascar
Duty-free	260700	Lead ores and concentrates	Senegal, Mozambique, Ethiopia, Tanzania ,Zambia
Duty-free	710399	Precious or semiprecious stones	Tanzania, Madagascar, Ethiopia, Mozambique, Zambia

** For each country, export commodities are in declining order of the average imports of India during 2009-2011.*

Table 17. Mapping of Model Sectors with GTAP Sectors

SrNo	Sectors	Code	GTAP Model Sectors
1	Paddy rice	pdr	Paddy rice
2	Wheat	wht	Wheat
3	Cereal grains NEC	gro	Cereal grains NEC
4	Vegetables, fruit, nuts	v_f	Vegetables, fruit, nuts
5	Oil seeds	osd	Oil seeds
6	Sugar cane, sugar beet	c_b	Sugar cane, sugar beet
7	Plant-based fibres	pfb	Plant-based fibres
8	Crops NEC	ocr	Crops NEC
9	Cattle,sheep,goats,horses	ctl	Cattle,sheep,goats,horses
10	Animal products NEC	oap	Animal products NEC
11	Raw milk	rmk	Raw milk
12	Wool, silk-worm cocoons	wol	Wool, silk-worm cocoons
13	Forestry	frs	Forestry
14	Fishing	fsh	Fishing
15	Coal	coa	Coal
16	Oil	oil	Oil
17	Gas	gas	Gas
18	Minerals NEC	omn	Minerals NEC
19	Meat: cattle,sheep,goats,horses	cmt	Meat: Cattle,Sheep,Goats,Horses
20	Meat products NEC	omt	Meat products NEC
21	Vegetable oils and fats	vol	Vegetable oils and fats
22	Dairy products	mil	Dairy products
23	Processed rice	pcr	Processed rice
24	Sugar	sgr	Sugar
25	Food products NEC	ofd	Food products NEC
26	Beverages and tobacco products	b_t	Beverages and tobacco products
27	Textiles	tex	Textiles
28	Wearing apparel	wap	Wearing apparel
29	Leather products	lea	Leather products
30	Wood products	lum	Wood products
31	Paper products, publishing	ppp	Paper products, publishing
32	Petroleum, coal products	p_c	Petroleum, coal products
33	Chemical,rubber,plastic prods	crp	Chemical,rubber,plastic prods
34	Mineral products NEC	nmm	Mineral products NEC
35	Ferrous metals	i_s	Ferrous metals
36	Metals NEC	nfm	Metals NEC
37	Metal products	fmp	Metal products

Table 17. *Continued*

38	Motor vehicles and parts	mvh	Motor vehicles and parts
39	Transport equipment NEC	otn	Transport equipment NEC
40	Electronic equipment	ele	Electronic equipment
41	Machinery and equipment NEC	ome	Machinery and equipment NEC
42	Manufactures NEC	omf	Manufactures, NEC
43	Air Transport	atp	Air Transport
44	Business Service	bsr	Communication (cmn), Financial Services NEC(ofi), Insurance (isr), business Services (obs)
45	Other Services	osr	Electricity (ely), Gas Manufacture, distribution (gdt); Water(wtr); Construction(cns), trade(trd), transport, n.e.c (otp); Sea Transport (wtp); recreation and other services (ros); PubAdmin/ Defence/Educat (osg); Dwelling(dwe)

Source: GTAP Ver 8.1 Database.

Table 18. Mapping of Model Regions with GTAP Regions

SrNo	Country/Region	Code	GTAP Sectors
1	India	India	India
2	China	CHN	China
3	Asian LDCs	AsiaLDC	Bangladesh, Cambodia, Nepal (NPL), Rest of South Asia(XSA), Lao PDR (Lao), Sri Lanka
4	Rest of Asia	RestofAsia	Hong Kong (HKG), Japan, South Korea (KOR), Singapore (SGP), Taiwan(TWN), Indonesia(IDN), Malaysia(MYS), Pakistan (PAK), Philippines (PHL), Sri Lanka (LKA), and Thailand (THA)
5	Australia and New Zealand	ANZ	Australia (AUS), New Zealand (NZL) and Rest of Oceania (XOC)
6	NAFTA	NAFTA	United State of America (USA), Canada (CAN) and Mexico (MEX)
7	Brazil	BRA	Brazil
8	America Other than North America	A_N	Argentina (ARG), Bolivia (BOL), Brazil(BRA), Chile (CHL), Colombia (COL), Ecuador (ECU), Paraguay (PRY), Peru(PER), Uruguay (URY), Venezuela (VEN), Rest of South America (XSM), Costa Rica(CRI), Guatemala (GTM), Honduras(HND), Nicaragua (NIC), Panama (pan), El Salvador (SLV), Rest of Central America (XCA), Caribbean (XCB)
9	European Union -27	EUN27	Austria (AUT), Belgium (BEL), Cyprus (CYP), Czech Republic (CZE), Denmark(DNK), Estonia (EST), Finland (FIN), France (FRA), Germany (DEU), Greece (GRC), Hungary(HUN), Ireland (IRL), Italy(ITA), Latvia (LVA), Lithuania (LTU), Luxembourg (LUX), Malta (MLT), Netherlands (NLD), Poland (POL), Portugal (PRT), Slovakia (SVK), Slovenia (SVN), Spain (ESP), Sweden (SWE), United Kingdom (GBR), Bulgaria (BGR), Croatia (HRV), Romania (ROU)
10	Rest of Europe	EUEFT	Switzerland (CHE), Norway (NOR), Rest of EFTA (XEF), Albania (ALB), Belarus (BLR), Ukraine(UKR), Rest of Eastern Europe(XEE), Rest of Europe (XER)
11	Middle East and North Africa	MENA	Bahrain (BHR), Iran Islamic Republic of (IRN), Israel (ISR), Kuwait (KWT), Oman (OMN), Qatar (QAT), Saudi Arabia (SAU), Turkey (TUR), United Arab Emirates (ARE), Rest of Western Asia (XWS), Egypt (EGY), Morocco (MAR), Tunisia (TUN), Rest of North Africa (XNF)
12	Rest of West Africa	RWAfrica	Rest of West Africa (XWF)
13	Benin	BEN	Benin
14	Burkina Faso	BFA	Burkina Faso
15	Guinea	GIN	Guinea
16	Togo	Togo	Togo

Table 18. *Continued*

17	Central Africa	CentAfrica	Central Africa (XCF)
18	South Central Africa	SCAFRICA	South Central Africa (XAC)
19	Senegal	SEN	Senegal
20	Ethiopia	ETH	Ethiopia
21	Madagascar	MDG	Madagascar
22	Malawi	MWI	Malawi
23	Mozambique	MOZ	Mozambique
24	Tanzania	TZA	Tanzania
25	Uganda	UGD	Uganda
26	Zambia	ZAM	Zambia
27	Rwanda	RWA	Rwanda
28	Rest of East Africa	RestEAfrica	Rest of Eastern Africa (XEC)
29	Africa -Other than LDC	OAFRICA	Cameroon (CMR), Cote d'Ivoire (CIV), Ghana (GHA), Nigeria (NGA), Kenya (KEN), Mauritius (MUS), Zimbabwe (ZWE), Botswana (BWA), Namibia (NAM), South Africa (ZAF), Rest of South African Customs(XSC)
30	Rest-of-World	ROW	Mongolia (MNG), Rest of East Asia (XEA), Viet Nam (VNM), Rest of Southeast Asia (XSE), Rest of North America (XNA), Kazakhstan (KAZ), Kyrgyzstan (KGZ), Rest of Former Soviet Union (XSU), Armenia (ARM), Azerbaijan (AZE), Rest of the World (XTW), Russian Federation (RUS)

Note: i) The GTAP region ***Rest of West Africa (XWF)*** *comprises of Cape Verde, Gambia, Guinea-Bissau, Liberia, Mali, Mauritania, Niger, Saint Helena, Ascension, and Tristan da Cunha, Sierra Leone. They are all AFLDCs except Cape Verde and Saint Helena, Ascension, and Tristan da Cunha; ii) The region* ***Central Africa (XCF)*** *contains Central African Republic, Chad, Congo, Equatorial Guinea, Gabon, Sao Tome and Principe. Gabon is not included into AFLDCs; iii) Two LDCs (Angola and Democratic Republic of the Congo) are included in* ***South Central Africa (XAC)****; The region* ***Rest of East Africa (XEC)*** *comprises of Burundi, Comoros, Djibouti, Eritrea, Mayotte, Seychelles, Somalia and Sudan. Except for Mayotte and Seychelles, the rest are AFLDCs;* ***Rest of North Africa (XNF)*** *includes Algeria, Libyan Arab Jamahiriya and Western Sahara;* ***Rest of Western Asia (XWS)*** *includes Iraq, Jordan, Lebanon, Palestinian Territory Occupied, Syrian Arab Republic and Yemen.*

Source: GTAP Version 8.1 Database.

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- Evaluating Aid for Trade on the Ground: Lessons from Ghana. By Sarah Jane Danchie, Edward Brown and Abdul Mijiyawa. Issue Paper No. 27, 2013.
- Una Evaluación de la Ayuda para el Comercio en la Práctica: Lecciones de Guatemala. Por Hugo Maul, Lisardo Bolaños, Irene Flores, Rodrigo Méndez y Gustavo Sáenz. Documento de Fondo No. 26, 2012.
- A Review of Trade Preference Schemes for the World's Poorest Countries. By Sam Laird. Issue Paper No. 25, 2012.

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