The Impact of Foreign Trade in the Graduation Process of Asian Least-Developed Countries (LDCs)

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Abstract

The importance of development studies comes from the need to assess and solve economic problems. Graduation from LDC status represents an important milestone in their development path. This research tries to deepen on the relationship between the fulfillment of the "graduation criteria" established by the United Nations and the evolution of the foreign trade indices of a group of Asian LDCs about to graduate (Bangladesh, Bhutan, Laos, Timor-Leste, Nepal, and Myanmar), checking how trade, one of its engines for economic development, has involved during the last years and, specifically, on their way to graduation. First, the characteristics of the LDCs and the criteria to exclude them from the list are analyzed. Second, a set of indices are presented to find out the trade flows throughout the period observed. Finally, conclusions and future lines of research are proposed. The results show that all the countries studied have succeeded in expanding their share in world trade. The high participation of Bangladesh is justified by the size of its economy and its weight within the textile trade. Regarding diversification, all of countries present a highly concentrated pattern of exports and their exchanges are carried out with few countries. This lack of trade diversification places them in a vulnerable position. The relative trade balance index indicates that all of them are competitive with their trading partners in the products analyzed and the six have comparative advantage. To conclude, the analysis confirms that the trade structure of the LDCs considered has improved, but with differences due to their characteristics.

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Introduction

Currently 10% of the world's population lives in extreme conditions of poverty (less than 1.90 USD$ a day) and half of which are children. Furthermore, almost 50% of the population lives in unstable areas that are continuously punished by natural disasters and armed conflicts (World Bank, 2021). It seems clear that underdevelopment is a major global issue, especially in the least-developed countries (LDCs).

As researchers interested in this field of study of economics it exists, to a certain extent, the duty to clarify aspects related to their economies that can shed light on where its limitations are, in order to improve their situation.

Trade development is particularly relevant to the group of LDCs. This article aligns with the implementation of the Bali Package, intended to streamline procedures through trade facilitation measures. Concerning the group of countries, UNCTAD classifies LDCs based on a combination of geographical and structural criteria, which includes African LDCs and Haiti, Asian LDCs, and Island LDCs. Among these groups, Asian countries have been selected for analysis. This narrower focus on a specific geographical area and trade allows for a deeper and more accurate examination of results. Lastly, regarding graduation, the Committee for Development Policy (CDP) Triennial review in 2021 considered three countries (Bangladesh, Lao People's Democratic Republic, and Myanmar) for graduation from LDC status, as they met the graduation criteria for the second time. Additionally, Nepal and Timor-Leste had met the criteria in 2018, but the CDP deferred its decision on their graduation.

More specifically, this paper intends to evaluate how foreign trade has evolved in a group of Asian LDCs (Bangladesh, Bhutan, Myanmar, Nepal, Laos, and Timor-Leste), that are in a common situation of being close to meeting the criteria for graduation in the coming years. The purpose is to assess if their situation corresponds to the achievement of the reclassification criteria established by United Nations and to assess how foreign trade has impacted their processes towards "graduation".

The article analyzes the evolution of foreign trade in those countries, close to their graduation, during the period 2008–2021.[1]

The text is divided into three parts. The first one analyzes the profiles of the LDCs. The second presents the indices that will be calculated to analyze the evolution of their foreign trade (trade openness, share of national trade in world exchanges, trade concentration, origin and destination of exports and imports, relative trade balance and comparative advantage of Bela Balassa). The third part includes discussion of results, conclusions, and a proposal for future research.

The method of analysis followed was to calculate the mentioned indices to the group of countries considered to get a clearer picture of the trade pattern of these countries.

For the estimations, several sources were handled: International Monetary Fund, World Trade Organization, CHELEM, The Atlas of Economic Complexity (Harvard's Growth Lab's, 2013), Statista, and the National Statistics Bureau of Bangladesh, Bhutan, Nepal, Myanmar, and Laos.

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[1] This time period has been chosen to avoid any problems arising from the availability of data that might affect the results.

The central question posed in this research is: Is there a correspondence between being on the verge of meeting the criteria for graduation from LDCs status and its foreign trade evolution in these countries?.

The LDCs Category: Background and Context

The LDCs category was established in 1971 by a United Nations resolution, at the proposal of the United Nations Conference on Trade and Development (UNCTAD). LDCs are low-income countries confronting severe structural problems to sustainable development. They are highly vulnerable to economic and environmental shocks and have low levels of human capital (UNCTAD, 2014, 2020).

In 1971, 25 countries were identified as LDCs. Over the years, the number and the variety of countries have increased. The inclusion of countries in the list of LDCs has been as follows: Afghanistan, Benin, Bhutan, Botswana, Burkina Faso, Burundi, Chad, Ethiopia, Guinea, Haiti, Lao People's Democratic Republic, Lesotho, Malawi, Maldives, Mali, Nepal, Niger, Rwanda, Samoa, Somalia, Sudan, Uganda, United Republic of Tanzania, and Yemen in 1971. Throughout the years, 28 countries were added, as countries gained independence and faced severe developmental challenges, namely: Bangladesh, Central African Republic, Gambia in 1975; Cabo Verde, Comoros in 1977; Guinea-Bissau in 1981; Djibouti, Equatorial Guinea, Sao Tome and Principe, Sierra Leone, Togo in 1982; Vanuatu in 1985; Kiribati, Mauritania, Tuvalu in 1986; Myanmar in 1987; Mozambique 1988; Liberia in 1990; Cambodia, Democratic Republic of the Congo, Madagascar, Solomon Islands, Zambia in 1991; Angola and Eritrea in 1994; Senegal in 2000; Timor-Leste in 2003; South Sudan in 2012.

With respect to the process of inclusion in the list of LDCs, dealing with that topic is outside the focus of this article, and it requires another approach. While economic and social development indicators have greatly improved, they remain largely insufficient. As of 2021, forty-six countries are considered by the United Nations as LDCs.[2]

The international development strategy over the last years concerning these countries has been concentrated in the promotion of the international trade and the economic cooperation, orientated to increasing the flows of trade which provide the resources to accelerate their development (Helble et al., 2012; Laborde, 2008). Also, a pack of different initiatives has been taken to increase productivity, promote structural transformations, and foster institutional development.

Even if a few numbers of countries have graduated from the LDC category up until now, much research has been launched to identify successful experiences, to investigate what policies have most contributed to their achievement, and to investigate which policies they have been lacking in.

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[2] Afghanistan, Angola, Bangladesh, Benin, Bhutan, Burkina Faso, Burundi, Cambodia, the Central African Republic, Chad, the Comoros, the Democratic Republic of the Congo, Djibouti, Eritrea, Ethiopia, the Gambia, Guinea, Guinea-Bissau, Haiti, Kiribati, the Lao People's Democratic Republic, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mozambique, Myanmar, Nepal, the Niger, Rwanda, Sao Tome and Principe, Senegal, Sierra Leone, Solomon Islands, Somalia, South Sudan, Sudan, Timor-Leste, Togo, Tuvalu, Uganda, the United Republic of Tanzania, Yemen, and Zambia.

The positive growth performance of LDCs has not been sufficient to accelerate structural transformation (Guillaumont, 2004), reduce dependence on foreign investments, diversify exports, and control the rapid growth of imports. They are countries in profound need of reforms to their economic, political, and social systems (UNESCAP, 2021).

Their structural economic problems have been analyzed from various perspectives. Over the past 15 years, UNCTAD has consistently highlighted the need to develop their productive capacities and support them to reduce their vulnerabilities, vulnerabilities which have been extensively studied (Gore & Kozul-Wright, 2011; Saleemul et al., 2004; Turvey, 2007; UNCTAD, 2008).

The list of LDCs is reviewed every three years by the Committee for Development Policy (CDP) in the United Nations. The Committee may then recommend to add countries to the list, remove them after their graduation, or both (Fialho, 2012).

Between 2017 and 2020 the CDP undertook a comprehensive review of the LDC criteria and established the following three criteria, starting with the triennial review scheduled from February 2021:

(a) Income. A per capita income criterion, based on a three-year average estimate of the gross national income (GNI) per capita.
(b) A human assets index (HAI). A tool that includes two sub-indices: a health sub-index and an education sub-index. The health sub-index includes three indicators: under-five mortality rate, maternal mortality ratio, and prevalence of stunting. In the education sub-index there are three indicators: gross secondary school enrollment ratio, adult literacy rate, and gender parity index for gross secondary school enrollment.
(c) The economic and environmental vulnerability index, consisting of two sub-indices: an economic vulnerability sub-index and an environmental vulnerability sub-index. The economic vulnerability sub-index incorporates four indicators: (1) the share of agriculture, hunting, forestry, and fishing in GDP; (2) remoteness and landlockedness; (3) merchandise export concentration; and (4) instability of exports of goods and services. The environmental vulnerability sub-index contains four indicators: (a) share of population in low elevated coastal zones; (b) share of the population living in drylands; (c) instability of agricultural production; and (d) victims of disasters.

At the 2021 triennial review, the graduation threshold for the income criterion was set at $1222 or above. The threshold for income-only graduation is set at twice times the graduation threshold, which is $2444. For the Human Assets Index (HAI), the graduation threshold was 66 or above, and for the Economic and Environmental Vulnerability Index (EVI), it was 32 or below.

To be eligible for inclusion on the list, a country must satisfy all three criteria, and does not have a population over 75 million and the government of the country agree to the classification. Moreover, to be eligible for graduation from the LDC status must reach thresholds in two of the three criteria in at least two consecutive triennial reviews by CDP. However, if the 3-year average in the per capita GNI has

risen to a level at least double that the graduation threshold and this performance is considered durable, the country will be deemed eligible for graduation, regardless of its score under the other two criteria. This rule is commonly referred to as the "income-only" graduation rule (UNCTAD, 2022).

After the recommendation to graduate, a country will benefit from a grace period (3 years as usual) before the graduation effectively takes place. During this period, the country remains as LDC in order to have a "smooth-transition," so that the socioeconomic progress of the country can be maintained.

At present, only six countries have graduated from this category: Botswana (December, 1994), Cabo Verde (December, 2007), Maldives (January, 2011), Samoa (January, 2014), Equatorial Guinea (June, 2017), and Vanuatu (December, 2020).

Nevertheless, there are a number of countries which are in the process of reclassification. Among them, the following have been objects of study: Bangladesh, Bhutan, Myanmar, Nepal, Laos, and Timor-Leste.

There were recommendations to graduate Angola, Tuvalu, and Kiribati from LDC status. Bhutan is scheduled to graduate in 2023; and Sao Tome and Principe and Solomon Islands are scheduled for 2024.

At the same time, two LDCs (Nepal and Timor-Leste), which met the graduation criteria, were not recommended for graduation owing to concerns about the sustainability of their development progress (United Nations, 2021).

Lastly, in the 2018 review of the list of LDCs, three Asian countries were found pre-eligible for graduation from this status: Bangladesh, the Lao People's Democratic Republic, and Myanmar. Bangladesh and Myanmar are the first historical cases of prequalification for graduation through all three graduation criteria (per capita income, human assets, and economic vulnerability) (Chowdhury, 2021; ESCAP, 2005).

The Need to Improve Foreign Trade

Trade has traditionally been a priority goal for LDCs, because progress on trade is essential to improve growth and development. With globalization, the impacts of international trade on development outcomes have intensified, which is why international support measures for LDCs have been launched (Banerjee & Duflo, 2005; Chimhowu et al., 2019; UNCTAD, 2016).

The intention was to address the challenges related to integrating the LDCs (a structurally handicapped groups of economies) into the international trading system so that they could attain their development. Most importantly, the objective was to boost LDC trade through special provisions that are known as the "LDC Package" (United Nations, 2022).

Heal and Palmioli (2015) and ESCAP (2015) observed that many LDCs have export sectors that are highly concentrated in a few tariff headings, for example, in agricultural products and textiles.

One of the arguments for special measures in favor of LDCs is that trade is also determined by the level of economic development, special measures focused to expand their trade opportunities and the amount of external aid.

Diversification in exports, increases in the share of LDCs in world trade, structural changes, improvement in their productive capacities and the quality of labor, better physical infrastructure, and the enhancement of the technological capabilities and private investment are in the core of a long-term development, instead of applying piecemeal interventions or sectoral approaches (Makhlouf et al., 2015).

Special Support Measures for LDCs

A country's capacity to produce is linked to tradeable sectors with productivity and competitiveness (Pilinkienė, 2016), but also many other factors (Ali, 2017; Sarkar, 2007).

To remedy these deficiencies, LDCs receive special support from the donor community with special treatments. Currently, the support is focused on official development assistance, including development in financing and technical cooperation, and other kinds of assistance (Klasen et al., 2021).

Trade-related international support measures include preferential market access for goods and services, special treatment under WTO rules and certain regional agreements, technical and financial assistance, and capacity-building.

Finally, when LDCs graduate, they will no longer have access to certain international support measures; however, it is possible to implement smooth transition strategies, as mentioned below.

Although the share of primary commodities in total world trade has continued to shrink, commodity dependence has persisted in developing countries, particularly among LDCs. In 2019, two-thirds of developing countries and 85% of LDCs were classified as commodity-dependent (UNCTAD, 2019). The low and unstable growth among developing countries is a result of their commodity specialization, which conditions their development and limits their scope for innovation and the emergence of productivity-led growth dynamics (UNCTAD, 2015).

For international trade to anchor economic diversification in these countries, further support is needed to: improve human capital, push for strong intersectoral growth, ensure rising per capita incomes, and develop better policies and institutions. LDCs will remain marginalized if they fail to diversify their exports and increase their share of manufacturing in exports (Osakwe et al., 2018).

The supply-side constraints limiting its participation in international trade have been analyzed in successive least-developed countries reports, their productive capacities, as well as options to strengthen their competitiveness.

Diversification in exports remains challenging, as the export of many countries is made up of only one or a few products. These structural weaknesses point to the need to: develop the productive capacities including the interlinkages within and across sectors; address the other supply-side constraints such as the quality of labor; address deficiencies in physical infrastructure, the level of technological capabilities, and low levels of private investment. The literature is also clear on the role of innovation and technology; both could potentially pave the way to enhance productivity and growth (Maksimov et al., 2017).

In addition, the optimization of choice between physical capital accumulation and investment in human capital should not arise for developing countries, as both are at low levels. A comprehensive development agenda is, therefore, required to boost economic diversification, growth, and global competitiveness (Nguyen, 2009).

The Support of the World Trade Organization (WTO) to LDCs

LDCs are characterized by high poverty and low income levels caused by scarcity of resources for investment and financing of public services such as education, healthcare, administration, and public order. Also, the shortage of savings reduces the levels of investment and low productivity negatively affects their progress.

The lack of domestic demand reduces profitable investment opportunities, and since there is a shortage of qualified workers, the widespread poverty leads to environmental degradation, as people have to consume the stock of environmental capital to survive.

Getting out of this situation of poverty is possible. However, it is highly unlikely without integration into a broader international economy. International trade plays a decisive role in LDCs' poverty reduction, given that it enables countries to increase their productive capacities through the accumulation of capital and technological progress (Deaton, 2005).

Participation in international trade is key. Thanks to imports, resources that were unused in the economy are reallocated, improving the growth in other sectors. Growing LCDs' exports is possible by reducing production costs and increasing the investment in human and physical capital. Due to this process of structural change, they can redirect the agricultural labor force to industry or services (Hamed et al., 2014; Ocampo, 1986; UNCTAD, 2004).

Exports/GDP ratios are relatively low in LDCs, which is an indicator of weak export capabilities. Namely, export growth can support economic growth through:

– Gains that arise by specializing according to the current comparative advantage.
– Higher capacity utilization, as a consequence of increased external demand which enhances the use of previously idle (or surplus) labor and land resources that have gone underused due to a shortage of domestic demand.
– Increased investment in physical and human capital due to better returns on investment that may arise through the identification of new opportunities associated with external demand or via improved returns on investment following lower production costs.
– Productivity growth by means of technology transfer.
– Accelerated export-led industrialization, which implies a reallocation of labor from agriculture to manufacturing.

The importance and the combination of these effects vary between countries. For most LDCs, the primary sector, particularly agriculture, dominates production and employment with low productive capacities. In this situation, the key role of exports is to allow import goods that are necessary for a future economic growth

and poverty reduction. In this case, exports must grow fast enough and in a stable manner to meet the growing demand for imports.

The effect of exports over imports is very high. An economy is highly sensitive to imports when import bottlenecks prevent the full utilization of domestic productive capacities, when the content of industrial products is high and food security depends on food imports (Sachs, 2004).

But import sensitivity is not simply defined by the share of imports in total GDP; it also relates to the structure of the national economy and the composition of imports. The higher the proportion is of essential imports for the continuation of economic activities and their development, the greater the economy's sensitivity to imports will be.

LDCs are largely dependent on the availability of critical imports: fuel, other intermediate products, and spare parts. When such imports cannot be financed for a full capacity utilization, there is underemployment of labor, capital, and resources in import-dependent sectors. As these inputs cannot normally be quickly redistributed to other activities, the entire economy is driven to levels of production that are well below potential (Helleiner, 1993).

In some LDCs, food security can as well be sensitive to imports to the extent that imports affect their availability. The sensitivity of food security to imports is an important and complex issue.

Given the limitations of the LDCs to build trade capacity on their own, the WTO has been developing a set of rules, programs, and mechanisms to help them increase their share in international trade. Nowadays, Bangladesh, Laos, Myanmar, and Nepal are WTO members, whereas Bhutan and Timor-Leste are participating in this process with observer status (Adhikari & Dahal, 2007).

The WTO Work Programme for LDCs was developed under the Doha Ministerial Conference (2001) with the aim of paying more attention to the trade concerns of these countries and focusing on: market access; technical assistance; diversification of production and exports and accession of the LDCs to the WTO, among others (Tang, 2011).

The Aid for Trade Initiative (AFT) was subsequently launched during the Sixth WTO Ministerial Conference in Hong Kong (2005) to assist developing, and specifically, Least Developed Countries to integrate in the multilateral trading system. Thanks to Aid for Trade Funds, LDCs receive technical assistance and support for infrastructure development, in order to enable them to increase their trade capacity. There have been a number of guides, studies and interpretations of the AFT since its approval, most of which express positive outlooks for global trade (Kanyimbo, 2013; Koopmann &Wittig, 2014; OECD, 2014; ITC, 2013; Eliason, 2015).

The Enhanced Integrated Framework (EIF) is the main instrument for accessing the Aid Funds for LDCs whose objective is to assist (solely) least-developed countries to strengthen their trade institutions and address trade-related difficulties. The Aid for Trade has proven to be highly effective since its implementation. Studies carried out by the Organization for Economic Co-operation and Development (OECD) reveal that "one dollar invested in aid for trade generates an increase of nearly 8 USD in exports from all developing countries and 20 USD in new exports for the poorest countries" (OECD/WTO, 2015).

Also related to Aid for Trade is the Standards and Trade Development Facility (STDF), a grouping of international and regional donors and corporations that provide assistance to governments and the private sector in the developing and least-developed countries to strengthen their sanitary and phytosanitary situation to achieve safer trade and sustainable development.

These mechanisms include exemptions for complying with the measures, lengthening of the transition period, and assistance in dealing with the challenges that may arise during the process. After reclassification, technical assistance is offered to further improve trade capacity, and the access to Enhanced Integrated Framework support is extended for five years (Lanz et al., 2016).

Trade Profile of the Countries Included in the Sample Analyzed

For an understanding of their situation and a better interpretation of the results, some of the fundamental features of the analyzed country are presented.

Bangladesh, Bhutan, Myanmar, Nepal, Laos, and Timor-Leste are Asian LDCs and are expected to be graduate from the category in the coming years. They all share a similar situation of poverty, inequality, unemployment, poor infrastructure, and trade dependence (Abdin, 2008; Miyan, 2015).

Levels of integration into the multilateral trading system, which are evident from trade-GDP ratios, vary among the Asia LDCs. While two countries, Afghanistan and Nepal, are less integrated into international trade with trade-GDP ratios of less than 50%, Timor-Lester with a trade-GDP ratio of more than 90%, registers higher levels of integration (Ravallion, 2003) (Table 1).

The People's Republic of Bangladesh became independent from Pakistan in 1971 and established a democracy in 1991. It is the eighth most densely populated country of the world (1017.9 inhab./km^2) and due to the low elevation above sea level and its tropical-subtropical climate, is highly exposed to natural disasters.

Table 1 Analyzed countries: some features

		Bangladesh	Bhutan	Myanmar (Birmania)	Nepal	Laos	Timor-Leste
Size (km^2)		147.570	38.394	676.563	147.181	236.600	14.954
Population (millions of inhabitants)		164.7	0.7716	54.41	29.7	7.27	1.31
GDP distribution by sector	Agriculture	13.74%	19.23%	21.3%	12.5%	18.48%	14.19%
	Industry	34.78%	34.41%	38%	26.4%	37.23%	29.37%
	Services	51.48%	46.36%	40.7%	61.1%	44.28%	56.82%

Own elaboration with data from: Bangladesh Bureau of Statistics, latest available data (2019–22020); Bhutan National Statistics Bureau, latest available data (2020); Laos Statistical Information Service, latest available data (2020); Myanmar Statistical Information Service, latest available data (2020); Nepal Central Bureau Statistics, latest available data (2020) and Statista, latest available data (2019)

Despite the fact that it has a powerful textile industry as a result of the location of multinational companies in its territory, most of its population works in the agricultural sector (Abdin, 2018; Alauddin & Chowdhury, 2015; Bhattacharya & Khan, 2018).

The country broadly meets all three criteria for graduation, so it has been proposed by CDP and is currently under consideration by the UN General Assembly.

For its future transition process, the CDP recommends it to make greater efforts to expand international trade by participating in more bilateral and regional agreements, and to also give higher priority to policies aimed at increasing investment in health, diversification of exports, and promotion of sustainable energies (Chaudhary et al., 2007).

The Kingdom of Bhutan is one of the smallest and least populated countries in the world. Additionally, it is one of the most mountainous and almost all of its territory is covered by forests, snow, and glaciers. Only 3% of its soil is arable land. This geographical vulnerability is aggravated by drought and monsoon seasons (Schroeder, 2015).

After a regime of absolute monarchy until 2008, the democratic government has undertaken successful reforms in order to reduce extreme poverty. Even so, most of Bhutan's economy is linked to subsistence agriculture and livestock.

The country is expected to graduate from LDC status in 2023. It fulfills graduation requirements widely, and the income-only threshold. Bhutan has made great progress for a smooth transition, and ensures the achievement of its planned development targets, such as economic growth and diversification, employment generation, access to clean water, increased income in rural areas, increased efficiency, and effectiveness of public services and expenditure management.

The Republic of the Union of Myanmar (formerly Burma) is rich in natural resources (timber, minerals, oil, gas, etc.) although it is highly exposed to natural disasters too. The country has large oil reserves and natural gas, even though the current fields are beginning to be depleted (Gilfillan, 2019; Rasiah & Myint, 2013).

Nowadays, its political, economic, and social situation is critical due to the military takeover in February 2021 and the continuous human rights violations suffered by its ethnic groups, especially the Rohingya.

Myanmar's graduation has been rejected for the second year even though it meets the three requirements for reclassification. The CDP defers this decision for the upcoming review in 2024. This resolution is justified by the aforementioned instability. The CDP insists on the priority of ensuring peace and respect for human rights, two key factors for securing future sustainable development in the country.

Furthermore, Myanmar is the largest opium producer on the Asian continent after Afghanistan, and given the close relationship between drugs and poverty, this issue will continue to be a burden on the country's development (Committee for Development Policy & United Nations Department of Economic & Social Affairs, 2021).

Federal Democratic Republic of Nepal. After 240 years of absolute monarchy and a violent civil conflict, the country became a federal parliamentary republic in 2007 (Deraniyagala, 2005; Sharma, 2006).

In April 2015, the country was hit by a terrible earthquake that caused thousands of deaths and great damages to its infrastructure, particularly in Kathmandu, the capital and main center of industrial activity, causing damages and delays in economic development. The same year it also suffered a border blockade by India due to diplomatic tensions. Like in the rest of the countries

studied, most of the population is engaged in agriculture for self-sufficiency (Pant, 2006; Shakya, 2012).

Nepal has been recommended as well for graduation by CDP and is under consideration by the UN General Assembly. While it does not meet the minimum income threshold, it does easily meet the human capital and economic and environmental vulnerability criteria (Rai, 2017).

The Committee for Development Policy points out its dependence on remittances from emigrants and its weak reception of foreign investment. It also recommends building resilience to natural disasters and further diversifying its economy, as well as improving the capacities of its central and local governments (CDP: Department of Economic and Social Affairs, 2021; CDP, 2021).

In Lao People's Democratic Republic, most of its territory is mountainous and landlocked. In addition, its tropical climate makes it prone to flooding (Lewis, 2008).

During the Vietnam war, Laos was a target of U.S bombing for nine years. It is estimated that millions of bombs remain unexploded, which threaten the lives of the Laotian population, mainly farmers who work in their fields. The country is rich in mineral, which has led to a boom in foreign investment in recent years, although agriculture is still employing most of its inhabitants (Kyophilavong, 2009).

Recommended for reclassification and under consideration by the UN General Assembly, it fulfills not only the single income requirement, but also the human capital and economic and environmental vulnerability requirements (United Nations Development Programme, 2017).

Nevertheless, concerning the items included in the human capital criterion, its gender-parity index in secondary education is below the rest of the studied countries. Ensuring that girls will have equal access to secondary education and the ability to reach professional positions is fundamental for progress in the country. Misogynistic societies lead to inequality, poverty, and instability.

Moreover, like Myanmar, Laos is a country with problems related to opium trafficking. The CDP recommends that for graduation, the country should focus on a number of goals such as: improvement of its macroeconomic stability; debt relief; structural reforms with greater economic diversification and regional integration; inequality reduction through fiscal and development policies; increased resilience to disasters and reversed environmental damage and the preservation of natural resources (Kyophilavong & Hayakawa, 2022).

The Democratic Republic of Timor-Leste, having gained its independence from Portugal in 1975 and the violent occupation by Indonesia for decades, became Asia's youngest state in 2002.

Timor-Lester is a mountainous island with a tropical climate, affected by floods and droughts. Its main earnings come from oil and gas exports, but its inefficient management and the declining gas and oil revenues present an uncertain future for the country (Rasiah & Miao, 2015; Scheiner, 2021).

Despite meeting the income and human capital criteria for the second consecutive time, Timor-Leste's graduation has been rejected by the CDP that justifies its decision by the country's declining per capita income and the uncertain future stability, given the depletion of its gas and oil. It does not fulfill the human capital criterion, having fallen below the required threshold. As in the case of Myanmar, the CDP defers the decision to the next triennial in 2024 (Lopes, 2021).

Methodology and Data

To measure the strength of the commercial structure, trade indicators are useful in measuring how a country performs vis-à-vis other countries in international trade. Some of the most typical indicators can be used in impact analysis.

There are many possible indicators for a better understanding of a country's trade pattern, as well as its dynamism, considering the various types of companies and sectors involved in international trade. The traditional literature has used a series of foreign trade indices which, as a whole, provide a fairly clear picture of the trade position of a country (Dumanska, 2021; Durán & Álvarez, 2008; Smith & White, 1992).

The indices chosen are widely known as valid indicators, and they largely define the level of internationalization of a country. Nevertheless, there are specific challenges to poorer countries, like those analyzed in this article, namely limited statistical capacity, the use of outdated data and methods, the large share of the agricultural sector, the informal economy, the lack of human resources, financial constraints are some, long and complete time series, which has forced us in this case to select the most appropriate ones according to data availability. This is the reason why other indices like TradeOverlap, Theil, Grubel Lloyd, Lafayor or The Krugman similarity index are not considered.

Due to the difficulty to obtain data on this subject for the group of countries and period chosen, the following indices were selected: trade openness, share of national trade in world exchanges, trade concentration or diversification, origin and destination of exports and imports, relative trade balance, and comparative advantage of Bela Balassa.

To estimations, several sources were handled: International Monetary Fund, World Trade Organization, CHELEM, The Atlas of Economic Complexity (Harvard's University), Statista, and the National Statistics Bureau of Bangladesh, Bhutan, Nepal, Myanmar, and Laos.

Trade Openness

The openness index is calculated as the ratio of a country's total trade: the sum of exports and imports, to the country GDP. The higher the index, the larger the influence of trade on domestic activities and the stronger that country's economy is.

This coefficient provides information about the degree of internationalization of a country or its capacity to exchange goods and services with the rest of the world. In addition, it also provides information on the proportion of economic activity that is focused on the domestic market.

At present, there is no consensus on the impact of trade openness on economic growth; however, Zeren and Ayse (2013), Idris et al. (2017), Molero et al. (2020), and Mercan et al. (2013) have proved that trade openness stimulates economic growth. Nevertheless, this index is biased by the size of the economy. It is lower in the larger economies and higher in smaller economies. In fact, it should be noted that among the countries studied, those with the smaller size are the ones with the highest index.

Trade openness can be calculated as:

$$Export\ openness = \frac{X_i}{GDP_i}.$$

The result ranges from zero to one. If it is zero the country is not exporting and if the index is 1, the country is entirely exporting production.

$$Import\ openness = \frac{M_i}{GDP_i}.$$

The result ranges from zero to one. If it is zero, the country is not importing and if it is 1, the county is importing everything it consumes.

$$Average\ tradeopenness = \frac{X_{i+M_i}}{GDP_i}$$

The result ranges from zero to one. If it is zero, the country does not carry out foreign trade (an autarky) and if it is 1, the country is exporting all its production and is importing everything it consumes.

where

X_i= country i's exports.

M_i= country i's imports.

GDP_i= country i's gross domestic product.

Share of National Trade in World Exchanges

This index provides information on a country's market share of total world trade, and the economy's weight in international trade.

$$Share\ measured\ by\ exports = \frac{X_i}{X}.$$

It relates the weight of the country's exports in total world exports.

$$Share\ measured\ by\ imports = \frac{M_i}{M}.$$

It relates the weight of the country's imports in total world imports.

$$Weight\ of\ domestic\ trade\ in\ world\ trade = \frac{X_i + M_i}{X + M}.$$

It relates the county's total weight of the exports and imports to total world exports and imports.

where

X_i= country i's exports.
X= world exports.
M_i= country i's imports.
M= world imports.

Trade Concentration, Diversification, and Main Trading Partners

Knowing which are the main products exported and imported allows us to calculate the relative weight of these products related to total exports and imports, as well as the level of dependence on this basket of products. If a few products represent the total, that means there is a high degree of concentration or dependency. In LDCs, this fact is particularly important, as generally they have a high concentration in primary goods exports, mainly due to their limited industrial capacity.

An analysis on the principal export destinations and the origin of the imports of the countries under study reveals the degree of dependence or independence of the economies with regard to their main trading partners.

A country that trades with a small number of countries will see its stability conditioned by that of its partners. On the contrary, if a country interacts commercially with several others, this diversification will lead to a lower economic dependence and, hence, more protected of exogenous shocks.

Relative Trade Balance (IRTB)

This index measures the ratio between the trade balance of a good or service in a country with respect to its total global trade. It provides information on the revealed relative advantage of each country in its commercial exchanges. The higher the index, the greater revealed comparative advantage, and vice versa.

$$IRTB_{ij}^k = \frac{X_{ijt}^k - M_{ijt}^k}{\left| X_{iwt} + M_{iwt} \right|}$$

where

X_{ijt}^k= exports of product k from country i to destination j in year t;
X_{iwt}= exports of product k from country i to the world (w) in year t;
M_{ijt}^k= imports of product k into country i from destination j in year t;
M_{iwt}= imports of product k into country i from the world (w) in year t.

The index can take negative and positive values, between -1 and 1, indicating lower or higher competitiveness in the sector, respectively.

Bela Balassa Revealed Comparative Advantage

This index measures the weight of the exports of a product in a specific market in relation to its weight in total exports of the product to the world. It allows for the identification of competitive sectors.

$$IB_{ij} = \frac{\dfrac{X_{ij}^k}{X_{ij}}}{\dfrac{X_{iw}^k}{Xi_w}}$$

where

X_{ij}^k= exports of product k from country i to destination j.

X_{ij}= total exports from country i to destination j.

X_{iw}^k = exports of product k from country i to the world (w).

X_{iw}= total exports from country i to the world (w).

The indicator can be interpreted as follows:

$\rightarrow IB_{ij} > 0.33$. Comparative advantage, net exporter.

$\rightarrow IB_{ij} \in (-1, -0.33)$. Trend towards intra-product trade.

$\rightarrow IB_{ij} < -0.33$. Comparative disadvantage, net importer.

Analysis of the Results and Discussion

Trade Openness

Although a greater openness in a country can promote economic growth and contribute to poverty reduction, a sudden and wrong designed trade opening could have adverse consequences for domestic production in the short term due to high costs from the shift to activities in more productive sectors. It is therefore very important to apply measures to minimize the potential harm resulting from trade liberalization.

(i) The performance of the degree of export openness has been uneven among the countries studied (Fig. 1).

– In Nepal, Bhutan, and Bangladesh the rate has decreased in the analyzed period.

– However, in Laos and Timor-Leste, it has increased.

– Myanmar is the country with the highest growth.

(ii) Trade openness of imports has decreased significantly in Bangladesh, Bhutan, and Timor-Leste (Fig. 2).

In contrast, it has risen in Nepal, Laos, and considerably in Myanmar, where the rate of import growth is twice that of exports, mainly explained by the
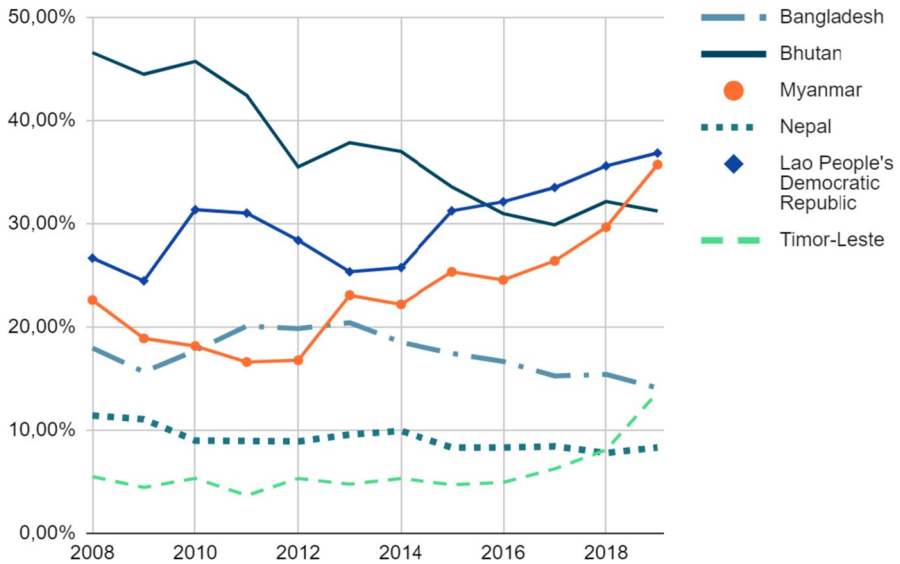
Fig. 1 Evolution of export openness. Source: Own elaboration. WTO and IMF data

increase in demand for commodities and machinery to support the country's industrial development.

All the countries studied show a higher rate of import openness than export openness over the period, which also corresponds to the chronic current account deficit that characterize the LDCs. Also, in the group, only Myanmar recorded (in 2008, 2009, 2010, and 2019) a higher openness to exports than that of imports.
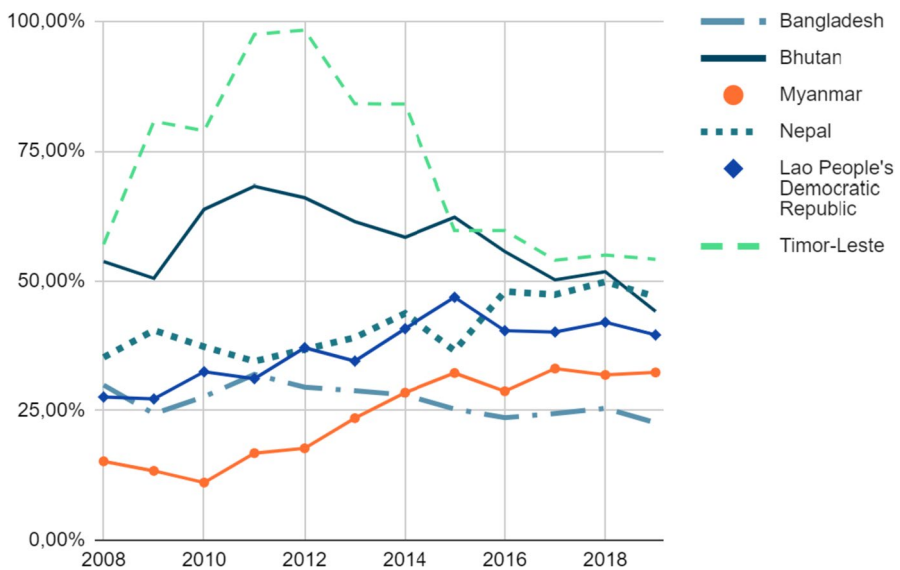

Fig. 2 Evolution of import openness. Source: Own elaboration. Data from WTO
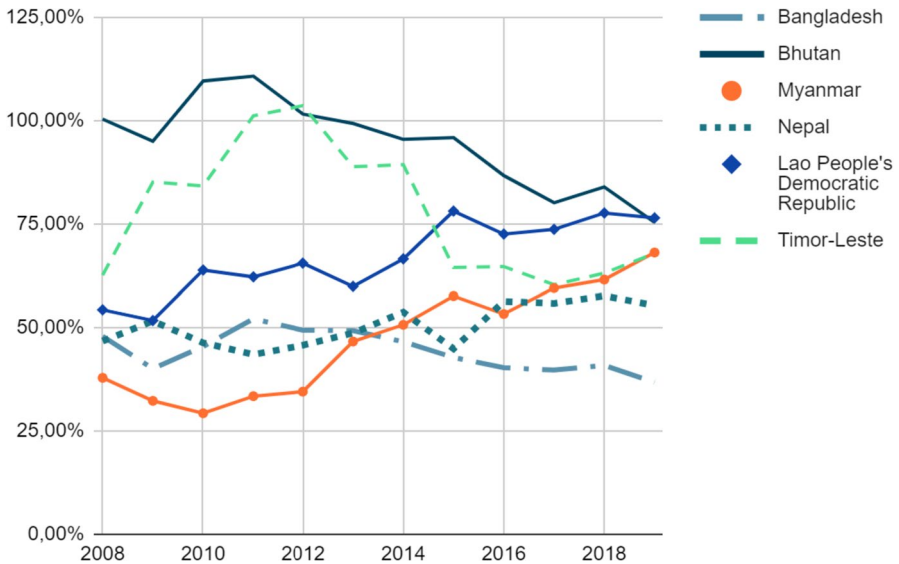
Fig. 3 Evolution of average trade openness. Source: Own elaboration. Data from WTO

As mentioned above, the degree of openness tends to be biased by the size of the economies, since the larger the country is, the less weight of foreign trade will play in comparison to the rest of the GDP components.

Bangladesh, despite having the most robust economy in the group, presents the lowest average degree of openness (0.45%), with a continuous decline throughout the period. In fact, the average rate between 2008 and 2019 was −23%, similar to Bhutan (−25%).

Myanmar is where trade openness has grown the most, with an 80% increase between 2008 and 2019 (Fig. 3). In 2019, the average rate was 68.13%, a relatively high growth for a country that has been an autarky until less than two decades ago. This rate shows that exports and imports take up a large part of the GDP. Likewise, thanks to the democratization of the country and the liberalization of its economy since 2011, international economic sanctions have abated, and foreign investment and aid have grown.

In Timor-Leste and Bhutan, openness indices exceeded 100% (Timor-Leste in 2011 and Bhutan from 2008 to 2013). This result is explained by the very small size of its economies and the high share of trade in their GDP.

In summary, there has been a general fall in the average trade openness rate in recent years, except in Laos and Myanmar. Like Myanmar, Laos has been undergoing a process of economic liberalization since it unfastened from Soviet influence in the 1990s. Its recent integration in the international scene explains the growth of this index, although the high level of state intervention still discourages foreign investment, with the exception of China, its main trading partner (Ginsburgs, 1984).

This fall in the trade openness index is not only happening in the LCDs but is rather a consequence of the international situation.

After the 2008 global crisis, trade in goods and services has been experiencing a general slowdown in LDCs for several reasons:

– The end of the rise in commodities prices.
– Weakening demand.
– The decline in prices of primary, intermediate, consumption and investment goods.
– The decline in the value of services traded from 2015.

LDCs are highly vulnerable to external shocks, so this downturn has a negative impact upon their already minimal integration in international trade.

National Trade Share in World Exchanges

The analysis of the evolution of LDCs' share in world trade of goods and services is very useful for assessing their effectiveness in adapting to international trade, as it shows, among other things, whether the country's export and import trend are following the global trend or, on the contrary, whether the nation is trading less and less with the world.

The size of the LDCs' economies, together with the lack of diversification in their production and their dependency on the trade of low-added value basic products, hamper the integration of these countries into world trade. The Istanbul Programme of Action and Goal 17 of the Sustainable Development Goals (SDGs) in the 2020 Agenda emphasizes the need to increase the share of LDCs exports in world trade (ESCAP, 2016).
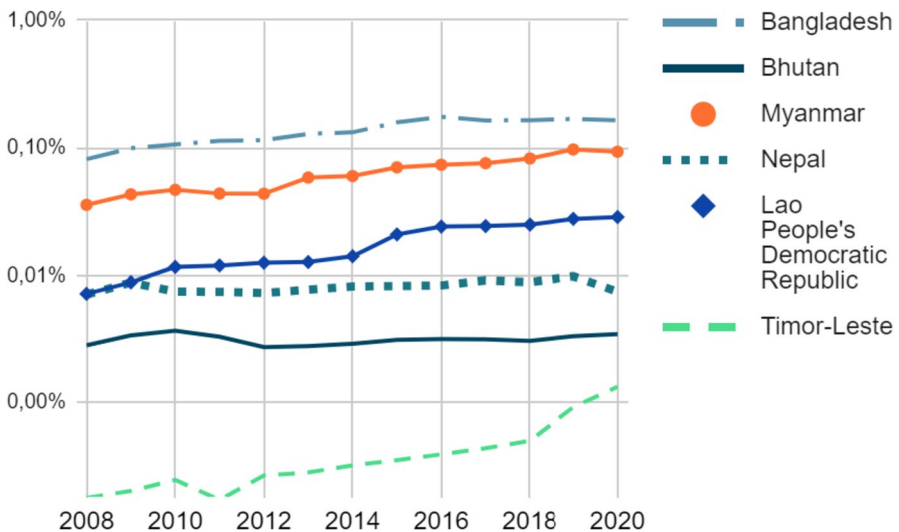

Fig. 4 Share of national exports in world exchanges. Source: own elaboration. Data from WTO. Logarithmic scale for a better understanding of the data

Despite the importance of trade for development in the LDCs, all of them do not even occupy the 1% of world trade. Most of this participation is concentrated in a few numbers of countries, like Bangladesh, which, by its weight within world textile trade, accounted for 0.22% in 2019.

On the contrary, the shares of Timor-Leste and Bhutan are quite low (0.002% and 0.004%, respectively), which is directly related to the reduced size of their economies (Figs. 4, 5, and 6).

Even with the aforementioned data on participation, all of the studied countries show an increasing trend in their exchanges in international trade between 2008 and 2019.

Myanmar and Laos have been the countries where share in international trade has increased the most, with an index growth rate from 2008 to 2019 of 211.13% and 295%, respectively. On the other hand, Bhutan has experienced the lowest (33%) compared to the rest, with an average share of 0.004%.

It is also important to note that Bangladesh, Nepal, and Timor-Leste experienced a growth of more than 100% in their share of participation in international trade.

Trade Diversification and Main Trading Partners

Thanks to the WTO Aid for Trade, LDCs are receiving funds and assistance to boost their trade capacity. Most of these efforts are focused on the development of infrastructure, which are essential to diversifying their economic activity. In general, the economies of the LDCs are not very diversified. They are focused on agriculture and the exploitation of natural resources, both being highly dependent on price volatility of international markets.

It is worth mentioning that Asian LDCs usually present greater diversification in both agricultural and industrial production, Bangladesh and Myanmar standing out the most.
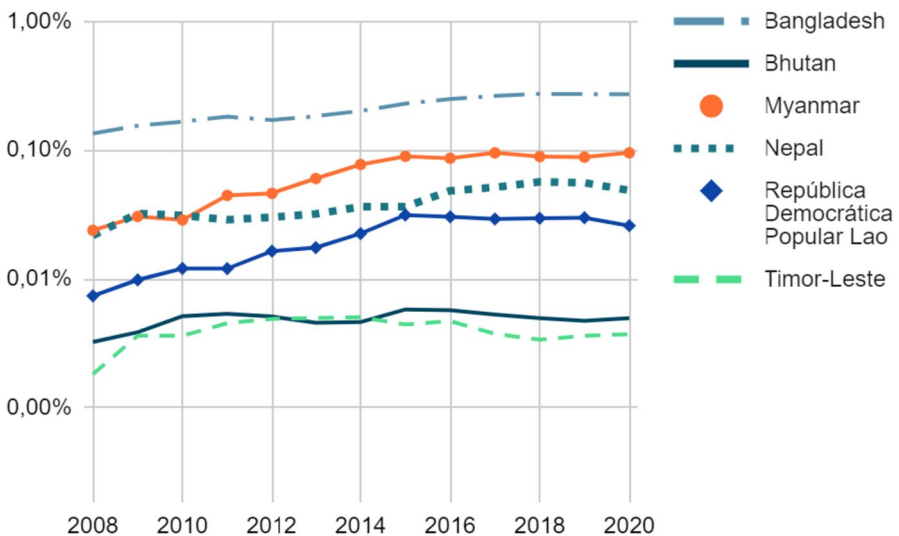

Fig. 5 Share of national imports in world exchanges. Source: own elaboration. Data from WTO. Logarithmic scale for a better understanding of the data
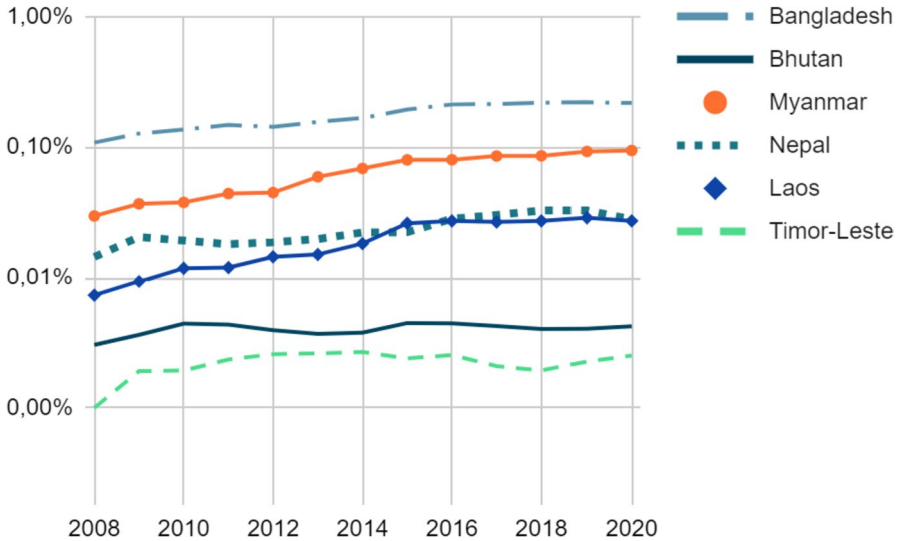
Fig. 6 Share of national trade in world exchanges. Source: own elaboration. Data from WTO. Logarithmic scale for a better understanding of the data

In Bangladesh, the main trading partners are European countries and the USA (61% and 18%, respectively). Most of its exports are textiles (80% of the total). Concerning products, the six most exported products are men's suits and pants (12.76%), T-shirts, knitted (12.45%), information and communication technologies (11.38%), sweaters, pullovers, sweatshirts, etc., knitted (12.28%), women's suits and pants (9.74%), men's shirts, knitted (4.55%).

Imports are more diversified: transport (8.437%), refined petroleum oils (5.67%) and raw cotton (2.84%), most used for textile production. There is also a certain dependence on the Chinese market, where purchases reach 29.93% of its total imports.

In summary, the results show that Bangladesh's exports will be damaged by the gradual elimination of preferences. Most of the decline is expected for exports to the European Union, specifically in apparel. The most affected products in terms of trade value will be T-shirts (cotton), men's pants (cotton), and sweaters (Joki & Haque, 2022).

Exports in Bhutan are highly concentrated in products and destinations. Concerning products, ferroalloys (31.62%) and travel and tourism (26.99%) reach nearly 60% of total export earnings. It also shows a high dependency on its neighboring country, India, its main buyer, and seller (90,82% of Bhutan's total sales and 84.35% of its purchases) (Uddin et al., 2010; Ura, 2015).

The country's main imports are as follows: refined petroleum oils (13.78%), information and communication technologies (7.86%), travel and tourism (7.41%), transport (6.41%), ferrous products from the reduction of iron ore (4.48%), and motor vehicles for the transportation of goods (2.93%). These represent 40.72% of total imports and show slightly diversified foreign trade.

Upon graduation, Bhutan will face limited tariff increases. Exports to the European Union and other markets with preferences are limited, so its main export products, such as ferroalloys, carbides, cardamom, dolomite, and limestone will experience little, or no tariff increases in preference-granting markets.

Myanmar presents a more diversified export pattern than the rest of the countries in the group. The six products with the highest relative weight (petroleum gases, travel and tourism, information and communication technologies, commodities, rice and women's coats, no point) add up to 52.52% of the country's total exports. The services sector represents 26.5% of the total, being the greatest weight in total exports. Export destinations are concentrated too, especially China (33,56%), followed by Thailand (16.38%) and Japan (7.72%).

However, there is a greater diversification of imports, relying mainly on petroleum oils (9.59%) and information and communication technologies (6%). Its main sellers are China (45.96%), Thailand (15.79%), Singapore (11.77%), India (3.6%), Indonesia (3.3%), and Malaysia (2.61%), adding up to 83.07% of total imports.

Myanmar is expected to experience limited tariff increases upon graduation. There will be no tariff increase for exports to its main trading partner, China. Petroleum gases (main exported product) will not suffer cost increases, as tariffs will remain unchanged after graduation. Tariff costs will increase significantly for apparel and rice (Hlaing et al., 2021).

In Nepal's export revenues, the service sector is the one with the greatest weight (62.7%), especially in information and communication technologies, which accounts for 30.8% of total export revenues. The sales of palm oil have grown exponentially since 2018, being the third most exported product in 2019 (solely to India) (Prasad, 2015; Taneja, et al., 2011).

Exports are expected to go down after graduation, specifically in apparel and textiles. Another product where great reduction is expected is wheat flour, or meslin, which is part of cereals and preparations. These negative impacts are concentrated in exports to the European Union, which currently account for 15% of its total goods exports.

Nepal's imports come from Asian countries (94%), notably, from India with almost 70% of the goods and services it exports and imports. Nevertheless, imports are quite diversified between services, minerals, and agriculture (Richter, 2017).

In Laos, the six main exports are electrical energy (17.7%), travel and tourism (13.17%), refined copper and copper alloys (7.65%), copper ore (5.91%), natural rubber (4.8%) and commodities (4.01%), representing 53.78% of Laos' total exports, making it the most diversified exporter among the mentioned group of countries.

The destinations are highly concentrated, since 75% of its total exports go to Thailand and China which are also the largest suppliers (nearly 80% of the total).

Imports are concentrated in travel and tourism (12.82%); petroleum oils, refined (9.74%); bovine (2.88%); cars (2.49%); transport (1.88%); and structures and their parts, of iron or steel (1.64%).

Laos is expected to face limited tariff increases after graduation. There will be no increase in tariffs for exports to China or Thailand, although there will be an increase in tariffs for exports to the European Union (Paudel, 2019; Vanhnalat et al., 2015).

Most of Timor-Leste's export revenues come from: travel and tourism (36.5%), petroleum oils, crude (26.23%), petroleum gases (13.3%), information and

communication technologies (8.87%), coffee (8.24%), and transport (1.77%), reaching 95% of total exports, showing a high concentration. The export destinations are also concentrated, with more than half being Singapore (52.06%), followed by China (20.19%) and Japan (8.70%).

About 44% of goods are sent to markets without preferential access for LDCs, so not too many tariff increases are expected after graduation. Concerning imports, it depends on information and communication technologies (26.26% of total). Indonesia is Timor-Leste's main supplier (38.69%), followed by China (26.35%) and Singapore (10,18%) (World Bank Group, 2016) (Tables 2 and 3).

Relative Trade Balance

To analyze this index, data are for 2013, 2015, 2017, and 2019, given the difficulty to obtain homogeneous data for all countries and all the years of the established period.

The products to which the index is applied have been chosen on the basis of their weight in total exports and the trading partner to whom the product in question is mainly sent. Services has been excluded.

For each country, it would be as follows:

Bangladesh: The total of exports of men's suits and pants from Bangladesh to the USA (X_{ijt}^{k}) and imports of men's suits and pants into Bangladesh from the USA (M_{ijt}^{k}) relative to the total of exports of men's suits and pants from Bangladesh to the world (X_{iwt}) and imports of men's suits and pants into Bangladesh from the world M_{iwt}).

Bhutan: The total of exports of ferroalloys from Bhutan to India (X_{ijt}^{k}) and imports of ferroalloys into Bhutan from India (M_{ijt}^{k}) relative to the total of exports of ferroalloys from Bhutan to the world (X_{iwt}) and imports of ferroalloys into Bhutan from the world (M_{iwt}).

Myanmar: The total of exports of petroleum gases from Myanmar to Thailand (X_{ijt}^{k}) and imports of petroleum gases into Myanmar from India (M_{ijt}^{k}) relative to the total of exports of petroleum gases from Myanmar to the world (X_{iwt}) and imports of petroleum gases into Myanmar from the world (M_{iwt}).

Nepal: The total of exports of yarn (other than sewing thread) of synthetic staple fibers, not put up for retail sale from Nepal to India (X_{ijt}^{k}) and imports of yarn (other than sewing thread) of synthetic staple fibers, not put up for retail sale into Nepal from India (M_{ijt}^{k}) relative to the total of exports of yarn (other than sewing thread) of synthetic staple fibers, not put up for retail sale from Nepal to the world (X_{iwt}) and imports of yarn (other than sewing thread) of synthetic staple fibers, not put up for retail sale into Nepal from the world (M_{iwt}).

Laos: The total of exports of electricity from Laos to Thailand (X_{ijt}^{k}) and imports of electricity into Laos from Thailand (M_{ijt}^{k}) relative to the total of exports of electricity from Laos to the world (X_{iwt}) and imports of electricity into Laos from the world (M_{iwt}).

Table 2 Exports of goods and services

Exports of goods and services (2019)

Country	Six main products	Percentage of total exports (%)	Six main trading partners	Percentage of total exports (%)
Bangladesh	Men's suits and pants (12.76%) T-shirts, knit (12.45%) Sweaters, pullovers, sweatshirts, etc., knit (12.28%) ICT (11.38%) Women's suits and pants (9.74%) Men's shirts (4.55%)	63.16%	USA (14.49%) Germany (14.02%) UK (8.22%) Spain (7.14%) France (6.97%) Poland (4.15%)	54.99%
Bhutan	Ferroalloys (31.62%) Travel and tourism (26.99%) Transport (8.64%) Dolomite (6.59%) Semifinished products of iron or nonalloy steel (5.28%) Cements (3.9%)	83.02%	India (90.82%) Nepal (4.58%) Italy (1.69%) Turkey (0.43%) Germany (0.40%) Singapore (0.38%)	98.3%
Myanmar	Petroleum gases (16.61%) ICT (15.1%) Travel and tourism (9.85%) Commodities not specified according to kind (4.35%) Rice (3.37%) Women's overcoats, not knit (3.24%)	52.52%	China (33.56%) Thailand (16.38%) Japan (7.72%) Germany (5.15%) USA (4.64%) Spain (3.04%)	70.49%
Nepal	ICT (30.8%) Travel and tourism (27.38%) Palm oil (6.53%) Transport (3.87%) Yarn of synthetic staple fibers, not for retail sale (2.64%) Carpets, knotted (2.27%)	73.49%	India (67.9%) USA (10.2%) China (3.24%) Germany (2.77%) UK (2.4%) Turkey (2.29%)	88.8%

Table 2 (continued)

Exports of goods and services (2019)

Country	Six main products	Percentage of total exports (%)	Six main trading partners	Percentage of total exports (%)
Laos	Electrical energy (17.7%) Travel and tourism (13.17%) Refined copper and copper alloys (7.65%) Copper ore (5.91%) Natural rubber (4.80%) Commodities not specified according to kind (4.01%)	53.24%	Thailand (39.34%) China (35.98%) Vietnam (10.01%) Japan (2.23%) USA (2.06%) Germany (1.62%)	91.24%
Timor-Leste	Travel and tourism (36.5%) Petroleum oils, crude (26.23%) Petroleum gases (13.3%) ICT (8.87%) Coffee (8.24%) Transport (1.74%)	94.88%	Singapore (52.06%) China (20.19%) Japan (8.70%) Indonesia (5.42%) USA (4.29%) Canada (3.66%)	94.32%

Own elaboration. Data from The Atlas of Economic Complexity, by Harvard's University Growth Lab. Last review in October 2022

Table 3 Imports of goods and services

Imports of goods and services (2019)

Country	Six main products	Percentage of total imports (%)	Six main trading partners	Percentage of total imports (%)
Bangladesh	Transport (8.43%) Petroleum oils, refined (5.67%) Raw cotton (2. 84%) ICT (2.73%) Petroleum gases (2.11%) Wheat and meslin (2.07%)	23.85%	China (29.93%) India (14. 23%) Singapore (5.27%) Malaysia (4.06%) USA (4.02%) Indonesia (3.3%)	60.81%
Bhutan	Petroleum oils, refined (13.78%) ICT (7.86%) Travel and tourism (6.41%) Transport (5.26%) Ferrous products from the reduction of iron ore (4.48%) Motor vehicles for transporting goods (2.93%)	40.72%	India (84.35%) Thailand (5.04%) France (2.34%) United Arab Emirates (1.44%) China (1.31%) Japan (0. 79%)	95.54%
Myanmar	Petroleum oils, refined (9.59%) ICT (6%) Transport (5.32%) Transmission apparatus for radio, telephone and TV (3.31%) Commodities not specified according to kind (2.84%) Woven fabrics of < 85% synthetic staple fibers weighing > 170 g/m² (2.18%)	29.24%	China (45.96%) Thailand (15.79%) Singapore (11.77%) India (3.60%) Indonesia (3.3%) Malaysia (2.65%)	83.07%
Nepal	Petroleum oils, refined (11.23%) Travel and tourism (5.8%) Transport (5.18%) Semifinished products of iron or nonalloy steel (3.4%) ICT (2.64%) Transmission apparatus for radio, telephone, and TV (2.43%)	30.68%	India (68.44%) China (14.32%) United Arab Emirates (2.64%) USA (1.18%) Singapore (1.16%) Hong Kong (1.01%)	88.75%

Table 3 (continued)

Imports of goods and services (2019)

Country	Six main products	Percentage of total imports (%)	Six main trading partners	Percentage of total imports (%)
Laos	Travel and tourism (12.82%) Petroleum oils, refined (9.74%) Bovine (2.88%) Cars (2.49%) Transport (1.84%) Structures and their parts, of iron or steel (1.64%)	31.41%	Thailand (55.79%) China (26.82%) Vietnam (9.39%) Japan (1.13%) South Korea (1.13%) Singapore (0.88%)	94.01%
Timor-Leste	ICT (26.26%) Travel and tourism (9.31%) Transport (6.83%) Petroleum oils, refined (6.68%) Insurance and finance (2.69%) Cars (1.87%)	53.64%	Indonesia (38.69%) China (26.36%) Singapore (10.18%) Malaysia (5.09%) Australia (3.98%) Taiwan (3.19%)	87.49%

Own elaboration. Data from The Atlas of Economic Complexity, by Harvard's University Growth Lab. Last review in October 2022

Timor-Leste: The total of exports of crude oil from Timor-Lest to Singapore (X_{ijt}^{k}) and imports of crude oil into Timor-Leste from Singapore(M_{ijt}^{k}) relative to the total of exports of crude oil from Timor-Leste to the world (X_{iwt}) and imports of crude oil into Timor-Leste from the world (M_{iwt}).

The relative trade balance index allows us to measure the degree of comparative advantage in these countries. The greater the export capacity, the greater the comparative advantage.

In our sample, all countries show a greater than zero index, which indicates a trade surplus in their respective sectors that makes them competitive (Fig. 7).

However, there are some differences. The countries with the greatest export capacity are Timor-Leste, Laos, and Bhutan.

Timor-Leste shows a prominent gain in export capacity (208%). Despite this increase, it has lost share in its crude oil exports, as it currently only exports to Singapore and in a much smaller volume. This is due to the decrease in the international price of oil since 2012 and the depletion of its reserves of this resource.

Laos has maintained its total exports of electrical energy stable, as well as those directed to its main partner, Thailand. Thanks to the progressive decrease in its imports, it has become more competitive in the sector.

Bhutan's relative trade balance has remained stable throughout the study period, at around 80–90%.

On the other hand, Myanmar, Bangladesh, and Nepal have lost export capacity.

In Myanmar, there has been a decrease in petroleum gas exports to Thailand, as well as in total exports in certain years. In addition, it has increased its total imports every year, which makes the country lose even more export capacity in this sector.
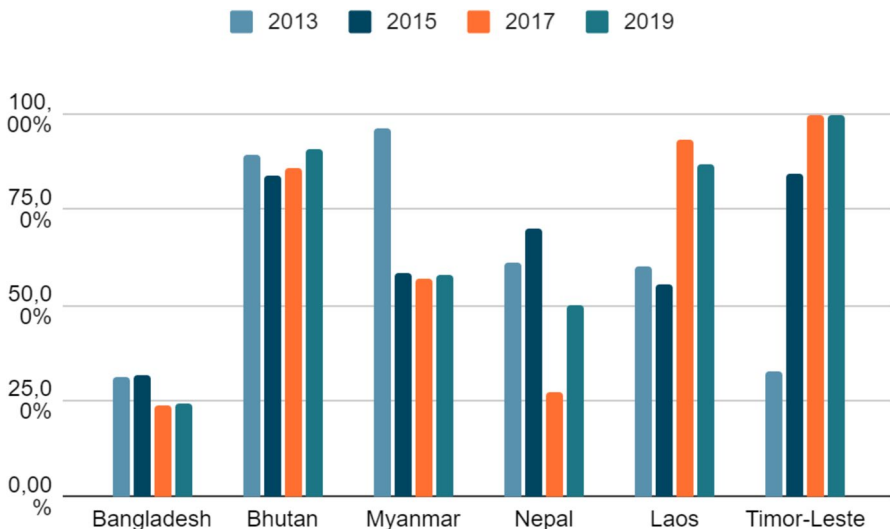

Fig. 7 Relative trade balance (IRTB). Source: own elaboration. Data from The Atlas of Economic Complexity, by Harvard's University Growth Lab. Last review in October 2022

While overall exports of men's suits and pants from Bangladesh grew in all years studied, production going to the USA remained stable.

In Nepal, the index suffers a more than double drop from 2015 to 2017 and has not regained previous levels, a consequence of the economic losses caused by the 2015 earthquake.

Bela Balassa Revealed Comparative Advantage

To analyze the evolution of the index, the same time series has been chosen: 2013, 2015, 2017, and 2019.

The products on which the index is applied have been selected according to their weight in total exports together with the trading partner to which the product in question is mostly directed. The services sector has been excluded due to the impossibility of relating it to trading partners.

The same rule has been followed for Nepal.

In each case they would be the following:

Bangladesh: The total of exports of men's suits and pants from Bangladesh to the USA (X_{ij}^k) and total exports from Bangladesh to the USA (X_{ij}), relative to the total of exports of men's suits and pants from Bangladesh to the world (X_{iw}^k) and total exports from Bangladesh to the world (X_{iw}).

Bhutan: The total of ferroalloy exports from Bhutan to India (X_{ij}^k) and total exports from Bhutan to India (X_{ij}), relative to the total ferroalloy exports from Bhutan to the world (X_{iw}^k) and total exports from Bhutan to the world (X_{iw}).

Myanmar: The total of petroleum gas exports from Myanmar to Thailand (X_{ij}^k) and total exports from Myanmar to Thailand (X_{ij}), relative to the total of petroleum gas exports from Myanmar to the world (X_{iw}^k) and total exports from Myanmar to the world (X_{iw}).

Nepal: The total yarn exports (other than sewing thread) of synthetic staple fibers, not put up for retail sale from Nepal to India (X_{ij}^k) and total exports from Nepal to India (X_{ij}), relative to the total of exports of yarn (other than sewing thread) of synthetic staple fibers, not put up for retail sale from Nepal to the world (X_{iw}^k) and total exports from Nepal to the world (X_{iw}).

Laos: The total electrical energy exports from Laos to Thailand (X_{ij}^k) and total exports from Laos to Thailand (X_{ij}), relative to the total electrical energy exports from Laos to the world (X_{iw}^k) and total exports from Laos to the world (X_{iw}).

Timor-Leste: The total of crude oil exports from Timor-Leste to Singapore (X_{ij}^k) and total exports from Timor-Leste to Singapore (X_{ij}), relative to the total of crude oil exports from Timor-Leste to the world (X_{iw}^k) and total exports from Timor-Leste to the world (X_{iw}).

Overall, the countries as a whole have a broad comparative advantage over their main trading partners during this period, which means that they are specialized and have a favorable position within international trade in their sectors.

Table 4 Bela Balassa revealed comparative advantage

| | Bela Balassa revealed comparative advantage | | | |
	Product	2013	2015	2017	2019
Bangladesh	Men's suits and pants	1.976513	1.787353	1.855952	1.954132
Bhutan	Ferroalloys	1.823673	1.708411	1.677833	1.451922
Myanmar	Petroleum gases	3.253549	2.783962	3.920456	4.941553
Nepal	Yarn of synthetic staple fibers, not for retail sale	1.223558	1.170760	0.556581	1.014960
Laos	Electrical energy	3.315430	3.300037	2.559673	2.926289
Timor-Leste	Petroleum oils, crude	1.826087	1.876993	3.153989	3.655303

Own elaboration. Data from The Atlas of Economic Complexity, by Harvard's University Growth Lab. Last review in October 2022

Nonetheless, the evolution of the index has been uneven (Table 4):

The highest growth rate is presented in the oil and oil derivatives exporting countries, Myanmar, and Timor-Leste, which from 2013 to 2019 exhibit an increase of 51.88% and 100.17%, respectively.

Nepal, Bhutan, and Laos exhibit a loss of competitiveness in their respective sectors, yarn (other than sewing thread) of synthetic staple fibers, ferroalloys, and electrical energy. It is notable that Nepal's index dropped to half in the 2015–2017 period, and despite recovering from 2017 to 2019, it has not returned to the previous levels.

The comparative advantage of Bangladesh's exports of men's suits and pants to the USA has changed little over the years, thanks to the competitiveness of labor costs in the country.

The group of countries studied—Bangladesh, Bhutan, Myanmar, Nepal, Laos, and Timor-Leste—represents 258 million people, more than half of the population of the European Union. All of them are LDCs in the graduation process and located in the Asian continent, trying to analyze countries located in an area with a certain degree of proximity among them.

However, their characteristics are quite different; some of them are highly populated, while others are not, where progress will concern a low number of people and the positive effects of achieving graduation will be limited to them.

The political situation, natural disasters, and lack of resilience to adverse effects slow down their economic and social progress.

Trade has a high impact in growth in developing countries, and especially in least developed countries. Its expansion generates increases in productivity and accelerates structural changes needed to achieve a sustained economic development.

Because of the characteristics of the analyzed countries, they have been fraught with difficulties due to lack of data (for some countries) and years and their unreliability. These factors have conditioned the choice of certain periods, sectors, and products to elaborate the trade indices.

The following conclusions can be drawn from the analyses carried out:

In the increase in average trade openness in exports and imports, Myanmar and Laos stand out. The rest of the countries, due to their size or productive structure, have not improved (or even worsened their situation).

In Bangladesh and Bhutan, the average openness index has been declining since 2008, their export and import openness has decreased.

The average trade openness of Nepal and Timor-Leste has grown slightly. Both have a very low level of export openness, which reflects economies with little industrialization based on subsistence agriculture. They show a higher degree of openness in imports.

Myanmar and Laos have had a large growth in the index, especially in imports due to political and economic changes as a consequence of the shift from a planned economy to a more market-oriented economy.

Summarizing:

– All of them have succeeded in expanding their share in world trade. Although it is not clear in the graphs presented due to the differences in scale. According to the results, the high participation of Bangladesh in comparison to the rest is justified by the size of its economy and its weight within world textile trade. As the most populous country in the sample, its progress will benefit a large part of the population.

– Regarding diversification, despite the progress made by this group of countries, all of them generally present a highly concentrated pattern of exports and their exchanges are carried out with few countries, usually Asian countries as well. This lack of trade diversification places them in a very vulnerable position in the face of external shocks and hampers their economic growth.

– The relative trade balance index (Fig. 7) favorably positions all the countries studied, since the index oscillates between (− 1.1) and all the values are above zero, indicating that all of them are competitive with their trading partners in the products analyzed.

– The six countries have a broad comparative advantage over their trading partners (Table 4), which places them in an advantageous position in the trade of these products. Myanmar and Timor-Leste stand out, whose index has grown the most over time (4.9 and 3.6, respectively).

To conclude, the analysis confirms that the trade structure of the LDCs analyzed has improved, but with differences due to their characteristics.

However, after graduation, they will continue dragging a series of weaknesses, such as the high degree of dependence on commodities, the balance of payments deficit, and trade concentration.

Conclusion

The main purpose of this work is to offer technicians tools for the development of their work when evaluating the dynamics of international trade; the study of the export patterns of the countries analyzed, and as a guide for those making decisions

in the political and business sphere. At the same time, it is hoped that this work will stimulate a more homogeneous and elaborate compilation of trade statistics for academic, dissemination, and economic diagnostic uses.

Graduation and the process that countries follow to achieve it is not the end point since the improvement in their development must continue. The results confirm that trade has contributed to reach the thresholds for graduation, however there are other key approaches to clear and enrich the paradigm.

The conducted research presents limitations. Therefore, for future studies should be necessary to examine other specific features of these countries or examine them in a new context. Overlaying the information obtained would facilitate the formulation of assumptions with other variables, areas of interest, or key areas. Also, various qualitative approaches can be employed to complement the quantitative analysis or to help address some limitations inherent in a quantitative approach.

Finally, an impact assessment is an essential component of policy management by gathering and analyzing evidence, verifying the existence of a problem, its causes, the actions needed, and the advantages and disadvantages of available solutions. The indices are designed to help trade policymakers and practitioners to have information on how the results of the impact assessments may be interpreted and put into practice.

Data Availability Data will be made available on request.

Declarations

Competing Interests The authors declare no competing interests.

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