Cost of Being Landlocked:

Lessons for Implementing the Programme of Action for the LLDCs for the Decade 2024-2034

United Nations
Office of the High Representative for the Least Developed Countries, Landlocked Developing Countries and Small Island Developing States (UN-OHRLLS)

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ABOUT UN-OHRLLS

The Office of the High Representative for the Least Developed Countries, Landlocked Developing Countries and Small Island Developing States (UN-OHRLLS) serves the 92 vulnerable member states that are LDCs, LLDCs and SIDS, and is responsible for advocating, supporting, mobilising, co-ordinating and reporting on the implementation of programmes of action and the achievement of the Sustainable Development Goals (SDGs).

Since UN-OHRLLS was established, it has been working through a dedicated unit to advocate for LLDCs; to mobilise and co-ordinate the UN system and other stakeholders towards supporting LLDCs; to monitor implementation of the Programme of Action (PoA) for the LLDCs at the country, regional and global levels; to provide intergovernmental support to the LLDCs; and to build effective linkages between the PoA for LLDCs and those of the 2030 Agenda for Sustainable Development.

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Foreword

In a world increasingly defined by connectivity and integration, the 590 million people of the 32 Landlocked Developing Countries (LLDCs) confront distinct challenges in their pursuit of sustainable development and economic growth.

The "Cost of Being Landlocked" represents a multifaceted barrier that these countries must overcome, ranging from limited access to international markets and high transport costs to underdeveloped systems of human development, and compounded by growing climate and debt crises. The severity of these challenges is such that half of the poorest 30 countries in the world are landlocked.

As we continue to advocate for a more inclusive and equitable global development landscape, it is imperative that we keep the focus on LLDCs—empowering them to overcome the high costs of being landlocked.

In December 2024, the United Nations General Assembly adopted a landmark new Programme of Action (PoA) for the LLDCs for the Decade 2024-2034. As this report shows, the previous two programmes of action—the Almaty Programme of Action and the Vienna Programme of Action—accompanied a fall in the cost to development of being landlocked. Especially significant strides forward were achieved in fundamental markers of longer-term development, including GDP per capita and reducing child mortality, as well as gains in access to electricity, ITC infrastructure, merchandise trade and investment.

Yet a considerable development gap persists between LLDCs and the rest of the world. The mean GDP per capita in LLDCs is still only 24 per cent of the global mean and child mortality remains as much as 25 per cent higher in LLDCs, than globally. LLDCs' exports remain stubbornly concentrated in primary commodities and rising external debt stocks and servicing costs are a growing concern.

The ***Cost of Being Landlocked***, as comprehensively estimated for the first time in this landmark report, remains high. Exports are 18 per cent lower than they would be. Human development index scores—UNDP's composite statistic of development beyond just economic indicators—is 19 per cent lower. Governance is one and a half times worse. Being landlocked also reduces infrastructure quality by 15.8 per cent, supply chain traceability by 9.66 per cent, logistics services by 8.06 per cent, logistics performance by 7.77 per cent, customs efficiency by 7.27 per cent, competitive logistics pricing by 7.06 per cent, and logistics timeliness by 5.37 per cent.

As we commence the implementation of the Programme of Action for the LLDCs for the Decade 2024-2034, this report highlights where LLDCs stand, where their development weaknesses lie, and where more must urgently be done. It is a call to action for governments, the private sector, international organizations, and all stakeholders to redouble their efforts, collaborate more effectively, and deliver on our shared commitment to build a more prosperous, sustainable, and interconnected world for all.

Rabab Fatima

Under Secretary-General and High Representative
of the Least Developed Countries, Landlocked Developing Countries
and Small Island Developing States

Abbreviations

APoA	Almaty Programme of Action
BoP	Balance of Payments
CPI	Consumer Price Index
CPIA	Country Policy and Institutional Assessment
DSA	Debt Sustainability Analysis
EAP	East Asia and Pacific
ECA	Europe and Central Asia
EKC	Environmental Kuznets Curve
FDI	Foreign Direct Investment
FTA	Free Trade Agreement
FAO	Food and Agriculture Organization
GDP	Gross Domestic Product
GFC	Global Financial Crisis
GNI	Gross National Income
HDI	Human Development Index
ICT	Information and Communication Technologies
IMF	International Monetary Fund
LAC	Latin America and Caribbean
LDC	Least Developed Country
LLDC	Landlocked Developing Country
LPI	Logistics Performance Index
MENA	Middle East and North Africa
NA	North America
ODA	Official Development Assistance
OHRLLS	Office of the High Representative of Least Developed Countries, Landlocked Developing Countries and Small Island Developing States
RTA	Regional Trade Agreement
SA	South Asia
SDGs	Sustainable Development Goals
SEZ	Special Economic Zone
SSA	Sub-Saharan Africa
TFA	Trade Facilitation Agreement
UN	United Nations
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Programme
VPoA	Vienna Programme of Action
WGI	Worldwide Governance Indicators
WTO	World Trade Organization

Overview

This report reviews developmental trends in Landlocked Developing Countries (LLDCs), evaluating progress in the priority areas of the Vienna Programme of Action (VPoA) and estimating the economic cost of landlockedness. It highlights achievements, lessons learned, and best practices in development in LLDCs, while providing recommendations for implementing the new Programme of Action for LLDCs for the Decade 2024-2034.

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The analysis is nested in a conceptual framework where development is broadly defined as the improvement in the well-being and quality of life for individuals and communities. Development is therefore a multidimensional concept, which is affected by landlockedness through multiple channels including the ability of a country to trade internationally, but also the circulation of people and ideas. This framework aligns with the UN's Sustainable Development Goals (SDGs), which advocate for a balanced and inclusive approach to development considering economic, social, and environmental consideration to improve the well-being of current and future generations.

Key messages

I. *DEVELOPMENTAL TRENDS OVER THE LAST THREE DECADES*

Over the past three decades, LLDCs have made progress in various aspects of development yet continue to face a persisting gap in comparison to transit countries and other developing countries.

Growth in LLDCs' GDP per capita has lagged behind due to slower economic expansion coupled with higher population growth. Poverty, defined as the proportion of people living below the international poverty line, has been declining in LLDCs but remains stubbornly above the global average. This is largely driven by weaker growth in per capita income rather than higher levels of income inequality, which is comparable to that of transit developing countries.

Quality governance remains a critical issue for LLDCs to ensure that sound policies are adopted, the needs of citizens are respected and responded to, and the relationship between state and citizens and among citizens are governed in a way to achieve inclusivity. For LLDCs, the evidence available from the World Governance Indicators suggests that limited improvement in governance has occurred in the last three decades.

II. *RECENT MACROECONOMIC CHALLENGES AND RESPONSE TO SHOCKS*

LLDCs have been particularly vulnerable to global economic shocks in recent years. The COVID-19 pandemic and the subsequent global supply chain disruptions, compounded by international conflicts, have disproportionately affected these countries. GDP contraction in LLDCs during the 2020 recession was notably deeper than in emerging and developing economies. Their subsequent recovery in 2021-2022 was also slower.

Supply chain disruptions, a sharp increase in energy and food prices (largely driven by the war in Ukraine), and post-pandemic inflation affected LLDCs relatively more, with inflation rising by more than the average of emerging and developing countries. Export performance also suffered, with LLDCs experiencing a sharper decline in exports during the pandemic compared to the global average. Although some recovery in export volumes was seen in 2021, it was below global and developing country averages.

III. *PROGRESS ON THE PRIORITIES OF THE VIENNA PROGRAMME OF ACTION*

This report assessed the Vienna Programme of Action (VPoA) (from 2013 to 2024) relative to the Almaty Programme of Action (APoA) (from 2003 to 2013), and the pre-2003 period. Most indicators show statistically significant improvements in LLDCs' development performance over the course of the two programmes of action. Key advancements include merchandise trade, better access to infrastructure, lower child mortality rates, and improvements in domestic credit systems.

plurinational state of Bolivia @roy (Adobe Stock)

Improvements in GDP per-capita and child mortality rates are especially good news, representing important fundamental gains in key indicators of monetary and non-monetary development. However, while the trajectory of these indicators is favourable, there is still a considerable distance between LLDCs and the rest of the world. Mean GDP per-capita in LLDCs in the VPoA period was still only 24 per cent of global mean GDP per-capita; mean child mortality remains 25 per cent higher in LLDCs than globally.

Challenges for LLDCs persist in certain areas, particularly energy sustainability, unemployment and governance. For instance, CO2 emissions, renewable energy consumption, and the quality of governance, are not statistically different from those in the preceding periods. Moreover, GDP growth, remittances and foreign direct investment in per cent of GDP declined in the VPoA period. The increase in the mean values of external debt stock and external debt service is one of the aspects of greatest concern during the VPoA period.

The structural transformation of LLDC economies also remains a complex issue. While export diversification has increased in some areas, there has been a notable rise in the concentration of exports, especially in primary commodities, which has limited the scope for broader economic development. This highlights the need for LLDCs to focus on diversifying their economies and improving the sustainability of their energy systems. Although some economic and social indicators are improving, the gap between LLDCs and the rest of the world remains significant.

For most of these variables, there remains a persisting gap between LLDCs and rest of the world. There is no current evidence of LLDCs significantly catching-up to the rest of the world in terms of unemployment, progress towards greater energy sustainability, and share of official development assistance flows.

IV. *ESTIMATION OF THE COST OF BEING LANDLOCKED*

The developmental cost of being landlocked cannot simply be determined through direct comparisons of indicators with transit or coastal developing countries. To accurately assess this cost, the report adopts a statistical approach that creates an "artificial benchmark" to compare the level of development of landlocked countries with that of non-landlocked counterparts. This benchmark provides a more accurate estimate of what LLDCs' development could look like if they had access to the sea.

The findings reveal that the average cost of being landlocked is substantial, with LLDCs' exports and human development levels being, on average, 18 per cent and 19 per cent lower than they would be if they had sea access. The key drivers of these costs include weaker logistical performance, particularly in transport and trade infrastructure, and governance deficits.

The quality of logistics and trade infrastructures is a major factor contributing to the developmental gap, with the cost of landlockedness being estimated at 7.8 per cent in terms of logistics performance and 15.8 per cent in terms of infrastructure quality. There is also a gap in institutional quality with the quality of governance, as measured by World Governance Indicators (WGI), being on average two and a half times worse in LLDCs than in their coastal counterparts. Closing these gaps is crucial to improving LLDCs' development prospects and should be a central focus of the new Programme of Action for LLDCs for the Decade 2024-2034.

Policy recommendations

I. *INVESTING TO SEIZE THE DEMOGRAPHIC DIVIDEND*

LLDCs are experiencing powerful population dynamics. To fully harness these opportunities, LLDCs should invest in the formation of human capital. This includes strengthening labour markets to ensure that quality job opportunities are available to growing populations, facilitating job-searching and skills-matching to achieve effective and efficient employment outcomes for both workers and firms, and harnessing the benefits of urbanisation while managing its risk.

II. *ENHANCING PHYSICAL CONNECTIVITY*

To offset the cost of being landlocked, LLDCs should continue to enhance their physical connectivity. Case studies suggest improvements in transport inter-modality would yield substantial benefits. Key interventions include improving the efficiency of air, seaport, and rail services, expanding quality road networks, and strengthening the coverage and affordability of information and communication technologies (ICT). LLDCs also should invest in upgrading power grids to accommodate growing energy demands, transitioning from fossil fuels to sustainable, electrically powered technologies.

Sustaining these investments will require both domestic and international resource mobilization. Domestically, LLDCs should focus on improving financial intermediation, enhancing financial literacy, increasing tax collection efficiency, and creating an environment conducive to attracting foreign investments—through reliable economic institutions, transparent regulatory frameworks, and greater macroeconomic stability. These efforts should be accompanied by a stronger commitment of the international community to ensure that ODA disbursements are predictable and reliable.

III. *ENHANCING DIGITALISATION*

Digital technologies present significant opportunities for LLDCs in overcoming the challenges of being landlocked. LLDCs should focus on enhancing digital connectivity, making digital devices more affordable, and upskilling their populations to benefit from digital services. Upgrading mobile networks from 2G/3G to at least 4G, for example, should be a priority, along with investments in the quality, not just the quantity, of ICT infrastructures. Additionally, LLDCs should leverage digital platforms for e-commerce and explore the potential of emerging technologies such as big data, robotics, and artificial intelligence (AI). Promoting greater digital literacy above and beyond "computer skills" is key to for populations to transition from merely digital consumers to digital producers.

Development partners and the private sector should play an active role in facilitating technology transfer and supporting LLDCs in building the necessary physical, human, and institutional capabilities for the adoption of relevant technologies.

IV. *ENHANCING TRADE FACILITATION*

Trade facilitation remains a key priority for LLDCs, requiring collaboration between LLDCs, transit countries, and the international community. Adopting interconnected and interoperable systems between countries is important to expedite the flow of goods at the border and during transportation. Increased cooperation between transit countries and LLDCs is also necessary, including sharing timely information on measures which may affect the transport of goods through their territories.

The WTO Trade Facilitation Agreement (TFA) provides an important framework for improving trade facilitation. LLDCs should be supported with technical assistance and capacity-building to implement the TFA effectively. Moreover, there should be concerted efforts to ensure that transit and trade facilitation provisions in bilateral and multilateral trade agreements reflect the specific connectivity challenges faced by LLDC.

V. *RESHAPING THE APPROACH TO REGIONAL INTEGRATION AND COOPERATION*

Regional integration presents significant opportunities for LLDCs to enhance cooperation, improve transit transport connectivity, and boost intra-regional trade. To maximise the benefits of regional integration, LLDCs and their regional partners should take a value creation approach, addressing supply-side constraints, and linking development priorities to trade opportunities emerging from regional initiatives. Trade facilitation and transit provisions should be incorporated into regional trade agreements. Over the longer term, LLDCs should address the challenge of multiple memberships in different regional initiatives to avoid fragmentation and improve coordination.

VI. *PROMOTING STRUCTURAL CHANGE AND MANAGING ITS CONSEQUENCES*

LLDCs' record of structural change is mixed. To promote the emergence of new sectors and improve productivity, LLDCs should design modern and evidence-based industrial policies. These new industrial policies involve iterative public-private collaboration, customized public services, and target a broad range of sectors, not just manufacturing. LLDCs should also articulate interventions in support of entrepreneurship and innovation, including targeted investment in Research and Development (R&D) and the protection of intellectual property rights. The use of Special Economic Zones (SEZs) to pilot and test policy reforms should also be considered.

While promoting structural change, LLDCs will need to manage its consequences, particularly in terms of labour market outcomes. LLDCs should implement active labour market policies to facilitate the requalification of workers and their relocation from declining to emerging sectors. Moreover, any focus on structural transformation should not overlook the needs of agriculture and rural populations, which remain vital to many LLDCs' economies.

VII. STRENGTHENING RESILIENCE TO SHOCKS AND CRISES

To become resilient economies, LLDCs will need to adopt a macroeconomic policy framework that allows them to manage sharp economic fluctuations and volatility and achieve price stability. This includes achieving effective monetary policy and building the physical, social and economic infrastructure that allows the extension of support and assistance in times of crisis. LLDCs should enhance the transparency and effectiveness of their central banks, improve their fiscal targeting, and ensure that they have the capacity to respond to economic downturns and other shocks.

VIII. ACTING ON CLIMATE CHANGE AND RESPONDING TO NATURAL DISASTERS

LLDCs face significant risks from extreme natural events and they must leverage digitalization to enhance their resilience. This includes using big data for early warning systems, improving coordination with humanitarian actors, and developing more effective loss and damage recording systems. Structural resilience can also be bolstered through interventions that enforce land use and zoning regulations, upgrade construction standards, and prioritize critical infrastructure projects for public utilities.

In addition, LLDCs should secure ex-ante financing for disaster-related costs and build consensus on climate action at the national, regional, and international levels. Strengthening climate resilience is key to mitigating the impacts of extreme events and ensuring long-term sustainability.

IX. ENHANCING GOVERNANCE FRAMEWORKS

Governance is a critical enabler of development. LLDCs should take full advantage of the technical assistance and capacity-building opportunities available from international partners to improve governance across various sectors. Governance should be integrated as a cross-cutting theme across all priority areas of the next program of action for LLDCs, ensuring that sound governance practices underpin the implementation of all development strategies.

X. ADVOCATING FOR DEVELOPMENT AND INTERNATIONAL SUPPORT TO LLDCS

Despite the progress realised over the last three decades, LLDCs continue to lag behind their coastal counterparts in many aspects of development. Renewed support and solidarity for LLDCs is essential for addressing the unique challenges faced by LLDCs. Donors should commit to predictable and regular disbursements of aid to prevent volatility in financial flows. There is also scope for increasing the share of aid for trade allocated to LLDCs, particularly for the purpose of trade related infrastructures which is crucial for LLDCs' development. The international community should also continue to provide technical support, particularly for trade facilitation.

The APoA and VPoA have been instrumental in prioritizing LLDCs' needs within the global development agenda. There is an opportunity now through the new Programme of Action to reinvigorate and extend this framework of support, including financial and technical support. The evidence stemming from the data analysis in this report also emphasizes the overarching importance of support for governance as a cross-cutting issue in the implementation of the new Programme of Action.

Central African Republic 8 @UN Photos (Flickr)

1. Introduction

This report provides a comprehensive review of developmental trends in Landlocked Developing Countries (LLDCs), assesses progress made by LLDCs on the priority areas of the Vienna Programme of Action, and estimates the developmental cost of being landlocked through an econometric analysis.

The aim of this report is to highlight key achievements, lessons learned, and best practices in fostering the development of LLDCs. Based on this analysis, it offers a set of recommendations to guide the implementation of the new United Nations Programme of Action for LLDCs (PoA) for the Decade 2024-2034.

At the core of this report is a conceptual framework that defines development broadly as the improvement in the well-being and quality of life for individuals and communities. Development is considered as a multidimensional concept, which is affected by landlockedness through multiple channels. Most directly, landlockedness hampers a country's ability to engage in international trade by increasing the costs, difficulties, and uncertainties associated with transport and transit. Additionally, landlockedness is also considered for its effects on the circulation of people, and hence ideas, which can hinder innovation and progress within the economy and society at large.

This conceptual framework aligns with and embeds the central premise of the Sustainable Development Goals (SDG) of the United Nations, which emphasize the creation of a shared global agenda that promotes a balanced, inclusive and sustainable approach to development. It recognizes the need to reflect economic, social, and environmental considerations to improve the well-being of current and future generations. In this respect, the Vienna Programme of Action has been instrumental to support the achievement of SDGs in the LLDCs.

The report serves three main purposes: first, to review the developmental trends and recent macroeconomic outcomes of LLDCs; second, to assess progress made in the six priority areas outlined in the Vienna Programme of Action (VPoA); and third, to provide a comprehensive estimate of the cost of being landlocked. Based on these analyses, the report offers a set of policy recommendations to inform future approaches to LLDCs' development, particularly in the implementation of the next United Nations Programme of Action for LLDCs.

THE STRUCTURE OF THE REPORT IS ORGANIZED INTO FIVE FURTHER SECTIONS.

- **Section 2** outlines the conceptual framework deployed in the study and summarizes the extant literature on the developmental impact of landlockedness.
- **Section 3** is divided into two subsections. The first subsection presents long-term trends in economic and human development indicators for LLDCs, while the second examines the series of global crises that impacted these countries between 2020 and 2023. This period saw significant disruptions, including the COVID-19 pandemic, as well as ongoing challenges arising from international political instability and supply chain disruptions.
- **Section 4** reviews progress in each of the six priority areas of the VPoA. The evolution of key indicators is discussed, with a specific focus on comparisons between the performance of landlocked developing countries and relevant counterparts. This is followed by an econometric assessment of whether the dynamics of a selected group of variables exhibit any significant changes or 'structural breaks' over time. The analysis identifies whether these changes or breaks have occurred in periods corresponding to the VPoA and the Almaty Programme of Action (APoA).

- **Section 5** provides an estimate of the cost of being landlocked. This estimate is derived by establishing an artificial benchmark for each LLDC, representing the level of development a landlocked country would achieve in the absence of its geographic constraints. The cost of being landlocked is calculated as the difference between the actual level of development in each country and this artificial benchmark.

- Finally, **Section 6** synthesizes the findings of the preceding sections and presents a set of recommendations. These recommendations concern actions that fall under the responsibility of landlocked developing countries, their transit countries, and the international community at large. The recommendations also include proposed ways forward for the implementation of future plans of action for the landlocked developing countries.

- **Appendices 1, 2 and 3** contain the full set of country-level data used in Section 2 and 4, along with the detailed results of the statistical analysis presented in Section 3. A Statistical Annex is provided to present the complete set of data related to the priority areas of the Vienna Programme of Action.

Throughout the rest of the report, landlocked developing countries will always be referred to with their common acronym LLDCs. Other acronyms are introduced as needed.

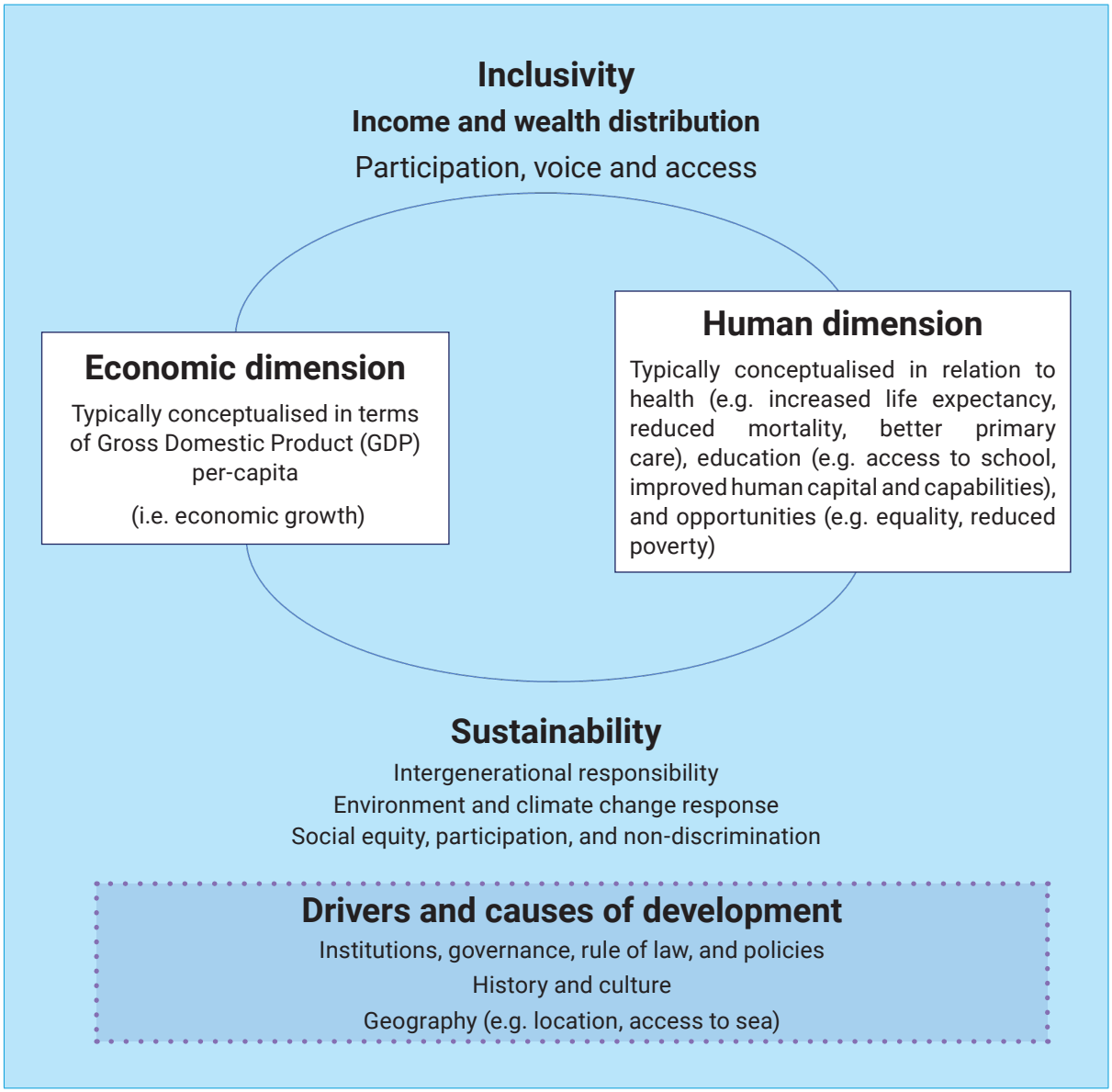
Rwanda @djoslin(Adobe Stock)

2. Conceptual framework of development and the cost of being landlocked

Conceptual framework

In its broadest definition, development is the improvement in the well-being and quality of life for individuals and communities. This definition lays the foundation for a conceptual framework in which development is a multidimensional process of positive change and societal progress. *Figure 2.1* outlines this conceptual framework.

Figure 2.1. Working conceptual framework for development



In this framework, the 'economic dimension' of development refers to the increase in income and wealth, which is typically measured in terms of Gross Domestic Product (GDP) or Gross National Income (GNI) and typically referred to as economic growth. The human dimension concerns the betterment of health outcomes, increased access to basic resources (such as food, housing, energy), and opportunities (such as education and employment), and the enhancement of capabilities for all individuals.

TWO CRITICAL ELEMENTS UNDERPIN THESE DIMENSIONS.

The first one is inclusion; that is, the idea that society should not develop only "on average", but across all its cohorts and demographics. Inclusion involves a more equitable distribution of opportunities to generate income and wealth, greater participation in society across socioeconomic groups, and access to the benefit of development for all individuals.

The second critical element is sustainability. While often considered in terms of environment, sustainability is conceived broadly to involve societal equity and intergenerational responsibility to guarantee that the development enjoyed by the current generation does not compromise the opportunity for future generations to meet their own needs and achieve their ambitions.

In this conceptual framework, the drivers of development distinguish between its fundamental and proximate causes. While early development literature focused on the accumulation of factors (such as physical capital) and total factor productivity to explain development patterns this report considers the fundamental causes that drive the processes of accumulation, technological progress, and all connected proximate factors, such as physical infrastructure and innovation.[1]

The box in the bottom portion of *Figure 2.1* highlights these 'fundamental' drivers and causes of development: institutions and policies, history and culture, and geography, which also includes natural resource endowments. These drivers are endogenously connected: history affects the quality of current institutions, which in turn affect the ability of countries to adopt and implement policies and legal frameworks that meet the need of their citizens. For instance, a country's geography and climatic conditions may affect its disease burden and, consequently, the quality and productivity of human capital.

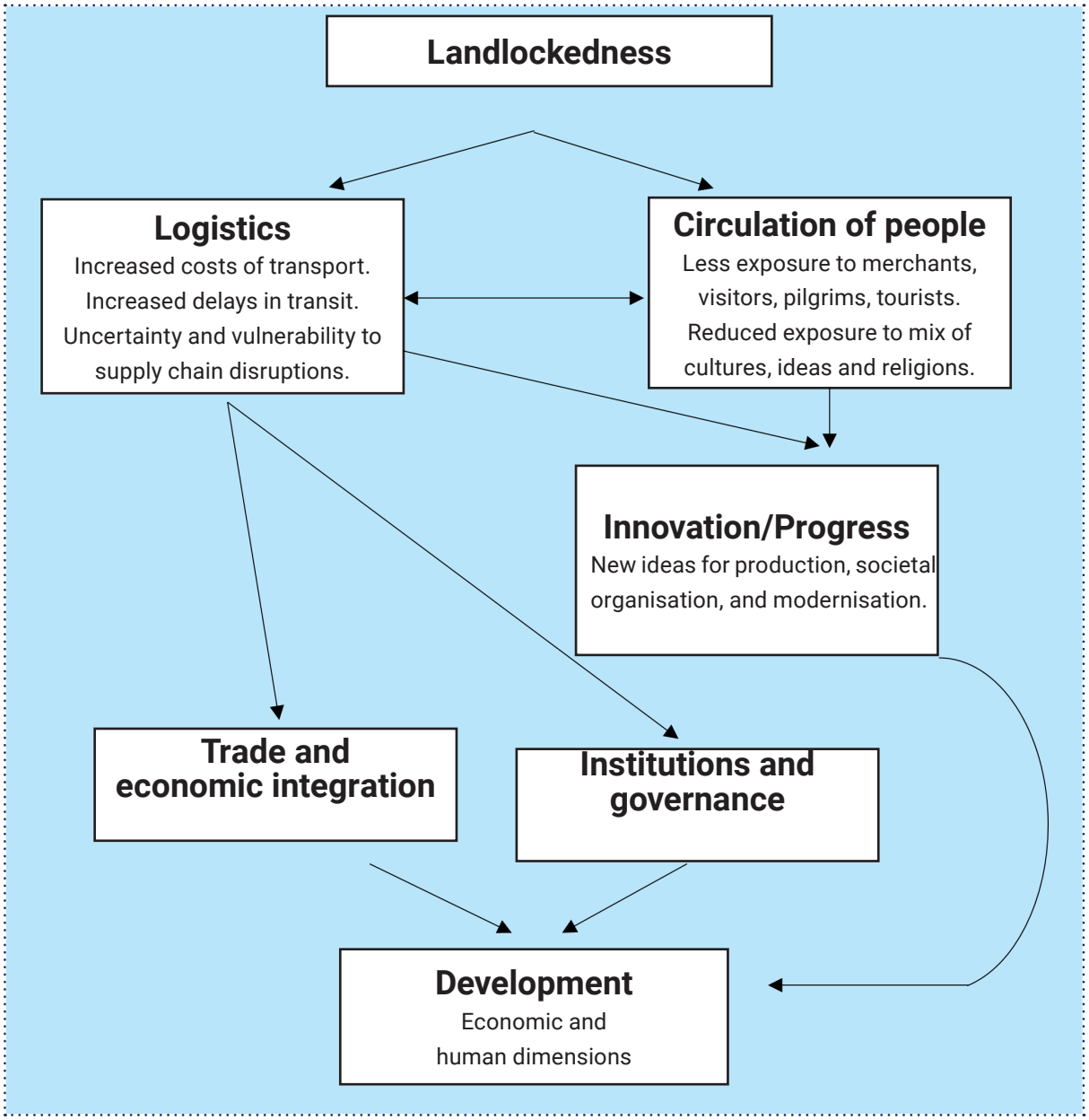
Given this conceptual framework, the theoretical links specifically concerning landlockedness and development are summarised in *Figure 2.2*. Landlockedness may limit a country's ability to trade internationally through transit difficulties, logistic difficulties and higher transportation costs. This can result in higher costs in sourcing needed inputs for domestic production, undermining the development of efficient domestic productive structures, limiting production possibilities, and increasing costs for consumers, with direct economic consequences for development.

Landlockedness can also reduce other aspects of countries' political and socioeconomic integration with the rest of the world. A key element in the development of a country is the circulation of ideas and sharing of knowledge and technological progress. This happens via trade, but also via the movement of people, the mixing of cultures, and participation in international non-economic ventures. For instance, transport difficulties may disincentivise foreign direct investment or international tourists' destination choices. Landlockedness therefore could weaken economic and non-economic ties with the rest of the world, potentially affecting development via multiple channels, including institutions and governance.

Figure 2.2 also incorporates proximate drivers of development as outcomes originating from the fundamental links discussed in the conceptual framework for development. The list of potential proximate drivers is not exhaustive; various socioeconomic variables correlate with development in different ways. A country's vulnerability and coping capacity to domestic and external shocks (such as the COVID-19 pandemic), hinge upon factors including its policy environment, institutional capacity, and geography, among others. These may be directly and indirectly affected by being landlocked.

[1] Hall and Jones (1999) started the former branch of the development literature asking exactly the question "Why do some countries produce so much more output per worker than others?".

Figure 2.2. Landlockedness and development



The model used in Section 5 to provide an estimate of the development cost of landlockedness is based on the links summarised in ***Figure 2.2***. The arrows in the figure should not be interpreted as the only possible direction of causality. In fact, in a long-term, general equilibrium perspective, most processes may be considered endogenous; that is, there are two-way effects from institutions to innovation, or from institutions to trade. More generally, it can be argued that development influences and reinforces its own determinants, creating the possibility of virtuous, and sometimes vicious, cycles. For instance, increased development enhances logistics, promotes greater integration, creates more opportunities for innovation, improves institutions and, in turn, catalyses more development.

The core of the mechanisms portrayed in ***Figure 2.2*** can be captured in three equations. These link (i) *trade and institutions to development*, (ii) *trade to landlockedness*, and (iii) *institutions to landlockedness*. That is, the system of three equations can model the effect of landlockedness on development via the trade channel, the institutional channel, and a residual channel that captures any other factors. The trade channels can be further articulated to reflect both outcomes,

such as flows of trade and trade facilitation. The results in Section 5 show that the cost of being landlocked goes above and beyond reduced trade integration with the rest of the world.

The conceptual framework used here aligns with and embeds the key premise of the Sustainable Development Goals (SDG) of the United Nations. This premise is to create a shared global agenda that promotes a balanced and sustainable approach to development, considering economic, social, and environmental elements of the well-being of current and future generations. In this respect, the Vienna Programme of Action (VPoA) is a vehicle to support the achievement of SDGs in the landlocked developing countries. The rest of the report provides evidence of progress made by countries under the VPoA, using a variety of indicators, including several taken directly from the SDG monitoring framework.

Literature summary of the developmental impact of landlockedness

The challenges faced by landlocked countries have been long acknowledged in the development literature. Early studies use the methodological framework of Barro's regressions to estimate the effect of being landlocked (or, equivalently, being coastal) on GDP per-capita growth. Several of these studies conclude that landlockedness significantly reduces the level of GDP per-capita or its growth rate (see Bloom and Sachs, 1998; Henderson et al., 2001; Easterly and Levine, 2003; Bloom at et al. 2003; Bosker and Garretsen, 2009). Other studies show that the direct effect of landlockedness on growth is mediated by other factors - particularly the quality of institutions (see Sala-i-Martin et al., 2004; Acemoglu et al., 2001; and Rodrik et al., 2004).[2] Building on these early findings, Carmignani (2015) explores the different mechanisms through which landlockedness affects long-term economic development, finding that institutional quality plays a prominent role. Rivero et al. (2020) also estimates that institutional innovations could reduce and mitigate the negative effect of landlockedness on GDP by 68 per cent.

Two strands of research have since emerged in the more recent literature. One strand tries to estimate more precisely the costs of specific aspects of landlockedness. For instance, Paudel (2019) finds that landlocked countries in South Asia have about a 2.5 per cent trade disadvantage, but that could through better trade facilitation (as represented by an increase in their trade facilitation index) generate up to 10 per cent more trade than other countries in the region. Jetter et al. (2019) looks at landlocked regions, finding a lack of ocean access to decrease GDP per-capita by 13 per cent but also that better transport-infrastructures may be able to alleviate this developmental disadvantage. In a broader human development context, Park et al. (2019) find that the effect of extreme weather events (including droughts, floods, storms, and extreme temperatures) on nutrient supplies is especially magnified among landlocked developing countries.

The other emerging strand in the literature draws on the experiences of landlocked countries to learn lessons and best practices for development policy. A great deal of attention is devoted to understanding how to improve logistics and supply chains. For example, Kawasaki et al. (2021) and Mlepo (2022) conclude that rail is more effective than road transport for overcoming corridor and border challenges in the Southern African region. For the case of West Africa, Kalgora et al. (2019) review the experience of five transport corridors used by the landlocked countries Burkina Faso, Mali, and Niger, highlighting the benefits of transport inter-modality.

[2] Acemoglu et al. (2001) and Rodrik et al. (2004) show that the effect of landlockedness in a growth regression becomes statistically insignificant when institutional quality and other fundamental drivers of development are controlled for. This has led to a hypothesis that landlocked countries are poorer because they happen to have worse economic and political institutions, not because of landlockedness per se, see also Sievers and Urbatsch (2018). In fact, Figure 2 helps interpret these findings: landlockedness affects development via multiple channels; that is, by affecting other variables (such as, possibly, institutions) which then affect development. In recent work Basnet (2021) tests whether the effect of landlockedness is entirely captured by the effect of institutions, concluding that landlockedness is still a powerful predictor of income per-capita levels even after controlling for the effect of institutions.

Tsui and Wu (2022)'s case study of the "One Belt, One Road" initiative finds that improved air connectivity can bring a "win-win" outcome for both landlocked countries and partner countries. Yang and Chang (2019) use a survey of shipping companies to assess the factors that influence logistics operations for Burkina Faso, finding that local agents' logistics capability is the most important factor. More generally, several authors document the lack of border capacity, in terms of physical infrastructure, human capital, and efficient regulations, and how this presents a fundamental challenge for landlocked and transit countries (De, 2011; Reitsma, 2015; and Sharapiyeva, 2019).

Within this second strand of the literature, considerable attention has also been given to the design and implementation of regional and supranational initiatives. Ndonga et al. (2020) assess the impact of the African Continental Free Trade Area (**AfCFTA**) by looking at the specific case of Malawi, concluding that its potential will depend on how the continent is able to restructure trade to achieve greater diversification and reduce its reliance upon primary commodities. This raises the issue of which regional initiatives landlocked countries should join, if any (a point that will be further discussed in Section 4).

Naranbold and Kim (2019) pose the question of criteria for the selection of FTA partners. For the case of Mongolia, they conclude that an FTA-oriented policy is not the right path given its relatively weak bargaining position. They suggest that Mongolia should avoid enacting FTAs until it improves and diversifies its industrial base. Along this line of work, Adhikari and Ma (2022) explores the role of the Belt and Road Initiative as an agent to strengthen the ties between the sea and landlocked countries, presenting a case study on Nepal, and Karim et al. (2020) discuss the contribution of the Trans-Asian railway network to the achievement of sustainable development goals.

Landlocked countries are also more vulnerable than their coastal counterparts to shocks that disrupt supply chains or complicate border transit. One recent example of such a shock is the COVID-19 pandemic. The pandemic forced governments to close borders, restrict the movement of people, and ultimately increased the challenges that landlocked countries face in connecting to global markets. In this context, recent papers highlight the importance of the digitization of logistics processes, along with other trade facilitation mechanisms such as authorised economic operators and foreign trade single windows (Rivera et al., 2020 and Perez and Suarez, 2021). Another recent example is provided by the impact of the Russia-Ukraine conflict on food supply chains (Jagtap et al. 2022) and energy supply chains (Allam et al. 2022 and Cui et al. 2023). While this impact has been felt globally, landlocked countries in the Euro-Asian region can be at greater risk of disruption (Kammer et al. (2022).

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3. Socioeconomic developmental trends and recent macroeconomic outlook

This section of the report presents a general overview of LLDCs' broad socioeconomic trends and recent macroeconomic performance. The socioeconomic trends are explored in the context of a long-term developmental perspective over a time horizon spanning three decades, and—in alignment with the conceptual framework of the report—considers both monetary and non-monetary indicators. This is followed by an analysis of macroeconomic performance over the more recent 2020-2023 period, which focuses on the challenges presented by COVID-19, increasing geopolitical tensions, inflationary pressures, and associated policy responses.

3.1. Developmental trends

ECONOMIC DEVELOPMENT

Development can be measured through a multitude of indicators. Gross Domestic Product (GDP) per-capita is one of the most basic and commonly used indicators of development. Being a monetary measure, GDP per-capita tends to capture the economic dimension of development (as opposed to the social and human dimensions). However, evidence suggests that there is a strong correlation between GDP per-capita and indicators of human development (see Box 1). GDP per-capita therefore provides a useful starting point in the review of broader developmental trends.

Box 1: The relationship between GDP per-capita and human development

GDP is a "monetary" measure. The question is therefore to what extent GDP can capture "non-monetary" dimensions of well-being, such as health, equity, or sustainability. To gain some insights on this point, consider the chart below. This is a plot of GDP per-capita in US dollars in 2021 against the level of the Human Development Index (HDI) in many countries world-wide. US dollars are measured at purchasing power parity, to account for cross-country price level differences. Each dot represents a country. For instance, in 2021 Equatorial Guinea had a GDP per-capita of about $7,500 and an HDI of 0.6.

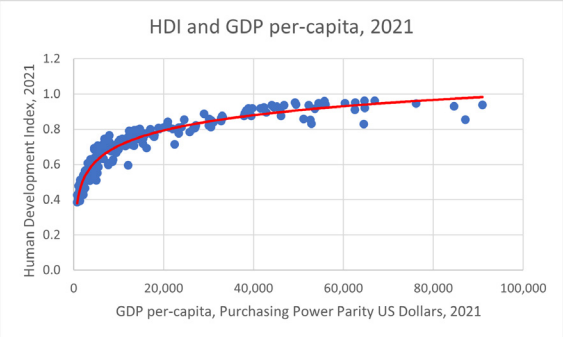
The HDI index is sourced from the United Nations Development Program (UNDP). It is a statistical measure that has been created to assess the development of a country in terms of people and their capabilities, not economic growth alone. As such, the HDI summarises achievements in terms of people having a long and healthy life, being knowledgeable, and have a decent standard of living. The HDI will be used and commented on more extensively in section 5 of the report.

Numerically, the HDI index is defined between 0 and 1, with 0 being the lowest level of development and 1 the highest level. In practice, as of 2021, the index ranges between 0.962 (Switzerland) and 0.385 (South Sudan).

The red line in the scatter plot shows the best quadratic fit (non-linear approximation) of the general patter of the scatter plot. From a statistical point, the red line summarises the relationship between GDP per-capita and HDI.

Two dynamics can be identified from the Chart:

- **FIRST, THE RELATIONSHIP BETWEEN GDP PER-CAPITA AND HDI IS POSITIVE:** this means that as GDP per-capita grows, HDI improves. We can say that on average countries with a higher GDP per-capita also have a higher level of human development.
- **SECOND, THE RELATIONSHIP IS INITIALLY VERY STEEP AND THEN IT FLATTENS:** this means that when a country is initially characterised by a low level of GDP per-capita and HDI, then even small increases in GDP per-capita generate are associated with large increases in HDI. Conversely, once the country reaches a high level of per-capita GDP and HDI, even large increases in GDP per-capita are associated with only a small improvement in HDI.



Sources: *World Development Indicators (World Bank) for GDP and United Nations Development Programme for HDI*

While the chart does not necessarily represent causality, it does provide a clear message that the increase in GDP per-capita (economic development) goes hand-in-hand with the improvement of HDI (human development). This of course does not necessarily mean that GDP is a perfect measure of well-being and this is why a full assessment of developmental trends must also look at other indicators.

Table 3.1. reports the data on total GDP at constant prices, the growth of GDP at constant prices, and the level of GDP per-capita in LLDCs and other country groupings. The country groups are world, transit developing countries, coastal developing countries, and advanced economies. To capture the long-term dynamics of these indicators, the data are averaged over decades: 1990-99, 2000-09, 2010-19, with the average of the last two or three years (depending on the latest available observation) reported separately. As a reference, averages of the periods corresponding to the Almaty Programme of Action (APoA) and the Vienna Programme of Action (VPoA) are provided. A more systematic comparison of changes in dynamics across the two periods is provided in Section 4 of the report.

LLDCs represented only 0.7 per cent of global GDP in the 1990s. This share has only marginally increased over the subsequent two decades, reaching 1 per cent in 2020-22. This reflects the fact that LLDC's have grown at about the same pace as the world, but slower than other developing countries. Transit countries in particular have grown significantly faster than LLDCs throughout the period of observation, although the gap in growth rates in the last ten years (VPoA) is smaller than in the previous ten years (APoA). While the share of transit countries in global GDP has increased by 16 percentage points (from 14 per cent in 1990s to 30 per cent today), the share of LLDCs has only increased by only 0.3 per cent. There is therefore evidence of a fundamental, long-term growth gap between LLDCs and the rest of the developing countries. Of course, this gap may not be due exclusively to landlockedness, but it is indicative of the developmental challenges associated with being landlocked.

TABLE 3.1. GROSS DOMESTIC PRODUCT IN LLDCS AND COMPARATIVE COUNTRY GROUPINGS

	1990-99	2000-09	2010-19	2020-22	APoA	VPoA
GDP constant prices (USD billions) (share of world GDP in brackets)						
World	40332	55659	74400	84451	69546	80182
LLDC	274 (0.7)	416 (0.7)	757 (1.0)	873 (1.0)	659 (0.9)	835 (1.0)
Transit	5558 (13.8)	10115 (18.17)	19554 (26.3)	25244 (29.9)	17058 (24.5)	22539 (28.1)
Coastal	9576 (23.7)	15827 (28.4)	27666 (37.2)	34129 (40.4)	24506 (35.2)	31204 (38.9)

	1990-99	2000-09	2010-19	2020-22	APoA	VPoA
Developing	9850 (24.4)	16236 (29.1)	28404 (38.2)	34983 (41.4)	25149 (36.2)	32019 (39.9)
Advanced	30482 (75.6)	39423 (70.9)	45996 (61.8)	49468 (58.6)	44397 (63.8)	48163 (60.1)
GDP growth (per cent)						
World	2.84	2.99	3.16	1.38	3.13	2.62
LLDC	2.82	3.02	3.18	1.36	3.16	2.63
Transit	5.62	7.00	5.97	3.68	7.38	4.84
Coastal	3.76	5.99	5.15	2.51	6.26	4.02
Developing	3.63	6.01	5.14	2.44	6.28	3.99
Advanced	2.59	1.77	2.01	0.65	1.69	1.75
GDP per-capita constant prices (USD) (average annual growth in brackets)						
World	7276 (1.10)	8655 (1.63)	10222 (1.98)	10953 (0.64)	9264 (1.84)	10676 (1.10)
LLDC	1007 (-2.76)	1138 (3.68)	1610 (2.63)	1655 (-2.68)	1333 (4.21)	1676 (0.70)
Transit	1665 (3.81)	2606 (5.59)	4446 (4.67)	5387 (2.71)	3310 (6.14)	4956 (3.26)
Coastal	2206 (2.00)	3134 (4.59)	4840 (3.93)	5642 (1.79)	3800 (5.03)	5293 (2.55)
Developing	2135 (1.83)	2998 (4.48)	4591 (3.84)	5319 (1.61)	3621 (4.95)	5007 (2.46)
Advanced	29369 (1.74)	35831 (1.15)	39638 (1.51)	41518 (0.29)	38986 (1.04)	40948 (0.72)

Source: WDI, World Economic Outlook, and UN World Population Prospects

GDP per capita in LLDCs has risen significantly less than in other developing countries in recent decades. This is partially because of the slower growth in total GDP and faster population growth in LLDCs than elsewhere. Over the 1990-2022 period for instance, population in LLDCs increased by 117 per cent, which is more than twice the cumulative growth in the world population (51 per cent) and population in developing countries (56 per cent). These powerful population dynamics could however be translated into development opportunities for LLDCs if accompanied by policies to ensure that infrastructures, education, and health sectors keep up with the pressures of increasing demand. Labour markets should also need to be sufficiently flexible of absorbing and efficiently allocating a growing supply of labour.

In terms of GDP per-capita dynamics, transit developing countries have outperformed LLDCs and have almost caught up with coastal developing countries. This means that transit countries have outperformed all other developing countries, reinforcing the developmental imperative for LLDCs to continue improving cooperation with their transit countries. More generally, the data in ***Table 3.1*** confirm the importance of addressing

transit issues for LLDCs, a point that will be further discussed in Section 4.

POVERTY, INEQUALITY, AND HUMAN DEVELOPMENT

The reduction of poverty—defined as the proportion of people living below the international poverty line—is a key aspect of development. Economic theory and existing empirical evidence[3] suggest that the elasticity of poverty to economic growth depends on the degree of inequality in the distribution of income across individuals. That is, while GDP growth generally reduces poverty, the effect of GDP growth on poverty is enhanced if growth is accompanied by a reduction in income inequalities. GDP growth represents an increase in the overall income of a country. Poverty then depends on how equitably or inequitably this income is distributed. The more "inclusive" growth is (the more the income generated by growth becomes accessible to wider sectors of the population), the stronger the poverty-reduction effect of economic growth.

Table 3.2 provides information on long-term poverty and inequality trends.[4] Unfortunately, data on poverty are available only with significant lags, meaning that there are not many observations available for the period 2020-22 and averages cannot be meaningfully calculated (see Appendix 3 for country-level data). Poverty is defined based on the international poverty line of $2.15 per day. Inequality is measured by the Gini index. This index measures the extent to which the distribution of income in a country deviates from a perfectly equal distribution (a distribution where all individuals have the same income). The index ranges from 1 to 100, with higher values denoting a less equal distribution of income.

As can be seen, poverty in LLDCs has been declining quite significantly over time, from an average of 54.6 per cent in the 1990s to 31.3 per cent in the 2010s. Still, it remains well above the world average (11.5 per cent). The comparison with the group of transit developing countries is particularly striking. Given the large economic and demographic weight of China in the group of transit countries and considering how fast poverty has declined in that country, assessing the median values of poverty is more instructive than comparisons with averages.[5] The medians however present a similar story to the averages reported in the table (the medians for the group of transit countries are 12.6 per cent in 1990-99, 5.8 per cent in 2000-09, and 1.3 per cent in 2010-19).

A reduction in poverty can come from an increase in per-capita incomes or a reduction in inequality (see Bourguignon, 2004, for a theoretical discussion). The table shows that inequality in LLDCs has reduced over time and is not significantly higher than in other developing countries, while it is lower than in transit countries. This suggests that persistently higher levels of poverty in LLDCs are primarily due to weak income growth; that is, GDP per-capita growth falling short of the global and developing country averages. Nevertheless, to ensure that growth translates into faster rates of poverty reduction, LLDCs should continue to moderate inequalities. Development comes with a structural transformation process that has the potential to sharpen inequalities. Therefore, as LLDCs go through associated changes in their production and export structures (see Section 4), there is a risk that inequality could start to rise again, which would in turn dampen the effect of economic growth on poverty and cause a developmental bottleneck. As further discussed in Section 6, moderating inequalities requires active labour market policies that support transfer of skills from declining to emerging sectors, suitable investment in the continued modernization of the agriculture sector, and a macroeconomic policy mix that stabilises cyclical fluctuations.

[3] See for instance Carmignani (2011), Chowdhury and Carmignani (2011) and De Silva (2016).
[4] Aligning with original data sources, the developing and advanced groupings are replaced by low and middle income and high income respectively when presenting poverty data. The break-down of groupings for HDI data also follows the original data sources.
[5] The median value represents the value (of the poverty index, in this case) such that half of the countries in the group have a higher value (of poverty) and of the countries have a lower value (of poverty). The median therefore reduces the impact that outliers could have on the group average.

TABLE 3.2. POVERTY, INEQUALITY, AND HUMAN DEVELOPMENT IN LLDCS AND OTHER COUNTRY GROUPS

	1990-99	2000-09	2010-19	2020-22	APoA	VPoA
People living below USD 2.15 per day (per cent of population)						
World	33.9	23.3	11.5	..	17.9	10.0
LLDC	54.6	44.2	31.3	..	37.3	25.4
Transit	11.5	6.5	1.7	..	4.2	1.2
Low and Middle income countries	42.0	31.2	16.0	..	25.3	13.6
High income	0.9	0.7	0.6	..	0.6	0.6
Gini index (simple averages)						
World	41.62	39.47	37.67	36.53	37.18	36.06
LLDC	45.48	41.65	39.80	34.82	38.30	36.84
Transit	43.15	43.51	41.33	45.98	42.41	42.33
Coastal	44.10	42.17	39.90	39.75	41.23	39.88
Developing	44.52	42.03	39.88	38.71	40.89	38.34
Developed	43.27	41.27	39.42	38.97	39.21	38.01
HDI						
World	0.601	0.645	0.724	0.734	0.697	0.733
LLDC	0.461	0.475	0.587	0.598	0.555	0.598
Transit	0.485	0.522	0.621	0.636	0.585	0.634
Developing countries	0.513	0.569	0.672	0.686	0.638	0.685
Medium human development	0.453	0.506	0.624	0.639	0.582	0.639
Low human development	0.356	0.399	0.506	0.519	0.477	0.517

Source: Word Development Indicators, UNSDG database, and United Nations Development Programme

The bottom portion of ***Table 3.2*** shows the Human Development Index (HDI) of the UNDP (previously referenced in Box 1). This is a composite measure that aggregates monetary and non-monetary indicators of development: life expectancy at birth, mean years of education, expected years of schooling, and gross national income per-capita. The index is defined between 0 and 1, with a higher value indicating a higher level of human development. Countries are typically classified into categories of very high human development, high human development, medium human development, and low human development based on their HDI scores. The table reports the simple averages for all LLDCs, plus the world average and the average for medium and low human development countries.

LLDCs as a group are between low and medium levels of human development, but over time they have somewhat lost ground, as evidenced by the fact that in the 1990s HDI in LLDCs was on average higher than in the medium human development group of countries. The gap vis-à-vis the group of transit countries and other developing countries has also slightly increased over time. This is consistent with previous observations on the GDP growth and the discussion in Box 1 concerning the close association between GDP per-capita and HDI, especially at lower initial levels of development.

ENVIRONMENTAL SUSTAINABILITY

A key challenge of development is its long-term environmental sustainability. As countries transition from agriculture to industry and services, pollution tends to increase and natural resources (including forests) are more intensively depleted. This suggests that development should be associated with greater environmental degradation. However, with industrialisation and urbanisation also come income growth and technological progress, which in turn raise environmental awareness and create opportunities for cleaner production and consumption. It is therefore possible that at sufficiently advanced stages of development, further development could be associated with less environment degradation. If this were the case, then the relationship between development and environment would be inverted U-shaped (the so-called Environmental Kuznets Curve, or EKC). While there is some evidence in support of EKC, it is far from unanimous. Furthermore, even if the relationship was inverted (that is, U-shaped), it is likely that the improvements in environmental quality achieved at advanced stages of development would not fully offset the environmental degradation suffered at initial stages of development.[6]

TABLE 3.3 REFLECTS THREE ENVIRONMENTAL SUSTAINABILITY INDICATORS THAT HAVE RECEIVED ATTENTION IN POLICY PRACTICE (COUNTRY-LEVEL DATA FOR LLDCS ARE REPORTED IN APPENDIX 3):

I. **CO2 emissions.** This is measured in metric tons of emissions per-capita and is a standard indicator of greenhouse gas accumulation in the atmosphere, which causes global warming. It is to be noted that data for this variable are available to 2020, so the average 2020-22 is in fact just the data point for year 2020.

II. **Number of deaths and missing persons attributed to disasters.** This number is reported per 100,000 people and is roughly indicative of the damage associated with climate change and related phenomena. Fluctuations in total population data exist for certain countries and years due to data availability gaps. To account for this, population weighted averages are shown in the table in addition to totals.

III. **Forest areas.** The surface covered in forest is reported in percent of total land area to indicate the extent of deforestation taking place over time.

At the global level, CO_2 emissions increased significantly until the early 2010s. Since then the trend has flattened and in 2020, the global level of emissions was lower than the average of the previous decade, though this is likely due to the slowdown in economic activity caused by COVID-19. For the group of advanced economies, the data show a pattern that is consistent with the environmental Kuznets curve hypothesis. There is also evidence of a slow-down in the rate at which emissions produced by developing countries are growing.

LLDCs tend to produce less emissions than other developing countries. The difference is particularly evident vis-à-vis transit countries (whose average is, however, significantly affected by the inclusion of China and India in the group). This reflects the mixed patterns of structural transformation experienced by LLDCs and the fact that they have not uniformly gone through a period of industrialisation with a significant increase in the share of manufacturing. On the other hand, it should be noted that the traditional idea of structural change as a linear process from agriculture to industry to services has lost much of its empirical backing, with more countries (including LLDCs) showing a non-linear pattern of transformation of their productive structure (*see more on this in Section 4*).

[6] Dinda (2004) provides a survey of theoretical channels and earlier evidence in support of the EKC, noting however that there is no agreement on the income level at which environmental degradation starts declining. More recent evidence is provided by Dogan and Inglesi-Lotz (2020) for advanced economies. For developing economies, Fisher et al. (2021) provide evidence of the large negative economic effect of pollution. This finding suggests that a rapid transition to wind and solar energy, avoiding reliance of fossil fuel-based economies and minimising pollution would have a significant positive effect on economic development.

The human cost of disasters is significant, but not necessarily increasing over time.[7] The high figure for 2020-22 (both globally and in LLDCs) is the result of specific episodes whose impact on the calculation of totals and averages, from a statistical point of view, will likely be diluted over time. However, one should be careful in interpreting this as evidence that the risk or cost of climate change is moderating. In fact, stable numbers over time may simply be reflecting the fact that countries are generally becoming more prepared to deal with the consequences of disasters.

Lastly, the data suggest that forests in LLDCs are being depleted at a rate of approximately one percentage point per decade. This is somewhat faster than trends in the developing countries and globally. Overall, the pattern of environmental indicators in LLDCs seems to reflect mixed progress on industrialisation and structural change rather than an evolution of their production structures (and consumption) towards greener technologies.

The challenge of environmental sustainability is compounded by the pressures of climate change. The risk associated with climate extremes puts pressure on countries to identify and implement adaptation solutions. The capacity to do that can be measured by the ND-GAIN country index developed by the University of Notre Dame. The index combines several dimensions into a quantitative indicator that is used to track a country's vulnerability and readiness over time. The dimensions that are included in the index are: degree of exposure to significant climate change, extent to which a country is dependent upon a sector negatively affected by climate hazards, availability of resources for sector-specific adaptation, and extent to which the country can leverage investment and implement adaptation actions.

Based on 2021 data (the latest available year of information), the index ranges from a minimum of 27 to a maximum of 75, with a global average of 49.6. The average for all developing countries is 45.8 and the average for transit countries is 45.7. LLDCs' average score is 43.8. While numerically moderate, this difference between LLDCs and transit countries is significant suggesting that, as a group, LLDCs tend to be more vulnerable and less prepared than transit countries and other developing countries. Over the last decade, the index has grown by almost 5 per cent in the LLDC group, against a 2 per cent increase globally and a 4 per cent increase in transit countries. Moving forward, economic development accompanied by investment in ICT infrastructures, education, and improved governance (see also below) will increase readiness. LLDCs should also invest in reducing their vulnerability, particularly in relation to urbanisation. Currently, LLDCs are less urbanised than other developing countries yet progress along the developmental path will be expected to increase urbanisation. As cities grow, they may also become more frequently exposed to extreme events such as floods and heat waves. Reducing vulnerability therefore requires making cities more resilient through appropriate urban planning and provision of adequate infrastructure.

GOVERNANCE AND INSTITUTIONS

Quality institutions are needed to ensure that sound policies are adopted, the needs of citizens are respected and responded to, and the relationship between state and citizens and among citizens are governed to achieve inclusivity. In short, good institutions are instrumental to the development process and are themselves an outcome of development. It is therefore important to include a measure of institutional quality in the assessment of long-term developmental trends of LLDCs.

Indicators provided by the Worldwide Governance Indicators (WGI) project provide a very useful source of statistical information on six dimensions of institutional quality. The indicators are constructed from four types of data sources: surveys of households and firms (e.g. Gallup World Poll, Global Competitiveness Report), commercial business information providers (e.g. Economic Intelligence Unit, Political Risk

[7] There is, however, a significant increase in the world average between the periods associated with APoA and VPoA. This reflects improved recording to an extent, but also the increased of incidence of events in more highly populated areas, which is also a consequence of patterns of urbanisation.

Services), non-governmental organisations (including Freedom House, Reporter Without Borders and Global Integrity), and public sector organisations (such as the World Bank or regional development banks). The six dimensions of governance captured by these indicators are:

- **VOICE AND ACCOUNTABILITY:** the extent to which citizens participate in the selection of their government, enjoy freedom of expression and association, and receive information from free media.
- **POLITICAL STABILITY AND ABSENCE OF VIOLENCE/TERRORISM:** the extent to which government changes occur in an orderly fashion and the absence of various forms of violence and disruption, including riots, social unrest, armed conflict, violent demonstration, and activities of non-state armed groups.
- **GOVERNMENT EFFECTIVENESS:** the quality of the public and civil service and their degree of independence from political pressure, the quality of policy formulation and implementation, and the extent to which the government's commitment to sound policies is perceived as credible.
- **REGULATORY QUALITY:** the extent to which the set of regulations that discipline economic interactions facilitate private sector development.
- **RULE OF LAW:** the extent of the enforcement of contracts, property rights, and more generally the extent to which citizens, businesses and the state abide by the laws of the country.
- **CONTROL OF CORRUPTION:** the extent to which public power is not exercised for private gains, interactions with this power are free from imposition of side payments, and the state is not captured by elites and private interests.

These indicators are developed on a standardised common scale and can be aggregated into a single index, here labelled as 'Governance'. Simple group averages of this aggregate governance index are reported at the bottom of *Table 3.3*, with country-level data available in Appendix 3. The values of the index span below and above zero. Higher values denote better governance. It should be noted that WGI indicators start from 1996 and until 2002 were produced every two years. This means that the average for the 1990s is based on only two observations per country.

TABLE 3.3. INDICATORS OF ENVIRONMENTAL SUSTAINABILITY, CLIMATE RISK, AND QUALITY OF GOVERNANCE

	1990-99	2000-09	2010-19	2020-22	APoA	VPoA
CO_2 emissions (metric tons per capita)						
World	3.91	4.24	4.63	4.29	4.49	4.56
LLDC	1.79	1.59	1.90	2.02	1.75	1.93
Transit	2.36	3.21	4.35	4.48	4.02	4.41
Coastal	2.21	2.99	3.86	3.87	3.44	3.87
Developing	2.06	2.55	3.34	3.32	2.85	3.33
Advanced	11.22	11.47	10.27	8.82	11.07	9.83
Number of deaths and missing persons attributed to disasters per 100,000 population						

	1990-99	2000-09	2010-19	2020-22	APoA	VPoA
World total cumulative in the decade	..	2037.15	3324.68	4115.30	4437.51	5502.54
World average	..	3.78	3.07	27.64	4.12	8.52
LLDC total cumulative in the decade	..	980.93	2147.10	841.20	2726.16	1541.61
LLDC average	..	2.08	1.95	14.89	4.96	4.80
Transit cumulative in the decade	..	471.76	215.56	544.04	575.51	655.84
Transit average	..	4.05	0.95	19.14	2.74	5.42
Forest areas (per cent of land area)						
World	32.08	31.80	31.39	31.18	31.61	31.23
LLDC	19.86	18.04	17.09	16.65	17.57	16.94
Transit	18.34	19.01	19.78	20.01	19.44	19.98
Coastal	33.41	33.01	33.25	33.23	33.12	33.24
Developing	32.34	31.88	32.17	31.92	32.43	32.01
Advanced	29.11	29.30	29.61	29.68	29.43	29.65
Governance indicator						
World	0.014	-0.005	-0.021	-0.023	-0.018	-0.021
LLDCs average	-0.665	-0.716	-0.681	-0.675	-0.702	-0.676
Transit	-0.449	-0.541	-0.528	-0.464	-0.557	-0.493
Coastal	-0.320	-0.334	-0.336	-0.326	-0.335	-0.335
Developing	-0.320	-0.351	-0.373	-0.368	-0.368	-0.370
Advanced	1.184	1.207	1.195	1.168	1.202	1.188

Sources: World Development Indicators, UNSDG Database, and World Governance Indicators

NOTE CO_2 EMISSION DATA ARE AVAILABLE FOR 2020 ONLY.

The table reflects that there has been little improvement in governance over recent decades in LLDCs. This is the case for the average of developing countries as well. There is, however, a clear gap in governance between LLDCs and the rest of the developing world, including transit countries: LLDCs tend to be characterised by worse governance than the average developing country. The distance between LLDCs and developing countries has numerically narrowed by a very small margin, but even this narrowing is the result of the worsening of governance in other developing countries rather than an improvement in governance in LLDCs.

While there is a high degree of correlation across the six dimensions of governance, the disaggregated data show the highest score of LLDCs is recorded for voice and accountability, which is the also the indicator that generally tends to have improved across all developing countries. Conversely, for LLDCs, the regulatory quality dimension shows the largest gap vis-à-vis the rest of developing countries. This suggests that LLDCs should continue to focus their efforts on strengthening their regulatory environments to support private sector development and to ensure that business regulations are clear and transparent.

The averages reported in the table cannot readily be interpreted as evidence of a direct causal

effect of landlockedness on governance quality. However, the econometric results presented in Section 5 show that being landlocked does have a significant cost in terms of institutional development, and that this cost is transferred onto human development performance. The consequence of this is a clear call for LLDCs to continue to improve their governance structures and for the international community to support them in this effort.

3.2. Recent macroeconomic outlook for LLDCs

GLOBAL MACROECONOMIC CONTEXT AND CHALLENGES FOR LLDCS

Between 2020 and 2023, the global macroeconomic outlook was characterised by significant uncertainty and volatility. This resulted from the combined effect that COVID-19 and socio-political tensions had on the economy, and particularly its supply side.

I. **COVID-19's impact was threefold. First,** as the disease hit globally in 2020, in the absence of a vaccine or a clear therapeutic treatment, most countries adopted control and containment measures. These included closings of schools and workplaces, cancellations of public events, limitations on gatherings, closings of public transports, restrictions on people's international and internal movements, and "stay-at-home" or similar home confinement orders. According to the government response tracker OxCGRT (Hale et al. 2021), by 1st March 2020, 142 countries out of the 187 tracked had adopted at least some measure of control and containment. By 1st April 2020 all countries had some measures in place. Such restrictions, whose strictness escalated quickly between February and April 2020, adversely affected the pace of economic activity. On the other hand, it can be argued that in the absence of such interventions, the spread of the pandemic would have been even more severe and could have caused an even deeper drop in productivity.

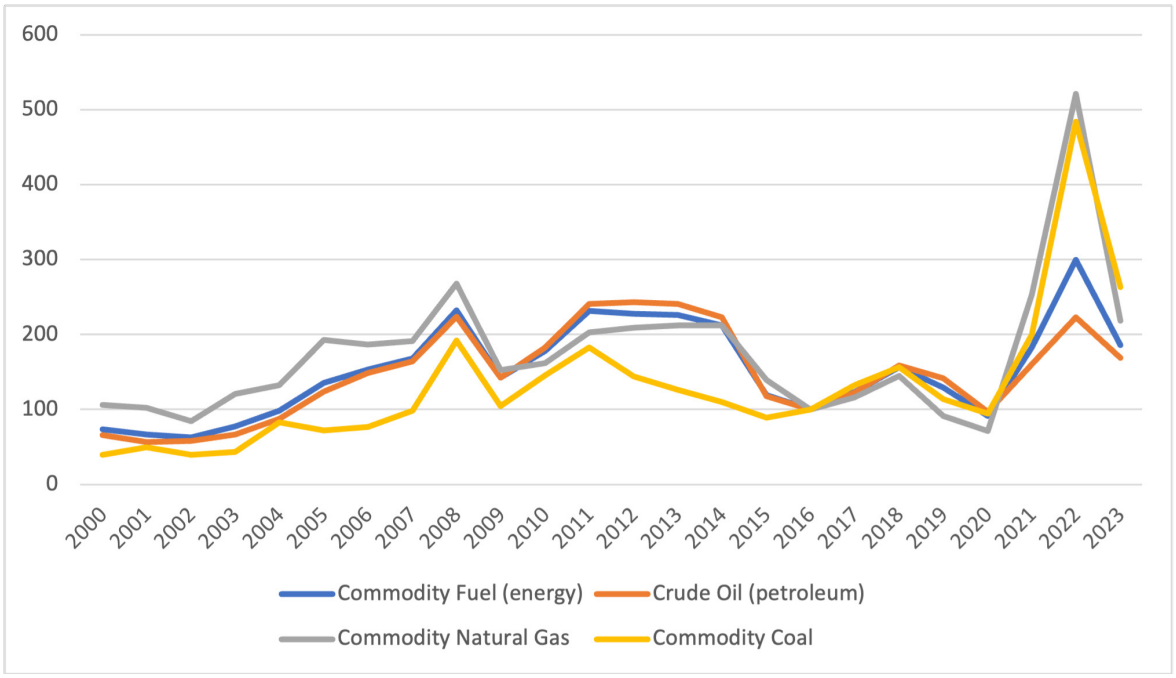
II. **Second,** it soon became clear that COVID-19 had the potential to cause a deep recession. At the same time, the crisis required an urgent and large investment in primary healthcare to prevent the congestion of hospitals (and intensive care units in particular) and ensure that enough capacity would be available to deal with what was an unprecedented crisis. Accordingly, most countries adopted large fiscal rescue packages aimed at: (i) strengthening the supply of primary health care, (ii) ensuring that people would continue to be paid or receive some form of income, and (iii) supporting firms, which were facing a sudden drop in demand and liquidity shortages. This fiscal policy intervention was accompanied by a monetary policy intervention to ensure the stability and liquidity of the financial sector and prevent a credit crunch. Data collected by the International Monetary Fund (IMF)[8] indicate that between January 2020 and July 2021, the global fiscal response to the pandemic totalled $16.5 trillion (or 16 per cent of global GDP). To finance these large fiscal packages, most countries increased their debt, thereby constraining their fiscal policy space for the stabilization of future cyclical fluctuations.

[8] Database of fiscal policy responses to COVID-10

III. **Third,** the combination of illness, shifts in demand patterns, and restrictions of various form disrupted global supply chains. This disruption occurred in two phases. Initially, production issues were most prevalent due to the slowdown in crucial global manufacturing hubs such as China. Then, as countries started to re-open and economies to rebound, transportation issues emerged, with a lack of sufficient air and maritime freight services to support the quick recovery in global demand. Overall, the cost of shipping a container on the world's transoceanic trade routes increased seven-fold in the 18 months following March 2020 and contributed to the inflationary hike. Research shows that the pass through to inflation is particularly high in LLDCs, as they already tend to pay higher freight costs (see Carriere-Swallow et al. 2022).

Regarding sociopolitical instability and the war in Ukraine, its impact has been felt worldwide via an increase in energy prices. To gauge a sense of the extent of this increase, ***Figure 3.1*** reports four commodity price indices: Fuel (grey dotted line), Petroleum (black dotted line), Natural gas (grey solid line) and Coal (black solid line).

Figure 3.1. Commodity Price Indices (base 100 = 2016)



Source: IMF, World Economic Outlook Database April 2023

Each index is calculated with year 2016 as base set equal to 100. All four indices declined between 2019 and 2020, reflecting the slowdown of the global economy during the first two waves of COVID-19 (and prior to the development of a vaccine). The conflict between Russia and Ukraine escalated in February 2022. Still, driven by the post-COVID re-opening of the economy,

energy prices had started to increase in 2021, with the fuel index doubling and the natural gas index more than tripling. The cost of energy effectively peaked in coincidence with the eruption of the armed conflict in Ukraine in 2022. Most notably, the price of natural gas and coal grew to a level three to five times higher than the level observed in 2019.

In addition to energy, food prices were also heavily affected by the war between Russia and Ukraine, which are two of world's largest exporters of wheat and other crucial crops. The Food Price Index of the Food and Agriculture Organisation (FAO) increased from 132.7 in January 2022 to 156.3 in March 2022, heightening food insecurity in many developing countries and further contributing to the acceleration of inflation worldwide. Food prices progressively declined through the second half of 2022 and through to the first half of 2023, with the index falling to 123.9 by mid-2023. Between July 2022 and July 2023, the Black Sea Grain Initiative of the United Nations allowed ships to safely export grain, food and fertilisers from Ukraine via a maritime humanitarian corridor. During its implementation, over 32 million tonnes and other food were moved to 45 countries, including two LLDCs. Through the initiative, 131,000 tonnes of wheat were exported to Afghanistan, and 263,000 tonnes of wheat and 20,000 tonnes of sunflower oil were exported to Ethiopia. In general, the movements of products via this initiative helped calm international markets.

The global economy was hit by a combination of demand- and supply-side shocks. This caused significant macroeconomic volatility.[9] In 2020, global GDP dropped by 2.8 per cent overall. By comparison, at the time of the Global Financial Recession, world GDP declined by only 0.1 per cent. Most countries worldwide experienced a technical recession, meaning at least two consecutive quarters of negative GDP growth. However, the re-opening of the economy, supported by large fiscal stimulus measures and abundant liquidity provided by central banks, gave rise to a V-shaped recovery, whereby GDP growth not only quickly rebounded, but overshot its pre-COVID level, reaching 6.3 per cent in 2021. GDP growth subsequently decreased to 3.4 per cent in 2022 and estimates indicate that it will further decline in 2023 due to persistent global tensions and the impact of the hike in interest rates needed to control inflation.

In the ten years prior to 2020, global inflation had been around 3.5 per cent on average. The recession of 2020 caused a further, moderate decline to 3.3 per cent. After 2021, however, the combination of global demand recovery (and the corresponding tightening of labour markets), supply chain disruption, growing shipping costs, and (from 2022 in particular) soaring energy prices, propelled inflationary pressures. Inflation increased to 4.7 per cent in 2021 and to 8.7 per cent in 2022.

LLDCs are more affected by ongoing transport issues than their coastal counterparts. Following from the discussion in Section 2, smooth transit and affordable supply chains are necessary to offset the higher costs of trade faced by LLDCs. Between 2020 and 2023, supply chain bottlenecks and transport issues increased LLDCs' vulnerability to inflationary pressures, particularly for those countries that already had a relatively high inflation rate prior to 2021 (such as Ethiopia, Zambia, South Sudan, and Uzbekistan). This is because of the tendency of cost-push shocks to propagate more strongly when inflation is high and rising (see Harding et al. 2022). The implication is then that inflationary pressures recede more slowly, and inflation remain high even once supply chains are fully restored and energy and food prices return to their pre-shock level.

In a broader perspective, the central question is how the growth performance of LLDCs was affected by macroeconomic instability between 2020 and 2023. To the extent that LLDCs have a less diversified production structure than their coastal counterparts, the near-collapse of international trade due to COVID-19 made them more exposed to recessionary dynamics and

[9] The macroeconomic data on GDP growth, inflation, and current account balance mentioned in this section are all sourced from the IMF World Economic Outlook Database, April 2023.

less able to recover in the short term. While the non-monetary dimension of development is not necessarily affected by the short-term volatility of GDP growth, there is a risk that the long-term trend of GDP growth may flatten because of increased short-term volatility (Barlevy, 2004 and Aghion et al. 2007). This could then cause a future slowdown in the pace of both monetary and non-monetary development of LLDCs, particularly since the limited space available to fiscal policy makers (something that LLDCs share with most other developing countries) prevents interventions to smoothen inequalities (which tend to increase in times of crisis and volatility).

LLDCS' RESPONSE TO COVID-19 [10]

The **key elements** of LLDCs' responses to COVID-19 are presented in ***Table 3.4***. For each LLDC, the table reports the following information:

- The cumulative value (expressed in USD billions and per cent of GDP) of the country's fiscal response to COVID-19 between January 2020 and July 2021. These data are sourced directly from the IMF's Database of Country Fiscal Measures in Response to the COVID-19 Pandemic.
- The maximum level of stringency of control and containment measures and the period over which this maximum level was adopted. The level of stringency is measured by the index of Hale et al. (2021), available from the Oxford COVID-19 Government Response Tracker. The index is constructed by assigning ordinal scores to nine metrics. These capture the strictness of "lockdown style" policies that primarily restrict people's behaviour. The nine metrics are: school closures, workplace closures, cancellation of public events, restrictions on public gatherings, closure of public transport, stay-at-home requirements, public information campaigns, restriction on internal movements, and international travel controls. The index takes values between 0 (no policies are in place) and 100 (maximum level of strictness). As a reference, while only nine countries recorded a level of strictness of 100 at some point in time, the average maximum level of strictness across all 187 countries was 85.
- The date when control and containment measures were first adopted, noting that in most countries, measures were still in place in late 2022.

[10] This section is focused on the macroeconomics of the policy response to COVID-19. UN-OHRLLS (2023) provide a comprehensive assessment of effects of COVID-19 on LLDCs and responses along various socio-economic dimensions.

TABLE 3.4. FISCAL AND PUBLIC HEALTH POLICY RESPONSE OF LLDCS TO COVID-19

	Total fiscal measures January 2020-July 2021		Max stringency		First day of stringency
	USD Billion	per cent of GDP	Level	Date	Date
Afghanistan	0.4	2.1	84.26	12/04/2020 - 29/06/2020	23/02/2020
Armenia	0.2	2.1	..	..	..
Azerbaijan	2.1	5.2	96.3	21/06/2020 -27/07/2020	30/01/2020
Bhutan	..	..	97.22	11/08/2020 - 31/08/2020	15/01/2020
Bolivia	6.1	16.7	96.3	31/03/2020 - 25/05/2020	10/03/2020
Botswana	0.4	2.4	86.11	2/04/2020 - 7/05/2020	1/01/2020
Burkina Faso	0.6	3.8	89.81	4/05/2020	12/03/2020
Burundi	0.1	4.9	27.31	16/02/2021 - 22/02/2021	1/02/2020
Central African Republic	0	1.2	75.93	8/05/2020 - 10/06/2020	14/03/2020
Chad	0.6	5.8	88.89	13/04/2020 - 11/05/2020	7/03/2020
Eswatini	0.1	3.2	89.81	3/04/2020 - 15/04/2020	29/01/2020
Ethiopia	3	3.1	80.56	8/04/2020 - 10/09/2020	28/01/2020
Kazakhstan	12.5	7.3	92.13	30/03/2020 - 30/04/2020	29/01/2020
Kyrgyz Republic	0.5	6.1	92.13	25/03/2020 - 29/04/2020	22/01/2020
Lao PDR	0	0	96.3	30/03/2020 - 3/05/2020	11/03/2020
Lesotho	0.1	3.7	90.74	29/03/2020 - 5/05/2020	4/03/2020
Malawi	0.1	0.5	64.81	8/08/2020 - 30/08/2020	11/02/2020
Mali	0.6	3.2	78.7	26/03/2020 - 30/04/2020	11/03/2020
Moldova	0.2	1.4	87.04	24/03/2020 - 17/04/2020	24/01/2020
Mongolia	1.9	14.7	96.3	13/04/2021 - 2/05/2021	22/01/2020
Nepal	..	..	97.22	25/05/2021 - 31/05/2021	16/01/2020
Niger	0.3	2	66.67	29/03/2020 - 9/04/2020	13/03/2020
North Macedonia	0.9	7.4	..	..	..
Paraguay	1.8	5	94.44	13/04/2020 - 24/05/2020	23/02/2020
Rwanda	0.7	6.3	90.74	21/03/2020 - 3/05/2020	21/01/2020
South Sudan	0.1	1.3	86.11	18/04/2020 - 6/05/2020	24/02/2020
Tajikistan	0.2	3	69.44	3/06/2020 - 14/06/2020	21/01/2020
Turkmenistan	0	0	75	5/12/2021 - 11/12/2021	8/01/2020
Uganda	0.9	2.1	93.52	30/03/2020 - 5/05/2020	20/01/2020
Uzbekistan	3.4	5.7	93.52	28/04/2020 - 7/05/2020	21/01/2020
Zambia	0.4	2.1	70.83	2/05/2020 - 7/05/2020	20/02/2020
Zimbabwe	0.7	3.5	87.96	30/03/2020 - 4/06/2020	27/01/2020
World	16549	15.9	..	..	..

Source: Database of Country Fiscal Measures in Response to the COVID-19 Pandemic; and IMF staff estimates; Oxford COVID-19 Government Response Tracker

In terms of fiscal response, the average across the LLDCs was 4.2 per cent of GDP, which is between the average for low income developing countries (2.2 per cent) and the average for emerging market economies (6.7 per cent). This was clearly well below the world average of 15.9 per cent, which was driven by the very large responses adopted in advanced economies. The variation within LLDCs is quite significant, with countries like Bolivia and Mongolia investing more than 10 per cent of their GDP in fiscal responses to COVID-19, and others investing between 1 per cent and 3 per cent. Unsurprisingly, the fiscal response tends to be larger in the LLDCs with a higher per-capita income level; however, the response measured as a percent of GDP is only weakly correlated with per-capita income levels.

Like most other countries, LLDCs generally started to adopt control and containment policies towards the end of January 2020 through February 2020. By early March 2023, most countries had some measure in place and by the end of the month all LDCs had adopted some restrictions. The strictness of these measures escalated quickly, and 21 LLDCs hit their maximum level of stringency by April 2020. The average maximum level of strictness for LLDCs was 84.5, in line with the rest of the world. The duration of the maximum stringency response varied considerably across countries, depending on the timing and intensity of the different waves of the disease.

Fiscal rescue packages and control and containment measures address two different, albeit related, aspects of the pandemic. The fiscal package aims at absorbing and offsetting economic effects while control and containment measures aim at preventing its spread. On the one hand, it might be argued that the stricter control and containment measures are, the less the disease spreads, and hence the less the need for a large fiscal rescue package. In this sense, one should expect a negative correlation between stringency and fiscal response, especially in countries where the fiscal policy space is heavily constrained. On the other hand, lockdown policies cause the economy to slow down, which triggers the need for large fiscal interventions to support household income and prevent the systemic default of productive sectors. It would also be reasonable to expect that some countries are more inclined than others to adopt aggressive responses to crises. From this perspective, the correlation between maximum stringency and fiscal response should be positive.

In LLDCs, the correlation coefficient between the two responses is positive, but not very high (0.28 when the fiscal response is measured in levels and 0.31 when measured in percent of GDP). This suggests that, on average, LLDCs tried to limit the spread of the pandemic via public health interventions and to manage its economic impact via fiscal policy, but fiscal constraints ultimately implied that the public health stance was relatively more aggressive than the fiscal stance.

MACROECONOMIC OUTLOOK FOR LLDCS

Tables 2.5 and 2.6 provide an overview of the macroeconomic performance of LLDCs in the period 2020-2023. Data are from World Economic Outlook Database of the IMF.[11]

Starting with ***Table 3.5***, relative to transit countries and all emerging and developing countries, LLDCs experienced on average a deeper contraction in 2020 and a slower recovery through 2021 and 2022. This pattern (deeper contraction, slower recovery) is consistent with the idea that recent global shocks have exacerbated the vulnerabilities stemming from being landlocked. However, it must be emphasised that some LLDCs have been able to maintain growth throughout this period, including Ethiopia, Tajikistan, and Niger.

[11] The averages for LLDCs and transit countries computed by the authors. Both unweighted and weighted (by GDP) averages are provided. In the case of inflation, a weighted average might be difficult to interpret. Also, the hyperinflation in Zimbabwe heavily skews the group average. Hence, averages computed excluding Zimbabwe are also presented in Table 3.5.

Inflation in LLDCs has remained significantly above the world average and the level observed in transit countries.[12] The disinflation in Zimbabwe in 2021 heavily affects the average for the entire group and somewhat complicates the interpretation of dynamics. For this reason, it is more informative to focus attention on the averages calculated excluding Zimbabwe. These show that the increase in inflation in LLDCs in both 2020 and 2021 was higher than in the other country groupings. Based on the weighted average, total inflation in LLDCs increased by 7.1 per cent over the two years. This increase was well above the cumulative increase observed worldwide (5.5 per cent) and in transit countries (3.9 per cent).

While the increase in inflation in 2021 can be largely attributed to the combined effect of supply-side bottlenecks and recovering aggregate demand, the subsequent increase in 2022 is also driven by the rise in energy and food prices associated with the escalation of the Ukrainian conflict and the pass-through from high shipping costs. Again, this is indicative of the fact that LLDCs are more vulnerable to shocks than their coastal counterparts. In the specific case of inflation, higher transport costs increase the cost of imports and cause inflation to be structurally higher in LLDCs. As previously noted, supply-side shocks (such as the disruption of supply chains and the increase in energy prices) propagate faster with higher inflation rates, meaning that LLDCs normally experience more inflation than other countries given the same shock. This implies that the pass-through of a given increase in energy prices (or transport costs) onto domestic inflation tends to be higher in LLDCs. In this respect, it can be argued that COVID-19 and the Ukrainian war have damaged LLDCs more than transit countries.

TABLE 3.5. RECENT TRENDS IN MACROECONOMIC INDICATORS FOR LLDCS AND COMPARISON GROUPS

	GDP growth				Inflation			
	2020	2021	2022	2023	2020	2021	2022	2023
Afghanistan	-2.35	-20.74	..	..	5.61	..	..	..
Armenia	-7.20	5.70	12.60	5.50	1.23	7.20	8.66	7.09
Azerbaijan	-4.30	5.60	4.65	3.00	2.82	6.66	13.80	11.25
Bhutan	-10.01	4.09	4.33	4.68	3.04	8.22	5.94	5.59
Bolivia	-8.74	6.11	3.20	1.80	0.94	0.74	1.75	3.98
Botswana	-8.73	11.37	6.43	3.74	1.89	6.68	12.20	6.50
Burkina Faso	1.93	6.91	2.47	4.89	1.89	3.91	14.07	1.47
Burundi	0.33	1.80	1.83	3.34	7.31	8.31	18.90	16.01
Central African Republic	0.90	0.90	0.38	2.51	0.88	4.26	5.84	6.30
Chad	-1.60	-1.20	2.49	3.55	4.46	-0.77	5.29	3.44
Eswatini	-1.56	7.88	0.47	2.81	3.87	3.72	4.80	5.37
Ethiopia	6.06	5.64	6.36	6.11	20.35	26.79	33.94	31.43
Kazakhstan	-2.50	4.30	3.21	4.27	6.80	8.00	14.96	14.83
Kyrgyz Republic	-8.40	3.61	7.00	3.55	6.32	11.91	13.91	11.35
Lao PDR	0.50	2.53	2.25	3.97	5.10	3.75	23.00	15.10
Lesotho	-8.36	1.35	2.09	2.22	4.98	6.05	8.24	6.80
Malawi	0.80	2.75	0.80	2.40	8.64	9.34	20.84	24.66

[12] In fact, this was the case even before 2020. Typically, inflation in LLDCs has averaged 2 to 3 percentage points above the world average. This is hardly surprising given the structural bottlenecks that affect trade and supply in LLDCs.

	GDP growth				Inflation			
	2020	2021	2022	2023	2020	2021	2022	2023
Mali	-1.24	3.05	3.70	5.00	0.48	3.81	10.08	5.00
Moldova	-7.38	13.94	-5.58	2.01	3.77	5.10	28.57	13.82
Mongolia	-4.56	1.64	4.85	4.50	3.73	7.36	15.15	11.17
Nepal	-2.37	4.25	5.84	4.40	6.15	3.60	6.26	7.77
Niger	3.55	1.39	11.11	6.13	2.90	3.84	4.23	2.79
North Macedonia	-6.11	3.96	2.22	1.40	1.20	3.23	14.21	9.20
Paraguay	-0.82	4.10	0.20	4.50	1.77	4.79	9.77	5.16
Rwanda	-3.36	10.88	6.76	6.19	7.73	0.83	13.88	8.20
South Sudan	-6.49	5.33	6.55	5.63	23.98	30.23	17.60	27.78
Tajikistan	4.40	9.20	8.00	5.00	8.58	8.97	6.64	5.37
Turkmenistan	-2.40	4.62	1.79	2.33	6.10	19.48	11.48	6.72
Uganda	2.95	3.54	4.93	5.70	2.76	2.21	6.78	7.62
Uzbekistan	1.89	7.42	5.67	5.26	12.87	10.85	11.45	11.84
Zambia	-2.79	4.60	3.44	4.00	15.73	22.02	10.99	8.95
Zimbabwe	-7.82	8.47	3.03	2.50	557.21	98.55	193.40	172.17
World	**-3.11**	**5.87**	**3.42**	**2.83**	**3.25**	**4.70**	**8.73**	**6.97**
Developing and emerging	**-1.77**	**6.88**	**3.96**	**3.93**	**5.18**	**5.87**	**9.81**	**8.63**
Transit	**-0.67**	**7.64**	**4.09**	**4.41**	**5.91**	**6.07**	**10.87**	**9.67**
LLDC	**-3.15**	**5.87**	**2.32**	**4.46**	**25.20**	**13.38**	**20.25**	**17.36**
LLDC (unweighted average)	..	..	..	..	**23.16**	**10.96**	**18.28**	**15.31**
LLDC excluding Zimbabwe	..	..	..	..	**7.46**	**9.94**	**14.60**	**13.17**
LLDC excluding Zimbabwe (unweighted average)	..	..	..	..	**5.93**	**8.04**	**12.44**	**10.08**
Transit (unweighted average)	..	..	..	..	**7.52**	**8.69**	**13.93**	**13.45**

Source: World Economic Outlook Database April 2023 (IMF) and author's calculations.

The data in ***Table 3.6*** indicate the cost that recent shocks have had on LLDCs' international trade. The current account balance remained negative through the contraction of 2020 and the subsequent rebound. This stands in contrast to transit countries, which on average tend to run a small current account surplus or a smaller deficit. Notably, there is a significant difference between the weighted and unweighted averages of transit countries. This difference clearly reflects the weight of China and India and somewhat complicates the comparison with the LLDCs.

With respect to export performance, it is worth noting first that LLDCs' terms of trade have, on average, moderately improved in the COVID and immediate post-COVID phase, rising 18 per cent overall between 2019 and 2021.[13] However, individual country experiences vary significantly. For example, Lesotho (-16 per cent), North Macedonia (-9.5 per cent), and Armenia (-5 per cent) experienced worsening terms of trade while Turkmenistan (+153 per cent), Uzbekistan (+57 per cent), and Paraguay (+55 per cent) experienced sharp improvements.

In this context, the export data in the table provide a relatively negative picture for 2020-2021. The decline in exports in 2020 was deeper than in the comparison country groupings, though similar to the overall drop at the global level. However, the recovery in 2021 was much slower in LLDCs than in the rest of the world, demonstrating how costly transport issues and the lack of smooth supply chains are for LLDCs. Overall, in the 2020-2021 period, the average LLDC suffered a cumulative

[13] Terms of trade are defined as the value of export unit in percentage to the value of import unit. Therefore, an increase in the terms of trade means that on average the value of exports of a country has grown faster (or declined more slowly) than the value of imports. Data are sourced from the UNCTAD database.

decline in exports of 4.7 per cent, while exports increased by 7 per cent and 2.4 per cent for the average emerging/developing country and globally, respectively. The 2022 and 2023 data indicate a sharp acceleration in LLDCs' exports while exports decline globally.

In conclusion, like the rest of the of the world, LLDCs were hit by a complex mix of demand- and supply-side shocks in the aftermath of the Covid-19 pandemic. As measured by GDP growth, the 2020 contraction was deeper in LLDCs than in the comparison group of developing economies. The subsequent recovery in 2021-2022 was also slower.

Supply chain disruptions caused a sharp increase in energy and food prices and a global inflationary hike. LLDCs were particularly affected, with higher inflation increases than the average of emerging and developing countries. This is likely to reflect the fact that cost-push shocks propagate faster in LLDCs, due in part to their structurally higher levels of inflation.

The global decline in exports caused by COVID-19 was more pronounced among LLDCS, and the subsequent increase in 2021 was below the global and developing countries average. This occurred despite a moderate increase in terms of trade and reflects the decreased export volumes associated with the disruption in global supply chains. This points to the fragility of LLDCs in situations of global crises.

TABLE 3.6. CURRENT ACCOUNT AND EXPORTS GROWTH FOR LLDCS AND COMPARISON GROUPS

	Current account per cent of GDP				Exports growth (per cent)			
	2020	2021	2022	2023	2020	2021	2022	2023
Afghanistan	11.16	..	..	..	0.53	..	..	..
Armenia	-3.78	-3.72	0.08	-1.72	-35.05	4.15	84.11	12.94
Azerbaijan	-0.53	15.18	30.47	19.21	-10.41	4.29	15.75	-8.06
Bhutan	-15.80	-11.98	-32.07	-29.02	-6.64	-8.85	7.13	5.69
Bolivia	-0.07	2.09	-1.45	-2.45	-18.98	33.82	12.66	-5.21
Botswana	-8.65	-0.48	3.14	3.34	-18.57	31.69	12.00	2.11
Burkina Faso	4.14	-0.42	-5.18	-3.61	-2.71	-0.20	1.50	4.04
Burundi	-10.28	-12.44	-15.67	-15.61	-15.37	-1.58	3.81	17.15
Central African Republic	-8.17	-11.04	-13.31	-8.85	-0.28	-6.14	-1.69	7.32
Chad	-7.29	-4.53	2.84	-1.42	2.81	-9.09	2.24	6.74
Eswatini	7.06	2.66	-1.65	3.45	-2.40	9.94	8.57	-4.08
Ethiopia	-4.60	-3.19	-4.26	-3.39	-8.06	3.15	10.96	-2.39
Kazakhstan	-4.44	-3.99	2.77	-1.92	-1.97	-16.50	9.18	10.23
Kyrgyz Republic	4.80	-8.45	-26.79	-9.72	-24.71	12.13	31.86	27.78
Lao PDR	-5.15	-0.58	-5.96	-2.61	-4.07	15.00	7.76	10.07
Lesotho	-1.00	-4.40	-4.38	0.58	-21.31	15.72	5.72	1.93
Malawi	-13.77	-12.58	-3.59	-12.25	-19.88	39.57	-15.40	10.06
Mali	-2.20	-8.18	-6.94	-6.16	-21.88	5.40	9.65	0.34
Moldova	-7.69	-12.42	-13.12	-12.78	-21.23	16.96	4.57	5.06
Mongolia	-5.07	-12.82	-15.76	-14.05	-15.07	-21.55	22.33	13.84
Nepal	-1.01	-7.84	-12.89	-5.19	..	..	..	..
Niger	-13.21	-14.07	-15.53	-12.78	63.96	-12.86	-10.40	24.01
North Macedonia	-2.93	-3.13	-5.96	-4.58	-10.93	11.70	13.40	3.70

	Current account per cent of GDP				Exports growth (per cent)			
	2020	2021	2022	2023	2020	2021	2022	2023
Paraguay	2.71	0.92	-5.18	-2.52	-5.20	16.10	-22.50	18.07
Rwanda	-12.05	-10.93	-11.63	-13.16	-15.32	32.28	8.95	24.39
South Sudan	-19.18	-9.48	6.73	6.29	..	..	..	..
Tajikistan	4.13	8.22	6.22	-1.89	5.42	17.18	-1.70	6.80
Turkmenistan	2.59	6.53	5.66	4.58	-11.19	32.58	-10.21	3.58
Uganda	-9.47	-8.28	-8.11	-10.92	-12.21	-1.33	-8.10	14.39
Uzbekistan	-4.99	-6.93	1.44	-3.53	-20.03	4.98	15.64	23.22
Zambia	10.61	9.21	2.36	3.85	9.22	-1.77	-3.25	6.85
Zimbabwe	2.52	0.97	0.81	0.40	..	..	..	..
World	**..**	**..**	**..**	**..**	**-7.43**	**10.60**	**4.79**	**2.46**
Developing and emerging	**0.46**	**0.82**	**1.37**	**0.33**	**-4.93**	**12.54**	**4.06**	**1.57**
LLDC (weighted average)	**-2.73**	**-2.12**	**0.13**	**-1.73**	**-7.31**	**3.90**	**6.81**	**6.90**
LLDC (unweighted average)	**-3.49**	**-4.07**	**-4.74**	**-4.47**	**-8.33**	**8.10**	**7.66**	**8.59**
Transit countries (weighted average)	**0.44**	**0.20**	**-0.24**	**-0.31**	**-2.77**	**15.13**	**3.63**	**0.89**
Transit countries (unweighted average)	**-2.43**	**-3.83**	**-4.58**	**-2.95**	**-6.93**	**8.97**	**4.51**	**4.12**

Source: World Economic Outlook Database April 2023 (IMF) and author's calculations.

4. Assessment of progress achieved in the VPoA Priority Areas

This section reviews progress in each of the six priority areas of the VPoA. To assess the impact of the United Nations Programme of Action for the LLDCs, it also analysis the presence of structural breaks in timeseries data corresponding to the introduction of the APoA or VPoA. The analysis draws on several indicators to benchmark the performance of LLDCs against the rest of the world and various groups, including transit countries, developing countries, and coastal developing countries (including transit countries).

4.1. Progress in the VPoA areas

PRIORITY AREA 1: FUNDAMENTAL TRANSIT POLICY ISSUES

Smooth and efficient transit requires a combination of adequate domestic policy, international agreements and conventions, and infrastructure development. The Country Policy and Institutional Assessment (CPIA) index and the Logistics Performance Index (LPI) provide an overview of these issues. The CPIA was designed by the World Bank as a tool to assess the quality of a country's policy and institutional framework along 16 dimensions, covering economic management, structural policies for trade and business regulation, policies for social equity and inclusion, and public sector management (World Bank, 2017). The index is computed on a scale from 1 (low) to 6 (high). The latest available information is for 2022, when the world average was 2.9. The LPI is a survey-based index focused on the building blocks of supply chains. This includes customs efficiency and border management, the quality of trade and transport infrastructure, the ability to arrange competitively priced shipments, the competence and quality of logistic services, the ability to track and trace consignments, and the timeliness of delivery (IBDU/World Bank, 2023). The LPI is built on a 5-point scale. The latest available information is based on 2022 data, when the world average was 3.

Table 4.1. reports the simple average CPIA for the group of LLDCs and several comparison groups. None of the groups show a significant change over the last decade. The average for LLDCs is only marginally below the global average and the average of transit and coastal countries. In fact, most of the LLDCs have a CPIA index between 2 and 3, with relatively little change over the period 2013-2021. The last two rows of the table estimate the probability of a randomly selected LLDC having a CPIA score higher than the average of transit countries or higher than the CPIA score of a randomly selected transit country. The fact that this figure is consistently below 0.5 suggests that the average for LLDCs is raised by a minority of good performers.

TABLE 4.1. COUNTRY POLICY AND INSTITUTIONAL ASSESSMENT (CPIA) INDEX IN REGIONAL GROUPINGS

	Country Policy and Institutional Assessment (CPIA) Index										
	2005	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
World	2.9	2.9	2.9	2.9	2.9	2.8	2.8	2.8	2.9	2.9	2.9
LLDC	2.7	2.8	2.8	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7
Transit	2.8	2.8	2.8	2.8	2.8	2.7	2.7	2.8	2.8	2.8	2.8
Coastal	3.0	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9
Developing	2.9	2.9	2.9	2.9	2.8	2.8	2.8	2.8	2.8	2.8	2.8

Country Policy and Institutional Assessment (CPIA) Index											
	2005	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Probability of LLDC being above transit average	0.45	0.44	0.46	0.45	0.42	0.43	0.45	0.46	0.45	0.46	0.45
Probability of any LLDC being above any transit	0.43	0.41	0.44	0.44	0.40	0.40	0.41	0.44	0.43	0.43	0.42

Source: World Development Indicators

NOTE: THE LAST TWO ROWS OF THE TABLE REPORTED ESTIMATED PROBABILITIES OF (I) A RANDOMLY SELECTED LLDC COUNTRY HAVING A CPIA SCORE ABOVE THE AVERAGE OF TRANSIT COUNTRIES AND (II) A RANDOMLY SELECTED LLDC COUNTRY HAVING A CPIA SCORE HIGHER THAN A RANDOMLY SELECTED TRANSIT COUNTRIES. THESE PROBABILITIES ARE COMPUTED FROM THE COHEN'S D STATISTICS, WHICH IS A WAY TO STANDARDISED THE DIFFERENCE BETWEEN THE MEANS OF TWO GROUPS OF OBSERVATIONS (SEE COHEN, 1988).

Table 4.2 provides further insights on the basis of the LPI index, which increases across all comparator groups, suggesting a steady, albeit not particularly steep, improvement in logistic performance worldwide. Despite signs of improvement, logistic performance in LLDCs remains on average below the rest of the developing world. On a 1 to 5 theoretical scale, the LLDCs' average of 2.5 is about 12 per cent lower than the average of coastal developing economies and 20 per cent lower than the global average. However, the gap vis-à-vis the coastal economies has narrowed in the last fifteen years. While there is still some difference, the improvement achieved by LLDCs serves as evidence of policy success. Some of the recommendations discussed in this report build on this result to identify ways to extend the positive trend into the next decade.

TABLE 4.2. LOGISTIC PERFORMANCE INDEX IN LLDCS AND COMPARISON GROUPINGS

Logistic Performance Index							
	2007	2010	2012	2014	2016	2018	2023
World	2.7	2.9	2.9	2.9	2.9	2.9	3.0
LLDC	2.2	2.5	2.4	2.5	2.4	2.5	2.5
Transit countries	2.6	2.7	2.8	2.7	2.8	2.8	2.8
Coastal developing countries	2.6	2.7	2.7	2.8	2.7	2.7	2.8
Developing countries	2.5	2.7	2.7	2.7	2.7	2.7	2.8

Source: World Development Indicators

Diving deeper into the individual components of the LPI index (see IBRD/World Bank, 2023), the evidence suggests that LLDCs tend to experience (i) longer delays in ports than in corresponding coastal countries, (ii) significant corridor delays, and (iii) significant dwell time inland, including at destination. More broadly, these types of delay highlights how the bottleneck experienced by LLDCs are not just a matter of unilateral policy interventions, but instead require coordinated, multilateral interventions across borders, along the lines of initiatives like the Transports Internationaux Routiers and the European transit system that promote freedom of transit. In this respect, ***Table 1.2*** in the Statistical Annex shows the status of ratification of key international conventions on trade and transport facilitations. While the number of ratifications is generally increasing over time, there are several conventions and agreements that are not yet ratified in many countries, both LLDCs and transit.

From an LLDC perspective, the issue of connectivity has an inevitable regional dimension. Unsurprisingly, a large share of trade involving LLDCs occurs with partners located in the same geographical macro-region (see commentary to Priority 4 further below). However, the extent of connectivity within macro-regions and between a macro-region and the rest of the world significantly differs across macro-regions. The implication is that LLDCs might experience acute transit and connectivity issues depending on the macro-region in which they are located. In this respect, the container port throughput data reported in the Statistical Annex (***Table 1.3***) confirm Asia's leading role as a global maritime freight loading and discharging centre and its high liner shipping connectivity compared to Africa and Latin America. In other words, the geographical disadvantage of being landlocked is higher for LLDCs in Africa and Latin America. This does not mean that individual countries' performance within each macro-region is uniform. For instance, Mongolia experienced significant transit issues during COVID-19.

PRIORITY AREA 2: INFRASTRUCTURE DEVELOPMENT AND MAINTENANCE.

Infrastructures are both an input into and an outcome of the process of societal development. As an input, infrastructures are required to facilitate connectivity and the flow of people, services, and goods, which in turn drive productivity and innovation. Infrastructures are also needed to ensure a more equitable access to economic opportunities across the different geographical areas and demographic cohorts in a society. As an outcome, infrastructures, to the extent that they are well maintained and aligned with the needs of the population, are evidence of successful investment of domestic and foreign resources towards the long-term well-being of the society. Against this background, the Statistical Annex (Tables 2.1 – 2.10) reports several indicators of the "physical" volume of infrastructures, their usage, and the financial flows to support their development and maintenance.

TABLE 4.3. PASSENGERS AND FREIGHT VOLUMES BY MODE OF TRANSPORT, 2021

	Billions of passenger-kilometers				Billions of freight tonnes-kilometres				
	Air	Rail	Road	Total	Air	Inland water	Rail	Road	Total
World	3626.0	5547.6	39841.0	49014.6	231.6	3782.7	12761.4	38536.1	55311.9
Sub-Saharan Africa	44.2	8.6	1552.9	1605.7	4.3	89.7	305.4	1610.8	2010.1
Northern Africa and Western Asia	395.4	199.1	3349.4	3943.9	46.9	48.3	251.7	3499.4	3846.3
Central and Southern Asia	137.5	2363.9	6555.2	9056.6	1.9	50.6	778.2	3295.3	4126.0
Eastern and South-Eastern Asia	820.0	2075.8	10899.7	13795.5	76.1	2029.9	4815.9	10684.7	17606.7
Latin America and the Caribbean	234.6	89.8	3193.9	3518.3	5.8	157.8	663.3	4508.7	5335.6
Oceania	36.0	11.0	399.9	446.8	1.6	6.4	75.7	936.2	1019.9
Landlocked developing countries	49.9	55.7	1013.7	1119.3	7.1	33.1	312.3	596.9	949.5
	Percent of total				Percent of total				
	Air	Rail	Road	Total	Air	Inland water	Rail	Road	Total
World	7.40	11.32	81.28	100	0.42	6.84	23.07	69.67	100
Sub-Saharan Africa	2.75	0.53	96.71	100	0.21	4.46	15.19	80.13	100
Northern Africa and Western Asia	10.03	5.05	84.93	100	1.22	1.26	6.54	90.98	100
Central and Southern Asia	1.52	26.10	72.38	100	0.04	1.23	18.86	79.87	100
Eastern and South-Eastern Asia	5.94	15.05	79.01	100	0.43	11.53	27.35	60.69	100
Latin America and the Caribbean	6.67	2.55	90.78	100	0.11	2.96	12.43	84.50	100
Oceania	8.05	2.46	89.49	100	0.16	0.63	7.42	91.80	100
Landlocked developing countries	4.46	4.97	90.57	100	0.75	3.49	32.90	62.87	100

Source: Statistical Annex: Global and regional data for Sustainable Development Goal indicators, 2023

NOTE: DATA REFER TO YEAR 2021; MARITIME TRANSPORT DATA NOT INCLUDED AS NOT RELEVANT TO LLDCS

Starting with transport infrastructures, ***Table 4.3*** provides a breakdown of passenger and freight volumes by mode of transport in LLDCs and several regions. While data are not available on a time series basis, it is interesting to note the relative weight of the different transport modes. Globally, road transport accounts for the largest share of both passengers and freight volumes.[14] In LLDCs, however, a significant portion of freight volumes (approximately 33 per cent) is transported by rail. ***Table 2.2*** in the Statistical Annex shows that the railways network in LLDCs has hardly expanded in the last two decades. This may lead to progressively more stringent bottlenecks and growing congestion of the system, which in turn reduces the timeliness of delivery. There is therefore a need to ensure adequate investment into the continuous improvement of the railways network in LLDCs.

Financing is central to the upgrading and expansion of networks. Given the limited extent of domestic resource mobilization in many LLDCs (see the commentary to Priority 6 for more discussion on this point), the allocation of international financial support to infrastructure development becomes crucial. ***Table 4.4*** provides an overview of the growth in total official flows for infrastructures over the period 2001-2021 and various sub-periods (2005-2021, 2010-2021, 2015-2012, and 2020-2021). Total official flows include Official Development Assistance (ODA) and Other Official Flows (OOF). When calculating the regional aggregates, only country-specific flows are included. The last row of the table (residual/unallocated ODA) includes all the flows allocated to multiple countries or regions. Finally, the growth rates are computed from level data expressed in millions of constant 2021 US dollars and available from the Creditor Reporting System of the OECD. ***Table 2.4*** in the Statistical Annex reports the detail for each LLDC.

TABLE 4.4. GROWTH OF TOTAL OFFICIAL FLOWS (GROSS DISBURSEMENT) FOR INFRASTRUCTURES

	Total growth of official flows for infrastructures				
	2001-2021	2005-2021	2010-2021	2015-2021	2020-2021
Total official flows	156.4	248.1	31.1	-0.1	-4.7
Sub-Saharan Africa	190.3	198.6	56.1	0.8	-1.4
Northern Africa	304.5	325.7	23.8	15.5	-10.1
Western Asia	96.4	59.9	-23.9	-31.8	6.7
Central Asia	334.9	986.3	21.3	12.6	-10.5
Southern Asia	179.8	274.7	51.5	34.8	8.6
Eastern Asia	-28.9	24.9	-30.8	-33.7	-9.5
South-Eastern Asia	82.0	215.5	72.0	-38.6	-14.4
Latin America and the Caribbean	139.2	439.7	17.8	-5.9	-16.7
Oceania	225.2	517.6	252.4	22.0	-4.5
Europe	281.5	325.1	-1.6	-1.4	-12.2
LLDCs	184.4	164.1	14.2	4.2	-14.5
Least developed countries	174.4	181.4	68.9	23.0	-8.1
Small island developing States	136.6	408.1	30.2	-6.7	-19.6
Residual/Unallocated ODA	379.4	756.1	92.0	76.6	-2.3

Source: Creditor Reporting System (CRS) database, 2023, The Organisation for Economic Co-operation and Development (OECD).

[14] The table does not include maritime transport, because by definition this is not observed in LLDCs. However, at global level, maritime transport in 2021 accounts for almost 22 billions of metric tons of freight loaded and unloaded. More than a third of this occurs in Easter and Southern Asia.

The most concerning aspect emerging from ***Table 4.4*** is the drop in flows in 2020-2021. This is a global phenomenon which seems to have hit LLDCs proportionally more than the rest of the world. Total official flows have declined by 4.7 per cent in total, but the decline to funds allocated to LLDCs is much larger, at 14.5 per cent. Over a longer-term perspective, the growth rate of flows to LLDCs over the period 2001-2021 is higher than the world total flows growth. However, much of the growth for LLDCs took place in earlier years. In fact, as can be seen from the table, in the second half of the 2000s and through the 2010s, growth of flows to LLDCs has been, on average, slower than world total flows growth. This underscores the need for renewed efforts to mobilize domestic and private sector resources (in partnership with the public sector) for investment in infrastructures in LLDCs. These efforts ought to involve a reconsideration of the allocation of priorities in ODA disbursements.

Infrastructures are not just about transport. Access to clean and affordable energy, and hence the existence of a reliable chain of supply and distribution of energy, is key to sustainable development. Particularly in the current context, characterised by rising commodity, energy and shipping prices, there is an elevated risk that lack of access to energy could hinder economic growth and human development.

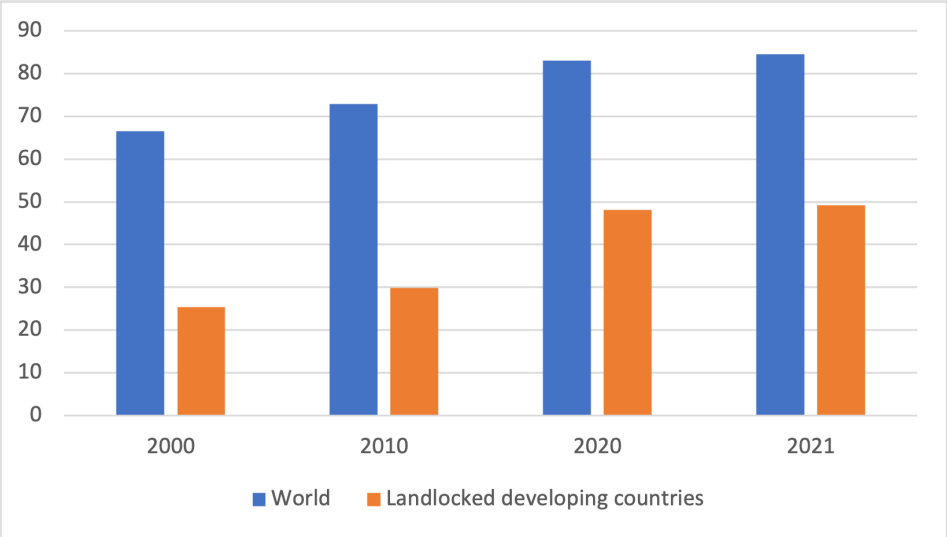
The proportion of the world population with access to electricity has grown from 78.4 per cent in 2000 to 91.4 per cent in 2021. Yet in LLDCs, only 60 per cent of the total population has access to electricity, and significant discrepancies exist between rural and urban areas. This can be observed from Figures 4.1 and 4.2 below. While the global gap in access to electricity between rural and urban population is less than 20 per cent, in LLDCs it is more than 30 per cent. The gap grows to almost 50 per cent for LLDCs in Sub-Saharan Africa (31.2 per cent access in rural areas compared to 80.8 per cent access in urban areas). This gap reflects two concurrent factors: a lack of sufficient investment in the electricity network outside of the cities and a lack of urbanisation relative to other developing countries.

Considering that LLDCs' share of urban population is on average 40 per cent against 58 per cent worldwide and 52 per cent in developing countries, more urbanisation is likely to occur as LLDCs progress along their developmental path. Current figures available from other developing countries suggest that the share of the rural population will continue to remain significant (it is currently 32 per cent in upper middle-income countries).[15] This highlights the need to intensify and improve the geographical coverage of electricity networks.

On average, 27 per cent of the population in LLDCs is primarily reliant on clean fuels, well below the global average of 63 per cent (see ***Table 2.6*** of the Statistical Annex). In rural areas the percentage drops to 15 per cent, with little or no improvement achieved since 2015, while globally the percentage of the population using clean fuels has improved from 39 per cent in 2015 to 51 per cent in 2021.

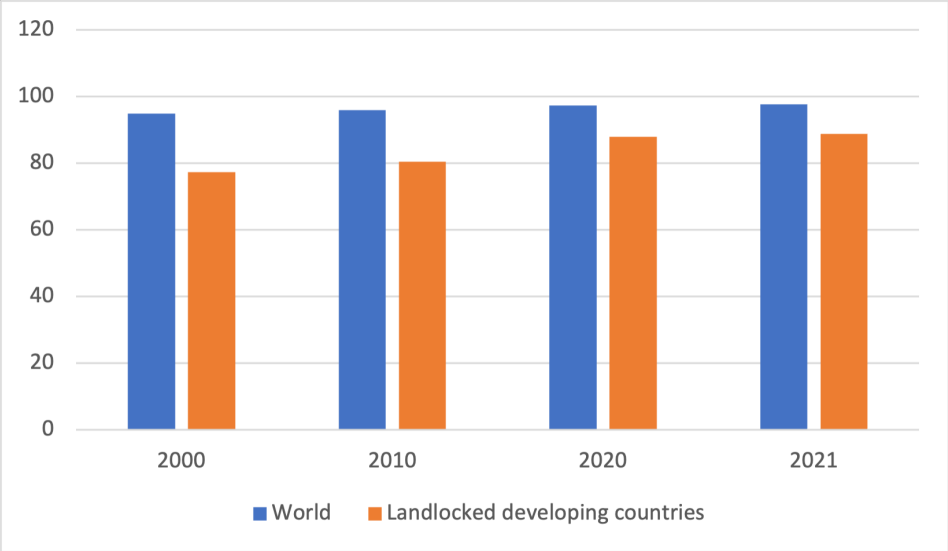
[15] The data on proportion or rural and urban population are taken from the World Bank Development Indicators.

Figure 4.1. Proportion of population with access to electricity, rural areas



Source: World Bank

Figure 4.2. Proportion of population with access to electricity urban areas



Source: World Bank

A second concerning aspect relating to energy relates to efficiency in its use. The data available from the UNSDG database (reported in detail in ***Table 2.7*** of the Statistical Annex) show that the energy intensity level of primary energy in LLDCs, while on a downward trajectory since 2000, is still higher than in the rest of the world. Intensity is measured as the ratio between energy supply and gross domestic product at purchasing power parity. It is therefore an indicator of how much energy is used to produce one unit of economic output, and lower ratios are indicative of greater efficiency. The ratio, expressed in megajoules per GDP, was 11.18 in LLDCs in 2000, against an average of 6.12 worldwide. In 2020, the LLDC ratio had declined to 6.17 (compared to 4.63 worldwide). Relative to LLDCs, energy intensity is significantly lower in most macro-regions of the world.

Regarding the development of infrastructures and services for information and communication (ICT), ***Table 4.5*** shows the gap between LLDCs and the world in terms of (i) proportion of individuals using

the internet, (ii) mobile network coverage, and (iii) mobile phones subscription. The proportion of individuals using internet in LLDCs is only slightly more than half the proportion of individuals using internet worldwide (36.4 per cent in LLDCs and 66.3 per cent in the world). Although this gap has been progressively closing since 2000, internet usage in the LLDCs remains amongst the lowest in the world, only very marginally above the average observed in the group of least developed countries (36.1 per cent).

Mobile network coverage is, by contrast, close to global levels. However, a large proportion of the population is still covered by 2G and 3G networks, with only 46.1 per cent of individuals across LLDCs covered by 4G. This is again among the lowest proportions worldwide, and lower than in the group of least developed countries (48.7 per cent). The number of cellular phone subscriptions in LLDCs (78 per 100 inhabitants) is approximately 20 per cent lower than the world total. This aggregate figure hides significant variation at the country level: in South Sudan and the Central African Republic, the number of subscriptions is as low as 30 per 100 inhabitants; at the opposite end, Botswana, Nepal, Moldova, and Mongolia are significantly above the world average.

The gap in the use of internet or cellular subscriptions may result from a combination of demand- and supply- side factors. That is, usage could be low partly because the infrastructure is not available and partly because individuals choose not to use internet or cellular phones. Additional investment in infrastructures would increase supply and likely result in a reduction in the cost of access. This would stimulate demand, especially if it is weak due to household budget constraints. The price of ICTs, and therefore their affordability, remains a major issue. Worldwide, the price of fixed broadband is about 3 per cent of average gross national income per capita and the price of mobile data and voice (high consumption) is 2.4 per cent. While these prices have started to decline since 2022, they remain above the affordability line (2 per cent of gross national income per-capita), especially in developing countries and even more so in some LLDCs. For instance, the price of data-only mobile broadband is 23.8 per cent of gross national income per capita in the Central African Republic, 22 per cent in Chad, and 17 per cent in Zimbabwe (compared to an average of 1.5 per cent worldwide).

Affordability is even more restricted when considering the bottom end of the income distribution. Again, taking 2 per cent of gross national income per-capita as the affordability threshold, the price of data-only mobile broadband for the bottom 40 per cent of the population is 49 per cent in Chad, 58 per cent in Zimbabwe, 28 per cent in Burkina Faso, 20.8 per cent in Mali, 15.1 per cent in Niger, 13.5 per cent in Uganda, 14.6 per cent in Lesotho, 5.6 per cent in Paraguay, 4.3 per cent in Bolivia, 4.6 per cent in Lao, 2.7 per cent in Mongolia, 2.1 per cent in Bhutan, and 2.2 per cent in the Kyrgyz Republic. Of the LLDCs for which data are available, the price for the bottom 40 per cent of the population is lower than 2 per cent of gross national income per-capita only in Moldova, North Macedonia, Kazakhstan, and Armenia.[16]

Investment should also target the quality of technology made available to citizens to ensure that the gap vis-à-vis the rest of the world is reduced effectively, rather than simply nominally. The case of mobile network coverage is a clear example of this point: while coverage is already today almost complete, there is a need to upgrade the current 2G-3G networks to at least 4G.

[16] All data on price affordability are from ITU (2023). See also ITU (2022)

TABLE 4.5. ACCESS TO INFORMATION AND COMMUNICATION INFRASTRUCTURES

	Proportion of individuals using the internet						
	2000	2005	2010	2015	2020	2021	2022
World	5.3	15.6	28.5	40	59.6	62.6	66.3
Landlocked developing countries	0.5	1.9	7.7	18.7	29.7	32.6	36.4

	Proportion of individuals covered by mobile network						
	2015	2017	2018	2019	2020	2021	2022
At least 2G							
World	94.8	96.1	96.3	96.8	97	97.1	97.3
Landlocked developing countries	88.2	91	93.3	93.6	93.6	93.6	94
At least 3G							
World	78.3	87.9	90.8	92.4	92.8	93.5	94.8
Landlocked developing countries	49.8	64.7	68.8	72.9	75.4	76.2	81
At least 4G							
World	43.4	75.1	79.9	82.8	85.1	86.5	87.7
Landlocked developing countries	12.3	24.8	32.1	36.2	39.6	41.5	46.1

	Mobile cellular phone subscriptions per 100 inhabitants						
	2003	2013	2015	2017	2019	2020	2021
World	18.5	92.0	96.1	101.4	105.8	105.5	107.3
Landlocked developing countries	3.1	67.1	71.1	74.4	74.7	75.0	78.6

Source: Data based on the World Telecommunication/ICT Indicators Database, 2022, International Telecommunication Union (ITU)

PRIORITY AREA 3: INTERNATIONAL TRADE AND TRADE FACILITATION

The most evident effect of the geographical disadvantage of LLDCs is their lack of economic integration with the rest of the world. This translates into (i) significantly smaller trade flows and (ii) reduced opportunities for the type of exchange that fosters innovation, technological progress, productivity, and ultimately economic growth. A more specific econometric assessment of this cost of being landlocked is undertaken in Section 5. This section instead focuses on the review of some indicators of trade integration and trade facilitation with the aim to assess the progress made over the last two decades. Tables 3.1 to 3.9 in the Statistical Annex provide detailed statistical information at the country level. Here, consideration is given to the comparison of LLDCs with other relevant country groupings, including transit countries.

TABLE 4.6. MERCHANDISE TRADE IN LLDCS AND COMPARISON GROUPS

	Merchandise Trade										
	2003	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Merchandise Exports (bn of USD)											
World	7630.3	19052.1	19090.3	16634.1	16113.7	17827.2	19644.7	19106.8	17734.8	22454.1	25027.1
LLDCs	44.2	229.0	224.5	154.0	138.7	162.2	191.2	189.0	167.5	219.1	278.6
Transit countries	951.8	4029.4	4173.1	3819.6	3622.0	4026.1	4430.6	4392.0	4321.4	5638.1	6166.8
Coastal countries	1953.4	7465.5	7466.7	6372.7	6002.1	6773.4	7660.9	7507.1	6991.5	9216.4	10556.1
Developing countries	1997.6	7694.5	7691.2	6526.7	6140.8	6935.6	7852.1	7696.1	7159.0	9435.6	10834.7
Merchandise Imports (bn of USD)											
World	7800.1	19042.3	19128.9	16790.8	16258.4	18034.4	19882.7	19400.9	17938.2	22692.7	25703.3
LLDCs	49.4	223.3	219.6	189.7	174.7	189.6	217.9	226.2	204.3	248.8	291.5
Transit countries	896.4	4037.7	4024.6	3482.7	3260.4	3789.7	4278.3	4142.5	3872.2	5158.9	5663.7
Coastal countries	1769.9	6873.4	6852.6	5971.5	5631.1	6397.8	7127.6	7005.7	6399.4	8442.3	9438.2
Developing countries	1819.2	7096.7	7072.1	6161.2	5805.8	6587.4	7345.5	7231.9	6603.6	8691.1	9729.7
Merchandise exports (USD per capita)											
World	1212	2666	2639	2272	2178	2382	2596	2508	2306	2905	3220
LLDCs	126	502	481	322	290	331	381	367	321	410	509
Transit countries	252	936	957	866	811	891	970	951	927	1198	1299
Coastal countries	397	1334	1318	1111	1034	1153	1289	1256	1159	1520	1733
Developing countries	379	1271	1254	1050	977	1090	1218	1186	1092	1430	1633
Merchandise imports (USD per capita)											
World	1239	2664	2644	2293	2198	2410	2627	2547	2333	2935	3307

	Merchandise Trade										
	2003	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
LLDCs	141	490	470	397	365	387	434	440	392	466	533
Transit countries	237	938	923	789	730	839	936	897	830	1096	1193
Coastal countries	359	1228	1209	1041	970	1089	1199	1172	1060	1393	1550
Developing countries	345	1172	1153	991	924	1035	1140	1114	1007	1318	1466
Share of merchandise exports											
World	100	100	100	100	100	100	100	100	100	100	100
LLDCs	0.6	1.2	1.2	0.9	0.9	0.9	1.0	1.0	0.9	1.0	1.1
Transit countries	12.5	21.1	21.9	23.0	22.5	22.6	22.6	23.0	24.4	25.1	24.6
Coastal countries	25.6	39.2	39.1	38.3	37.2	38.0	39.0	39.3	39.4	41.0	42.2
Developing countries	26.2	40.4	40.3	39.2	38.1	38.9	40.0	40.3	40.4	42.0	43.3
Share of merchandise imports											
World	100	100	100	100	100	100	100	100	100	100	100
LLDCs	0.6	1.2	1.1	1.1	1.1	1.1	1.1	1.2	1.1	1.1	1.1
Transit countries	11.5	21.2	21.0	20.7	20.1	21.0	21.5	21.4	21.6	22.7	22.0
Coastal countries	22.7	36.1	35.8	35.6	34.6	35.5	35.8	36.1	35.7	37.2	36.7
Developing countries	23.3	37.3	37.0	36.7	35.7	36.5	36.9	37.3	36.8	38.3	37.9

Source: UNCTAD database

Since 2003, global merchandise trade has grown by almost 150 per cent in real terms (discounting the effect of inflation), mostly due to increased trade participation by developing countries. In fact, trade growth for the whole of the developing countries group has almost doubled global trade growth, and the trade of LLDCs has grown even faster (albeit not as fast as the trade of transit countries). However, this massive increase in trade has largely occurred through the first decade or so of the new century. Global trade from 2013 to 2022 has grown very little in real terms with the 33 per cent growth in total flows almost entirely accounted for by global inflation. However, growth has been faster in transit and developing countries than in LLDCs.

The implications of these growth patterns are evident from the bottom half of ***Table 4.6***. The share of LLDCs in global trade increased from 0.6 per cent in 2003 to 1.2 per cent in 2013, but it has remained substantially unchanged since then. The transit countries' share of global trade increased from 12 per cent in 2003 to 21 per cent in 2013, and it has continued to increase (albeit more moderately) up to 23.3 per cent in 2022. The shares of coastal countries and all developing countries are clearly larger because of the larger number of countries in the two groups, but irrespective of that, both show a moderately upward trend in the last decade. Therefore, LLDCs stand in sharp contrast with the rest of the developing world.[17] This is concerning, particularly in consideration of how strongly the APoA and VPoA advocate for greater integration of LLDCs in world trade.

The fragility of LLDCs' position in world trade is also evidenced by their vulnerability to the 2020 crisis. As noted in Section 3, LLDCs suffered a greater drop in trade in 2020 than their coastal and transit counterparts. While merchandise trade dropped by 7.3 per cent globally, 7.7 per cent for coastal developing countries and only 4 per cent for transit countries, the drop for LLDCs was 10.5 per cent. In the subsequent rebound in 2021, LLDCs experienced growth of 25.9 per cent, which was lower than the global average (26.6 per cent) and growth for transit and coastal developing countries (31.8 per cent and 31.9 per cent respectively). However, in 2022, LLDCs exports picked up significantly (27 per cent growth on 2021), driving LLDCs' trade growth above that of transit and developing economies.

Improved integration of LLDCs in global trade requires the removal of non-tariff barriers. In this context, the WTO Trade Facilitation Agreement (TFA) plays an important role. The TFA contains provisions for expediting the flow of goods, including goods in transit, and easing trade bottlenecks at borders. Its implementation is expected to increase the opportunity for all developing countries, and LLDCs in particular, to participate successfully in global value chains. WTO (2021) reports that full implementation of the TFA is estimated to reduce LLDCs trade costs by an average of 15.4 per cent.

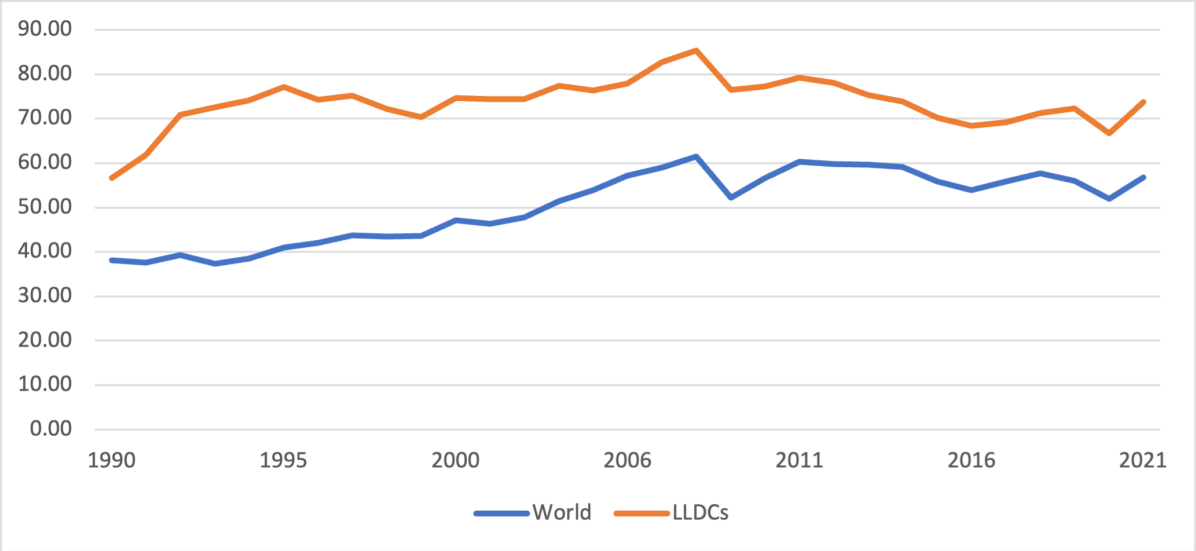
The rate of TFA implementation across all WTO members was 77 per cent, plus 5.6 per cent of implementation commitments notified to take place by the end of 2024. For LLDCs, the rate of implementation was 61.8 per cent (which represents a significant improvement since the 34 per cent recorded in 2021). For transit countries, implementation stood at 72.7 per cent. Of specific concern for LLDCs is the low rate of implementation (below 40 per cent) of particularly relevant provisions, such as border agency cooperations, expedited shipments, use of international standards, test procedures, and enquiry points. Certain countries have notified the WTO that a significant proportion of those commitments will be implemented upon receipt of the necessary technical advice and capacity-building support. The most-required type of technical assistance includes human resources and training, legislative and regulatory framework, and information and communication technology.[18]

[17] It is worth noting that the share of global trade of advanced economies has also declined since the early 2000s. Given that global trade has increased in volumes, this decline in the trade share of regions like Europe and North America can be seen as evidence that "globalisation" is truly global. This is therefore a very different situation from the one experienced by LLDCs, which have been left at the margin of the globalisation process.

[18] More detailed data and information on the implementation of the TFA is available from the TFA database at Implementation commitments dashboard | TFAD - Trade Facilitation Agreement Database (tfadatabase.org).

While their relative share in global trade is small, LLDCs are on average more "open" economies than the rest of the world. Openness is measured by the GDP share of exports and imports of goods and services. Empirical analysis has found this indicator to have a positive association with long term economic growth (Levine and Renelt, 1992; Dollar and Kraay, 2003; Yannikaya, 2003). *Figure 4.3* plots the indicator for the group of LLDCs and the world between 1990 and 2021. Tables 3.5 and 3.6 in the Statistical Annex report detailed information for each LLDC.

Figure 4.3. Total trade in goods and services as a per cent of GDP, 1990-2021



Source: UNCTAD database

Two significant facts emerge from *Figure 4.3*. First, the GDP share of trade is higher in LLDCs; in this sense, LLDCs are more open than the world average. This fact, however, should be interpreted with caution. The world average is heavily skewed because some of the largest economies worldwide tend to be relatively closed. The GDP share of trade is just 25 per cent in the United States and 37 per cent in China. In this respect, one should look at the median value of the trade share, which is 66 per cent worldwide, rather than the average. The large trade share observed in LLDCs is driven mostly by imports. LLDCs' exports in percent of GDP are we 31 per cent of GDP in 2021, only slightly above the world average. Conversely, LLDCs' imports amounted to 42 per cent of GDP compared to 28 per cent worldwide. This suggests that the openness of LLDCs is more the result of import needs than export opportunities.

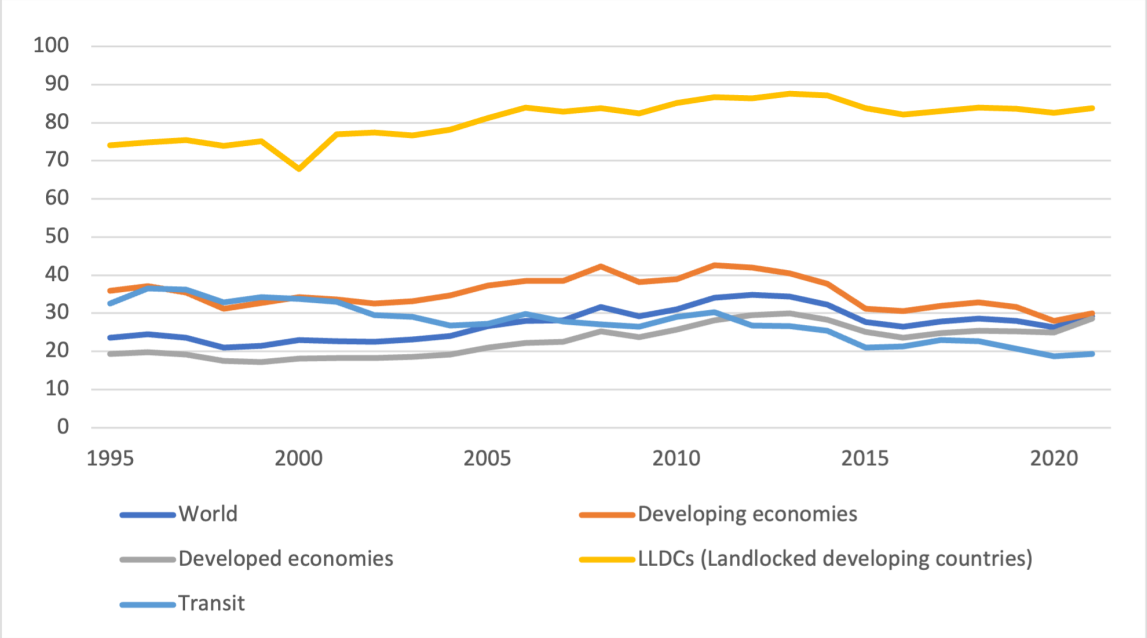
The second significant fact from *Figure 4.3* is that the degree of openness of LLDCs has substantially stagnated since the late 2000s. This is consistent with the previous observation about the dynamics of merchandise exports. From an empirical perspective, since openness in LLDCs has not increased over time, it can only contribute to explaining the level of GDP per-capita (rather than its growth rate). That is, the observed higher level of openness may have had an initial positive impact on the level of per-capita GDP in LLDCs economies, but it is unlikely to have produced much of an effect on the rate of growth of GDP in the last ten to fifteen years.

Aside from the overall degree of openness, economic growth and development are affected by the structure of international trade. For instance, excessive reliance on primary commodities has sometimes been associated with reduced growth performance in the long-term (the so-called "resource curse hypothesis"), even if in the short term it can lead to a temporary boom. Similarly,

a greater incidence of higher quality products (measured in terms of productivity levels) and a wider variety of exports tend to amplify the growth effect of international trade.

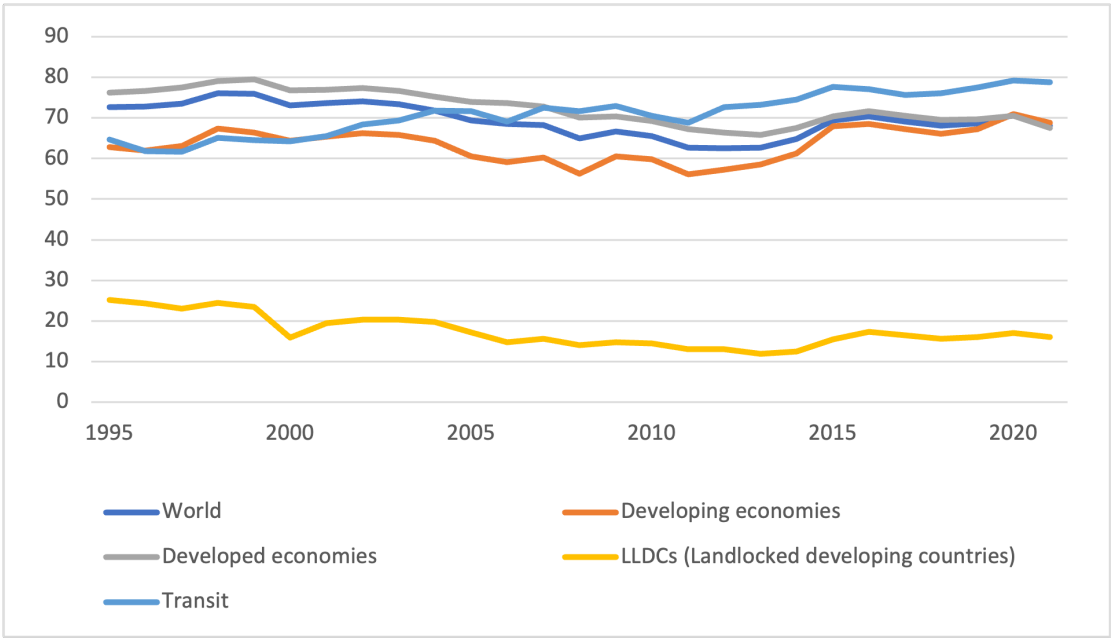
Against, this background, Figures 4.4 and 4.5 plot the share of primary commodities and manufactured goods in total merchandise exports.

Figure 4.4. Share of primary commodities, stones and gold in per cent of merchandise exports, 1995-2021



Source: UNCTAD database

Figure 4.5. Exports of manufactured goods share of merchandise exports (per cent)



Source: UNCTAD database

The figures show that LLDCs' export structures are characterised by a strong dependence on primary commodities. The share of manufactured goods in total LLDCs' merchandise exports is small compared to all other country groupings, including transit countries. This share is also declining over time. While it is not uncommon for developing economies to be more reliant on the export of primary commodities, this is much more the case in LLDCs than in their coastal counterparts and this share is not exhibiting any tendency to decline suggesting that there is scope for greater diversification to increase the variety of exports.

Lastly, *Table 4.7* details the top exports by LLDC. Information is presented following the classification standards of the United Nations Conference on Trade and Development (UNCTAD). Consistent with the evidence from Figures 4.4 and 4.5, most LLDCs primarily rely on the export of primary commodities, ores and metals, and fuels. Manufactured goods, while rarely top exports in any of the LLDCs, tend to be the second export in many countries. Also interesting is the fact that for all countries but five (Bolivia, Lao, Niger, Uzbekistan, and Tajikistan), the top three export categories account for at least 80 per cent of total exports. Combined with the observation that the "other" category is generally dominated by a single product (or a small group of products), this observation suggests that the degree of export diversification is still relatively low in LLDCs.

TABLE 4.7 TOP EXPORTS BY COUNTRY

	First export (share of total exports)		Second export (share of total exports)		Third export (share of total exports)	
Afghanistan	Food items	52	Agricultural materials	16	Other	15
Armenia	Ores and metals	40	Manufactured goods	27	Food items	24
Azerbaijan	Fuels	87	Manufactured goods	4	Other	3
Bhutan	Manufactured goods	55	Fuels	20	Ores and metals	18
Bolivia	Ores and metals	28	Other	25	Fuels	22
Botswana	Other	95	Manufactured goods	5	..	..
Burkina Faso	Other	83	Food items	6	Agricultural materials	6
Burundi	Other	52	food items	36	Ores and metals	8
Central African Rep.	Agricultural materials	56	Manufactured goods	23	Other	17
Chad	Fuels	90	Agricultural materials	8	Other	2
Eswatini	Manufactured goods	64	Food items	25	Agricultural materials	6
Ethiopia	Food items	77	Manufactured goods	16	Agricultural materials	5
Kazakhstan	Fuels	63	Ores and metals	17	Manufactured goods	14
Kyrgyz Republic	Other	49	Manufactured goods	18	Ores and metals	16
Lao PDR	Fuels	33	Manufactured goods	22	Ores and metals	18
Lesotho	Manufactured goods	57	Other	40	Agricultural materials	4

	First export (share of total exports)		Second export (share of total exports)		Third export (share of total exports)	
Malawi	Food items	90	Manufactured goods	7	Other	3
Mali	Other	95	Agricultural raw materials	5	..	..
Moldova	Manufactured goods	52	Food items	44	Other	4
Mongolia	Ores and metals	50	Fuels	31	Other	16
Nepal	Food items	49	Manufactured goods	45	Other	6
Niger	Other	44	Fuels	17	Food items	17
North Macedonia	Manufactured goods	84	Food items	8	Ores and metals	5
Paraguay	Food items	69	Fuels	15	Manufactured goods	13
Rwanda	Other	36	Food items	32	Ores and metals	15
South Sudan	Fuels	94	Other	6	..	..
Tajikistan	Ores and metals	35	Manufactured goods	21	Other	18
Turkmenistan	Fuels	88	Manufactured goods	9	Other	4
Uganda	Food items	49	Other	32	Manufactured goods	15
Uzbekistan	Other	30	Manufactured goods	26	Fuels	19
Zambia	Ores and metals	73	Manufactured goods	11	Food items	8
Zimbabwe	Other	44	Food items	22	Ores and metals	21

Source: Country Profiles available from UNCTADStat. Data are averaged over the period 2019-2022.

Notes: The number next to each product is the percentage share of that product in total country's exports. Food items include SITC 0, 1, 22, 4; Agricultural raw materials include SITC 2 less 22, 27 and 28; Ores and Metals include SITC 27, 28 and 68; Fuels include SITC 3, Manufactured goods include SITC 6, 8 less 667 and 68. Consequently, Other primarily includes pearls, precious and semi-precious stones, gold (excluding gold ores), iron and steel, textiles.

PRIORITY AREA 4: REGIONAL INTEGRATION AND COOPERATION

Regional integration, defined as the process of creating closer economic cooperation among countries within a particular geographical region, can affect a country's participation in global trade in two ways.

First, the establishment of a free trade agreement or custom union (the two most typical forms of regional integration) with another country or group of countries will divert a country's trade from partners not included in the agreement. At the same time, more trade will be created between the country and the other countries included in the agreement. If the trade diversion effect is greater than the trade creation effect, then regional integration can cause a deadweight loss for the participating country. Second, by providing an intermediate step towards full multilateral trade liberalisation, regional integration can support progressive liberalisation and openness in small and developing economies that would find it otherwise very difficult and expensive to be part of broader multilateral agreements. It is this second aspect that may be particularly relevant for LLDCs.

Regional integration initiatives generally have a geographical nature; that is, they tend to bring together countries that are located close to each other (albeit not necessarily sharing a border). This means that through regional integration, LLDCs can effectively improve their access to relevant transit countries, therefore creating an opportunity to overcome some of the supply chain bottlenecks that limit their global trade participation. This is especially likely to be the case if the regional integration initiative is open towards the rest of the world, meaning the free trade area or custom union also involves a reduction in tariffs and non-tariff barriers to trade with non-member countries.

Table 4.1 in the Statistical Annex reports the number of regional trade agreements (RTAs) of which each LLDC is a member. This number has increased, on average, from 3.3 in 2014 to 4.3 in 2023. Most members participate in more than one RTA, and several countries participate in more than five agreements. While participation in these agreements could be beneficial for the reasons discussed above, multiple memberships may be difficult to manage. Each RTA comes with its own requirements, rules, and constraints. In some cases, this could lead to conflicting priorities. Furthermore, LLDCs are likely to have limited human resources and technical capabilities to support many memberships. The implication is that participation in some RTAs might be more nominal than actual, which means that no effective benefit is generated. From this perspective, LLDCs could review the range of their participation in RTAs to ensure that multiple memberships do not create obstacles on the way towards deeper global trade integration.

Overlapping RTA membership makes it difficult to isolate the contribution of each RTA to the trade of each LLDC. One can, however, examine broader geographical regions to gauge the level of LLDCs' export market diversification. On the one hand, constraints arising from limited transit corridors and high transport costs make it necessary for LLDCs to trade within their region, and possibly with a restricted number of partners in that region. This supports the use of regional agreements as a tool to foster and facilitate trade. On the other hand, excessive geographical concentration of export destinations could expose countries to risks. Consider the situation of a country whose exports are mostly directed to a single partner country. Any idiosyncratic shock that causes an economic contraction in the partner country will significantly reduce exports from the origin country, therefore causing an economic contraction in the origin country as well. With a larger number of partner countries, the origin country diversifies the risk associated with idiosyncratic shocks. This risk diversification strategy is even more effective if partner countries are located across different regions, reducing exposure to region-wide shocks (like a large natural disaster or a localised conflict).

TABLE 4.8. GEOGRAPHICAL DESTINATION OF LLDC'S EXPORTS BY MACRO-REGIONS

	Primary destination	Max share 2010	Max share 2019-2020	H-index 2010	H-index 2019-2020
Afghanistan	SA	55.7811	81.4583	0.40	0.68
Armenia	ECA	75.1006	66.3715	0.58	0.48
Azerbaijan	ECA	62.7954	82.8396	0.43	0.70
Bhutan	SA	87.4341	..	0.78	..
Bolivia	LAC	60.2397	48.4267	0.42	0.30
Botswana	..	72.1994 (ECA)	26.4515 (MENA)	0.56	0.21

	Primary destination	Max share 2010	Max share 2019-2020	H-index 2010	H-index 2019-2020
Burkina Faso	ECA	69.6106	80.4152	0.54	0.65
Burundi	..	58.0688 (ECA)	38.601 (MENA)	0.41	0.28
Central African Republic	ECA	69.576	..	0.52	..
Eswatini	SSA	73.3072	92.1013	0.56	0.85
Ethiopia	..	36.1321 (ECA)	25.5001 (MENA)	0.24	0.20
Kazakhstan	ECA	68.6945	66.1757	0.51	0.50
Kyrgyz Republic	ECA	68.8267	95.7458	0.52	0.92
Lao PDR	EAP	88.5109	91.0129	0.79	0.83
Lesotho	SSA	75.4773	34.7939	0.62	0.33
Malawi	ECA	40.6834	47.9435	0.26	0.33
Mali	SSA	67.1574	47.8092	0.50	0.39
Moldova	ECA	94.7508	94.4684	0.90	0.89
Mongolia	EAP	..	75.0579	..	0.62
Nepal	SA	74.451	70.2634	0.58	0.52
Niger	..	31.8343 (ECA)	22.9433 (SSA)	0.25	0.19
North Macedonia	ECA	95.9236	94.4193	0.92	0.89
Paraguay	LAC	60.3141	74.3706	0.45	0.57
Rwanda	..	42.1189 (ECA)	45.4997 (SSA)	0.35	0.32
Tajikistan	ECA	..	79.6542	..	0.65
Uganda	..	52.3388 (SSA)	45.796 (MENA)	0.36	0.33
Uzbekistan	ECA	..	38.0064	..	0.26
Zambia	ECA	52.6664	46.6905	0.37	0.36
Zimbabwe	SSA	57.1415	55.0863	0.38	0.35

Source: Author's calculations from data in WITS

Information on the destination of LLDCs' exports is provided in ***Table 4.8***. For each LLDC, the table reports the macro-region to which the largest share of country's exports is directed (primary destination), the share of exports directed to the primary destination in 2010 and 2019-2020, and the Herfindahl index of export destinations. This is calculated as follows. Let be the share of exports from the LLDC country towards the generic macro-region .. There are seven macro-regions: Europe and Central Asia (ECA), East Asia and Pacific (EAP), Latin America and Caribbean (LAC), North America (NA), South Asia (SA), Sub Saharan Africa (SSA) and Middle East and North Africa (MENA). Therefore, there are seven values for ,, each included between 0 and 1. By definition, the sum of the seven shares adds up to 1. The index is then calculated by taking the sum of the squared values of the seven values. Higher values of the index therefore indicate greater market concentration for each country and region.

The data in the table confirm that LLDCs tend to export primarily to countries in their geographical neighbourhood, reinforcing the case for broader regional trade agreements based on geography.[19] There are some interesting exceptions that concern several SSA countries. The primary destination for most of them in 2010 was ECA. This most likely reflected post-colonial economic ties with Western Europe. The only SSA countries

[19] As LLDCs already trade with countries in their geographical region, the risk of trade diversion is reduced. On the other hand, the establishment of broader trade agreements that encompass most of the region could effectively facilitate further trade creation and work as a steppingstone towards LLDCs' fuller participation in multilateral trade.

whose primary destination was SSA were Eswatini, Lesotho, Mali, Uganda, and Zimbabwe. However, the last decade has seen significant changes. Botswana, Burundi, and Ethiopia all switched primary destination from ECA to MENA, while Niger and Rwanda turned to SSA as their primary destination. Conversely, Uganda switched primary destination from SSA to MENA. These patterns might reflect varying degrees of success of the many sub-regional trade agreements established in SSA since the 1990s and 2000s.

To interpret the index of concentration, consider that perfect diversification (a situation in which a country has the same trade share with each macro-region) would yield a concentration index of 0.14. At the other end of the spectrum, a country with 90 per cent of exports going to the same region and the remaining 10 per cent going to another region would have a concentration index of 0.82. In between, a country that splits its exports equally between two regions would have a concentration index of 0.5.

For LLDCs, the highest value of the index (lowest degree of export destination diversification) is 0.89 (North Macedonia) and the lowest value (highest degree of diversification) is 0.19 (Niger). Within these extremes, three broad groups can be identified:

A group of countries with a high degree of diversification (index below 0.33) including Niger, Ethiopia, Botswana, Uzbekistan, Burundi, Bolivia and possibly Rwanda, Lesotho, Uganda, and Malawi. For these countries, full participation in multilateral trade agreements is likely to be more beneficial at this stage than participation in more regional integration agreements at the local level, which might cause excessive trade diversion.

At the other end, a group of countries with a low degree of diversification (index above 0.66), including Eswatini, the Kyrgyz Republic, Lao, Moldova, North Macedonia and possibly Afghanistan and Azerbaijan. These countries could benefit from regional initiatives with a more geographically diversified membership.

In between, a group of countries including Zimbabwe, Zambia, Paraguay, Nepal, Mongolia, Mali, Kazakhstan, Armenia and probably Burkina Faso and Tajikistan that would benefit from broader regional initiatives in terms of both number of participating countries and scope of cooperation.

PRIORITY AREA 5: STRUCTURAL ECONOMIC TRANSFORMATION

The process of economic development is linked to a fundamental change in productive and trade structures. Most countries at early stages of economic development rely on agricultural production and tend to export primary commodities and natural resources (if available). For a long time, the general view was that the next stage of development would necessarily involve the transfer of resources from the agricultural sector to the industrial sector, with progressive expansion of manufacturing. This view led to an industrial policy approach whereby governments adopted import substitution strategies to nurture infant industries with the hope to spur technological progress and growth. These strategies presented two types of problems. First, import substitution, while meant to be temporary, often turned into permanent protectionism, therefore hindering productivity and preventing the emergence of internationally competitive industries. Second, the selection of industries or sectors to be protected and nurtured was often a top-down choice that did not consider notions of dynamic comparative advantage.

Governments essentially "picked winners" and subsidised them indefinitely, at a massive financial and economic cost. [20]

Structural transformation requires a more flexible policy approach to support the emergence of new competitive sectors. This may involve a rise in

[20] See, for instance, Carmignani and Mandeville (2014) for a discussion of structural change in economic development and Aiginger and Rodrik (2020) and Juhasz et al. (2023) for an analysis of new industrial policy approaches. The view of economic development as a process of creative destruction goes back to Schumpeter (1942) and was formalised first by Aghion and Howitt (1992). The role of entrepreneurship in the process of creative destruction is investigated by Francois and Llyod-Ellis (2003) and Spencer et al. (2008), among others.

manufacturing, but non-manufacturing industries and services could also emerge, alongside or in the place of manufacturing. More generally, the traditional view of structural transformation in which economies transition linearly from agriculture to manufacturing/industry and then to services does not always apply in the modern globalised context for economic development. Innovation ultimately drives productivity and growth. Aligning with this observation, the fundamental purpose of industrial policy should be the creation of an environment to support entrepreneurship and accommodate the creative destruction that inevitably accompanies structural transformation. Some key elements of this policy approach can be sketched as follows:

- **Entrepreneurship** (the process of identifying, creating and pursuing opportunities to develop new ideas into successful commercial and business ventures) involves innovation and some degree of risk-taking. Policy interventions should therefore aim at designing and implementing programmes to support truly new activities without picking winners ex-ante. This support can take various forms (including preferential access to credit or tax facilitations), but must be (i) temporary and (ii) linked to the achievement of set milestones. These milestones are established in consultation between government and relevant stakeholders and informed by international benchmarks. Their purpose is to provide a path for new activities to become successful, i.e. competitive and self-sustainable. Some new activities will fail to hit the agreed milestones (at which point they will no longer receive support), but others will eventually become successful. In this way, winners will have emerged ex-post through a market process and will be able to sustain international competition.

- **Innovation** occurs when new scientific discoveries are translated into business ventures. These discoveries can happen in any country and are eventually shared with other countries through trade, scientific community networks, and the movement of people. It is therefore important for any country to invest in the development of local technological and scientific capabilities to generate new discoveries or catch up with the technological frontier and take advantage of discoveries made elsewhere. Research and Development therefore plays a critical role in a modern approach to structural transformation in advanced and developing economies alike. In the case of LLDCs, R&D is particularly important as it contributes to filling the connectivity gap.

- **As new activities and sectors emerge**, others will inevitably decline. Policy interventions should accommodate this exchange by (i) ensuring that obsolete activities and sectors are not unnecessarily preserved through protectionist policies and permanent subsidies and (ii) facilitating the flow of human, technological, and financial resources from declining to emerging sectors. This latter point is particularly important for workers in declining sectors. They will face unemployment or reduced incomes, and justifiably expect some form of protection or support. For this reason, active labour market policies should ensure that workers are provided with training and professional development opportunities, support in mobility across sectors (e.g. assistance in searching for new jobs), and social welfare that guarantees they continue to receive an income as they transition from one sector to another.

- Inevitably, **all of the above has a cost**, which developing countries with tight budget constraints and limited borrowing capacity might find unaffordable. At the outset, however, the cost involved is less than the cost of traditional import substitution policies which produce permanent subsidisation programs to keep uncompetitive industries alive. Furthermore, as an economy progresses through structural transformation and new competitive sectors emerge, productivity growth will translate into a faster growth of GDP and incomes. In this respect, the initial investment will be paid off. Nevertheless, in the short-term, domestic and foreign

resource mobilization becomes a priority, which needs to be addressed via a mix of public, private and foreign funding (see also discussion under Priority Area 6). This requires strengthening the banking system to ensure a steady flow of domestic credit to the private sector, promoting regulatory and operational conditions to attract foreign direct investment, and – at the international level – strengthening commitments and disbursements of official flows.

This preamble serves as an important introduction for interpreting the evidence available from the indicators reviewed in this section (and the broader set of data presented in Tables 5.1-5.14 in the Statistical Annex). Starting from the "investment" side, ***Table 4.9*** summarises the volume of domestic credit to the private sector (in per cent of GDP) in LLDCs and comparison groupings. The world figure is heavily driven by what happens in advanced economies. However, relative to comparative developing country groupings, LLDCs are characterised by low levels of credit to the private sector. Domestic credit includes all financial resources provided by financial corporations, including monetary authorities, deposit money banks, finance and leasing companies, pension funds, and insurance corporations. In this respect, it can be taken as an indicator of the depth of the financial system. Considering the previous discussion on the need to mobilize resources to support structural transformation, the data in the table demonstrate a need for greater efforts to support broad financial development in LLDCs.

TABLE 4.9. DOMESTIC CREDIT TO PRIVATE SECTOR IN LLDCS AND COMPARISON GROUPS

	Domestic Credit to the private sector (per cent of GDP)									
	2003	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
World	124.91	118.29	119.91	123.41	125.17	126.15	125.58	130.98	147.28	144.98
LLDC	14.12	24.21	25.28	26.55	27.89	27.10	27.92	28.90	29.75	31.46
Transit	25.28	42.18	44.23	46.72	46.56	45.99	47.21	49.64	53.03	54.56
Coastal	29.11	42.62	43.85	46.03	46.47	45.72	45.13	46.16	52.30	50.24
Developing	26.34	38.74	39.87	41.77	42.40	41.58	41.21	42.20	47.14	45.84

Source: World Development Indicators, World Bank

Further on the investment side, ***Table 5.12*** in the Statistical Annex shows levels of R&D expenditure as a proportion of GDP. Data are not available for several LLDC countries and so caution should be exercised in the interpretation of regional aggregates. Nevertheless, LLDCs invest in R&D significantly less than the rest of the world. As of 2020, R&D expenditure in LLDCs was 0.2 per cent of GDP, compared to 1.9 per cent globally. The comparison with other developing countries also suggests that LLDCs are underinvesting in R&D. In the group of least developed countries, R&D expenditure was 0.27 per cent. At a regional level, R&D expenditure was 0.3 per cent in Sub-Saharan Africa, 0.9 per cent in Northern African and Western Asia, 0.6 per cent in Central and South Asia, 2.3 per cent in Eastern and South-Eastern Asia and 0.6 per cent in Latin America and the Caribbean.[21]

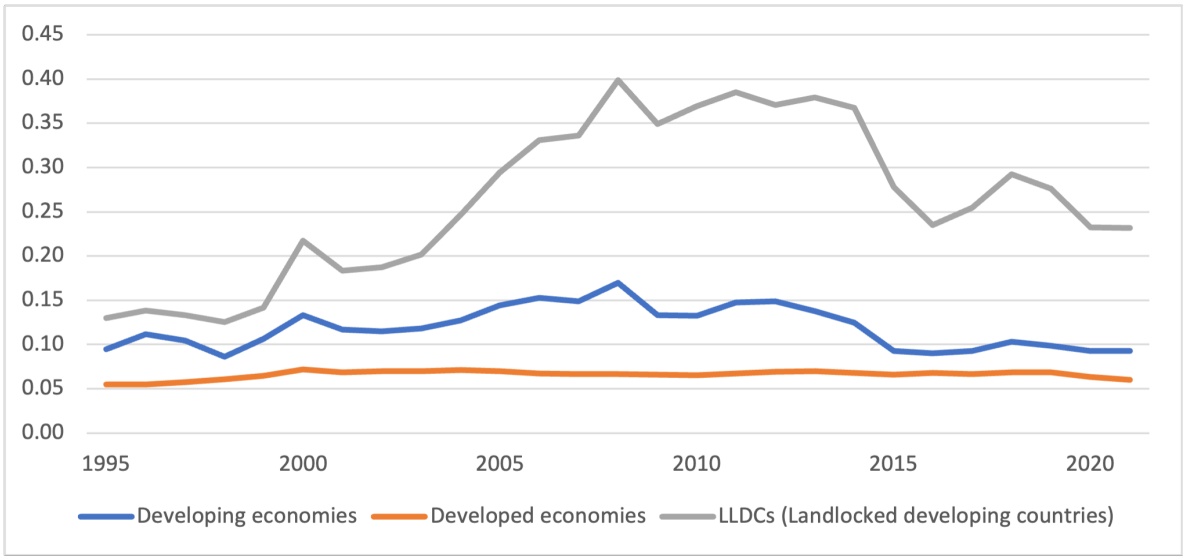
Turning to structural transformation, Figures 4.6 and 4.7 respectively report the export concentration index and import concentration index for LLDCs, developing economies and developed economies. These indices are provided by UNCTAD, and they are akin to the Herfindahl index introduced in the commentary to Priority Area 4. The difference is that these indices refer

[21] Data are taken from the Statistical Annex: Global and regional data for SDG indicators 2023.

to products rather than destinations. That is, the export concentration index measures the degree of concentration of exported goods; higher values of the index indicate that a larger share of country's exports is accounted for by a smaller number of commodities. Similarly, the import concentration index takes higher values the larger the share of country's imports that is accounted for by a smaller number of commodities.

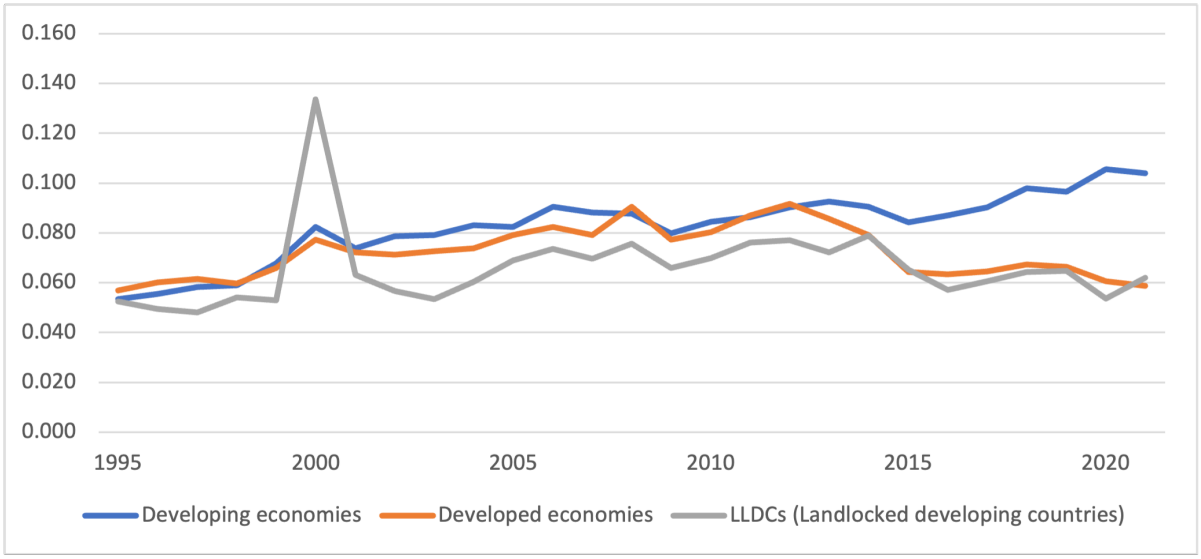
As is evident from the two charts, exports are significantly more concentrated in LLDCs than in developing countries. The inverted U-shaped pattern of the index for LLDCs suggests that the concentration increased with the rapid increase in exports (see table 4.6) and has subsequently started to decline. This later decline is consistent with the idea that structural transformation leads to an increased variety in exports, contributing in turn to the growth and developmental effects of further trade integration. LLDCs' imports are significantly less concentrated than those of developing countries. As the index for LLDCs exhibits no clear tendency to increase or decrease in the long term, the most likely interpretation is that LLDCs have been structurally less able to produce the variety of products demanded by consumers or required by firms. The fact that LLDCs' exports are significantly more concentrated than their imports confirms that the productive structures of LLDCs still lack a degree of goods diversification.

Figure 4.6. Export concentration index in LLDCs and comparison groups, 1995-2001



Source: UNCTAD database

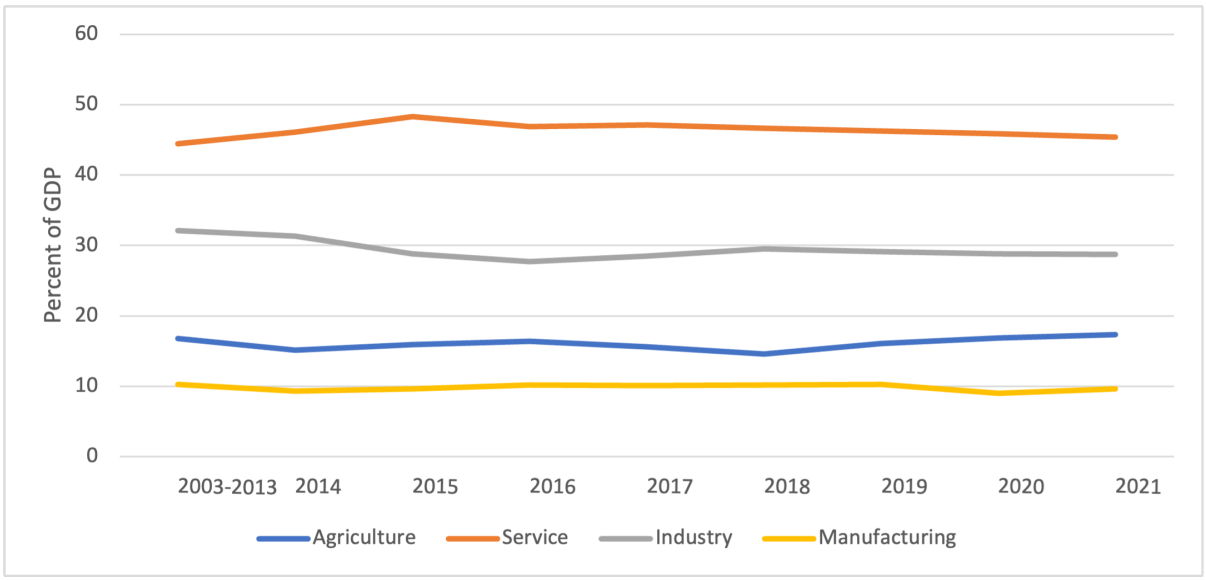
Figure 4.7. Import concentration index in LLDCs and comparison groups



Source: UNCTAD database

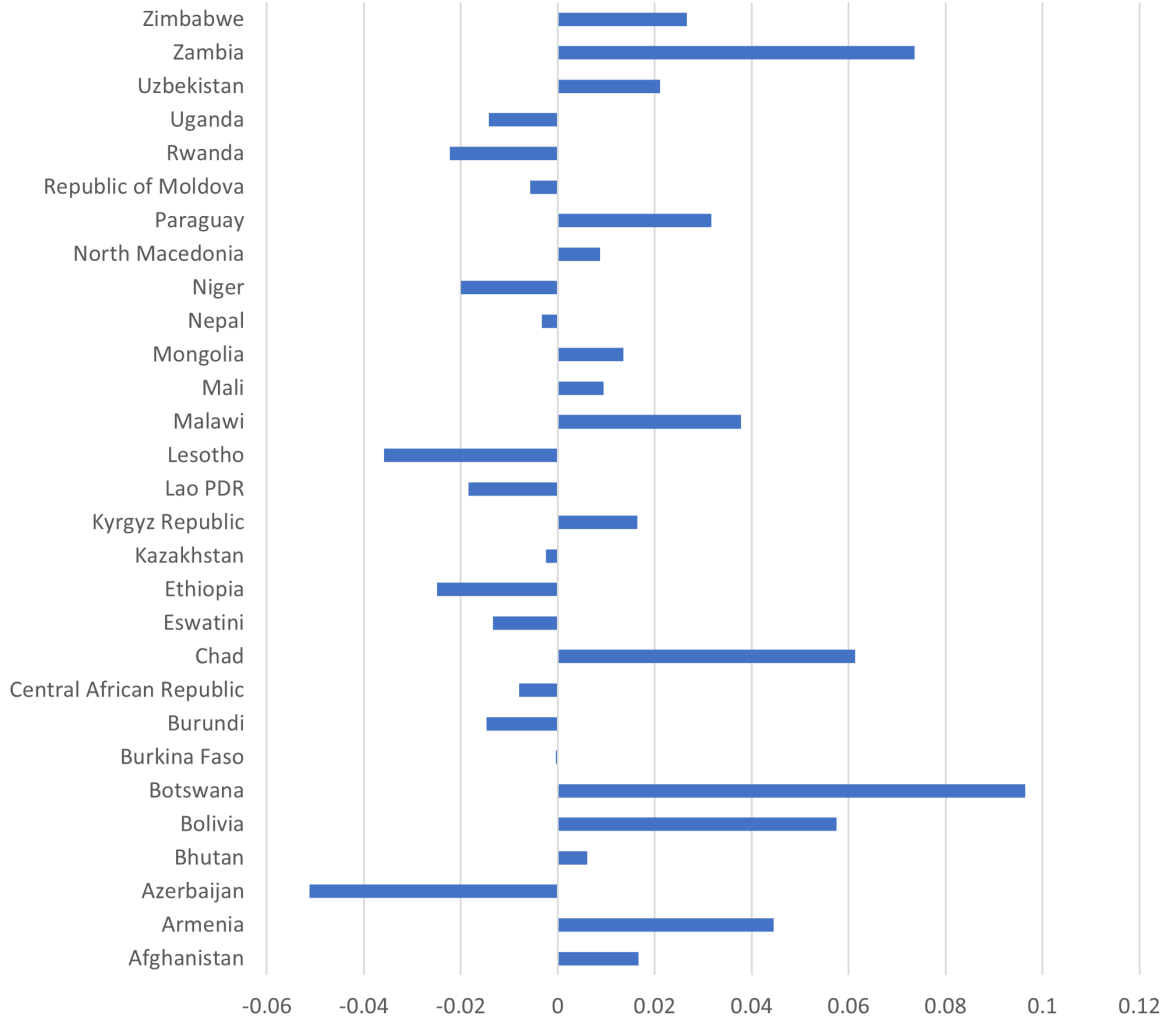
To further assess the change in economic and productive structures, Figures 4.8a and 4.8b make use of information on the sectoral shares of GDP. Sectors are identified as agriculture, industry, service and manufacturing (a sub-sector of industry). Figure 4.8a shows the four shares for the LLDC group. There is evidence of change occurring up to the mid-2010s, with services increasing and industry declining. However, these changes seem to have halted in the last 8-10years, apart from a recent increase in the share of agriculture.

Figure 4.8a. Sectoral shares of GDP in LLDCs



Source: World Development Indicators

Figure 4.8b. Changes in Herfindahl Index by LLDC, 2003-2021



Source: Author's calculations from WDI data

Figure 4.8b reports the change in the Herfindahl index calculated for each country over the period 2003-2021. The index considers the value-added contribution of the three macro sectors, i.e. agriculture, industry and services.[22] An increase in the index over time indicates a less diversified productive structure. As can be seen, there is a significant diversity of experiences across LLDCs. Most countries, however, have experienced an increase in concentration. The countries where concentration has declined have not necessarily seen their industry share of GDP increase. In this respect the case of Azerbaijan is interesting; much of the observed reduction in concentration is due to the progressive rise of the service sector, while the industry share has decreased (though there is a moderate increase in manufacturing).

[22] The index is constructed as follows. Let si be the value added of sector i in percentage of GDP. The index is then defined as the sum of the squared values of the shares si. For the purpose of this analysis, three sectors are separately identified: agriculture, industry (including manufacturing and construction) and service. The changes in the contribution of these macro-sectors to GDP is what typically defines the different phases of economic development (see Carmignani and Mandeville, 2014).

PRIORITY AREA 6: MEANS OF IMPLEMENTATION.

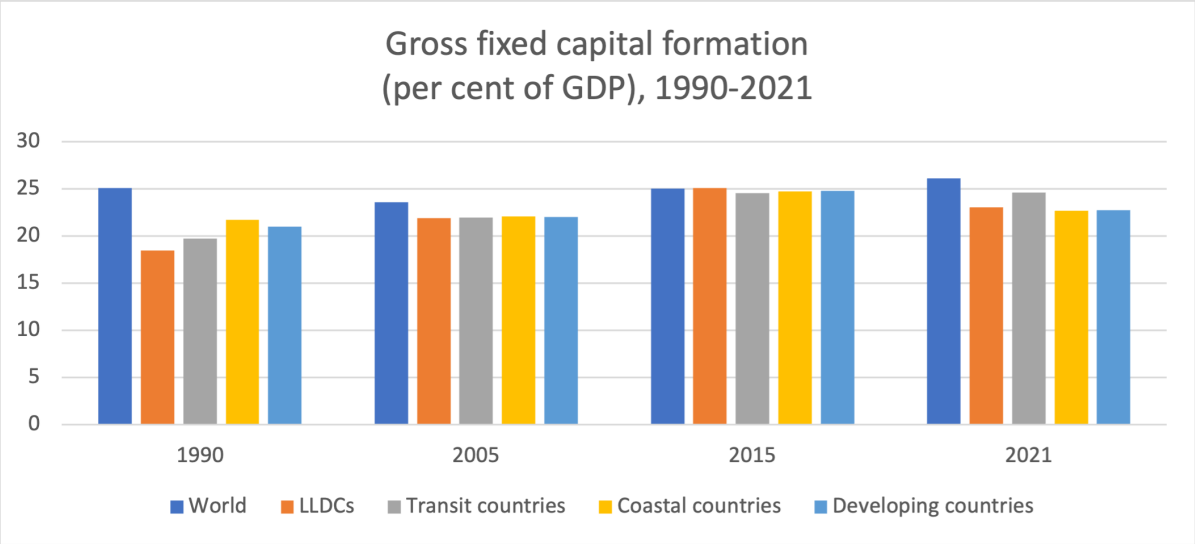
Discussions of the other priority areas have raised points regarding financing needs. This section explores the extent to which various sources are available to support the implementation of the VPoA.

The mobilization of resources to support development is primarily a domestic responsibility, raising the question of whether an economy has enough domestic savings to finance an adequate volume of investment. *Figure 4.9* compares gross fixed capital formation as percent of GDP across LLDCs and key country groupings. From an economic perspective, gross fixed capital formation represents the core of a country's fixed investment in infrastructures (including schools, offices, hospitals), machineries, and equipment, and it is therefore an effective indicator of physical capital accumulation, which in turn is a driver of aggregate GDP growth.

The figure suggests that LLDCs have achieved a rate of investment that is comparable to that of other developing countries, albeit still below the rate of investment in transit countries. However, due to their disadvantaged geographical position and the issues uncovered in the section reviewing Priority Area 2, LLDCs could benefit from a focus on growing fixed investment above the average of other developing countries so to build-up their potential for future growth and catching-up to their coastal counterparts. Essentially, while keeping gross fixed capital formation at a comparable rate with other developing countries might prevent a further widening of the developmental gap, closing this gap would require increased investment from LLDCs.

At a macro level, funding for increased investment comes primarily from gross domestic savings. In an open economy, any gap between domestic investment and savings can be financed by external funding including foreign direct investment, official development assistance, and remittances. Nevertheless, domestic savings are an important indicator of the capacity of a country to finance its own development. *Table 6.3* in the Statistical Annex reports the details of gross domestic savings across all LLDCs. On average, in the last two decades, savings in LLDCs have fluctuated between 20 per cent and 25 per cent of GDP. This is several percentage points below the world average, but broadly in line with the current rate of fixed investment observed in *Figure 4.8*. A further upscale of investment would therefore require an increase in domestic savings.

Figure 4.9. Gross fixed capital formation over time (per cent of GDP)



Source: WDI

An increase in domestic savings can be achieved through an increase in the marginal propensity of households and corporations to save, coupled with interventions to ensure that private savings are channelled towards domestic investment as opposed to investments abroad), an increase of public sector savings, or both. The former would require, among other things, deeper financial intermediation, consistent with previous observations under Priority Area 5. The latter requires an increase in tax revenues (or a reduction in expenditure, which is difficult to achieve in a context where most interventions require additional government funding). ***Table 6.4*** in the Statistical Annex reports government revenues in per cent of GDP across each LLDC. It is evident that (i) large disparities persist across countries (reflecting their different economic structures, endowments of natural resources, and approaches to government budgeting), and (ii) in many countries, the revenue-to-GDP ratio has not increased significantly in the last decade. This raises the question of whether there is scope for a further increase in tax rates. It is possible that rather than raising the tax burden, efforts could initially concentrate on strengthening the efficiency of tax collection, to ensure that all individuals and companies contribute their due share and that taxation is effectively progressive.[23]

Aside from domestic resource mobilisation, it is evident that international flows will continue to play an important role for LLDCs. ***Table 4.10*** provides a comprehensive summary of the state of ODA in LLDCs and comparison country groups.

TABLE 4.10. OFFICIAL DEVELOPMENT ASSISTANCE TO LLDCS, COMPARISON WITH OTHER COUNTRY GROUPS

	Net Official Development Assistance									
	2003	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
Billions of 2020 USD										
World	89.88	144.09	153.44	155.09	168.05	171.32	167.41	166.35	193.24	190.07
Total LLDC	15.11	25.29	25.19	26.43	27.68	29.56	29.08	30.25	35.16	29.78
Total Transit	26.45	41.51	39.09	41.03	38.63	40.93	34.08	37.63	46.47	40.89
Total Coastal	46.48	67.32	65.06	69.44	71.71	74.68	73.90	71.32	89.61	87.45
Total Developing	61.59	92.61	90.25	95.87	99.39	104.24	102.99	101.57	124.76	117.23
USD per capita										
World	14.27	20.16	21.21	21.18	22.72	22.89	22.12	21.84	25.13	24.59
Total LLDC	43.03	55.46	53.94	55.30	57.90	60.35	57.95	58.81	67.48	55.78
Total Transit	6.99	9.64	8.97	9.30	8.65	9.06	7.46	8.15	9.96	8.69

[23] A typical challenge encountered in development practice is that indirect taxes are generally easier to collect than direct taxes. This in turn results in tax system that are highly regressive, as well as excessive reliance on taxes on international trade (which are clearly at odds with trade integration). In this regard, LLDCs should advocate for technical assistance and capacity building from the international community in the design, review and implementation of tax systems and tax collection procedures.

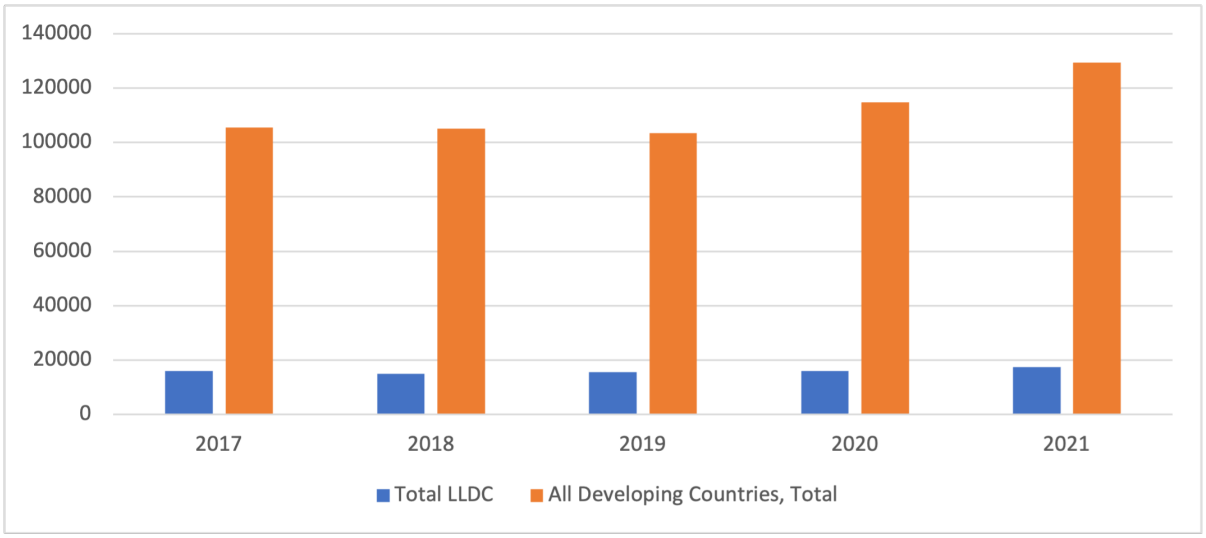
	Net Official Development Assistance									
	2003	2013	2014	2015	2016	2017	2018	2019	2020	2021
Total Coastal	9.44	12.03	11.48	12.10	12.35	12.71	12.44	11.94	14.85	14.42
Total Developing	11.68	15.30	14.71	15.43	15.82	16.38	15.98	15.65	19.03	17.77
Percent of world										
Total LLDC	16.81	17.55	16.42	17.04	16.47	17.25	17.37	18.18	18.19	15.67
Total Transit	29.43	28.81	25.47	26.46	22.99	23.89	20.36	22.62	24.05	21.51
Total Coastal	51.72	46.72	42.40	44.77	42.67	43.59	44.14	42.87	46.37	46.01
Total Developing	68.53	64.27	58.82	61.82	59.14	60.84	61.52	61.06	64.56	61.68
Percent of all developing countries										
Total LLDC	39.83	29.49	30.92	28.76	28.02	27.21	27.42	29.32	22.59	21.67
Total Transit	42.94	44.83	43.31	42.80	38.86	39.26	33.10	37.05	37.25	34.88
Total Coastal	75.47	72.69	72.09	72.43	72.15	71.64	71.76	70.22	71.82	74.59
Total Developing	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Source OECD Dataset

At the global level, net ODA has increased by 111 per cent since 2003. Since 2014, however, ODA growth has significantly decelerated to an annual average of 3.9 per cent. ODA directed to LLDCs has grown more than ODA directed to transit and coastal developing countries in the last two decades (97.1 per cent cumulative growth for LLDCs versus 54.6 per cent for transit countries and 90.3 per cent for developing countries). Since 2014, however, transit countries have experienced no significant growth in ODA, while ODA to LLDCs has declined to 2.2 per cent a year compared to 3.3 per cent growth in assistance to developing countries. ODA per-capita is significantly higher in LLDCs than elsewhere. Another element that emerges from the table is the volatility of ODA when considered in terms of annual changes. This volatility is a source of uncertainty that could hinder the effectiveness of aid. In this regard, the international community is recommended to consider measures ensuring that ODA disbursements are as predictable as possible.

Aid for trade is an important component of assistance to developing countries in general, and LLDCs in particular. ***Figure 4.10***, however, suggests that the share of aid for trade allocated to LLDCs has dropped since 2017. This is concerning given the specific developmental needs that LLDCs have around all aspects of trade and trade facilitation.

Figure 4.10. Aid for Trade to LLDCs and developing countries

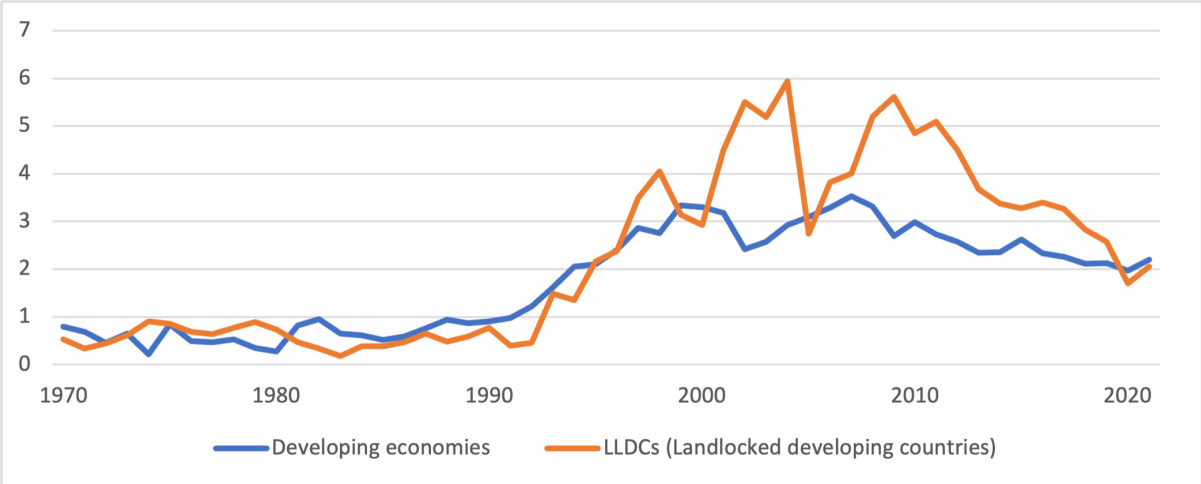


Source: OECD database

Foreign Direct Investment (FDI) plays an important role in the context of development finance needs. Economic reasoning suggests that due to capital scarcity, rates of return on investment in developing economies should be higher than in advanced economies. Therefore, savings should flow from advanced economies (where they are likely to exceed domestic needs) towards developing economies (where there is a shortage of domestic savings). A necessary condition for this flow is that developing countries provide a suitable environment for foreign investment, including reliable and transparent institutions, efficient regulatory frameworks, and overall macroeconomic and political stability. As developing countries effectively compete for foreign capital, the ability to meet those conditions drives competitive advantage in international capital markets.

FDI flows have increased over time, benefiting developing countries in general, especially through the 1990s and early 2000s. This contributed to offsetting the global imbalances that emerged in the lead-up to the Global Financial Crisis (GFC). Following the GFC, FDI growth first slowed and subsequently flattened. This is reflected in the volume of FDI received by developing countries as proportion of GDP (see ***Figure 4.11***). LLDCs have received a proportionally large amount of FDI relative to their economic size for most of the last two decades. However, since 2010, they have also experienced a faster drop than the group of developing countries. For LLDCs, the priority moving forward should be the reconstitution of the institutional and regulatory conditions that are most conducive to attracting foreign capital.

Figure 4.11. Foreign Direct Investment (FDI) in percent of GDP



Source: UNCTAD database

Remittances have received growing attention in development policy and practice. In practice, their impact can reach beyond filling the financing gap. At the macro level, remittances represent a significant source of foreign exchange for recipient countries, therefore contributing to their balance of payments and reducing their dependence on external borrowing. This might be of particular relevance to LLDCs that are currently facing external debt distress (see below). Moreover, the inflow of remittances stimulates the development of the financial sector in the recipient country by encouraging locals to open bank accounts and to engage with the formal financial sector. Therefore, a stable flow of remittances to LLDCs can be a mechanism to deepen financial intermediation, which is one of the main priorities for LLDCs. At the micro level, remittances can be used to fund education and support entrepreneurship in recipient countries. There is evidence of remittances being used by recipients to start small business ventures or expand existing ones.

Table 6.11 in the Statistical Annex reports remittances data for LLDCs. Since 2013, the growth rate of remittances to LLDCs has been similar to the global growth rate. However, remittances to the broader group of low- and middle-income countries have grown more than remittances to LLDCs (58 per cent versus 48 per cent in LLDCs). The distribution of remittances across LLDCs is also quite uneven, reflecting differences in the size of respective diasporas as well as cultural factors. This confirms that while remittances are important in a developmental context, they are not a comprehensive solution to the financing needs of LLDCs and can be seen as a complementary source of finance alongside the other flows discussed in this section.

Borrowing is another option that countries could utilise to finance their development needs. In principle, if borrowing goes towards investment in long-term growth and societal development, then sufficient future revenues will be generated to service this debt and eventually repay it. In practice, several complications emerge, including currency exchange rate fluctuations, changes in global interest rates, financial crises, and mismanagement, all of which could result in excessive debt accumulation and subsequent debt distress. ***Table 4.11*** below provides an overview of the external debt situation in LLDCs.

TABLE 4.11. EXTERNAL DEBT STOCK IN LLDCS AND DEBT SUSTAINABILITY ANALYSIS (DSA) STATUS

	External debt stock (per cent of Gross National Income)										Date of last DSA publication	Risk of distress
	2003	2013	2014	2015	2016	2017	2018	2019	2020	2021		
Afghanistan	..	12.80	12.34	13.45	14.19	14.48	14.69	13.94	14.97	..	6/28/2021	High
Armenia	68.83	73.54	70.52	80.42	91.33	85.72	84.73	86.13	101.24	102.59	..	..
Azerbaijan	27.63	15.00	16.55	25.92	40.99	38.91	36.14	34.21	37.27	27.47	..	..
Bhutan	83.63	93.59	103.90	108.08	116.02	116.55	114.61	117.25	139.78	..	5/24/2022	Moderate
Bolivia	75.37	28.32	28.39	31.05	33.00	35.69	33.70	35.71	42.58	40.56	..	
Botswana	7.57	16.76	16.46	17.04	15.42	11.83	11.62	9.89	10.88	11.90	..	
Burkina Faso	37.51	68.36	77.21	111.55	83.58	94.04	69.02	59.74	58.55	55.01	4/25/2023	Moderate
Burundi	175.85	27.86	25.58	20.16	22.85	22.36	21.94	24.03	23.51	33.21	7/29/2022	High
Central African Republic	93.39	35.02	34.56	40.23	37.65	33.20	32.92	35.60	36.58	41.49	5/02/2023	High
Chad	67.39	23.54	27.93	26.36	28.85	31.64	29.29	29.85	36.89	34.56	1/23/2023	High
Eswatini	21.04	17.13	12.67	11.52	21.19	21.24	17.63	20.62	26.78	25.32	..	
Ethiopia	85.09	26.47	30.55	31.78	31.59	32.20	33.19	29.77	28.36	27.11	5/06/2020	High
Kazakhstan	79.46	70.93	79.50	88.83	132.26	107.12	99.99	100.17	103.45	95.90	..	
Kyrgyz Republic	115.69	98.60	101.79	120.33	123.55	110.91	101.81	104.50	115.33	115.81	2/16/2023	Moderate
Lao PDR	131.22	72.24	75.95	84.45	88.88	90.89	89.50	93.86	97.63	97.16	8/08/2019	High
Lesotho	42.65	34.02	33.54	36.10	56.57	57.41	51.10	57.03	69.22	63.92	6/07/2022	Moderate
Malawi	98.23	29.24	28.31	27.97	34.14	24.60	23.32	22.40	24.55	25.69	11/23/2022	In distress
Mali	67.17	27.20	25.19	29.25	28.19	29.10	27.80	30.20	34.88	34.77	3/30/2021	Moderate
Moldova	95.70	59.71	56.63	74.37	73.05	68.18	61.96	59.73	67.15	66.08	1/12/2023	Low
Mongolia	97.53	161.62	188.74	206.08	239.88	283.25	249.41	250.46	268.48	260.65	..	
Nepal	50.83	17.99	17.26	16.77	17.30	16.96	16.54	18.86	23.37	24.27	1/27/2022	Low
Niger	60.47	18.65	17.64	21.93	23.52	26.29	23.80	26.70	34.72	32.82	1/27/2023	Moderate

	External debt stock (per cent of Gross National Income)										Date of last DSA publication	Risk of distress
	2003	2013	2014	2015	2016	2017	2018	2019	2020	2021		
North Macedonia	38.66	63.79	64.87	69.42	73.31	78.68	71.33	74.85	90.38	82.01	..	
Paraguay	103.90	42.33	42.36	46.92	46.61	42.25	40.64	44.53	57.66	56.16	..	
Rwanda	73.82	30.12	36.17	41.21	51.09	56.64	61.12	65.10	82.37	82.94	12/19/2022	Moderate
South Sudan	..	..	..	..	..	..	..	..	..	..	3/09/2023	High
Tajikistan	85.68	43.75	45.36	52.50	64.11	67.94	67.74	68.91	73.07	66.68	3/28/2023	High
Turkmenistan	32.49	23.14	18.59	20.78	23.19	23.80	20.90	14.95	..	..	..	..
Uganda	70.76	30.28	27.15	30.14	35.15	38.88	38.48	40.57	46.55	48.33	3/15/2022	Moderate
Uzbekistan	53.12	13.73	14.71	15.28	17.39	25.84	32.52	36.95	54.17	56.16	6/22/2022	Low
Zambia	144.46	23.40	34.57	56.52	74.94	92.83	90.82	118.99	151.63	124.71	9/06/2022	In distress
Zimbabwe	84.96	44.78	43.64	49.23	56.90	72.43	70.87	64.81	73.04	53.75	4/08/2022	In distress
Average LLDCs	**73.68**	**41.96**	**43.57**	**49.98**	**56.74**	**57.80**	**55.05**	**56.26**	**66.54**	**63.11**	..	..
Median LLDCs	74.59	30.12	33.54	36.10	40.99	38.91	38.48	40.57	55.92	54.38		
Low- and Middle-Income countries	34.63	24.41	25.15	24.75	25.62	25.80	25.97	26.56	28.79	26.49	..	..

Source WDI and IMF Debt Sustainability Analysis (DSA)

TWO POINTS FROM THE TABLE ARE MOST SIGNIFICANT. THE FIRST IS THE HIGH AVERAGE LEVEL OF EXTERNAL DEBT IN LLDCS COMPARED TO THE GROUP OF LOW- AND MIDDLE-INCOME COUNTRIES. THE SECOND IS THAT OF THE 22 LLDCS FOR WHICH A DEBT DISTRESS ANALYSIS WAS AVAILABLE, EIGHT HAD A HIGH RISK OF DEBT DISTRESS AND THREE WERE ALREADY IN DEBT DISTRESS. THIS EMPHASIZES THE CHALLENGE OF DEBT SUSTAINABILITY.

The global macroeconomic scenario poses significant challenges to debt sustainability in LLDCs. The decline in exports in 2020 and the subsequent slow recovery in 2021 resulted in a corresponding decline in export earnings. The 2020 crisis also triggered an outflow of capital (as can be seen from the drop in FDI) and the collapse of tourism industries, depriving LLDCs of important sources of income required to service external debt. This combination of shocks was compounded by deceleration in economic growth, followed by increasing global interest rates. As the gap between interest rate and growth rate widens, the debt ratio increases, thus making debt even less sustainable. In the short-term, dealing with potential debt distress requires well-designed debt relief interventions that utilise a combination of temporary standstills, reprofiling, and restructuring. In the longer-term, LLDCs need to strengthen responsible debt management practices, aligning borrowing with developmental priorities.

4.2. An assessment of significant changes in the pattern of key indicators over time

Some of the key indicators reviewed in the previous section are available on a time-series basis for an extended period of time. This provides the opportunity for a more formal statistical investigation of how the pattern of these indicators has changed over time. More specifically, in the context of assessing LLDCs' progress along several dimensions of development, two important milestones can be identified: (i) the adoption of the Almaty Programme of Action in 2003, and (ii) the adoption of the Vienna Programme of Action in 2014. Given these two milestones, the timeline can be divided into three periods:

- **Pre-2003**, broadly corresponding to a situation where, while generally acknowledged in the developmental practice, the needs and special circumstances of LLDCs were not advocated through a formal programme of action;
- **2003-2013**, broadly corresponding to the decade of the Almaty Programme of Action (APoA);
- **Post-2013**, broadly corresponding to the decade of the Vienna Programme of Action (VPoA) (albeit in most cases, indicators are available only up to 2021-22).

Some simple statistical tests can then be used to detect significant changes in the trajectory of variables across the three sub-periods. Box 2 provides details on the statistical approach used. These tests are not necessarily indicative of causality (i.e. it is not possible to establish that a given change is directly caused by the APoA or the VPoA.) Nevertheless, studying changes in patterns over time provides a good idea of how the trajectory of LLDCs has evolved across decades.

Box 2. Statistical tests used for the assessment of changes in the patterns of key indicators

Consider that data are available as a panel of dimension *N* times *T*, where *N* is the number of LLDCs and *T* is the number of years. In our case, the period of observation is formally set to 1990-2022, i.e. *T* = 23. However, the panel is heavily unbalanced in the sense that different variables are available over different time periods in different countries.

A simple way to test for significant changes in the time pattern of variables is to check whether mean values are different across sub-periods. That is, let T_1, T_2, and T_3 be three subperiods, and $\bar{y}_1$, $\bar{y}_2$, and $\bar{y}_3$ be the average of variable in each of the three subperiods, respectively. Then a test of the null hypotheses (i) $H_0: \bar{y}_1 = \bar{y}_2$, (ii) $H_0: \bar{y}_1 = \bar{y}_3$ and (iii) $H_0: \bar{y}_2 = \bar{y}_3$ will provide some evidence of the change in the longer-term trajectory of variable across the three subperiods.

This approach is conceptually akin to a formal test of structural breaks in time series of panels (see, for reviews, Casini and Perron, 2019 and Antoch et al. 2019). However, while those tests aim at detecting structural breaks at any point in time, the approach proposed here aims at determining the statistical significance of changes in variables at specific points in time (corresponding to the introduction of the programme of actions).

The test is implemented within a standard regression framework:

$$(1)\quad y_{i,t} = \alpha + \beta d_t^{APoA} + \gamma d_t^{VPoA} + \varepsilon_{i,t}$$

Where i denotes a generic LLDC, t is a generic year, y is any of the variables used for the analysis, d^{APoA} is a pulse variable that takes value 1 in years that correspond to the APoA (2003-2013), d^{VPoA} is a pulse variable that takes value 1 in years that correspond to the VPoA (2014 to latest available observation), and is a residual.

The ordinary least squares of the estimates of the model parameters have the following interpretation:

- α is the average value of before the adoption of APoA
- β is the change in the average value of over the period of the APoA
- γ is the change in the average value of over the period of the VPoA, relative to the period before the adoption of the APoA

In other words, β and γ capture the breaks associated with APoA and VPoA, respectively, relative to the pre-2003 period. A standard statistical test of the null hypotheses $H_0: \beta = 0$ and $H_0: \gamma = 0$ will be used to determine whether the breaks are statistically significant. In addition, the test of the null hypothesis $H_0: \beta - \gamma = 0$ will provide evidence as to whether there is a significant break between APoA and VPoA.

Equation (1) is estimated on the full sample of LLDCs, so the model parameters effectively capture changes ***within*** that sample, i.e. whether the developmental performance of LLDCs has changed over the period corresponding to the APoA or VPoA. It may also be interesting to assess the existence of breaks ***between*** the group of LLDCs and the rest of the world. This means assessing whether the gap between rest of the world and LLDCs has increased or decreased significantly over the period corresponding to the APoA or VPoA. To this end, equation (1) also scales each variable to the world average.

It must be stressed that neither these tests nor the underlying regression model can be interpreted in terms of direct causality, in the sense that a significant change in the mean of a variable between two subperiods might be due to a variety of factors, rather than merely the adoption of any of the two programmes of action. However, even without causality interpretation, detecting a change in trajectory is useful to inform policy analysis and recommendations for future interventions or attention to priority areas.

Lastly, equation (1) only tests for changes occurring at the time picked by the pulse variables, i.e. the time corresponding to the introduction of APoA and VPoA. It does not test for changes that might have occurred at other times, e.g. as a result of large global shocks like the Global Financial Crisis. In fact, the purpose of this test is not to investigate the full set of determinants of changes in variable , but to see whether the progress of LLDCs as a group has been different in a statistical sense across the three periods of interest, namely the pre-APoA period (pre-2003), the APoA period (2003-2013), and the VPoA period (post-2013).

The variables selected for this analysis are reported in *Table 4.12*. This is a sub-set of all the variables examined in the previous section (3.1) of this report. The selection of variables is driven by data availability. For the test to be meaningful, it is necessary that variables are available (i) over a period of time that spans several years prior to 2003 and up to several years after 2014 (ideally up to 2021 or 2022), without significant gaps or missing observations in between, and (ii) for most (ideally all) of the LLDCs. These two conditions result in a selection of 33 variables which can be broadly grouped into five areas: macroeconomic outlook and development, economic integration, infrastructures and access, resources, and structural transformation of production and trade structures.

For each variable, the test examines whether the mean of the variable changes across the three subperiod identified above (pre-2003, 2003-2013, post-2013). The change can be an increase, decrease, or statistically insignificant. Most of the variables are defined such that an increase denotes an "improvement" in the trajectory of the variable, such as an increase in the rate of GDP growth across sub-periods. There are, however, some variables for which improvement would be denoted by a decrease over time (e.g. unemployment, inflation, mortality, external debt stock and service, and CO_2 emissions).

TABLE 4.12. VARIABLES USED IN THE ANALYSIS OF CHANGES IN TRAJECTORY OVER TIME

Macroeconomic outlook and development
GDP growth
GDP per capita (constant 2015 US dollars)
Unemployment, total (per cent of total labor force) (modelled ILO estimate)
Inflation CPI
External debt stocks (per cent of GNI)
External debt service per cent of exports of goods, services, and primary income
Mortality rate, under-5 (per 1,000 live births)
CO_2 emissions
Average governance
Economic integration
Merchandise exports (current US$) (ratio percent)
Merchandise imports (current US$) (ratio percent)
Foreign direct investment, net inflows (BoP, current US$) (ratio percent)
Foreign direct investment, net inflows (per cent of GDP)
Personal remittances, received (current US$) (ratio percent)
Air transport, registered carrier departures worldwide (ratio percent)
Infrastructures and access
Access to clean fuels and technologies for cooking (per cent of population)
Rail lines (total route-km)
Access to electricity (per cent of population)
Individuals using the Internet (per cent of population)

Mobile cellular subscriptions (per 100 people)
Renewable energy consumption (per cent of total final energy consumption)

Resources
Domestic credit to private sector (per cent of GDP)
Net official development assistance received (constant 2020 US$)
Gross capital formation (per cent of GDP)
Gross fixed capital formation (per cent of GDP)
Gross domestic savings (per cent of GDP)
Tax revenue (per cent of GDP)

Structural transformation of productive and trade structures
Trade in services (per cent of GDP)
Export concentration index
Import concentration index
Share of manufactured goods in merchandise exports
Share of primary commodities, previous stones, and non-monetary gold in merchandise exports
Manufacturing, value added (constant 2015 US$)

NOTE: DATA SOURCES AS PER STATISTICAL ANNEX

There are variables for which the interpretation is not necessarily linear. For instance, to some extent an increase in tax revenues' share of GDP could be a positive factor of development, as it would denote greater capacity to finance development with domestic resources via a more efficient tax system. However, an excessive increase in tax revenues could conceivably be negative as it could discourage investment and labour effort to the point of decreasing productivity and future growth potential.

In *Table 4.12*, the variables for which an increase generally denotes an improvement are highlighted in green, those for which a decrease generally denotes an improvement are highlighted in orange, and the other variables are left in white. Linear interpretation is particularly unsuitable for the variables that denote structural transformation. As discussed in Section 4.2, the process of economic development involves a structural change in productive and trade structures. However, this change can take different forms which, at different stages of development, might involve a greater or lesser concentration of imports and exports, larger or smaller shares of manufacturing, industry, and services, and varying degrees of reliance on primary commodity and natural resource exports.

Table 4.12 shows the original unit of measurement of the variables. Variables are also rescaled using the corresponding world averages. In practice, each variable is expressed in its original unit of measurement and as a ratio to the corresponding world average. This latter is useful in assessing whether the gap between LLDCs and world average has been significantly narrowing or widening.[24]

THE RESULTS OF THE ANALYSIS ARE SUMMARISED IN TABLES 4.13 AND 4.14. THE FULL SET OF RESULTS IS PROVIDED IN THE TABLE IN APPENDIX 1.

[24] For some of the variables, the world average was not provided in the original data sources. When this happens, the variable is not rescaled and the analysis is only conducted for the variable expressed in the original measurement unit. See Appendix 1 for a full list of result.

Table 4.13 analyses changes relative to the pre-2003 period. It groups the variables based on whether an increase, decrease, or no statistically significant change is observed between the pre-2003 period and either or both of the other periods. For instance, the mean of GDP growth (expressed in original units) has increased in both the 2003-2013 period and the post-2013 period relative to the pre-2003 period. By contrast, there has been no significant change in the mean unemployment rate since the pre-2003 period.

Table 4.14 compares the 2003-13 period against the post-2013 period; that is, the APoA with the VPoA. In this case, a significant increase means that the mean of the variable is significantly higher post-2013 than in the 2003-2013 period.

THERE ARE SEVERAL NOTABLE FACTS THAT EMERGE FROM THE TWO TABLES:

- For most variables, there is evidence of a statistically significant improvement in 2003-13 and post-2013 relative to pre-2003. A lack of significant improvement is only reflected in the unemployment rate, CO_2 emissions, renewable energy consumption, rail lines, and the quality of governance. These are all variables with pre-2003 means that are not statistically different from their means in 2003-13 or post-2013. These are variables for which there is no evidence of a significant change in trajectory over time. While most of the variables show improvement in both 2003-13 and post-2013, some only show an improvement in one of these periods. For instance, FDI (expressed in per cent GDP) significantly increased in 2003-2013 relative to the previous period but returned to its pre-2003 level in the post-2013 period. Conversely, access to clean fuels did not show any significant improvement in 2003-13, but its mean post-2013 increased significantly compared to pre-2003.

- The significant improvement observed across many variables largely translates into significant catching-up to the rest of the world in 2003-13 and post-2013. This is especially the case for measures of GDP growth and GDP per-capita, access to electricity and telecommunication infrastructures, merchandise trade, domestic credit to the private sector, domestic investment in physical capital, and FDI flows. With the exception of the rate of GDP growth, these variables all have ratios relative to the global GDP that remain well below 1 in the post-2013 period, meaning that while the gap has narrowed since 2003, there is still a significant distance between LLDCs and rest of the world. Furthermore, there is no evidence of LLDCs significantly catching up to the rest of the world in terms of unemployment, progress towards energy sustainability, and share of ODA flows. This latter finding is worth emphasising; despite the aid advocacy built into the APoA and VPoA, the average LLDC has not seen its share of global ODA increase significantly since the pre-2003 period.

- Compared to 2003-13, the post-2013 period is characterised by a further improvement along several important dimensions including merchandise trade, access to and usage of basic infrastructures, child mortality, and depth of the domestic credit system. Conversely, physical investment, domestic savings, and unemployment do not show any significant change, while GDP growth, remittances and FDI in per cent of GDP significantly decline post-2013 (though it should be noted that mean GDP growth in LLDCs remains above mean global growth). The increase in the mean values of external debt stocks and external debt service is one of the most concerning changes the post-2013 period. The dynamics of inflation provide an example of the caution that is required in interpreting this type of analysis. Mean inflation goes from 7.6 per cent in 2003-13 to 12.2 per cent post-2013. This increase is numerically relevant. Statistically, however, it exists against the backdrop of a reduction from the pre-2003 mean of 53 per cent. Because of this wide variation, the statistical test reveals no significant difference

between the 2003-13 period and the post-2013 period compared to the pre-2003 period. Still, from a policy perspective, the post-2013 period is, on average, more inflationary than the 2003-13 decade.

- The results for the variables that represent structural transformation trends are quite complex. Mean export concentration has significantly increased in the post-2013 period compared to the other two subperiods. This increase is evident in terms of both the absolute level of the concentration index and its ratio to the world average. The intensifying export concentration is a feature of the last decade. At the same time, import concentration significantly declined post-2003, but this trend has not continued post-2013. The increased concentration of exports most likely reflects an increased dependence on export of primary commodities, coupled with the decreased share of manufacturing exports. It would be therefore tempting to conclude that structural transformation in the post-2013 period is characterised by a significant shift towards the production of a narrower set of goods or services. However, this interpretation would not be consistent with the observation that the valued added by manufacturing has increased since 2003, while trade in services has significantly decreased post-2013. These apparently conflicting findings might be explained by the fact that in the post-2013 period, LLDCs' manufacturing sectors have become internationally less competitive. Alternatively, it is also possible that the decline in the export share of manufacturing is simply the statistical consequence of primary commodities cannibalising other exports' shares. This would align with a traditional reading of the resource curse hypothesis.

- From a longer-term developmental perspective, the changes in GDP per-capita and child mortality represent some improvement. These are fundamental indicators of monetary and non-monetary development, and both are characterised by significant improvements across the three periods. However, while the trajectory of these indicators is favourable, there is still a considerable distance between LLDCs and the rest of the world. Mean GDP per-capita in LLDCs post-2013 is still only 24 per cent of the global mean GDP per-capita, and mean child mortality is 25 per cent higher in LLDCs than globally.

- Another point of concern is the environmental sustainability of this development. CO2 emissions have not significantly increased since pre-2003, but renewable energy consumption as a proportion of total energy consumption has significantly declined post-2013. Energy transition continues to be challenging in LLDCs, as is the case in many developing and emerging economies. This challenge relates to the perceived risk of a trade-off between an energy transition and overall economic growth; that is, the possibility that energy transition could hamper economic growth and therefore slow down progress on other elements of development.25

- Also relevant from a development perspective is the observation that the governance indicator does not show any change in trajectory over time. Considering the importance of good governance in the context of fostering inclusion and ensuring that the benefits of economic growth and development are equitably shared by the population, this observation reflects a need for renewed efforts in this direction.

[25] See for instance Bhattacharya et al. (2023).

TABLE 4.13. SIGNIFICANT CHANGES IN THE PATTERN OF VARIABLES SINCE 2003

	Significant increase		Significant decrease		No significant change	
	Original unit of measurement	**Ratios to world**	**Original unit of measurement**	**Ratios to world**	**Original unit of measurement**	**Ratios to world**
In 2003-13 and post-2013	> GDP growth > GDP per-capita > Air transport > Access to electricity > Internet usage > Cellular subscriptions > Merch exports > Merch imports > Domestic credit > Capital formation > Fixed capital formation > Domestic savings > Tax revenue > FDI level > Remittances > Manufacturing VA > Net ODA	> GDP growth > GDP per-capita > Access to electricity > Internet usage > Cellular subscriptions > Merchandise exports > Merchandise imports > Domestic credit > Capital formation > Fixed capital formation > Tax revenue > FDI level	> Inflation > Child mortality > External debt stock	> Inflation > Child mortality > Trade in services > Export share of primary commodities > Import concentration	> Unemployment rate > CO_2 emissions > Rail lines > Governance	> Unemployment rate > CO_2 emissions > Access to clear fuels > FDI per cent of GDP > Renewable energy > Net ODA > Expo share of manufact

In 2003-13 only	> FDI per cent of GDP	> Domestic savings	> External debt service > Import concentration	> Export concentration	> Export concentration > Renewable energy > Access to clean fuels
Post-2013 only	> Access to clean fuels > External debt service > Export share of primary commodities > Export concentration	> Air transport > Manufacturing value-added	> Trade in services > Export share of manufactures > Renewable energy		> Import concentration > FDI per cent of GDP

Source: The table is constructed using the results reported in Appendix 1.

NOTE: FOR EACH PERIOD, A CHANGE (INCREASE OR DECREASE) IS CLASSIFIED AS SIGNIFICANT IF THE NULL HYPOTHESES SPECIFIED IN BOX 2 CAN BE REJECTED AT THE 10 PER CENT CONFIDENCE LEVEL AT LEAST. THIS MEANS THAT A SIGNIFICANT INCREASE OR DECREASE CORRESPONDS TO A SITUATION WHERE THE AVERAGE OF THE RELEVANT VARIABLE IN A GIVEN PERIOD IS STATISTICALLY DIFFERENT (AT THE 10 PER CENT CONFIDENCE LEVEL AT LEAST) FROM THE AVERAGE OF THE SAME VARIABLE IN THE OTHER PERIOD(S).

TABLE 4.14. BREAKS BETWEEN PERIOD POST-2013 AND PERIOD 2003-2013

	Levels	Ratios
Statistically significant increase	> GDP per capita > Access to clean fuels > Air transport > Access to electricity > Internet usage > Cellular subscriptions > Merchandise exports > Merchandise imports > Domestic credit > External debt stock > External debt service > Manufacturing value-added > Net ODA > Export share of primary commodities > Export concentration	> GDP per-capita > Inflation > Air transport > Access to electricity > Internet usage > Cellular subscriptions > Merchandise exports > Merchandise imports > Domestic credit > FDI levels > Manufacturing value-added > Export share of primary commodities > Export concentration
Statistically significant decrease	> GDP growth > Child mortality > Trade in services > FDI per cent of GDP > Remittances > Import concentration	> GDP growth > Child mortality > Trade in services > Capital formation > Fixed capital formation > Import concentration
No change	> Unemployment rate > Inflation > CO2 emissions > Rail lines > Capital formation > Fixed capital formation > Domestic savings > Tax revenue > FDI levels > Expo share of manufacturing > Renewable energy > Governance	> Unemployment rate > CO2 emissions > Access to clean fuels > Domestic savings > Tax revenue > FDI per-cent of GDP > Renewable energy > Net ODA > Expo share of manufacturing

Source: The table is constructed from the results reported in Appendix 1.

NOTE: A CHANGE (INCREASE OR DECREASE) IS CLASSIFIED AS SIGNIFICANT IF THE NULL HYPOTHESIS SPECIFIED IN BOX 2 CAN BE REJECTED AT THE 10 PER CENT CONFIDENCE LEVEL AT LEAST. THIS MEANS THAT A SIGNIFICANT INCREASE OR DECREASE CORRESPONDS TO A SITUATION WHERE THE AVERAGE OF THE RELEVANT VARIABLE IN THE PERIOD POST-2013 PERIOD IS STATISTICALLY DIFFERENT (AT THE 10 PER CENT CONFIDENCE LEVEL AT LEAST) FROM THE AVERAGE OF THE SAME VARIABLE IN THE PERIOD 2003-2013.

5. Estimating the cost of being landlocked.

5.1. Method

The observation that, on average, many development indicators tend to be worse in landlocked countries than in coastal countries suggests that lack of access to the sea has a significant developmental cost. Quantifying this cost, however, requires isolating the effect of geographical location from the effects of other fundamental drivers of development as much as possible. In other words, the assessment of the cost of being landlocked must account for the fact that landlocked countries could conceivably be experiencing slower development compared to coastal countries for reasons other than lack of access to the sea. The purpose of this section of the report is to present an econometric estimate that carefully isolates the specific cost of being landlocked.

In theory, given a development indicator (such as the human development index), the cost of being landlocked could be measured as the difference between the value of in a landlocked country and the value of in a coastal country at a given point in time. However, for this type of comparison to correctly capture the cost of landlockedness, the two countries would need to be identical in every possible respect other than their geographical location. Finding two such countries is very difficult, if not outright impossible. A possible alternative would be to identify a country that through its history goes from being landlocked to being coastal (or vice-versa) and measure the difference in the value of before and after the change in geographical situation. In fact, there are countries that have experienced this type of change (e.g. Ethiopia in 1992). However, even in this case, two methodological problems exist: (i) reliable time series of that cover periods both before and after the change are often unavailable (e.g. data on many development indicators for Ethiopia are often not available for years prior to 1992) and (ii) the change in geographical location is likely to be accompanied by other events that profoundly affect the socio-political and economic structure of the country such that the country before the change is effectively different from the country after the change.

Because of these reasons, measuring the cost of being landlocked by directly comparing the value of development indicators across countries or over time is not a suitable strategy. A more statistically-sound approach is to build an artificial benchmark against which to compare the development of landlocked countries. This artificial benchmark is essentially the best possible approximation of what the country would look like if it were not landlocked. In other words, given that an identical-but-not-landlocked country does not exist, the statistical approach is to build a synthetic one against which to compare each LLDC. The econometric approach to accomplish this is described in more detail in Box 3.

Box 3: Econometric approach to measuring the cost of being landlocked

The cost of being landlocked is defined by the difference in developmental performance between a landlocked country and an artificial benchmark coastal country with the same characteristics as the landlocked country in every other respect. If $y_{i,t}$ is the observed value of the indicator of development performance in the generic landlocked country i over the period t, and $\hat{y}_{i,t}$ is the value of the indicator of development performance in the artificial benchmark, then the cost of being landlocked over period is defined as:

$$(1)\ \ cost_{i,t} = 1 - \frac{y_{i,t}}{\hat{y}_{i,t}}$$

In other words, the cost is expressed as the difference between the artificial benchmark and actual observed development, articulated in per cent of the artificial benchmark.

To calculate the artificial benchmark $\hat{y}_{i,t}$, which is not directly observed, a system of equations is used. This system represents the fundamental relationships linking a country's stage of development to its fundamental characteristics (including landlockedness). Once suitably estimated, the system can be used to generate predicted values of the developmental variable(s)

from observed country's characteristics under the assumption that the country is not landlocked. These predicted values provide the benchmark required to operationalise equation (1).

THE ECONOMETRIC MODEL

Section 2 of this report discusses how landlockedness affects development via two different channels: (i) the limited ability of LLDCs to trade with the rest of the world, and (ii) more difficult circulation of people and ideas, which in turn affects institutional development as well as innovation and productivity growth. Given this conceptual model, one can then write a corresponding econometric model as follows:

$$(2)\quad y_{i,t} = \beta_1 l_i + \gamma x_{i,t} + \delta z_{i,t} + \mathbf{W}_{i,t}\boldsymbol{\alpha_1} + \varepsilon_{i,t}$$

$$(3)\quad x_{i,t} = \beta_2 l_i + \mathbf{V}_{i,t}\boldsymbol{\alpha_2} + \vartheta_{i,t}$$

$$(4)\quad z_{i,t} = \beta_3 l_i + \mathbf{M}_{i,t}\boldsymbol{\alpha_3} + \mu_{i,t}$$

Where l is a dummy variable that takes value 1 if country is landlocked and zero otherwise, is a measure of institutional quality, is an indicator of economic integration, $\mathbf{W}$, $\mathbf{V}$, and $\mathbf{M}$ are sets of control variables (including a constant term), and ε, ϑ, and μ are random disturbances. The parameters to be estimated are $\beta_1, \beta_2, \beta_3, \gamma, \delta, \boldsymbol{\alpha_1}, \boldsymbol{\alpha_2}, \boldsymbol{\alpha_3}$

NOTE THAT THESE LAST THREE ARE VECTORS OF PARAMETERS.

In other words, the system allows for landlockedness to affect development via its effect on economic integration (equation 4), institutional quality (equation 3) and any other residual channel (equation 2). Conceptually, this econometric model is nested within the literature that investigates the fundamental determinants of development (see, among many examples, the seminal contributions of Hall and Jones, 1999, Rodrik et al. 2004, Acemoglu et al. 2005, and Spolaore and Wacziarg, 2013). In this literature, development is measured by the levels of variables (as opposed to their growth rates) because this allows for a better empirical representation of long-term effects. Consequently, lagged values of the dependent variables are not included as regressors in the system equations.

Under appropriate identifying restrictions, the parameters of the system can be estimated using a two-stage or a three-stage least squares approach, depending on the assumptions on the co-variances between errors across equations.

Once the parameters are estimated (i.e. once a numerical value is obtained for $\beta_1, \beta_2, \beta_3, \gamma, \delta, \boldsymbol{\alpha_1}, \boldsymbol{\alpha_2}, \boldsymbol{\alpha_3}$), the observed values of the controls $\mathbf{W}$, $\mathbf{V}$, and $\mathbf{M}$ in each LLDC can then be used to generate predicted values of y, x, and z for that LLDC under the restriction $l = 0$. These predicted values are therefore the estimated value of development, economic integration, and institutional quality that would be expected for the LLDC if it wasn't landlocked. $\hat{y}_{i,t}$ in equation (2) is then equal to the predicted value of obtained from this procedure.

IN THE IMPLEMENTATION OF THE ECONOMETRIC MODEL, THE FOLLOWING DEVELOPMENTAL INDICATORS ARE USED:

- y (development) measured by the index of human development (HDI) of the UNDP. There are many possible alternatives that could be used however HDI presents two key advantages. First, it is an aggregated index combining several individual indicators of monetary and non-monetary development into a single measure that captures the various dimensions of the development process. Second, HDI is widely known and used in developmental practice; hence, by using it, one does not need to make a subjective choice of which individual indicators to aggregate and how to aggregate them.
- x (institutional quality) is calculated as the average of six indicators of quality of governance sourced from the World Governance Indicators (WGIs) of the World Bank. The six indicators capture control of

corruption, political stability and absence of violence, voice and accountability, government effectiveness, regulatory quality, and rule of law. Again, there could be many other alternative measures of institutional quality, but the WGIs provide a comprehensive set of indicators that cover most countries for a long period of time, which is necessary for the econometric analysis.

- z (economic integration) is represented by the export share of GDP (total exports of goods and services expressed as a percentage share of a country's GDP. This is sourced from the World Bank Development Indicators. This is a relatively standard empirical definition of economic integration; a possible alternative would be to add the export and import shares. However, access to export markets and international competitiveness are the two central issues from the perspective of landlocked countries, hence it is preferable to focus on exports only.

The model generates artificial benchmarks for each of these three variables, so that it is possible to calculate the cost of development in terms of human development, institutional quality, and trade.

The choice of control variables to be included in equations (2), (3), and (4) is driven by considerations of relevance and parsimony. Because of the high risk of multicollinearity and endogeneity, it is advisable to limit the control variables to fundamentally exogenous factors. Based on the existing literature on the long-term determinants of development, the following are chosen:

- **EQUATION (2):** the country's latitude, to capture the effect of disease environment and climate on development. Countries that are located at greater distance from the equator generally benefit from a safer disease environment and therefore tend to have better economic performance and health in the long run.

- **EQUATION (3):** the country's legal system origin and endowment of natural resources. Legal system origins have been found to affect the quality of governance via their impact on the checks and balances that discipline the relationship between powers of the state. For instance, the UK's common law provided greater protection to citizens against the abuse of power of the Crown compared to the French civil code, which was designed to support state intervention in the economy. As a result, countries whose legal system derived from the UK's common law tend to have more optimal governance. A large endowment of natural resources creates a valuable pool of rents, which in turn triggers competition for their appropriation. This competition can take disruptive forms including political violence, war, and the establishment of extractive institutions. The implication is that a greater abundance of natural resources reduces the quality of institutions, other things being equal.

- **EQUATION (4):** the country's population (in natural logs), land area (in natural logs) and endowment of natural resources.[26] Controlling for population and land area follows from the voluminous literature on gravity models which shows that generally, larger countries tend to be more closed to international trade. Abundant natural resources provide the country with valuable commodities in high demand worldwide. This increases exports. A possible drawback is that resource-rich countries experience a positive and large trade balance, which could lead to the appreciation of the exchange rate and hence reduce the competitiveness of other export sectors. In this respect, while conducive to greater trade integration, a high degree of dependence on the exports of natural resources could be an obstacle to the structural transformation of the economy.

[26] Natural resources are defined as defined as the sum of rents from coal, forest, minerals, natural gas, and oil in percent of GDP. Rents are calculated as the difference between the value of production of each resource and their cost of production. Data are sourced from the World Bank Development Indicators.

This choice of controls satisfies the necessary condition required for the identification of the system (i.e. that for each equation, the number of excluded exogenous variables is greater or equal to the number of included endogenous variables).

There are many other variables that could be included as controls. However, as noted above, the purpose of the model is to focus on the long-term determinants of development (i.e. those variables that affect the deep roots of economic and societal processes). Both conceptually and empirically, controls should be maximally exogenous to development outcomes. This is why several macroeconomic indicators like exchange rate and inflation are not suitable for this type of analysis. From a practical perspective, it is also necessary that the variables used as controls are available for most countries over a long period of time. This excludes variables that are often available for short periods or for only a subset of countries.

The system of equations can, in principle, be estimated with annual data so that subscript in the equations represents a generic year. However, some of the variables are not available regularly with an annual frequency. To make the panel more balanced, following a standard practice in applied work, data are averaged over five-year non-overlapping windows (i.e. 1973-1977, 1978-1982, 1983-87, 1988-92, 1993-1997, 1998-2002, 2003-2007, 2008-2012, 2013-2017, and 2018-2022, noting that HDI data are not available prior to 1990). This approach also has the advantage of eliminating short-term noise from the estimation, thus focusing on longer term effects.

ESTIMATION RESULTS

TABLE B1 REPORTS THE RESULTS OF THE ESTIMATION OF THE SYSTEM OF THREE EQUATIONS, WITH STANDARD ERRORS IN BRACKETS.

TABLE B1. ESTIMATION RESULTS FROM THE FULL MODEL OF THREE EQUATION

	Equation (2) HDI	Equation (3) Governance	Equation (4) Exports
Exports	0.0026***		
	(0.0004)		
Governance	0.0328***		
	(0.0122)		
Landlocked	-0.0996***	-0.4096***	-4.2311**
	(0.0109)	(0.0601)	(2.1268)
Latitude	0.4026***		
	(0.0296)		
UK legal origin		0.1832**	
		(0.0756)	
French legal origin		-0.1426*	
		(0.0734)	
Natural resources		-0.0148***	0.4901***
		(0.0020)	(0.0776)
Population			-1.0086
			(0.7815)
Area			-3.2962***
			(0.6650)
Constant term	0.4738***	-0.1285*	88.0131***
	(0.0193)	(0.0704)	(7.6434)
Observations	705	705	705

NOTES: ***, **, * DENOTE STATISTICAL SIGNIFICANCE OF THE ESTIMATED COEFFICIENT AT 1 PER CENT, 5 PER CENT, AND 10 PER CENT CONFIDENCE LEVEL RESPECTIVELY. DIAGNOSTICS FOR EQUATION (2): ANDERSON LM STATISTIC 184.533 (P-VALUE 0.000), CRAIGG-DONALD WALD F STATISTIC 45.191 (5 PER CENT MAXIMAL CRITICAL VALUE 13.97), SARGAN STATISTIC 6.407 (P-VALUE 11.547).

Equation (2) includes two endogenous regressors (governance and exports). It is therefore useful to look at some diagnostics (*Technical note*: these diagnostics are not produced when the equations are estimated as a system, so the diagnostics are generated by estimating this equation separately from the other two equations). The Anderson LM Statistic is a test of whether the instruments (natural resources, population, area, and legal origins) are correlated with the endogenous regressors. Under the null hypothesis of the test, the equation is under-identified. The p-value associated to the statistics is 0.000, hence the null hypothesis can be safely rejected. Moreover, the Cragg-Donald statistic is much higher than the critical value of 13.97, which suggests that the equation is not weakly identified. Finally, the Sargan statistic tests for the joint null hypothesis that the instruments are uncorrelated with the error term and that the exclusion restrictions are correct. The p-value is greater than 0.10, meaning that the null hypothesis cannot be rejected at the usual confidence level. Collectively these diagnostics confirm the validity of the model's specification.

All estimated coefficients have the expected sign. Higher levels of exports and better governance are associated with increased human development. Landlockedness has a negative effect on each of the three indicators of development (Governance, Exports and HDI), implying that the cost of being landlocked on human developments is identified as operating through three different channels: via reduced exports, via lower institutional quality, and directly by affecting the components of HDI (or their respective determinants other than exports and governance). It is also interesting to note the twofold effect of natural resource abundance: natural resources increase exports (positively affecting development) but also reduce the quality of institutions (adversely affecting development). Their net effect of HDI is therefore the difference between these two intermediate effects of opposite sign.

BASED ON THE ESTIMATES REPORTED IN THE TABLE, THE FULL MODEL BENCHMARKS ARE CALCULATED AS FOLLOWS:

$$\hat{z}_{i,t} = 88.0131 - 1.0086 * population - 3.2962 * area + 0.4901 * resources$$
$$\hat{x}_{i,t} = -0.1285 + 0.1832 * UK\ legal - 0.1426 * French\ legal - 0.01478 * resources$$
$$\hat{y}_{i,t} = 0.4738 + 0.0026 * \hat{z}_{i,t} + 0.0328 * \hat{x}_{i,t} + 0.4026 * latitude$$

There are two possible complications to consider. One concerns the population variable. As shown in the table, its estimated coefficient is the only one that does not pass a zero-restriction test. This means that from a statistical point of view, the coefficient is not statistically different from zero. Therefore, population is not a statistically significant determinant of exports and hence it should be dropped from the calculation of the artificial benchmark for exports $\hat{z}_{i,t}$ However, the corresponding p-value is 0.19, so not overly high, which could be an argument to retain population in the calculation.

The other complication is that the estimated coefficients from equation (3) generate an artificial benchmark for governance ($\hat{x}_{i,t}$) that is in many cases significantly lower than the actual level of governance in LLDCs. To ensure that the cost of being landlocked is not being overestimated, sensitivity analysis was undertaken using a two-equation model including just equations (2) and (4), without equation (3), and the actual values of governance instead of the predicted ones. The estimation results for this two-equation model are reported in Table B2 below:

TABLE B2. ESTIMATION RESULTS FROM THE REDUCED MODEL OF TWO EQUATIONS

	Equation (2) HDI	Equation (4) Exports
Exports	0.0028***	
	(0.0004)	
Governance	0.0607***	
	(0.0089)	
Landlocked	-0.0858***	-4.2311**
	(0.0100)	(2.1268)
Latitude	0.3811***	
	(0.0287)	
Natural resources		0.4901***
		(0.0776)
Population		-1.0086
		(0.7815)
Area		-3.2962***
		(0.6650)
Constant term	0.4795***	88.0131***
	(0.0203)	(7.6434)
Observations	705	705

****, **, * denote statistical significance of the estimated coefficient at 1 per cent, 5 per cent, and 10 per cent confidence level respectively*

Following from these considerations, **no population full model benchmarks** and **reduced model benchmarks** are also calculated as follows:

FULL MODEL (WITHOUT POPULATION BENCHMARKS:)

$$\hat{z}_{i,t} = 88.0131 - 3.2962 * area + 0.4901 * resources$$
$$\hat{x}_{i,t} = -0.1285 + 0.1832 * UK\ legal - 0.1426 * French\ legal - 0.01478 * resources$$
$$\hat{y}_{i,t} = 0.4738 + 0.0026 * \hat{z}_{i,t} + 0.0328 * \hat{x}_{i,t} + 0.4026 * latitude$$

REDUCED MODEL WITHOUT EQUATION (3):

$$\hat{z}_{i,t} = 88.0131 - 3.2962 * area + 0.4901 * resources$$
$$\hat{y}_{i,t} = 0.4795 + 0.0028 * \hat{z}_{i,t} + 0.0607 * governance + 0.3811 * latitude$$

5.2. Results

The artificial benchmarks and the holistic cost of being landlocked for the group of LLDCs are reported in ***Table 5.1*** The top segment of the table provides the average of the three developmental variables (exports in percent of GDP, governance, and HDI) over the entire sample period for the LLDCs and the coastal developing countries.[27] Exports in LLDCs are 21 per cent lower than in coastal countries and the HDI is 16 per cent lower. Regarding the governance index, more negative values denote worse institutions, so in LLDCs governance is more than one and a half times worse than in coastal developing countries.

The central segment of the table reports the artificial benchmarks. Based on the full model of three equations, if LLDCs were not landlocked, then their exports would be 36 per cent of GDP, their level of HDI would be 0.663, and their level of governance quality would be -0.260. These are all sizeable improvements compared to the actual figures. While there are some residual differences due to the other determinants of exports, governance and HDI, removing landlockedness brings LLDCs very close to the level of the coastal developing countries (if not above). The benchmarks based on the reduced model of two equations are very similar, meaning that statistical concerns about a possible overestimation of the cost of being landlocked are not very relevant. Instead, when population is excluded from the calculations, artificial benchmarks for exports and HDI further improve. These benchmarks therefore provide an upper bound to the estimate of the cost of being landlocked.

The bottom segment of the table shows the cost of being landlocked, expressed as the difference between actual figures and the artificial benchmark, expressed as a percentage of the artificial benchmark. Under the full model estimates, exports of LLDCs are 18 per cent lower than what they would be if countries were not landlocked. Similarly, human development is 19 per cent lower, while institutions are one and a half time worse. The impact of landlockedness on governance is therefore large relative to the other two development indicators. In the model that excludes population, the export cost of being landlocked is much higher (43 per cent). However, a reasonable and conservative estimate of the cost, based on the evidence provided here, is that development (in its various dimensions) is around 20 per cent lower than what it would be if countries were not landlocked.

Appendix 2 provides calculations of artificial benchmarks for each LLDC. The cost of being landlocked varies significantly across countries. This is particularly evident for exports and, to a lesser extent, governance. While being landlocked is on average a developmental detriment, the extent of this detriment is not the same across countries, which also confirms that the effect is not insurmountable and that the disadvantages of being landlocked can be overcome.

Part of the cross-country variation in developmental costs seems to be linked to other geographical factors. As the country-level estimates in Appendix 2 show, some of the countries with the highest export cost of being landlocked are in Sub-Saharan Africa, but so are some of the countries where the cost is lowest (in fact, actual exports of Botswana, Eswatini, and South Sudan are higher than their respective artificial benchmarks). This evidence is indicative of a possible neighbourhood effect whereby a country's ability to manage landlockedness also depends on the specific context of the region in which the country is located. In this respect, regions in which there are more effective trade facilitation and regional integration may provide a more conducive environment to the development of a landlocked country.[28]

[27] By construction, the artificial benchmark is the non-landlocked equivalent of a landlocked country (i.e. what the landlocked country would be if it weren't landlocked). The benchmark is constructed from a regression that includes all countries, not just transit and landlocked countries. In fact, if only transit and landlocked countries were included, then there would be a risk of bias in the selection of the sample for estimation. For consistency, the top part of the table reports averages for coastal developing countries and not just transit countries. However, it must be stressed that the calculation of the cost of being landlocked is not affected by this.

[28] The hypothesis that the neighbourhood matters for the development of a landlocked country is also consistent with existing evidence on catching-up effects in regional integration agreements (see for instance Carmignani, 2007). This evidence shows that not all regional integration agreements promote catching-up to the same extent.

TABLE 5.1. ESTIMATES OF THE COST OF BEING LANDLOCKED

	Exports	Governance	HDI
Actuals			
LLDCs	29.48	-0.691	0.538
Coastal developing	37.44	-0.256	0.640
LLDC v Coastal gap in per cent of Coastal	21.25	170.03	15.91
Artificial benchmarks			
Full model	36.02	-0.260	0.663
Full model without population	51.83	-0.260	0.704
Model without governance equation	36.02	..	0.644
Cost in per cent of artificial benchmark			
Full model	18.157	165.77	18.854
Full model without population	43.122	165.77	23.580
Model without governance equation	18.157	..	16.460

Source: Author's calculations based on methodology described in Box 3.

In summary, from a broader developmental perspective, LLDCs tend to lag behind their coastal counterparts. The cost of landlockedness can be measured in terms of the increased level of development that LLDCs could achieve if they had access to the sea. This cost is estimated to be on average 18 per cent for exports compared to the rest of the world, and 19 per cent for human development. That is, on average, if LLDCs were not landlocked, then their exports and human development would be increased by 18 per cent and 19 per cent, respectively. The main drivers of this cost are reduced logistical performance (see below) and lower governance quality.

5.3. Extensions

Focusing on the cost of being landlocked on reduced exports, it is possible to estimate the importance of trade facilitation. One way to make this assessment could be to add an indicator of trade facilitation to the set of controls in the system of equations described in Box 3. However, this immediately raises a complication in the estimation of the system because trade facilitation is likely endogenous. This would necessitate the addition of a fourth equation to the system, making it more difficult to estimate. A more practical and equally informative approach is to simply replace exports with an indicator of trade facilitation in the system of equations, and then compare the resulting cost with the cost reported in ***Table 5.1***.

For this exercise, the six components of the logistic performance index (LPI) of the World Bank were used as indicators of trade facilitation:

- **LOGISTIC PERFORMANCE:** is the overall index that comprises all components.
- **INFRASTRUCTURE:** refers to the quality of trade and transport infrastructures.
- **TIMELINESS:** refers to the frequency with which shipments are delivered on time.
- **TRACEABILITY:** refers to the ability to track and trace consignments.
- **LOGISTIC SERVICES:** refers to the competence and quality of logistic services.

- **COMPETITIVE PRICE:** refers to the ease of arranging competitively priced shipments.
- **CUSTOMS EFFICIENCY:** refers to the efficiency of border management clearance.

Results are reported in ***Table 5.2*** The cost of being landlocked varies from between 5.4 per cent (for timeliness of delivery) to 15.8 per cent (for quality of trade and transport infrastructure). Overall, based on the aggregate LPI index, the cost of being landlocked in terms of trade facilitation is 7.7 per cent. This is certainly significant, but still less than half of the cost estimated in terms of exports (18 per cent). The implication is that more trade facilitation would strengthen LLDC's exports, but not eliminate the gap caused by landlockedness.

TABLE 5.2 ESTIMATES OF THE COST OF BEING LANDLOCKED ON TRADE FACILITATION

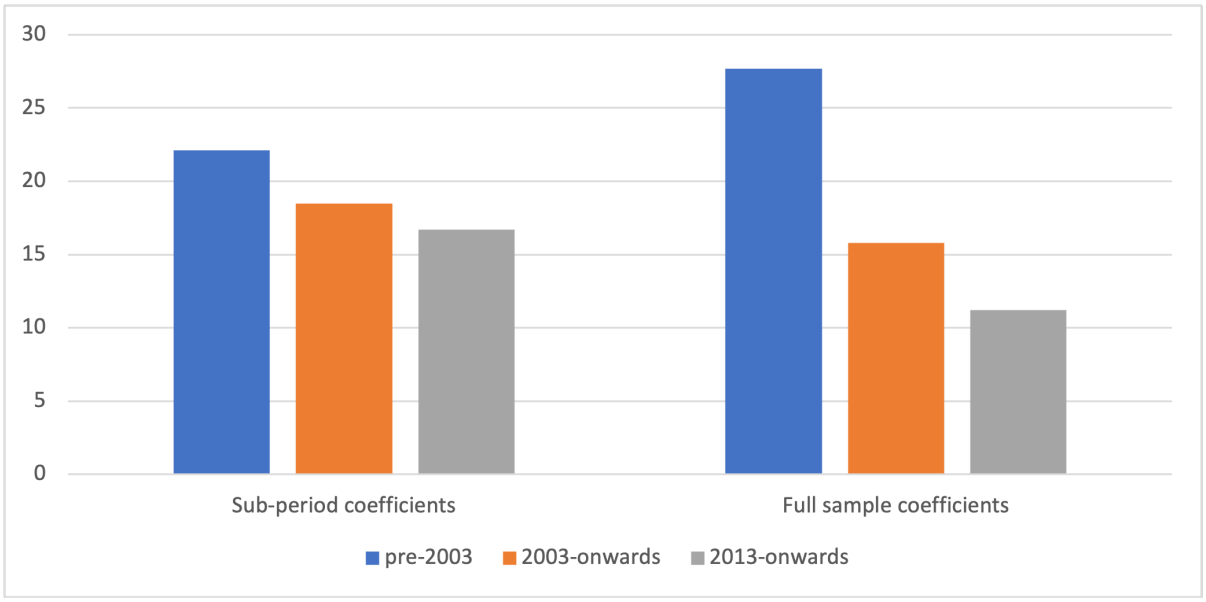
	Cost of being landlocked (in per cent of artificial benchmark)
Logistic performance	7.77
Infrastructure	15.80
Timeliness	5.37
Traceability	9.66
Logistic services	8.06
Competitive price	7.06
Customs efficiency	7.27

Source: Author's calculations based on methodology described in Box 3.

The estimates in ***Table 5.2*** can be extended to assess the evolution of the cost of being landlocked over time. This requires calculating the artificial benchmark over different sub-periods. This can be done either by using the coefficients estimated from the entire sample period or by re-estimating the coefficients for every given sub-period. Given that there are not strong statistical arguments in favour of one option over the other, both are used. Results are summarised in ***Figure 5.1***.

The figure shows the cost of being landlocked in terms of human development in three distinct subperiods: pre-2003, 2003-onwards, and 2013-ownwards. The columns on the left represent the cost calculated using coefficients estimated in each separate sub-period; the columns on the right measure cost calculated from full sample coefficients. In interpreting the table, it is important to consider that benchmarks tend to change slowly over time and so, therefore, does the cost of being landlocked.

Figure 5.1. HDI cost of landlockedness over time



Source: Author's calculations based on methodology described in Box 3

The figure shows that the cost of being landlocked has declined over time, irrespective of which of the two options for the construction of the benchmark is used. However, the estimates based on sub-period coefficients show a smoother decline in cost, from 22.1 per cent in the pre-2003 subperiod to 16.7 per cent in the 2013-onwards subperiod. This pattern appears to be most consistent with the overall estimates reported in Table 5.1.

While the *Figure 4.12* focuses on the cost of being landlocked in terms of human development, it is possible to replicate the analysis by sub-periods for the cost of being landlocked in terms of exports and governance. Based on benchmarks generated from sub-period coefficients, the cost of landlockedness in terms of exports declined from 24.1 per cent in the pre-2003 subperiod to 15.6 per cent in the 2013-onwards subperiod. The cost of landlockedness in terms of governance instead declined from 192.3 per cent in the pre-2003 subperiod to 175.2 per cent in the 2013-onwards subperiod.

This estimates therefore confirm the evidence from Section 4 in relation to the overall progress made by LLDCs under APoA and VPoA. At the same time, there is scope for further improvement to reduce the cost of being landlocked.

SUMMARY OF FINDINGS AND POLICY ANALYSIS

The central result of this section is that if LLDCs were not landlocked, then on average their exports and human development would increase by 18 per cent and 19 per cent, respectively. The estimates also show that LLDCs experience a significant cost in terms of institutional quality. In general, the cost of being landlocked has declined over time, but opportunities arise for further reducing it in several key areas.

Weaker logistical performance is a key underlying driver of the cost of being landlocked. The estimates show that, of the various aspects of logistical performance, quality of trade and transport cost infrastructures play a particularly significant role. When estimated in terms of overall logistic performance, the cost of being landlocked is 7.8 per cent; when considering specifically infrastructure, the cost of being landlocked is 15.8 per cent. In this respect, investment in infrastructures will need to remain a fundamental priority area of policy intervention.

The quality of governance in LLDCs is, on average, two and a half times worse than in their coastal counterparts, according to the measures used in this report. This suggests that closing the governance quality gap is an effective way to close the developmental gap. Therefore, the new programme of action should greatly emphasize efforts to improve the institutional and governance aspects of the development process.

These results and their corresponding policy-related implications are discussed in further detail in Section 6.

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6. Consolidated Recommendations

This concluding section summarises and consolidates the policy recommendations considered throughout this report. It also proposes new recommendations that are linked to the evidence presented in previous sections.

A. INVESTING TO SEIZE THE DEMOGRAPHIC DIVIDEND

Most LLDCs are characterised by a rate of population growth well above the global average. Given a rate of GDP growth in line with the world average, this has translated to relatively weak growth in GDP per-capita. However, powerful population dynamics also provide countries with the opportunity to experience a positive demographic dividend in the future. This, however, requires appropriate policy interventions to support human capital formation for the youth and ensure that they are not marginalised to the benefit of older population cohorts that might be better represented in government. These policy interventions include:

1. Investing in education and health, both in terms of physical infrastructure (e.g. building new schools and hospitals) and delivery (e.g. increasing the number of teachers, doctors, and nurses and equipping schools and hospitals), to ensure that the increasing demand for public goods is met by a quantitatively and qualitatively adequate supply.

2. Strengthening labour market opportunities. For the investment in human capital to generate a significant positive return (at both the individual and societal level), high-quality job opportunities must become available in the labour market. Labour market reforms that promote inclusiveness, reduce barriers to work, discourage informal and underpaid employment, and create incentives for lifelong learning are central to ensuring that productivity gains translate into better paid jobs and that these jobs are accessible to a wider segment of LLDCs' growing populations. Vocational education should complement secondary and higher education in offering the youth pathways to skills acquisition. If properly designed in consultation with the private sector and government, vocational programmes can boost employment opportunities for trainees.

3. Adopting an active approach to labour market policies to support first entrants and aid them in job-searching and skill-matching. It is also important to ensure that the labour market is actively characterised by the flexibility required to accommodate continued structural change (see further below).

4. While urbanisation trends differ across LLDCs, population growth generates a greater concentration of people in urban areas. Forward-looking policies are needed to utilise these higher population concentrations for a more efficient and at-scale provision of public goods and services. Failure to do so would expose LLDCs to the risks associated with rapid urbanisation, such as deteriorating health and increased exposure to the effects of climate change in cities. Future-focused urban planning and the establishment of strong and effective city-level institutions are therefore necessary to minimise the risks and harness the opportunities of urbanisation. This must be balanced with the need to provide non-urban populations with access to basic infrastructures. The observed gap in access to electricity between urban and non-urban populations in LLDCs excludes part of the society from development. LLDCs should also be aware of the risks that comes with rapid and insufficiently planned urbanisation.

B. ENHANCING PHYSICAL CONNECTIVITY

Trade and transport infrastructures are a key driver of the cost of being landlocked. The evidence shows that LLDCs should continue to enhance physical connectivity, both within their borders and across borders. Selected case studies suggest that LLDCs would benefit from increased inter-modality involving interventions for improving the efficiency of air, seaport and train services, further developing a quality road network, and strengthening the quality and

affordable coverage of information technology and communication networks. In addition, it is recommended that LLDCs invest in increasing the capacity and flexibility of their power grids to accommodate the growing demand for electricity, while progressively replacing technologies that use fossil fuels with electrically powered equivalents.

Strengthening investment in physical infrastructure poses the question of how to mobilize resources. Recommendations on this subject are as follows:

1. There continues to be a need for deepening financial intermediation via reforms that improve private sector access to credit and guarantee the stability and liquidity of the banking sector. LLDCs should also consider strengthening general levels of financial literacy among their populations. This can be achieved by introducing financial literacy classes in school curricula and making similar programs available, especially to women, in non-urban areas, where literacy rates are lower.

2. LLDCs should also plan to increase public sector savings by strengthening the efficiency of tax collection and ensuring that the tax system is effectively progressive.

3. In the context of financing development needs, foreign investment remains a largely untapped opportunity for many LLDCs. In this sense, the priority should be to create the most conducive conditions for attracting foreign capital, including reliable and transparent economic institutions, efficient regulatory frameworks, and overall macroeconomic and political stability.

4. These efforts should be accompanied by a stronger commitment of the international community to ensure that ODA disbursements are as predictable as possible.

C. *ENHANCING DIGITALIZATION*

Recognising the tremendous opportunities that digital technology generates for sustainable development, LLDCs should focus on strengthening connectivity, expanding the affordability of devices, and upskilling the population to benefit from digital services. More specifically:

1. Investment in ICT should target not just the quantity of infrastructure, but also the quality of ICT technology made available to citizens. Focusing on quality is important to ensure that the gap via-a-vis the rest of the world is effectively reduced. For instance, in the case of mobile network coverage, there is need to upgrade the current 2G-3G network to at least 4G.

2. The use of digital platforms for e-commerce should be facilitated and promoted to support economic activity and job creation. For instance, in Uganda, UNDP collaborated with an e-commerce firm (Jumia) to enable informal market vendors to sell their goods online. More than 4,000 vendors registered on the platform—with a majority of women, youth, and people with disabilities. It is estimated that, as a result, more than 900 jobs have been created for young people.[29]

3. Digital literacy should be fostered to equip people to utilise ICT opportunities. To this end, LLDCs should design digital skills programs and interventions that go beyond a narrow set of computing capabilities. That is, digital literacy should be understood in broader terms than just computer skills, to include, for instance, e-banking and social media literacy. The development of digital skills should be set in the context of lifelong learning to ensure that the capabilities of both youth and adults remain current.

[29] See https://www.undp.org/blog/three-ways-digital-transformation-accelerates-sustainable-and-inclusive-development

D. ENHANCING TRADE FACILITATION

Trade facilitation remains a key priority for LLDCs, requiring collaboration between LLDCs, transit countries, and the international community. To strengthen trade facilitation:

1. With the support of the international community, LLDCs and transit countries should adopt interconnected and interoperable systems to expedite the flow of goods at borders and during transportation. An example is the ASYCUDA computerised customs management system developed by UNCTAD. More generally, the digitisation of logistics processes can support smoother transit, foster greater traceability of flows, and improve the transparency of border processes.

2. LLDCs, transit countries, and the international community should further progress the implementation of the WTO Trade Facilitation Agreement (FTA). Of specific concern for LLDCs is the low rate of implementation of provisions concerning border agency cooperation, expedited shipments, use of international standards, test procedures, and enquiry points. To foster implementation, the international community is called upon to provide LLDCs and transit countries with additional technical assistance and capacity-building around legislative and regulatory frameworks, ICT, and human resources and training.

3. LLDCs should continue to improve cooperation with their transit countries. In this context, transit countries should provide LLDCs (and the international community) with timely information on measures which may affect the transport of goods through their territories.

4. The WTO (2021) emphsizes that there is an opportunity to boost the potential from bilateral and multilateral trade agreements by formulating transportation rules that better reflect the connectivity challenges of LLDCs. For instance, in many cases, preferential tariff treatment is granted based on requirements that exports are consigned directly from the LLDC to the importing country. For some shipments this is not possible. Hence, some LLDCs cannot reap the benefits of preferential agreements.

E. RESHAPING THE APPROACH TO REGIONAL INTEGRATION AND COOPERATION

Active participation in regional integration initiatives is an opportunity for LLDCs to increase international trade, address certain transit issues, and take advantage of increased economic and political cooperation to foster development. However, regional integration can also become an obstacle on the road to a country's full participation in the multilateral trading system. Furthermore, regional integration has its costs; in particular, it can lead to the diversion of trade (rather than the creation of new trade), and it might require countries to take commitments that stretch beyond their financial and technical capabilities. Against this background, to ensure the maximization of potential benefits and limit the costs of regional integration, LLDCs and their regional partners should:

1. Move regional integration forward with a value-creation focus to address supply-side constraints. In this sense, regional integration should aim at introducing projects that identify and improve existing production capacity, such as crowdfunding for venture capital and shared access to market information.

2. Link LLDCs' development priorities to the trade opportunities that emerge from regional integration agreements. This requires working with other partners in a regional agreement towards a more effective mapping of trade

opportunities and knowledge of how these can support the transformation of productive structures in LLDCs.

3. Integrate specific trade facilitation and transit provisions in regional trade agreements. Regional cooperation can significantly contribute to reducing trade costs, for instance through shared trade transit infrastructure initiatives and enhanced trade corridors.

4. Address the issue of multiple-membership and overlapping commitments to regional integration initiatives. LLDCs do not have the financial or technical capacity to support effective participation in many regional integration initiatives, particularly if they involve deep commitments (e.g. going beyond free trade areas). There is, therefore, scope for a prioritisation of regional integration initiatives, especially over the longer-term.

5. Lastly, LLDCs should use data on the geographical diversification of their export destinations to inform their long-term approach to regional integration. This will help ensure that regional integration continues to be conducive to trade creation and LLDCs' full participation in the multilateral trading system.

F. *PROMOTING STRUCTURAL CHANGE AND MANAGING ITS CONSEQUENCES*

While development does not necessarily follow a linear transition from agriculture to manufacturing/industry to services, it does involve a change in production and export structures. The progress of LLDCs in this respect is mixed and that there is scope for increased diversification of exports. In this context, promoting structural change requires:

1. Designing and implementing of a modern, evidence-based, industrial policy agenda that overcome the limitations of centralised subsidisation of certain sectors. Some key elements of this new industrial policy approach should be an iterative public-private collaboration, the customization of public services and inputs, and a broader focus (i.e. not restricted to manufacturing only).[30]

2. Promoting and supporting entrepreneurship by:

   > **Facilitating access to capital**. In addition to deepening financial intermediation and fostering financial literacy, LLDCs should consider more direct forms of intervention, including loan programmes for small and medium entrepreneurs and tax facilitations for investors in start-ups.

   > **Establishing an environment that incentivises innovation**. To this end, LLDCs should specifically target investment in Research and Development, but also ensure that legal and regulatory frameworks effectively protect intellectual property rights.

   > **Creating opportunities for the exchange of ideas and networking**. For instance, training and mentoring for new entrepreneurs can be provided via incubator or accelerators. The organisation of trade fairs, exhibitions, and events where entrepreneurship is acknowledged and celebrated can contribute to the creation of networks of entrepreneurs and foster a culture of innovation and entrepreneurship.

3. Special Economic Zones (SEZs) can be used by LLDCs to foster transformation and pilot policy reforms along the lines established above. At the same time, the record of success of SEZs in developing countries is mixed. To strengthen chances of success, LLDCs should ensure that SEZs are designed and established following a demand-driven approach and that SEZs are in areas with adequate infrastructure connectivity

[30] Juhasz et al. (2023) provide a comprehensive review and some empirical evidence of the new economics of industrial policy.

and labour skills. It is also important that SEZs do not suffer from the same market or government failures that slow structural transformation in the first place (e.g. poor power supply, deficient telecommunication, or inadequate waste treatment).[31]

4. Managing the consequences of structural change, and in particular:

   - As structural change involves the decline of some sectors and the emergence of new ones, there is a risk that it could sharpen inequalities. There is no evidence that income inequality (only one of several forms of inequality) has increased on average in LLDCs. This is likely in part because of mixed progress on structural change so far. Nevertheless, as countries take a new approach to economic transformation, they must continue monitoring inequalities. In this regard, active labour market policies that support the requalification of workers and their relocation from declining to emerging sectors will play a central role.

   - While structural transformation typically involves a move away from agriculture, the agricultural sector should not be neglected. Agricultural raw materials still represent a significant source of exports and employment for LLDCs, and this is likely to continue in the long-term. Additionally, the continuous modernisation and development of the agricultural sector is a critical pathway out of poverty and food insecurity, especially for rural populations. In practice, this means developing a strategy in support of the agricultural sector that prioritizes research and development and technology transfers, human resource development, contract enforcement and a reliable system of land rights. LLDCs should also align investment in rural infrastructure with the need to ensure structural resilience against extreme weather events and climate change.

G. *STRENGTHENING RESILIENCE TO SHOCKS AND CRISES*

The last few years have shown that developmental paths are vulnerable to shocks that, while transitory in nature, can have persistent long-term effects. As global macroeconomic moderation declines, countries worldwide should adopt macroeconomic policy frameworks that allow them to manage sharp cyclical fluctuations. Certain types of shocks have the potential to be particularly hurtful for LLDCs in view of the limited diversification of their production structures and supply-side bottlenecks that increase the cost of imports (even when supply chains are fully operational).

MONETARY POLICY FRAMEWORK

The recent increase in energy prices and consequent inflationary pressures are an example of the macroeconomic vulnerability of LLDCs. In this respect, it is important that LLDCs continue to anchor their monetary policy, either via an inflation-targeting regime or a fixed exchange rate arrangement. Both require some pre-conditions, but in general the success of inflation targeting hinges on the monetary authority and related economic institutions being mature and technically advanced.

FISCAL POLICY FRAMEWORK

The last 10-15 years have emphasised the central role of fiscal policy in mitigating the impact of large global shocks, from the Global Financial Crisis to the COVID-19 pandemic, on households and businesses. The challenge in this respect is that space for fiscal policy actions is often tightly constrained. To increase fiscal policy space and ensure the sustainability of fiscal interventions in response to shocks, LLDCs should focus on two aspects: (i) strengthening fiscal space, and (ii) developing capabilities to design sustainable fiscal responses to adverse shocks.

[31] See Zeng (2021) for a discussion of SEZs in the context of developing countries.

1. Strengthening fiscal space requires prioritising programs aimed at creating the physical, social, and economic infrastructure that makes an economy resilient. Depending on the individual circumstances of a country, this might include investing in primary health care and establishing social protection systems that operate as an automatic stabiliser in "normal times" but can be escalated in times of crisis. A broader fiscal space also requires broadening the tax base by reducing tax avoidance and evasion and ensuring that the tax system is fully progressive.

2. In designing sustainable fiscal responses, LLDCs should develop capabilities around prioritization and targeting of programmes. Targeting is particularly important in a constrained policy space. Fiscal authorities need to ensure not only that they are using money to support priority interventions, but also that this money is effectively and efficiently directed to the most vulnerable population groups or businesses. To this end, these projects should be supported by the development of databases on vulnerable households and businesses. Another important element of sustainability hinges on social protection systems: if these are in place, then fiscal support to households should be channelled through a temporary increase in benefits (hence the need for scalability mentioned above), with the provision that it can be reversed when appropriate. If social protection systems are not yet in place, then prioritisation and targeting become even more crucial.

H. *ACTING ON CLIMATE CHANGE AND RESPONDING TO NATURAL DISASTERS*

Climate change increases the risk of extreme natural events that have a potentially large economic and social impact. In this respect, LLDCs should invest in both mitigation and adaptation. This can involve:

1. Harnessing the potential significant benefits of digitalisation for (i) collecting and analysing large amounts of data, (ii) developing and communicating early warning systems, (iii) facilitating an exchange of information between humanitarian actors, (iv) maintaining contact with affected people, and (v) recording damage. Digitalisation underpins the implementation of a modern, effective disaster management approach, from risk analysis and prevention to reconstruction and recovery. However, there are some prerequisites for the application of ICT in a disaster context.[32] In this regard, it is recommended that LLDCs invest in digital literacy and inclusion and in digital structures to provide safeguards against failures and damage, particularly those resulting from extreme natural events. LLDCs should also upgrade legislation and regulation to ensure that data are protected and misuse of data is prevented.

2. Generating structural resilience through interventions aimed at enforcing land use and zoning rules, upgrading building codes and construction standards, and prioritising key infrastructure projects for public utilities (e.g. electricity grids and irrigation systems). Examples of investing in structural resilience include Malawi's review of construction standards to better withstand storms and Lesotho's development of flood resistant infrastructure.

3. Planning for financial resilience. Prevention can significantly reduce the risk, and hence the cost, of natural disasters, but it cannot eliminate either. LLDCs therefore should secure ex-ante financing for disaster costs. This could happen through a combination of various instruments, including (i) insurance or similar risk-sharing mechanism, (ii) pre-arranged credit lines with international financial institutions, (iii) concessional financing from the international community. Climate-resilient debt instruments can be explored to provide affected LLDCs

[32] The World Risk Report 2022 at https://weltrisikobericht.de/weltrisikobericht-2022-e provides an extensive analysis of digitalisation in the context of disaster management.

with an automatic extension of debt service in the event of natural disasters that meet certain pre-specified parameters (see IMF, 2019).

4. Building consensus on climate action. The developmental costs of climate inaction are very large.[33] In this sense, LLDCs should ensure that climate action is not seen as separate from development action. This means working with the civil society to create broad a popular endorsement of climate action strategies. For instance, Bhattacharya et al. (2023) provide case studies demonstrating how to build support around the energy transition in carbon-intensive developing countries at risk of a carbon lock-in. Most of the difficulties in creating popular support relate to financing, as the costs of climate action are significant and occur well in advance of its benefits. A possible strategy to manage the financing gap is to consider a reform of multilateral development bank systems. LLDCs should consider playing a leadership role in setting the international agenda for this and other related reforms aimed at strengthening partnerships and trust)between developing and advanced economies.

I. ENHANCING GOVERNANCE FRAMEWORKS

LLDCs have considerable scope to improve their governance frameworks, according to the data presented in this study. In this respect, they should take advantage of the technical and capacity-building assistance available from international partners to progress reforms along the various dimensions of governance quality. This type of reform carries strong potential in terms of development prospects, as better governance is instrumental to: i) Promoting domestic entrepreneurship and deepening the domestic financial sector; ii) Strengthening LLDCs' attractiveness as destinations for foreign direct investment and other types of international capital flows; and iii) Increasing opportunities for private-public partnerships to finance large investment projects, especially in infrastructures.

All three of the above points play an important role in the context of resource mobilisation for development. A domestic financial sector that gives entrepreneurs competitive and reliable access to finance (including capital markets, start-up finance, micro-lending, and risk capital) is key to unlocking the potential for structural change. Specific interventions to achieve this include guarantee schemes, training for small and medium entrepreneurs, and a more effective use of financial technology innovations (e.g. digital payments, mobile banking, blockchain technology) to reduce transaction costs and improve the efficiency of service delivery. LLDCs are also recommended to continue aligning their domestic financial regulations and standards with international best practices to strengthen the credibility and transparency of their domestic financial institutions for international investors.

J. ADVOCATING FOR DEVELOPMENT AND INTERNATIONAL SUPPORT TO LLDCS

Despite the progress realised over the last three decades, LLDCs continue to lag behind their coastal counterparts in many aspects of development. If LLDCs' development is effectively a priority for the international community, then this ought to be demonstrated through renewed efforts and commitments to financial and technical support. Donors should commit to regular disbursements of aid so that LLDCs do not experience excessive, unpredicted volatility in the volume of flows received annually. There is also scope for increasing the share of aid for trade allocated to LLDCs, particularly for the purpose of supporting trade-related infrastructures. The international community should also continue to provide technical support, particularly for trade facilitation. Interventions should also include setting mechanisms for tracking and tracing containers, monitoring port calls, managing liner schedules, utilising dry ports, and managing the

[33] For instance, the effects of warming temperature on the transmissions of diseases such as malaria and dengue fever are of concern in view of the heavy burden that these diseases place on human development (see, for instance, Mordecai at al. 2020)

movement of trains and tracks. This would also help to detect whether any discriminatory and anti-competitive practices are affecting LLDCs.

The APoA and VPoA have been instrumental in gathering support for LLDCs and setting priorities for action at domestic, regional, and international levels. There is an opportunity now through the new Programme of Action for the LLDCs for the Decade 2024-2034 to extend the framework beyond trade and trade facilitation and more explicitly incorporate interventions that address the non-trade challenges of landlockedness. As efforts are made to effectively implement the Programme of Action, reinvigorated financial and technical support will be required. The evidence stemming from the data analysis in this report also emphasizes the overarching importance of support for governance as a cross-cutting issue in the implementation of the Programme of Action.

IN CONCLUSION, THE SET OF RECOMMENDATIONS PROPOSED ARE COMPLEX, REQUIRING MORE OF EVERYTHING (MORE FINANCES, MORE CAPABILITIES, MORE COMMITMENT, ETC.). THIS MAY BE AT ODDS WITH THE CURRENT GLOBAL SCENARIO, IN WHICH THE COVID-19 PANDEMIC AND SUBSEQUENT CRISES HAVE PUT BOTH PUBLIC AND PRIVATE RESOURCES UNDER STRAIN. THE QUESTION THEN BECOMES ONE OF PRIORITISATION. WHILE THE RECOMMENDATIONS ARE INTRINSICALLY CONNECTED, THERE IS SCOPE FOR PUTTING SOME FORWARD AND POSTPONING OTHERS DEPENDING ON THE SPECIFIC CIRCUMSTANCES OF LLDCS. THIS IN ITSELF IS AN ADDITIONAL RECOMMENDATION. LLDCS SHOULD DEVELOP THEIR OWN CAPABILITIES FOR ASSESSING RECOMMENDATIONS AGAINST THEIR NEEDS, SELECTING THOSE THAT HAVE PRIORITY, AND LEADING THEIR IMPLEMENTATION (IDEALLY WITH THE SUPPORT OF THE INTERNATIONAL COMMUNITY).

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Appendix 1: Full set of results for the variables in Section 4.2.

	Variables expressed in levels									Variables expressed in ratios								
	Period Mean			Differences between periods						Period Mean			Differences between periods					
	pre-2003 NOPoA	2003-13 APoA	post-2013 VPoA	APoA v. NoPoA		VPoA v NoPoA		VPoA v. APoA		pre-2003 NOPoA	2003-13 APoA	post-2013 VPoA	APoA v. NoPoA		VPoA v NoPoA		VPoA v. APoA	
Macroeconomic outlook and development																		
GDP growth	2.094	6.053	3.231	3.959	***	1.137	**	-2.822	***	0.661	1.366	1.206	0.705	***	0.545	**	-0.160	***
GDP per capita	1347	1918	2537	570	***	1189	***	619	***	0.185	0.210	0.241	0.025	*	0.056	***	0.031	***
Unemployment rate	8.104	7.971	7.467	-0.133		-0.637		-0.504		1.394	1.283	1.241	-0.111		-0.153		-0.042	
Inflation	52.903	7.602	12.181	-45.301	***	-40.722	***	4.579		6.722	1.859	6.122	-4.863	***	-0.600		4.263	**
External debt stocks	70.348	48.119	57.394	-22.229	***	-12.954	***	9.275	***	..	..	..	..		..		..	
External debt Service	15.518	11.182	16.262	-4.336	***	0.744	***	5.080	***	..	..	..	..		..		..	
Child mortality	120.77	75.75	50.99	-45.02	***	-69.78	***	-24.77	***	1.434	1.341	1.249	-0.093	*	-0.185	***	-0.092	***
CO_2 emissions	1.708	1.737	1.921	0.029		0.213		0.184		0.444	0.397	0.426	-0.047		-0.018		0.029	
Governance	-0.693	-0.706	-0.676	-0.013		0.017		0.030		..	..	..	..		..		..	
Economic integration																		
Merch exports	0.870	4.592	5.831	3.722	***	4.961	***	1.239	*	0.017	0.031	0.031	0.014	***	0.014	***	0.000	***
Merch imports	1.066	4.292	6.737	3.226	***	5.671	***	2.445	***	0.020	0.029	0.036	0.008	***	0.015	***	0.007	***
FDI level	0.124	0.797	0.751	0.674	***	0.628	***	-0.046		0.021	0.043	0.041	0.022	***	0.019	***	-0.002	***
FDI (per cent of GDP)	2.647	4.436	2.551	1.789	***	-0.096		-1.885	***	1.452	1.558	1.221	0.106		-0.231		-0.337	
Remittances	0.104	0.588	1.099	0.484	***	0.995	***	0.512	***	0.104	0.148	0.179	0.044	**	0.075	***	0.031	***
Air transport	7290	11408	17236	4118	***	9946	***	5828	***	0.039	0.042	0.054	0.002		0.014	***	0.012	**

Infrastructures and access																			
Access to clean fuels an	30.563	36.848	42.579	6.285		12.016	***	5.731	*	0.613	0.667	0.649	0.054		0.036		-0.018		
Rail lines	2054	2611	2755	557		701		144		..	..	..	..		..		..		
Access to electricity	42.858	52.579	63.936	9.721	***	21.078	***	11.357	***	0.581	0.639	0.724	0.059	**	0.143	***	0.084	**	
Internet usage	0.290	9.278	34.121	8.988	***	33.831	***	24.843	***	0.041	0.348	0.690	0.307	***	0.649	***	0.342	***	
Cellular subscriptions	0.922	41.368	88.497	40.446	***	87.575	***	47.129	***	0.075	0.620	0.869	0.546	***	0.794	***	0.249	***	
Renewable energy	55.615	54.086	49.806	-1.529		-5.809	*	-4.281		3.162	3.201	2.920	0.040		-0.242		-0.281		
Resources																			
Domestic credit	11.891	18.718	28.081	6.827	***	16.190	***	9.363	***	0.098	0.155	0.216	0.057	***	0.118	***	0.061	***	
Net ODA	0.388	0.683	0.911	0.295	***	0.523	***	0.228	***	0.005	0.006	0.005	0.001		0.000		0.000		
Capital formation	19.852	24.808	26.322	4.956	***	6.470	***	1.514		0.871	1.063	1.061	0.191	***	0.190	***	-0.002	***	
Fixed capital formation	19.520	23.880	24.374	4.360	***	4.854	***	0.494		0.823	1.003	0.961	0.179	***	0.138	***	-0.041	***	
Domestic savings	11.550	14.940	14.617	3.390	**	3.067	**	-0.322		0.479	0.592	0.542	0.113	**	0.063		-0.050		
Tax revenue	13.109	14.914	15.134	1.805	**	2.026	***	0.220		0.935	1.090	1.076	0.154	*	0.141	*	-0.013		
Structural transformation of production and trade structures																			
Trade in services	15.504	15.412	14.200	-0.092		-1.304	*	-1.212	*	1.820	1.339	1.094	-0.481	***	-0.726	***	-0.245	***	
Export concentration	0.430	0.427	0.463	-0.003		0.033	*	0.036	**	7.104	5.472	6.963	-1.633	***	-0.141		1.491	***	
Import concentration	0.122	0.133	0.116	0.011	**	-0.007		-0.017	***	2.028	1.743	1.700	-0.285	***	-0.328	***	-0.043	***	
Expo share of manufacturing	25.555	23.646	21.287	-1.909		-4.268	**	-2.360		0.345	0.353	0.310	0.008		-0.035		-0.043		
Expo share of prim commod.	72.188	73.648	77.970	1.459		5.782	***	4.323	**	3.176	2.526	2.766	-0.651	***	-0.411	***	0.240	***	
Manufacturing VA	1.082	1.766	2.888	0.684	***	1.806	***	1.122	***	0.013	0.016	0.022	0.003		0.009	***	0.000	**	

Source: Author's calculations based on data in the Statistical Annex

NOTE: THE RATIO OF THE FOLLOWING VARIABLES ARE MULTIPLIED BY 100: MERCHANDISE EXPORTS AND IMPORTS, FDI IN LEVELS, PERSONAL REMITTANCES AND AIR TRANSPORT. THIS IS BECAUSE THE VALUE FOR LLDCS ON THE WORLD TOTAL IS VERY SMALL. THEREFORE INSTEAD OF SIMPLY EXPRESSED THE VARIABLES AS A RATIO, THEY ARE EXPRESSED AS A PERCENTAGE, TO MAKE THE FIGURES MORE EASILY READABLE. THIS RESCALING DOES NOT CHANGE THE INTERPRETATION AND OUTCOME OF THE STATISTICAL TEST.

Appendix 2: Artificial benchmarks for each LLDC

	Exports		Governance		HDI	
	actual	artificial	actual	artificial	actual	artificial
Afghanistan	11.87	27.41	-1.705	-0.288	0.409	0.683
Armenia	29.32	39.55	-0.312	-0.141	0.712	0.751
Azerbaijan	47.49	47.00	-0.876	-0.502	0.685	0.759
Bhutan	31.15	42.43	0.254	-0.031	0.627	0.705
Bolivia	27.37	29.30	-0.474	-0.365	0.654	0.614
Botswana	51.42	31.28	0.689	0.015	0.641	0.654
Burkina Faso	14.12	34.79	-0.417	-0.404	0.373	0.61
Burundi	8.75	46.97	-1.332	-0.52	0.363	0.593
Central Africa Rep	18.65	33.69	-1.343	-0.417	0.359	0.579
Chad	24.01	32.77	-1.271	-0.484	0.354	0.61
Eswatini	60.29	45.05	-0.521	-0.035	0.521	0.707
Ethiopia	10.92	31.92	-0.982	-0.508	0.402	0.576
Kazakhstan	45.94	31.04	-0.604	-0.387	0.744	0.756
Kyrgyz Republic	38.83	34.24	-0.737	-0.186	0.652	0.74
Lao	24.92	35.12	-0.867	-0.233	0.529	0.637
Lesotho	36.09	42.23	-0.195	-0.029	0.477	0.713
Malawi	..	37.80	-0.378	-0.204	0.432	0.625
Mali	19.97	28.50	-0.547	-0.363	0.367	0.612
Moldova	41.76	38.86	-0.332	-0.132	0.701	0.781
Mongolia	44.05	32.58	-0.002	-0.321	0.665	0.754
Nepal	12.88	32.72	-0.654	0.028	0.52	0.685
Niger	15.89	28.46	-0.706	-0.365	0.319	0.607
North Macedonia	39.78	40.30	-0.256	-0.139	0.716	0.76
Paraguay	36.69	31.13	-0.64	-0.303	0.679	0.647
Rwanda	11.37	42.19	-0.643	-0.234	0.432	0.584
South Sudan	43.80	41.82	-1.767	-0.371	0.405	0.637
Tajikistan	38.44	34.04	-1.255	-0.158	0.614	0.731
Turkmenistan	44.40	48.97	-1.259	-0.716	0.715	0.756
Uganda	12.97	37.95	-0.664	-1,636	0.455	0.571
Uzbekistan	26.98	34.58	-1.228	-0.327	0.671	0.736
Zambia	33.69	33.80	-0.438	-0.142	0.494	0.624
Zimbabwe	27.25	32.30	-1.188	-0.036	0.511	0.646
LLDCs	**29.48**	**36.02**	**-0.691**	**-0.26**	**0.538**	**0.663**

Source: Author's calculations based on the methodology described in Section 5.

Appendix 3: Country-level data for the indicators used in Section 3

	GDP, constant prices, billions of USD									
	2003	2013	2016	2017	2018	2019	2020	2021	2022	2023
Afghanistan	8.22	19.19	20.45	20.99	21.24	22.07	21.55	17.08	..	..
Armenia	5.60	9.87	10.57	11.37	11.96	12.87	11.94	12.62	14.21	14.99
Azerbaijan	15.80	51.09	51.43	51.53	52.30	53.61	51.31	54.18	56.70	58.40
Bhutan	0.85	1.78	2.17	2.27	2.34	2.47	2.22	2.31	2.41	2.53
Bolivia	18.55	29.84	34.41	35.85	37.36	38.19	34.86	36.98	38.17	38.85
Botswana	9.45	13.45	14.51	15.10	15.73	16.21	14.80	16.48	17.54	18.20
Burkina Faso	6.13	10.91	12.54	13.31	14.19	15.00	15.29	16.35	16.75	17.57
Burundi	2.06	3.10	3.09	3.10	3.15	3.21	3.22	3.28	3.34	3.45
Central African Republic	1.72	1.62	1.78	1.86	1.93	1.99	2.00	2.02	2.03	2.08
Chad	4.35	9.97	10.27	9.96	10.20	10.53	10.36	10.23	10.49	10.86
Eswatini	2.72	3.94	4.11	4.19	4.29	4.40	4.34	4.68	4.70	4.83
Ethiopia	18.67	53.07	70.68	77.44	82.72	89.64	95.07	100.43	106.82	113.34
Kazakhstan	90.14	174.86	186.42	194.06	202.02	211.11	205.83	214.68	221.58	231.03
Kyrgyz Republic	3.97	6.18	6.97	7.30	7.57	7.92	7.26	7.52	8.04	8.33
Lao PDR	5.92	12.50	15.44	16.50	17.53	18.49	18.58	19.05	19.48	20.26
Lesotho	1.59	2.25	2.44	2.37	2.37	2.39	2.19	2.22	2.27	2.32
Malawi	3.35	5.87	6.53	6.79	7.09	7.48	7.54	7.74	7.81	7.99
Mali	8.12	11.53	13.87	14.61	15.30	16.03	15.83	16.31	16.92	17.76
Moldova	4.77	7.40	8.09	8.47	8.83	9.16	8.48	9.66	9.12	9.31
Mongolia	4.40	10.52	11.79	12.46	13.42	14.17	13.53	13.75	14.42	15.07
Nepal	14.65	22.10	24.47	26.66	28.70	30.61	29.88	31.15	32.97	34.42
Niger	5.20	8.70	10.24	10.75	11.53	12.21	12.65	12.82	14.25	15.12

	GDP, constant prices, billions of USD									
	2003	2013	2016	2017	2018	2019	2020	2021	2022	2023
North Macedonia	6.69	9.35	10.35	10.46	10.76	11.19	10.50	10.92	11.16	11.32
Paraguay	21.50	33.40	37.76	39.57	40.84	40.68	40.34	42.00	42.08	43.98
Rwanda	3.43	7.39	9.05	9.41	10.22	11.18	10.81	11.98	12.79	13.59
South Sudan	..	13.01	..	..	..	..	..	..	..	..
Tajikistan	3.64	7.31	8.84	9.47	10.19	10.94	11.43	12.48	13.47	14.15
Turkmenistan	11.16	30.48	38.02	40.49	43.00	45.71	..	..	..	..
Uganda	14.88	29.29	33.94	35.00	37.20	39.60	40.77	42.21	44.29	46.82
Uzbekistan	35.53	75.22	91.31	95.32	100.43	106.16	108.16	116.19	122.78	129.23
Zambia	9.49	19.72	22.05	22.83	23.75	24.09	23.42	24.50	25.34	26.35
Zimbabwe	15.22	19.28	20.14	20.96	22.02	20.62	19.01	20.62	21.24	21.77
World	**52024.05**	**70754.75**	**77295.54**	**79912.95**	**82539.58**	**84678.53**	**82041.01**	**86860.28**	**89827.43**	**92370.45**
Total LDC	**357.77**	**714.19**	**793.70**	**830.46**	**870.19**	**909.93**	**853.16**	**892.46**	**913.17**	**953.91**

Source: World Development Indicators and World Economic Outlook, April 2023

	Growth of constant GDP									
	2003	2013	2016	2017	2018	2019	2020	2021	2022	2023
Afghanistan	8.83	5.60	2.26	2.65	1.19	3.91	-2.35	-20.74	..	..
Armenia	14.00	3.30	0.20	7.50	5.20	7.60	-7.20	5.70	12.60	5.50
Azerbaijan	10.21	5.81	-3.10	0.20	1.50	2.50	-4.30	5.60	4.65	3.00
Bhutan	7.82	2.12	8.13	4.65	3.06	5.76	-10.01	4.09	4.33	4.68
Bolivia	2.71	6.80	4.26	4.20	4.22	2.22	-8.74	6.11	3.20	1.80
Botswana	4.63	11.10	7.20	4.11	4.19	3.03	-8.73	11.37	6.43	3.74
Burkina Faso	7.80	5.79	5.96	6.20	6.60	5.69	1.93	6.91	2.47	4.89
Burundi	-1.22	4.92	-0.60	0.50	1.61	1.81	0.33	1.80	1.83	3.34
Central African Republic	-5.40	-36.39	4.75	4.53	3.79	3.10	0.90	0.90	0.38	2.51
Chad	14.72	5.70	-6.26	-2.99	2.37	3.25	-1.60	-1.20	2.49	3.55
Eswatini	3.88	3.86	1.06	2.03	2.37	2.70	-1.56	7.88	0.47	2.81
Ethiopia	-2.16	10.58	9.43	9.56	6.82	8.36	6.06	5.64	6.36	6.11
Kazakhstan	9.30	6.00	1.10	4.10	4.10	4.50	-2.50	4.30	3.21	4.27
Kyrgyz Republic	7.03	10.92	4.34	4.74	3.76	4.60	-8.40	3.61	7.00	3.55
Lao PDR	6.07	8.03	7.02	6.89	6.25	5.46	0.50	2.53	2.25	3.97
Lesotho	4.56	1.79	3.61	-3.14	0.07	0.93	-8.36	1.35	2.09	2.22
Malawi	5.71	5.20	2.48	4.00	4.39	5.45	0.80	2.75	0.80	2.40
Mali	9.12	2.30	5.85	5.31	4.75	4.76	-1.24	3.05	3.70	5.00
Moldova	6.60	9.04	4.41	4.69	4.30	3.68	-7.38	13.94	-5.58	2.01
Mongolia	7.00	11.65	1.49	5.64	7.74	5.60	-4.56	1.64	4.85	4.50
Nepal	3.95	3.53	0.43	8.98	7.62	6.66	-2.37	4.25	5.84	4.40
Niger	2.17	5.32	5.74	5.00	7.21	5.94	3.55	1.39	11.11	6.13
North Macedonia	2.22	2.93	2.85	1.08	2.88	3.91	-6.11	3.96	2.22	1.40
Paraguay	4.32	8.29	4.27	4.81	3.20	-0.40	-0.82	4.10	0.20	4.50
Rwanda	2.20	4.72	5.97	3.98	8.58	9.46	-3.36	10.88	6.76	6.19

	Growth of constant GDP									
	2003	2013	2016	2017	2018	2019	2020	2021	2022	2023
South Sudan	..	13.13	..	..	..	..	..	..	6.55	5.63
Tajikistan	11.00	7.40	6.90	7.10	7.60	7.40	4.40	9.20	8.00	5.00
Turkmenistan	3.27	10.20	6.20	6.50	6.20	6.30	..	..	1.79	2.33
Uganda	6.47	3.59	4.78	3.13	6.30	6.44	2.95	3.54	4.93	5.70
Uzbekistan	4.23	7.30	5.93	4.40	5.35	5.71	1.89	7.42	5.67	5.26
Zambia	6.94	5.06	3.78	3.50	4.03	1.44	-2.79	4.60	3.44	4.00
Zimbabwe	-17.00	3.20	0.90	4.08	5.01	-6.33	-7.82	8.47	3.03	2.50
World	**3.11**	**2.81**	**2.81**	**3.39**	**3.29**	**2.59**	**-3.11**	**5.87**	**3.42**	**2.83**
Total LDC	**3.12**	**2.84**	**2.79**	**3.40**	**3.30**	**2.61**	**-3.15**	**5.87**	**2.32**	**4.46**

Source: World Development Indicators

	GDP per-capita constant USD									
	2003	2013	2014	2015	2016	2017	2018	2019	2020	2021
Afghanistan	363	608	603	592	590	589	579	584	553	426
Armenia	1816	3402	3539	3666	3690	3986	4216	4562	4256	4522
Azerbaijan	1919	5426	5506	5500	5271	5230	5262	5348	5083	5344
Bhutan	1339	2437	2551	2696	2889	2998	3066	3220	2878	2977
Bolivia	2049	2778	2883	2976	3055	3135	3219	3243	2920	3062
Botswana	5171	6068	6291	5870	6166	6288	6419	6485	5811	6367
Burkina Faso	470	619	627	632	650	671	696	716	710	740
Burundi	300	305	308	289	283	278	274	270	263	261
Central African Republic	426	338	339	352	362	372	378	381	375	371
Chad	473	754	778	774	703	660	653	653	622	596
Eswatini	2572	3522	3530	3583	3594	3639	3696	3766	3673	3924
Ethiopia	255	547	587	630	671	716	744	785	811	835
Kazakhstan	6046	10264	10539	10511	10476	10759	11053	11403	10974	11298
Kyrgyz Republic	786	1081	1102	1121	1146	1177	1198	1227	1103	1123
Lao PDR	1040	1893	2010	2125	2240	2358	2468	2564	2539	2566
Lesotho	795	1085	1092	1114	1140	1091	1078	1075	972	974
Malawi	277	366	376	376	375	380	386	396	389	389
Mali	658	678	703	724	742	756	768	779	746	745
Moldova	1643	2588	2719	2731	2885	3073	3262	3436	3218	3695
Mongolia	1750	3698	3910	3919	3893	4024	4242	4385	4107	4107
Nepal	570	807	853	882	878	946	1007	1061	1018	1037
Niger	403	466	479	481	489	495	511	521	520	508
North Macedonia	3301	4531	4687	4862	4995	5044	5185	5386	5067	5287
Paraguay	4016	5562	5775	5861	6025	6227	6339	6229	6095	6265
Rwanda	401	666	690	733	758	769	815	871	822	890

	GDP per-capita constant USD									
	2003	2013	2014	2015	2016	2017	2018	2019	2020	2021
South Sudan	..	1171	1199	1072	..	..	..	..	..	..
Tajikistan	545	899	937	970	1013	1061	1116	1172	1197	1280
Turkmenistan	2346	5481	5936	6208	6478	6784	7090	7422	..	..
Uganda	565	830	847	864	876	872	896	922	918	921
Uzbekistan	1390	2487	2614	2754	2867	2943	3047	3161	3160	3328
Zambia	875	1295	1312	1308	1315	1320	1331	1311	1237	1258
Zimbabwe	1260	1422	1412	1410	1394	1421	1463	1343	1213	1289
World GDP per capita	**8261**	**9900**	**10082**	**10268**	**10449**	**10678**	**10906**	**11115**	**10669**	**11236**
LLDC GDP per-capita	**1019**	**1566**	**1612**	**1631**	**1660**	**1695**	**1734**	**1769**	**1638**	**1672**

Source: WDI and UN World Population Prospects

	Poverty headcount ratio at $2.15 a day (2017 PPP) (per cent of population)			
	1990-99	2000-09	2010-19	2020-22
Afghanistan	..	..	..	..
Armenia	11.9	5.0	1.1	0.5
Azerbaijan	12.4	1.3	..	..
Bhutan	..	9.7	1.3	..
Bolivia	18.7	14.2	4.6	2.6
Botswana	34.1	23.4	15.4	..
Burkina Faso	81.0	53.7	35.1	..
Burundi	77.3	71.8	65.1	..
Central African Republic	82.2	61.9	..	..
Chad	..	57.8	33.8	..
Eswatini	85.4	52.7	36.1	..
Ethiopia	63.6	34.6	28.9	..
Kazakhstan	7.9	4.6	0.0	..
Kyrgyz Republic	..	17.6	1.7	1.3
Lao PDR	33.5	22.5	9.0	..
Lesotho	53.7	66.3	32.4	..
Malawi	58.5	68.9	68.1	..
Mali	84.5	51.7	14.8	..
Moldova	23.5	9.6	0.1	0.0
Mongolia	21.7	6.7	0.7	..
Nepal	55.2	40.3	8.2	..
Niger	85.0	79.7	54.9	..
North Macedonia	..	9.8	5.6	..
Paraguay	8.6	7.6	2.5	0.8
Rwanda	..	70.1	54.1	
South Sudan		34.5	67.3	
Tajikistan	62.0	19.4	6.1	..
Turkmenistan	43.1	..	..	..
Uganda	66.5	57.1	40.8	..
Uzbekistan	58.8	81.1	..	..
Zambia	52.6	60.7	65.0	..
Zimbabwe	..	..	31.9	..
LLDC	**54.6**	**44.2**	**31.3**	**..**
World	**33.9**	**23.3**	**11.5**	**..**

Source: WDI and UNSDG Database

	Gini index of income inequality			
	1990-99	2000-09	2010-19	2020-21
Afghanistan	..	..	..	..
Armenia	36.2	32.8	31.4	26.5
Azerbaijan	34.7	28.4	..	..
Bhutan	..	39.5	38.1	..
Bolivia	58.2	55.9	45.4	42.3
Botswana	60.8	62.6	53.3	..
Burkina Faso	49.0	41.6	41.3	..
Burundi	37.8	33.4	38.6	..
Central African Republic	61.3	56.2	..	..
Chad	..	39.8	40.4	..
Eswatini	60.5	52.3	54.6	..
Ethiopia	37.3	29.8	34.1	..
Kazakhstan	35.4	32.6	27.5	..
Kyrgyz Republic	..	32.0	28.1	29.0
Lao PDR	34.6	34.0	37.4	..
Lesotho	63.2	51.6	44.9	..
Malawi	65.8	39.9	42.9	..
Mali	50.4	37.3	36.1	..
Moldova	39.7	35.4	27.8	25.7
Mongolia	31.8	34.4	33.0	..
Nepal	35.2	43.8	32.8	..
Niger	38.8	40.9	34.4	..
North Macedonia	..	42.8	36.0	..
Paraguay	52.1	52.9	48.5	43.2
Rwanda	..	50.3	45.3	..
South Sudan	..	46.3	44.1	..
Tajikistan	29.5	32.3	34.0	..
Turkmenistan	40.8	..	..	..
Uganda	41.1	44.1	42.2	..
Uzbekistan	44.7	34.8	..	..
Zambia	52.6	50.3	56.4	..
Zimbabwe	..	..	45.9	..
LLDC (simple average)	**45.5**	**41.6**	**39.8**	**..**
World	**41.6**	**39.5**	**37.7**	**..**

Source: WDI

	Human Development Index							
	1990	2000	2010	2015	2018	2019	2020	2021
Afghanistan	0.273	0.335	0.448	0.478	0.483	0.488	0.483	0.478
Armenia	0.656	0.662	0.746	0.766	0.771	0.778	0.757	0.759
Azerbaijan	..	0.622	0.727	0.748	0.757	0.761	0.73	0.745
Bhutan	..	..	0.581	0.627	0.658	0.671	0.668	0.666
Bolivia (Plurinational State of)	0.55	0.632	0.662	0.69	0.714	0.717	0.694	0.692
Botswana	0.586	0.585	0.66	0.702	0.716	0.717	0.713	0.693
Burkina Faso	..	0.296	0.372	0.418	0.449	0.452	0.449	0.449
Burundi	0.29	0.297	0.405	0.428	0.428	0.431	0.426	0.426
Central African Republic	0.338	0.329	0.372	0.384	0.405	0.411	0.407	0.404
Chad	..	0.291	0.362	0.389	0.398	0.403	0.397	0.394
Eswatini (Kingdom of)	0.545	0.471	0.503	0.575	0.607	0.615	0.61	0.597
Ethiopia	..	0.287	0.412	0.46	0.489	0.498	0.498	0.498
Kazakhstan	0.673	0.68	0.767	0.805	0.814	0.819	0.814	0.811
Kyrgyzstan	0.638	0.621	0.664	0.69	0.698	0.698	0.689	0.692
Lao People's Democratic Republic	0.405	0.47	0.551	0.599	0.607	0.61	0.608	0.607
Lesotho	0.479	0.452	0.467	0.503	0.522	0.524	0.521	0.514
Malawi	0.303	0.374	0.456	0.491	0.51	0.519	0.516	0.512
Mali	0.237	0.317	0.404	0.416	0.43	0.433	0.427	0.428
Moldova (Republic of)	0.653	0.641	0.73	0.749	0.768	0.774	0.766	0.767
Mongolia	0.579	0.598	0.701	0.732	0.743	0.746	0.745	0.739
Nepal	0.399	0.467	0.543	0.579	0.601	0.611	0.604	0.602
Niger	0.216	0.262	0.338	0.376	0.399	0.406	0.401	0.4
North Macedonia	..	0.675	0.738	0.762	0.779	0.784	0.774	0.77
Paraguay	0.595	0.649	0.685	0.723	0.727	0.732	0.73	0.717
Rwanda	0.319	0.34	0.489	0.515	0.528	0.534	0.532	0.534
South Sudan	..	..	0.43	0.412	0.395	0.393	0.386	0.385
Tajikistan	0.628	0.56	0.636	0.657	0.671	0.676	0.664	0.685
Turkmenistan	..	..	0.711	0.74	0.746	0.742	0.741	0.745
Uganda	0.329	0.394	0.502	0.517	0.522	0.525	0.524	0.525
Uzbekistan	..	0.607	0.673	0.701	0.72	0.726	0.721	0.727
Zambia	0.412	0.418	0.529	0.562	0.572	0.575	0.57	0.565
Zimbabwe	0.509	0.452	0.512	0.582	0.602	0.601	0.6	0.593
World	**0.601**	**0.645**	**0.697**	**0.724**	**0.736**	**0.739**	**0.735**	**0.732**
LLDC	**0.461**	**0.475**	**0.556**	**0.587**	**0.601**	**0.605**	**0.599**	**0.597**

Source: United Nations Development Programme

	Number of deaths and missing persons attributed to disasters per 100,000 population									
	2005	2013	2014	2015	2016	2017	2018	2019	2020	2021
Afghanistan	..	..	..	..	..	0.05	0.00	0.97	..	..
Armenia	13.52	13.55	13.60	14.94	11.62	12.48	14.21	15.14	117.05	199.82
Azerbaijan	..	..	..	..	..	0.00	..	..	..	..
Bhutan	2.41	289.34	257.89	175.17	0.00	2.78	2.23	3.65	..	..
Bolivia (Plurinational State of)	0.41	0.10	0.21	0.00	0.00	0.08	0.16	0.52	76.93	86.64
Botswana	..	0.00	0.00	0.00	0.00	..	0.04	0.20	..	..
Burkina Faso	5.57	2.86	2.40	1.66	1.70	1.14	0.89	0.03	..	..
Burundi	..	..	..	1.53	1.84	1.97	5.66	..	..	..
Central African Republic	..	..	..	0.04	..	..	..	..	..	..
Chad	..	..	..	..	..	..	..	..	..	..
Eswatini	0.00	0.00	2.40	0.00	0.09	0.00	0.00	1.97	18.04	98.97
Ethiopia	0.70	0.20	0.07	0.07	0.36	0.14	0.21	0.21	..	..
Kazakhstan	0.04	0.03	0.01	0.02	0.04	0.16	0.01	0.02	14.72	82.08
Kyrgyzstan	1.39	1.66	1.15	0.90	0.78	2.30	0.29	0.30	61.59	1.67
Lao People’s Democratic Republic	0.32	..	..	..	..	..	..	..	..	..
Lesotho	..	..	..	..	..	..	..	..	..	..
Malawi	16.08	12.05	10.99	6.87	5.58	5.40	7.32	7.05	3.49	..
Mali	0.17	0.36	0.10	..	..	0.11	0.00	..	..	..
Moldova	..	..	..	..	..	..	..	..	..	..
Mongolia	7.54	6.71	6.03	6.68	7.59	6.59	6.48	6.28	7.74	66.61
Nepal	..	2.34	2.85	34.26	1.78	1.98	1.71	1.84	2.25	1.94
Niger	0.35	0.32	0.18	7.56	1.78	2.37	2.05	2.70	..	..
North Macedonia	..	..	..	..	..	..	..	..	..	..
Paraguay	0.04	0.07	0.13	0.15	0.18	0.05	0.11	0.08	..	..
Rwanda	..	..	..	..	0.29	..	..	..	..	..
South Sudan	..	..	..	..	2.62	..	..	..	..	..
Tajikistan	..	..	..	0.41	0.23	0.35	0.13	0.26	0.08	..

	Number of deaths and missing persons attributed to disasters per 100,000 population									
	2005	2013	2014	2015	2016	2017	2018	2019	2020	2021
Turkmenistan	..	..	..	..	..	..	..	0.00	..	..
Uganda	..	0.31	0.23	0.07	0.27	0.00	0.29	..	0.30	0.17
Uzbekistan	..	..	..	..	..	..	..	0.01	0.41	0.03
Zambia	0.86	..	..	..	..	..	..	..	..	..
Zimbabwe	..	..	..	..	..	0.00	..	2.24	..	..
Total LLDCs	**49.41**	**329.91**	**298.25**	**250.33**	**36.77**	**37.95**	**41.78**	**43.45**	**302.60**	**537.94**
Weighted average LLDC	**2.22**	**2.24**	**2.03**	**4.99**	**1.19**	**0.91**	**1.13**	**1.18**	**10.19**	**19.59**
World total	**167.99**	**418.64**	**462.91**	**353.88**	**120.88**	**124.85**	**182.40**	**142.31**	**1521.66**	**2593.65**
World average	**1.71**	**4.06**	**4.49**	**3.13**	**1.09**	**1.03**	**1.67**	**1.45**	**17.69**	**37.59**

Source: UNSDG database

	CO_2 emissions (metric tons per capita)									
	2003	2013	2014	2015	2016	2017	2018	2019	2020	2021
Afghanistan	0.05	0.19	0.15	0.18	0.15	0.13	0.17	0.16	..	..
Armenia	1.13	1.90	1.90	1.86	1.77	1.88	2.01	2.19	..	..
Azerbaijan	3.47	3.29	3.38	3.29	3.30	3.24	3.29	3.54	..	..
Bhutan	0.41	0.91	0.96	1.03	1.24	1.28	1.38	1.37	..	..
Bolivia	1.00	1.74	1.87	1.87	1.95	1.99	2.00	1.90	..	..
Botswana	2.14	2.45	3.09	3.02	2.82	3.05	2.98	2.90	..	..
Burkina Faso	0.08	0.18	0.17	0.20	0.19	0.22	0.23	0.24	..	..
Burundi	0.02	0.04	0.04	0.04	0.04	0.05	0.06	0.06	..	..
Central African Republic	0.06	0.03	0.03	0.04	0.04	0.04	0.05	0.05	..	..
Chad	0.05	0.17	0.17	0.17	0.15	0.14	0.14	0.14	..	..
Eswatini	0.59	0.67	0.67	0.67	0.74	0.77	0.79	0.82	..	..
Ethiopia	0.07	0.10	0.12	0.13	0.14	0.15	0.16	0.16	..	..
Kazakhstan	9.80	15.26	12.10	10.87	11.36	11.90	11.85	11.46	..	..
Kyrgyz Republic	1.11	1.64	1.66	1.72	1.60	1.52	1.78	1.56	..	..
Lao PDR	0.20	0.63	0.65	1.31	2.28	2.72	2.72	2.59	..	..
Lesotho	0.20	0.29	0.29	0.31	0.32	0.32	0.33	0.35	..	..
Malawi	0.06	0.06	0.05	0.05	0.06	0.07	0.08	0.08	..	..
Mali	0.11	0.19	0.19	0.20	0.25	0.27	0.27	0.28	..	..
Moldova	2.67	2.51	2.70	2.83	2.90	2.93	3.15	3.33	..	..
Mongolia	3.70	6.46	6.24	5.84	6.00	6.32	6.81	7.14	..	..
Nepal	0.12	0.22	0.26	0.26	0.37	0.44	0.53	0.47	..	..
Niger	0.06	0.11	0.11	0.10	0.10	0.09	0.09	0.09	..	..
North Macedonia	4.51	3.95	3.72	3.58	3.52	3.75	3.52	4.00	..	..
Paraguay	0.74	0.88	0.92	1.03	1.15	1.27	1.31	1.26	..	..
Rwanda	0.06	0.07	0.08	0.08	0.10	0.10	0.10	0.10	..	..
South Sudan	0.11	0.13	0.14	0.18	0.16	0.14	0.15	0.16	..	..
Tajikistan	0.33	0.39	0.55	0.58	0.70	0.83	0.95	1.01	..	..

	CO_2 emissions (metric tons per capita)									
	2003	2013	2014	2015	2016	2017	2018	2019	2020	2021
Turkmenistan	9.74	12.63	12.61	12.73	12.50	12.25	12.04	11.83	..	..
Uganda	0.06	0.10	0.11	0.13	0.13	0.13	0.14	0.14	..	..
Uzbekistan	4.77	3.70	3.41	3.17	3.30	3.38	3.41	3.48	..	..
Zambia	0.19	0.28	0.30	0.31	0.32	0.39	0.43	0.37	..	..
Zimbabwe	0.84	0.91	0.87	0.88	0.76	0.70	0.82	0.77	..	..
World	**4.09**	**4.72**	**4.68**	**4.60**	**4.56**	**4.58**	**4.63**	**4.59**	..	..
LLDC	**1.51**	**1.94**	**1.86**	**1.83**	**1.89**	**1.95**	**1.99**	**2.00**	..	..
total LLDC	**48.47**	**62.08**	**59.51**	**58.63**	**60.42**	**62.47**	**63.77**	**63.98**	..	..

Source: WDI

	Forest areas (per cent of land area)								
	2003	2013	2014	2014	2016	2017	2018	2019	2020
Afghanistan	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85
Armenia	11.66	11.59	11.58	11.57	11.57	11.56	11.55	11.54	11.54
Azerbaijan	12.11	12.82	12.93	13.04	13.15	13.27	13.41	13.55	13.69
Bhutan	66.23	71.13	71.18	71.23	71.23	71.29	71.35	71.40	71.45
Bolivia	50.31	48.42	48.22	48.03	47.77	47.53	47.31	47.11	46.92
Botswana	30.47	28.38	28.17	27.96	27.75	27.54	27.33	27.13	26.92
Burkina Faso	25.83	24.00	23.82	23.63	23.45	23.27	23.09	22.90	22.72
Burundi	7.55	9.55	10.22	10.89	10.89	10.89	10.89	10.89	10.89
Central African Republic	36.62	36.14	36.09	36.04	35.99	35.94	35.90	35.85	35.80
Chad	4.85	4.09	3.99	3.88	3.79	3.69	3.60	3.51	3.43
Eswatini	27.73	28.43	28.51	28.58	28.65	28.72	28.79	28.86	28.93
Ethiopia	18.31	15.58	15.51	15.45	15.38	15.32	15.25	15.19	15.12
Kazakhstan	1.16	1.19	1.21	1.23	1.24	1.25	1.26	1.27	1.28
Kyrgyz Republic	6.23	6.48	6.50	6.53	6.55	6.57	6.67	6.76	6.86
Lao PDR	74.87	72.95	72.80	72.65	72.50	72.35	72.20	72.05	71.90
Lesotho	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Malawi	31.35	26.90	26.45	26.00	25.56	25.11	24.67	24.22	23.78
Mali	10.90	10.90	10.90	10.90	10.90	10.90	10.90	10.90	10.90
Moldova	10.75	11.61	11.68	11.75	11.75	11.75	11.75	11.75	11.75
Mongolia	9.16	9.11	9.11	9.10	9.10	9.10	9.10	9.10	9.10
Nepal	40.71	41.59	41.59	41.59	41.59	41.59	41.59	41.59	41.59
Niger	1.02	0.92	0.91	0.90	0.89	0.88	0.87	0.86	0.85
North Macedonia	37.69	38.89	39.16	39.43	39.72	39.71	39.71	39.71	39.71
Paraguay	55.29	46.13	45.09	44.04	43.63	42.64	41.94	41.23	40.53
Rwanda	11.37	10.86	10.90	10.94	11.03	11.07	11.11	11.15	11.19
South Sudan	..	11.33	11.33	11.33	11.33	11.33	11.33	11.33	11.33
Tajikistan	2.93	2.98	3.02	3.04	3.04	3.04	3.04	3.05	3.05

	Forest areas (per cent of land area)								
	2003	2013	2014	2014	2016	2017	2018	2019	2020
Turkmenistan	8.78	8.78	8.78	8.78	8.78	8.78	8.78	8.78	8.78
Uganda	15.21	13.10	12.89	12.69	12.48	12.28	12.07	11.86	11.66
Uzbekistan	7.06	7.96	8.05	8.06	8.14	8.20	8.26	8.32	8.37
Zambia	63.15	62.06	61.80	61.55	61.30	61.04	60.79	60.54	60.28
Zimbabwe	47.12	45.93	45.81	45.69	45.57	45.45	45.33	45.21	45.09
LLDCs	**18.23**	**17.15**	**17.08**	**17.00**	**16.93**	**16.85**	**16.78**	**16.71**	**16.65**
World	**31.88**	**31.44**	**31.40**	**31.37**	**31.34**	**31.29**	**31.25**	**31.21**	**31.18**

Source: WDI

	Quality of Governance indicator									
	2003	2013	2014	2015	2016	2017	2018	2019	2020	2021
Afghanistan	-1.48	-1.57	-1.47	-1.48	-1.56	-1.60	-1.60	-1.57	-1.68	-1.68
Armenia	-0.20	-0.17	-0.32	-0.32	-0.35	-0.33	-0.15	-0.11	-0.14	-0.15
Azerbaijan	-0.91	-0.74	-0.72	-0.75	-0.70	-0.71	-0.68	-0.66	-0.77	-0.60
Bhutan	0.25	0.20	0.33	0.38	0.44	0.61	0.57	0.57	0.60	0.64
Bolivia	-0.46	-0.53	-0.59	-0.61	-0.64	-0.59	-0.59	-0.76	-0.72	-0.72
Botswana	0.87	0.67	0.65	0.64	0.66	0.59	0.58	0.61	0.55	0.60
Burkina Faso	-0.36	-0.49	-0.51	-0.43	-0.41	-0.41	-0.45	-0.55	-0.57	-0.57
Burundi	-1.41	-1.13	-0.99	-1.26	-1.43	-1.42	-1.44	-1.43	-1.38	-1.33
Central African Republic	-1.26	-1.56	-1.71	-1.56	-1.53	-1.55	-1.57	-1.57	-1.62	-1.55
Chad	-1.28	-1.27	-1.34	-1.25	-1.37	-1.35	-1.38	-1.36	-1.33	-1.36
Eswatini	-0.52	-0.49	-0.52	-0.52	-0.54	-0.45	-0.56	-0.58	-0.55	-0.64
Ethiopia	-1.06	-0.94	-0.84	-0.91	-0.95	-0.98	-0.83	-0.79	-0.84	-0.95
Kazakhstan	-0.67	-0.71	-0.48	-0.45	-0.46	-0.39	-0.35	-0.32	-0.33	-0.33
Kyrgyz Republic	-0.81	-0.78	-0.78	-0.81	-0.74	-0.64	-0.62	-0.59	-0.67	-0.76
Lao PDR	-1.27	-0.82	-0.69	-0.71	-0.69	-0.72	-0.77	-0.80	-0.77	-0.69
Lesotho	-0.08	-0.05	-0.20	-0.25	-0.29	-0.29	-0.34	-0.40	-0.41	-0.44
Malawi	-0.43	-0.39	-0.42	-0.44	-0.49	-0.47	-0.52	-0.50	-0.38	-0.35
Mali	-0.24	-0.83	-0.83	-0.81	-0.81	-0.85	-0.92	-0.98	-1.07	-1.12
Moldova	-0.52	-0.28	-0.27	-0.38	-0.42	-0.35	-0.36	-0.33	-0.32	-0.22
Mongolia	0.10	-0.19	-0.08	-0.10	0.05	0.00	0.03	0.02	-0.01	-0.08
Nepal	-0.87	-0.81	-0.68	-0.76	-0.72	-0.64	-0.58	-0.60	-0.50	-0.47
Niger	-0.49	-0.71	-0.70	-0.66	-0.70	-0.75	-0.77	-0.76	-0.79	-0.72
North Macedonia	-0.46	-0.11	0.08	-0.09	-0.13	-0.09	-0.05	-0.06	0.02	0.03
Paraguay	-0.90	-0.63	-0.49	-0.47	-0.39	-0.41	-0.36	-0.34	-0.31	-0.40
Rwanda	-0.98	-0.15	-0.07	-0.07	-0.06	0.01	-0.03	-0.05	0.00	0.06
South Sudan	..	-1.55	-1.91	-1.89	-2.01	-2.06	-2.08	-2.10	-2.03	-2.04
Tajikistan	-1.12	-1.23	-1.03	-1.09	-1.15	-1.22	-1.22	-1.16	-1.10	-1.09

	Quality of Governance indicator									
	2003	2013	2014	2015	2016	2017	2018	2019	2020	2021
Turkmenistan	-1.23	-1.31	-1.22	-1.26	-1.36	-1.34	-1.33	-1.35	-1.34	-1.34
Uganda	-0.73	-0.61	-0.64	-0.61	-0.59	-0.56	-0.61	-0.64	-0.66	-0.68
Uzbekistan	-1.31	-1.26	-1.14	-1.18	-1.11	-1.03	-0.95	-0.93	-0.93	-0.69
Zambia	-0.47	-0.21	-0.27	-0.26	-0.35	-0.37	-0.40	-0.48	-0.56	-0.50
Zimbabwe	-1.35	-1.37	-1.33	-1.21	-1.22	-1.23	-1.19	-1.24	-1.25	-1.22
LLDCs average	**-0.70**	**-0.69**	**-0.66**	**-0.67**	**-0.69**	**-0.67**	**-0.67**	**-0.68**	**-0.68**	**-0.67**
All developing	**-0.33**	**-0.38**	**-0.37**	**-0.37**	**-0.37**	**-0.37**	**-0.37**	**-0.37**	**-0.37**	**-0.37**

Source: Worldwide Governance Indicators

Appendix 4: List of Landlocked, Transit and Coastal Developing Countries

LANDLOCKED DEVELOPING COUNTRIES

Afghanistan, Armenia, Azerbaijan, Bhutan, Bolivia (Plurinational State of), Botswana, Burkina Faso, Burundi, Central African Republic, Chad, Eswatini, Ethiopia, Kazakhstan, Kyrgyzstan, Lao People's Democratic Republic (Lao PDR), Lesotho, Malawi, Mali, Mongolia, Nepal, Niger, North Macedonia, Paraguay, Republic of Moldova, Rwanda, South Sudan, Tajikistan, Turkmenistan, Uganda, Uzbekistan, Zambia, Zimbabwe

TRANSIT DEVELOPING COUNTRIES

Algeria, Angola, Argentina, Bangladesh, Benin, Brazil, Cambodia, Cameroon, Chile, China, Cote d'Ivoire, Democratic Republic of Congo, Eritrea, Ghana, Guinea, Djibouti, India, Iran, Kenya, Mozambique, Myanmar, Namibia, Nigeria, Pakistan, Peru, Senegal, Somalia, South Africa, United republic of Tanzania, Thailand, Togo, Turkey, Uruguay, Viet Nam

COASTAL DEVELOPING COUNTRIES

Albania, Algeria, Antigua and Barbuda, Argentina, Bahamas, Bahrain, Bangladesh, Barbados, Belize, Benin, Brazil, Bulgaria, Cambodia, Cameroon, Cabo Verde, Chile, China, Colombia, Comoros, Democratic Republic of Congo, Republic of Congo, Costa Rica, Cote d'Ivoire, Croatia, Djibouti, Dominica, Dominican Republic, Ecuador, Egypt, El Salvador, Equatorial Guinea, Fiji, Gabon, The Gambia, Georgia, Ghana, Guatemala, Guinea, Guinea-Bissau, Haiti, Honduras, India, Indonesia, Iran, Jamaica, Jordan, Kenya, Kiribati, Kuwait, Latvia, Lithuania, Madagascar, Malaysia, Maldives, Mauritania, Mauritius, Mexico, Micronesia, Myanmar, Morocco, Mozambique, Namibia, Nicaragua, Nigeria, Oman, Pakistan, Palau, Panama, Papua New Guinea, Peru, Philippines, Poland, Qatar, Romania, Russia, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and Grenada, Samoa, Sao Tome and Principe, Saudi Arabia, Senegal, Seychelles, South Africa, Sri Lanka, Sudan, Suriname, Syria, United Republic of Tanzania, Thailand, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Ukraine, United Arab Emirates, Uruguay, Vanuatu, Venezuela, Viet Nam, Yemen

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