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Gnangnon, Sèna Kimm

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## Effect of Special and Differential Treatment Flexibilities in WTO Rules on Trade Reforms, Manufactured Exports and Export Upgrading in the Least Developed Countries

Authors: Sèna Kimm Gnangnon<sup>1</sup> Manuscript date: March 2025

#### Abstract

This article examines the effect of special and differential treatment (S&D) flexibilities embedded in the World Trade Organization (WTO) rules on trade reforms, manufactured exports and export upgrading in least developed countries (LDCs). The empirical analysis uses the entropy balancing approach over different samples with data spanning the annual period from 1996 to 2018. The treatment group includes LDCs that acceded to the WTO under the WTO Article XII, (LDC Article XII Members). Control groups include carefully selected countries among non-LDC developing countries that did not join the WTO under Article XII (referred to as LDC founding Members). The findings show that the utilization of S&D flexibilities is associated with a greater trade policy liberalization in LDC Article XII Members, but with a greater trade protectionism in LDC founding Members. The utilization of S&D flexibilities is also associated with higher trade costs for manufactured goods, but to a lesser extent for LDC Article XII Members than for LDC founding Members. In connection with these findings, the utilization of S&D flexibilities leads to an improvement in manufactured exports across different types of manufactures, and export upgrading in LDC Article XII Members, but to the reverse outcomes in LDC founding Members. Finally, the utilization of S&D flexibilities enhances the integration of LDC Article XII Members into the world market of manufactured exports, while it does not for LDC founding Members. The implications of the analysis are discussed.

**Keywords:** Special and Differential Treatment; WTO rules; Least developed countries; Trade reforms; Manufactured exports; Export Upgrading. **JEL Classification:** F13; F14; O2.

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<sup>&</sup>lt;sup>1</sup> The World Bank - E-mail for correspondence: <u>sgnangnon@worldbank.org</u>

#### 1. Introduction

The category of Least Developed countries (LDCs) is designated by the United Nations (for the first time in 1971) as the most disadvantaged countries, i.e., the poorest and most vulnerable countries in the world to environmental, as well as economic and financial shocks. The Committee for Development Policy<sup>2</sup> (CDP), a subsidiary body of the United Nations Economic and Social Council (ECOSOC), advises the Council on a range of issues, especially LDC issues. Every three years, the Committee considers which country(ies) may qualify for inclusion in or graduation from the LDC category, and provides appropriate recommendations to ECOSOC and the United Nations General Assembly. The inclusion in and graduation of a country from the LDC category are determined using three main criteria, which are the per capita Gross National Income (GNI); human assets; and the economic and environmental vulnerability<sup>3</sup> (United Nations, 2021). When created in 1971, the LDC category included 25 countries. Over years, 28 additional countries were added to the group, as countries gained independence and faced severe development challenges and/or experienced a sustained deterioration of economic conditions (United Nations, 2024). As of 2024, the LDC category comprises 45 countries (United Nations, 2024).

In view of their structural disadvantages, LDCs receive a special attention from the international community in the form of exclusive international support measures (ISMs) that span the areas of trade, development cooperation and participation in international organizations and processes (United Nations, 2021; UNCTAD, 2021, WTO, 2022). In the international trade domain, the special attention accorded to LDCs is justified by the very weak performance of these countries in global trade. For example, according to WTO (2024a), over the past 30 years, LDCs' exports of goods and services increased at an average annual rate of 8.7% (higher than the world average of 5.9%), but this reflects a slight decline in goods exports by 5% year-on-year, but an increase in commercial services exports by 9%. Concurrently, these dynamics mask the weak share of LDCs' share (1.17%) in world exports of goods and commercial services in 2023, yet against 0.59% in 1995.

The Members of the World Trade Organization (WTO) recognize<sup>4</sup> the disadvantageous situation of LDCs and the structural impediments they face in their integration into global trade. This is why they accord special flexibilities (trade-related ISMs) to LDCs in WTO Agreements and Decisions. These special flexibilities, also referred to as "Special and Differential Treatment<sup>5</sup> (S&D) or S&D flexibilities" in the WTO jargon, are more generous than the ones granted to developing countries<sup>6</sup> in the WTO rules (WTO<sup>7</sup>, 2023). In 2000, the WTO Secretariat adopted a typology of S&D provisions<sup>8</sup> in the WTO framework<sup>9</sup>. The WTO Secretariat has been using this

<sup>&</sup>lt;sup>2</sup> Detailed information on the CDP is available online at: <u>https://www.un.org/development/desa/dpad/our-work/committee-for-development-policy.html</u>

<sup>&</sup>lt;sup>3</sup> Detailed information on the group of LDCs is accessible online at: <u>https://www.un.org/ohrlls/content/ldc-category</u>

<sup>&</sup>lt;sup>4</sup> Article XI.2 of the Marrakesh Agreement establishing the WTO states that "The least-developed countries recognized as such by the United Nations will only be required to undertake commitments and concessions to the extent consistent with their individual development, financial and trade needs or their administrative and institutional capabilities." (see <a href="https://www.wto.org/english/docs-e/legal-e/marag-e.htm#art11">https://www.wto.org/english/docs-e/legal-e/marag-e.htm#art11</a>)

<sup>&</sup>lt;sup>5</sup> The literature has used different expressions to qualify S&D treatment. These include inter alia, "development dimension", "policy space", "flexibility" and "development friendly" rules.

<sup>&</sup>lt;sup>6</sup> In the WTO framework, there are no criteria to tell apart "developed" and "developing" countries. When joining the WTO, member states self-designate as 'developed country' or 'developing country', but other members can challenge the decision of a member to make use of provisions available to developing countries (see information online at:

https://www.wto.org/english/tratop\_e/devel\_e/d1who\_e.htm#:~:text=Developing%20country%20status%20in% 20the,countries%20can%20receive%20technical%20assistance.)

<sup>&</sup>lt;sup>7</sup> The most recent compilation of S&D provisions for developing countries is contained in document WTO (2023).

<sup>&</sup>lt;sup>8</sup> See Garcia (2004), Keck and Low (2004), Rolland (2012a); Bacchus and Manak (2021) for a history of S&D treatment. <sup>9</sup> See the Secretariat Note contained in document WT/COMTD/W/77, of 25 October 2000, and titled "*Implementation Special and Differential Treatment Provisions in WTO Agreements and Decisions*".

typology to regularly update its note on S&D provisions. The recent update is contained in document WT/COMTD/W/271 of 16 March 2023 (see WTO, 2023). The six-fold typology retained includes: (i) provisions aimed at increasing the trade opportunities of developing country Members; (ii) provisions under which WTO Members should safeguard the interests of developing country Members; (iii) flexibility of commitments, of action, and use of policy instruments; (iv) transitional time-periods; (v) technical assistance; and (vi) provisions relating to LDC Members. The last type of S&D provisions (LDC specific S&D provisions) is at the heart of the present study and spans all other five categories of S&D provisions (see WTO, 2023). LDC-related S&D flexibilities take the form of numerous exceptions and waivers in WTO Agreements and Decisions, including in the areas of goods, services, trade-related intellectual property rights, subsidies and countervailing measures, Aid for Trade, and government procurement (WTO, 2023).

The literature on the trade effects of S&D provisions is scant because it is challenging to quantify the utilization of S&D provisions that take multiple forms and whose influence is spread out over time (Ornelas, 2016). Studies<sup>10</sup> that attempt to investigate the economic (including trade) effects of S&D flexibilities mostly adopt an indirect approach, which consists of examining empirically the economic (including trade) effect of the membership in the WTO for developing countries (e.g., Brotto et al. 2021, 2024; Conconi and Perroni, 2015; Subramanian and Wei, 2007; Tang and Wei, 2009). This is grounded on the idea that the entry into the WTO (including relatively to the GATT) restricts countries' policy room for implementing restrictive trade policies and hence the scope of S&D flexibilities that they can avail themselves of in the WTO rules. As a result, any change (or lack thereof) in trade flows (or in other economic outcomes) after the entry into the WTO compared to the GATT<sup>11</sup> period (period preceding the WTO accession) can provide an insight into the economic (including trade) effects of the WTO-related S&D provisions. A little attention is paid to the specific category of LDCs in the existing studies on the effect of S&D flexibilities, whereas this group of countries is distinct from the NonLDC developing countries (i.e., developing countries not classified in the LDC category) in that it enjoys a wide range and greater flexibilities than the NonLDC developing countries.

The present study aims to contribute to the nascent literature on the trade effects of S&D flexibilities by focusing on LDCs and examining how S&D flexibilities affect LDCs' trade policies, manufactured exports, and more generally export upgrading. To the best of our knowledge, this is the first study on the matter, specifically for LDCs. It intends to provide policymakers and scholars with a good perspective on the effectiveness of LDC-related S&D flexibilities on their trade policy, manufactured exports, and export upgrading. The analysis uses impact analysis techniques, especially the entropy balancing approach developed by Hainmueller (2012). Different samples have been built to address empirically the questions under analysis. These samples use as treatment group, the LDCs that joined the WTO under the WTO Article XII, and two control groups. The main control group is composed of developing countries that are not classified as LDCs, but would not have met the criteria for graduation from the LDC category if they had been in this category (see Klasen et al., 2021). The other control group is used for robustness check analysis and is comprised of developing countries that are not LDCs but are considered by the World Bank as low-income countries and lower-middle income countries. All panel datasets cover the annual period from 1995 to 2018. Several findings emerge from the empirical exercise. For LDC Article XII Members, i.e., LDCs that acceded to the WTO under Article XII, the utilization of S&D flexibilities is associated with a greater trade policy liberalization in LDC Article XII Members, but with a greater trade protectionism in LDC founding Members. The utilization of S&D flexibilities is also yet associated with higher trade costs for manufactured goods, but to a lesser extent for LDC Article XII Members than for LDC founding Members. Finally, for LDC Article XII

<sup>&</sup>lt;sup>10</sup> See Ornelas (2016) for a literature review of the economic effects, especially trade effects of S&D flexibilities in WTO rules.

<sup>&</sup>lt;sup>11</sup> The acronym "GATT" refers to the General Agreement on Tariffs Trade. It was created in 1947, and is the predecessor of the WTO, which was created on 1 January 1995.

Members, the utilization of S&D flexibilities generates an improvement in in manufactured exports across different types of manufactures, as well as export upgrading, for example, including export product and market access diversification. In contrast, for LDC founding Members, the utilization of S&D flexibilities is associated with the promotion of the export of a few manufactures, and a higher export product and market (per product) concentration. Finally, the utilization of S&D flexibilities fosters LDC Article XII Members' integration into the world market of manufactured exports, but it does not affect significantly the integration of LDC founding Members into the world market for manufactured exports.

The rest of the paper is structured around five sections. Section 2 presents the theoretical background on the relevance of S&D flexibilities. Section 3 provides a brief review of the empirical works on the effects of S&D flexibilities. Building on sections 2 and 3, section 4 formulates the hypotheses that will be tested empirically. Section 5 presents the empirical strategy, including the model specification and the econometric approach. Section 6 discusses the empirical findings. Section 7 concludes.

#### 2. Theoretical background on the effect of S&D flexibilities

This section presents a review of the theoretical works on the effect of S&D flexibilities on trade policy reforms (sub-section 2.1), and on industrialization, specially manufactured exports and export product upgrading (sub-section 2.2). The last section (sub-section 2.3) focuses on LDCs.

#### 2.1. Theoretical works on S&D and trade policy reforms

A few studies<sup>12</sup> have considered the economic relevance of S&D flexibilities, that is, whether it is relevant to provide developing countries (and specifically LDCs among them) with the possibility of implementing partly (or not implementing at all) WTO rules, or whether these countries should fully implement the WTO rules in the same way as developed countries. The theoretical literature has, in fact, considered whether reciprocity (or non-reciprocity) in trade agreements between developed and developing countries affects developing countries' trade policies. Hoekman (2005) stresses that the numerous opt outs in WTO Agreements and the focus on trade preferences have led to a significant discrimination among developing countries, and incentivized beneficiary countries to oppose trade liberalization based on the most-favored nation principle, thereby creating less certainty and predictability of trade policy. Krishna and Mitra (2005) show that the unilateral trade liberalization in the foreign country induces domestic liberalization in the home country. Özden and Reinhardt (2005) argue that non-reciprocal trade agreements, in particular the Generalized System of Preferences<sup>13</sup> (GSP) programs may discourage export groups in beneficiary countries (that is, developing countries) to exert political pressures for trade liberalization, thereby offering the opportunity to import-competing groups to lobby for protectionist measures. Their empirical analysis, carried out over 154 developing countries, reveals that countries that were excluded from the entitlement to the United States' GSP program tended to adopt more liberal trade policies than countries that continued to benefit from this program. They conclude that "developing countries may be best served by full integration into the reciprocity-based world trade regime rather than continued GSP-style preferences". The argument put forth by Özden and Reinhardt (2005) is shared by Tobin and Busch (2019) who observe empirically that GSP programs lead to lower imports by beneficiary countries when these countries become GATT/WTO Members. The explanation of this outcome provided by the authors is that exporters in GSP beneficiary countries that become GATT/WTO members de-mobilize politically, as the multilateral trade regime

<sup>&</sup>lt;sup>12</sup> Ornelas (2016) provides a very good literature survey on the matter.

<sup>&</sup>lt;sup>13</sup> GSP programs were born out of the Resolution adopted by member states at the second UNCTAD conference held in 1968 (Resolution 21 (II)), which called for the establishment of a "generalized, non-reciprocal, nondiscriminatory system of preferences in favour of the developing countries, including special measures in favour of the least advanced among the developing countries" (see for example, Grossman and Sykes 2005).

lessens their concern for ad hoc conditionality<sup>14</sup> (that is, their access to the markets of preferencegranting countries is not subject to trade liberalization at home). This results in greater trade protectionism and lower imports.

Conconi and Perroni (2012) have developed a two-country model of trade relations between a small developing country and a large developed country, where the government of the small country faces a commitment problem. In their theoretical framework, free trade is optimal in the long run, but it is not credible in the short run if the government cannot commit to tariff choices before investors make their investment decisions. In these circumstances, a trade agreement could be a vehicle for such a commitment: conditional liberalization by the large country will allow the small country to easily overcome its domestic commitment problem. Conconi and Perroni (2012) suggest that the implication of their findings for S&D treatment depends on how one reads the stated objectives of S&D rules. If one considers S&D flexibilities as a possibility given to developing countries not to undertake substantial trade liberalization commitments, then S&D rules may not help developing countries overcome their policy credibly problems (Conconi and Perroni, 2012: p629). In contrast, developing countries can overcome their policy credibly problems if the entitlement ton S&D flexibilities implies that they will be pursuing market access reforms provided that they are accorded longer transition periods to implement WTO (Conconi and Perroni, 2012: p629). Similar results' patterns are obtained by Conconi and Perroni (2015) who investigate theoretically the rationale for S&D treatment for developing countries in WTO rules, and specifically whether S&D provisions could be reconciled with reciprocity in trade policy liberalization. The authors conclude that S&D provisions can help developing countries liberalize trade and improve their trading prospects if they are reconciled with the principle of reciprocity. However, Ornelas (2016) challenges the interpretation of the stated objective of S&D rules by Conconi and Perroni (2015), arguing that that actually, S&D rules (of which GSP programs) do not really represent asynchronous reciprocity, as envisaged by Conconi and Perroni (2015). According to Ornelas (2016), a more subtle way for GSP programs to affect beneficiary countries' trade policies is to be instrumental in keeping beneficiary countries from violating their WTO commitments. Developed countries can take advantage of the leverage they exert over smaller or weaker countries, by using trade preferences under GSP programs as a tool (that is, a 'stick') to prevent developing countries from breaching their commitments in WTO Agreements and Decisions<sup>15</sup> (for example, Wu, 2015). Overall, it appears that if the objective of S&D treatment provisions in WTO rules were to help recipient countries undertake credible domestic trade policy liberalization reforms, then this objective might not be achieved, unless preference-granting countries use the offered trade preferences as a tool to oblige developing countries to comply with WTO rules.

S&D provisions constitute a fundamental building bloc of the multilateral trading system. In that respect, these provisions are to be looked at not as exceptions to the general rules, but more importantly as an integral and inherent objective of the multilateral trading system. This paragraph shows that developing countries might not be considering S&D provisions as a springboard to greater trade policy liberalization – at least in the short or medium term, but rather as a set of provisions that account for the fact that developing countries are at very different stages of economic, financial and technological developments and, therefore have entirely different capacities, compared to developed countries in taking on multilateral commitments and obligations (WTO, 2001a: paragraph 1). This is in line with the Preamble of the Marrakesh Agreement

<sup>&</sup>lt;sup>14</sup> According to Tobin and Busch (2019), the GATT/WTO makes GSP non-discriminatory, not that GSP, by itself, is non-reciprocal. When a non-reciprocal trade preferences requires that a beneficiary country complies with some obligations such as intellectual property or workers' rights, its exporters will have to lobby on a wide variety of commercial and foreign policies. As the membership in the GATT/WTO makes the effect of non-reciprocity (of trade preferences) more credible, it will incentivize exporters to demobilize more fully.

<sup>&</sup>lt;sup>15</sup> As noted by Ornelas (2016), this recommendation by Wu (2015) conforms with the reality but needs to be tested empirically.

establishing the WTO, which recognizes "the need for positive efforts to ensure that developing countries and the least developed countries secure a share in the growth in international trade commensurate with the needs of their economic development<sup>16</sup>." Thus, for developing countries, even though S&D provisions may ultimately lead them to engage in deep trade liberalization reforms in the long-term, these provisions should primarily aim to provide them with a breath in WTO rules to industrialize and develop, as oldindustrialized countries and East Asian countries did in the past.

The main message from this literature review is that by providing developing countries with a breath in WTO rules to industrialize and develop, the partial or full exemption from the implementation of WTO rules (i.e., S&D flexibilities) leads to less trade liberalization reform. This is regardless of whether the very intent of S&D flexibilities (i.e., sheltering domestic industries from foreign competition) helps promote industrialization, specially manufactured exports, and export upgrading. This applies even more so to LDCs that enjoy far greater flexibilities in WTO rules than other developing countries.

#### 2.2. Can S&D flexibilities promote manufactured export and export upgrading?

Besides these theoretical works, the debate on the efficacy and usefulness of S&D flexibilities - in fostering industrialization (especially, manufactured exports), enhancing integration into global trade and promoting economic growth and development - remains inconclusive. For example, Hart and Dymond (2003) explain that the premise of the current S&D flexibilities which is to waive developing countries from the full application of WTO rules, at least in the early stages of economic development - is more likely to retard than aid economic development. According to Hoekman (2005), S&D provisions in WTO Agreements have not focused on helping developing countries develop pro-development policies. As a result, they needed to be recast if WTO were to effectively help poor countries use trade as a tool for development. Messerlin (2006) shares an opposite view that allowing developing countries to make the lowest possible level of commitments might not be development friendly. Specifically, the protection of the infant industry is the oldest, but most risky, trade policy instrument used as development policy. While this policy could be successful in a very limited number of sectors, it is unlikely to provide the needed broad impetus for development. Messerlin (2006), then, proposes that the type of S&D flexibilities that would be accorded to beneficiary countries be identified on the basis of a cost-benefit analysis of the relationship between WTO regulatory disciplines on market access, their role in national development priorities, and their implementation costs - and not a country-by-country basis. For example, an S&D provision could not be offered to a particular regulatory policy (for example, national regulations on standards) that restricts foreign firms' market access, as it would impose costs quite similar to the usual protection costs. Bacchus and Manak (2020) argue that the premise of the current approach to S&D treatment is mistaken, because the protectionism implied by the current S&D treatment approach<sup>17</sup> never works for long, either for developed or developing countries. Drawing from Low et al. (2018) and Lamp (2016), and building on the literature review by Ornelas (2016), they infer that S&D treatment may best be described as a "minimalist bargain" that leaves all sides worse off, insofar as the limited empirical evidence suggests that S&D treatment has not been instrumental in improving development outcomes.

The issue of S&D treatment is also tightly linked to that of trade policy space i.e., the policy autonomy available to member states<sup>18</sup>. While many studies recognize that the WTO membership restricts Members' trade policy space (e.g., DiCaprio and Gallagher, 2006; Rodrik, 2004; Sykes, 2016; Thrasher, 2021), other studies note that the WTO membership does not deprive developing

<sup>&</sup>lt;sup>16</sup> See information online at: <u>https://www.wto.org/english/docs\_e/legal\_e/04-wto\_e.htm</u>

<sup>&</sup>lt;sup>17</sup> According to Bacchus and Manak (2020), this approach entails affording more time and more policy room for developing countries to erect and maintain trade barriers in order to protect their domestic producers and products from foreign competition, and hence permit them to climb more quickly up the ladder of development.

<sup>&</sup>lt;sup>18</sup> See UNCTAD (2006) and UNECA (2016) for an analysis of the constraints imposed by the WTO rules on developing countries' policy space and the leeway available to these countries to achieve their public policy objectives.

countries from the policy tools needed to foster their integration into the world trading system and promote development (e.g., Aggarwal and Evenett, 2014; Amsden and Hikino, 2000; Mah, 2011; UNCTAD, 2014; UNECA, 2016; Van der Ven, 2017). For example, Amsden (2000, p iii) notes that new WTO rules still provide ample opportunity for countries to develop their manufacturing sectors. According to Rodrik (2004), the significance of the restrictions imposed by WTO rules on developing countries' policy autonomy should not be exaggerated, as governments that have a strategic sense of their economic priorities, can generally make the best use of these agreements, and transform potential constraints into opportunity. Along the same lines, Aggarwal and Evenett (2014) argue that there are still options for countries that are complying with WTO rules to develop clusters, promote research and development, and foster their firms' integration into the world markets. Santos (2012) puts forth that many of the protection mechanisms that prevailed under the GATT rules could be used in a different legal form under WTO rules.

#### 2.3. The specific case of LDCs

Apart from the trade policy space implied by LDC-related S&D flexibilities, LDCs also enjoy a special flexibility in terms of market access in WTO rules that significantly affects their manufactured exports, and export upgrading patterns. This special flexibility has been provided through the landmark decision on the duty-free and quota-free (DFQF) market access for LDCs' products (also referred to as "DFQF Decision") adopted by WTO Trade Ministers at the 2005 Hong Kong Conference. The Decision aims at reducing the uncertainty associated with market access for products originating in LDCs (see WTO, 2005: Decision 36 of Annex F), and ensuring that at least 97 per cent of products originating from LDCs (defined at the tariff line level) enjoy a DFQF market access<sup>19</sup> (see WTO, 2005). The Decision provides, inter alia, that developedcountry Members, and developing-country Members declaring themselves in a position to do so shall "provide DFQF market access on a lasting basis, for all products originating from all LDCs, and Members facing difficulties to provide market access as set out above, shall provide DFQF market access for at least 97 per cent of products originating from LDCs, defined at the tariff line level<sup>20</sup>. Many studies observe that the DFQF Decision has been instrumental in promoting LDCs' exports (e.g., Bouët et al 2010; Dowlah, 2008; Gnangnon and Priyadarshi, 2017; Gradeva and Martínez-Zarzoso, 2019; Ito and Aoyagi, 2019). For example, Gnangnon and Priyadarshi (2017) observe that the DFQF Decision has yet fostered LDCs' aggregate exports, but to a greater extent primary product exports than manufactured products Klasen et al. (2021) obtain empirically that relatively to the non-LDC status, the LDC status strongly promotes LDCs' aggregated exports, especially their agricultural and light manufacturing products (textiles and leather after 1990).

Even though, in general, S&D flexibilities restrict developing countries' policy space in WTO rules, this applies more to developing member states that are not LDCs than to LDCs themselves. The WTO has, indeed, largely preserved policy space in WTO rules, in view of the multiple flexibilities that they enjoy across a wide range of WTO rules, making any loss of policy space relatively insignificant (for example, Mah, 2011; UNCTAD, 2014; UNECA, 2015: Chapter 5, p157; UNECA, 2016). However, a number of factors constrain the effective utilization of these flexibilities by LDC governments<sup>21</sup> (see sub-section 2.3.1). Additionally, not all LDCs are on equal footing when it comes to access to existing LDC-related S&D flexibilities in WTO rules (see sub-section 2.3.2).

<sup>&</sup>lt;sup>19</sup> Detailed information on the DFQF market access schemes by developed countries under their GSP schemes, and by developing countries is provided by the WTO in its dedicated Preferential Trade Arrangements (PTA) database. It is accessible online at: <u>http://ptadb.wto.org/</u>

<sup>&</sup>lt;sup>20</sup> The list of the major multilateral non-reciprocal LDC preference schemes undertaken by Members as of 2024 is available in WTO (2024:p21-22, Annex Table 3).

<sup>&</sup>lt;sup>21</sup> Cortez (2011) discusses the different benchmarks that can be used to assess the effectiveness of the S&D flexibilities in LDCs (e.g., the benchmarks can be addressing the structural handicaps that LDCs confront; or facilitating LDC integration in the global trading system).

#### 2.3.1. Constraints to the LDCs' effective utilization of S&D flexibilities

Lee and Kim (2022) document that while some developing countries adopt trade liberalization measures without using S&D flexibilities, those that utilize them are mainly countries with good domestic implementation capabilities (including government effectiveness) and international socialization. The surveys conducted by Cortez (2011) underline factors that limit the effective utilization of S&D flexibilities in LDCs. Even though the situation might have changed for some LDCs since the conduct of the surveys (in 2011), the majority of these factors remain relevant today for many LDCs. These factors include for example, the lack of full understanding of WTO rules; the weak communication among the different ministries with jurisdiction on WTO, and between the government and the private sector; the unavailability of qualified human resources to follow up on complex WTO legal matters; financial constraints that prevent, for example, LDCs from subsidizing agricultural and non-agricultural exports (see for example, Coppens, 2013); and finally the irrelevance of some S&D treatment measures (e.g., the Agreement on Government Procurement to which no LDC is party). This aligns with the findings by Cortez et al. (2014) that LDCs might not be fully using the policy flexibilities that they enjoy in the WTO law. The authors document that the government of the Gambia identified 25 ISMs<sup>22</sup> deemed as of high priority needs, out of the fifty-two ISMs that LDCs enjoy. In the same spirit, Van der Ven (2017: p75) show that the restriction of WTO policy space has played a marginal role in the industrialization in Africa (a continent that includes many LDCs). Rather, progress in industrialization in the continent is undermined by the limited understanding of the WTO policy flexibilities, and the lack of coherence between the trade and investment policies adopted by these countries<sup>23</sup>.

#### 2.3.2. LDCs' differentiated access to policy space related S&D flexibilities

All LDCs do not have equal access to LDC-specific S&D flexibilities in WTO rules. For LDCs that joined the WTO under the WTO Article XII, the access to existing LDC-related S&D flexibilities is compromised by the level of concessions made. Thus, while LDC founding Members (i.e., LDCs that transitioned from the GATT to the WTO) have access to the whole LDC-related S&D flexibilities in WTO rules, LDC Article XII Members do not. As of the date of the writing the present paper (February 2025), 37 LDCs are WTO Members<sup>24</sup>, of which 11 LDCs<sup>25</sup> joined the WTO under Article XII, and 6 LDCs<sup>26</sup> (referred in the WTO jargon to as LDC Observers) are in the process of joining the organization.

Cortez (2011) notes that despite being in the same category, all LDCs do not have equal access to the S&D flexibilities granted to them in WTO rules. While founding LDC Members (i.e., those that were contracting parties of the GATT before joining the WTO) can avail themselves of the available S&D flexibilities, the latter do not represent acquired rights for those LDCs that joined the WTO, as WTO LDC Members commit to different levels of concessions to founding LDC Members. Rolland (2012b) notes that the development status does not guarantee an overall entitlement to S&D flexibilities for new WTO Members. This is because what each new Member (regardless of whether its protocol of accession explicitly makes mention of its "development status" or not) negotiates during the accession process to the WTO (i.e., the content of its protocol of accession) determines which S&D flexibilities it can avail itself of. In other words, new Members typically take on commitments during the accession process that limit the scope of S&D available to them going forward. In fact, there is a tendency for developing countries to make far-reaching

<sup>&</sup>lt;sup>22</sup> These are trade-related International Support Measures (mostly S&D flexibilities in the WTO framework).

<sup>&</sup>lt;sup>23</sup> Lee and Kim (2022) provide a literature review on the efficacy of S&D flexibilities contained in WTO rules.

<sup>&</sup>lt;sup>24</sup> See information online at: <u>https://www.wto.org/english/thewto\_e/whatis\_e/tif\_e/org7\_e.htm</u>

<sup>&</sup>lt;sup>25</sup> Until 31 January 2022, 9 LDCs joined the WTO under WTO Article XII (WTO, 2022: page 3). Since then, Comoros and Timor Leste are the two additional LDCs that joined the Organization (respectively on 21 August 2024 and 30 August 2024.

<sup>&</sup>lt;sup>26</sup> These are Bhutan, Ethiopia, Sao Tomé and Principe; Somalia, South Sudan and Sudan (see WTO, 2022), and the WTO website that includes both WTO Members and Observers (<u>https://www.wto.org/english/thewto\_e/whatis\_e/tif\_e/org6\_e.htm</u>)

concessions and disclaim access to existing S&D provisions in WTO rules, thereby calling into question the view that developing countries receive special treatment in the WTO framework, or that their development needs are accommodated in the rules (e.g., Tortora, 2003; Van Grasstek, 2001). These commitments include, for example, tariffs binding at levels significantly lower than the ones of the overall WTO membership (Langhammer and Lücke, 1999) and sometimes at applied levels, removing agricultural subsidies, making significant services commitments, joining plurilateral agreements, transitioning to a market economy, and complying with most or all WTO agreements upon entry without recourse to transitional periods (see details in Rolland, 2012b). As far as LDCs are concerned, Tonga, Vanuatu, and Samoa undertook extensive liberalization concessions during the accession negotiations (under Article XII), in part leading Vanuatu to withdraw its bid (Mitchell and Wallis, 2010). Likewise, Cambodia and Nepal make the so-called "WTO-plus commitments" as part of their accession packages (Sauvé, 2005). There are almost no or very limited transitional periods<sup>27</sup> afforded to new WTO Members for the implementation of WTO Agreements. This has led some WTO Members to argue that only original developing Members (i.e., those that were GATT Members and transition to the WTO) can avail themselves of the transitional period. They subsequently request that this transitional period needs to be extended to countries acceding under Article XII, regardless of their level of development<sup>28</sup>. This explains, for example, why Nepal (that joined the WTO in April 2004) was granted a shorter period (than founding LDC members and other developing countries) to implement the Trade-Related Aspects of Intellectual Property Rights Agreement (TRIPS) (Sauvé, 2005; Cortez, 2011). Likewise, Timor-Leste, which joins the WTO in 2024 is granted a transitional period until 1 January 2027 "to undertake the relevant legislative reform and equip the Government to fully implement the obligations under the TRIPS Agreement." (WTO, 2024b: paragraph 301). Timor-Leste has been granted no transitional period (from the date of accession to the WTO) for the implementation of the Agreement on Trade-Related Investment Measures (WTO, 2024b: paragraph 233).

Several messages emerge from the discussion under section 2. One of these is that S&D flexibilities may not necessarily lead to higher exports (especially, manufactured exports) and export upgrading, and consequently promote economic development, unless they are used appropriately (wisely) and in a time-bound manner. The DFQF market access schemes offered by both developed and developing countries can contribute to spurring manufactured exports and export upgrading. However, the effective utilization of LDC-related S&D flexibilities for export promotion can be constrained by several domestic factors (e.g., lack of full understanding the complex WTO Agreements; financial constraints) that prevent LDCs from taking full advantage of these flexibilities, notably for promoting higher value-added exports. In addition, LDCs have differentiated access to the LDC-related S&D flexibilities, depending on whether they are "LDC founding Members" (i.e., they were GATT Members but transitioned to the WTO through simple domestic administrative procedures) or whether they are "LDC Article XII Members" (i.e., LDCs that joined the WTO through Article XII of the Marrakesh Agreement establishing the WTO). Regardless of the limiting factors of utilizing LDC-related flexibilities, LDC founding Members can avail themselves (without restriction) to existing flexibilities, while the commitments undertaken by LDC Article XII Members restrain their access to existing LDC-related flexibilities. In the meantime, the limited access of LDC Article XII Members to LDC-related flexibilities compared to LDC founding Members implies a greater trade policy liberalization in the former (thanks to their greater commitments to implement trade liberalization reforms) than in the latter. This may provide LDC Article XII Members with a greater advantage in terms of manufactured export promotion and export upgrading than LDC founding Members. This is because of the potential positive effects of trade liberalization on trade flows, especially manufactured exports and export upgrading (e.g., Aditya and Acharyya, 2015; Agosin

<sup>&</sup>lt;sup>27</sup> This is because the implementation periods embedded in WTO Agreements are calculated from the entry into force of the WTO Agreement, and not from the date of accession of a particular country (e.g., Rolland, 2012b).

<sup>&</sup>lt;sup>28</sup> Rolland (2012b) provides further details on how liberalization commitments by acceding developing countries (including both LDC and NonLDC Members) have deprived them from benefiting from many S&D flexibilities that original developing Members can avail themselves of.

et al., 2012; De Loecker and Goldberg, 2014; Dennis and Shepherd, 2011; Gaglio, 2017; Osakwe et al., 2018; Stojčić et al., 2018; World Bank, 2021: Chapter 3).

#### 3. A brief review of the empirical works on the effects of S&D flexibilities

As noted by Ornelas (2016), it is challenging to investigate empirically the trade effects of S&D flexibilities<sup>29</sup>, given their multiple forms and that their influence is spread out over time. Nevertheless, a few studies attempt to shed light on the effect of S&D disciplines on trade flows<sup>30</sup>, by examining the issue through the lens of the trade effect of the WTO accession. In other words, those studies infer the (indirect) effect of S&D flexibilities on trade flows by contrasting the trade effect of the accession to the WTO (for developing countries) before and after the change in accession requirements (Ornelas, 2016). The rationale for this is that while a large number of developing countries joined the General Agreement on Tariff and Trade (GATT) under a procedure that essentially by-passed the formal accession process (i.e., those countries did not undertake significant trade liberalization commitments), developing countries that joined the WTO (from 1995, and under Article XII of the Marrakesh Agreement establishing the WTO) are subject to more rigorous accession procedures and undertook far greater trade liberalization commitments<sup>31</sup>. These commitments deprive Article XII (developing) Members from the benefits of some S&D flexibilities whereas GATT developing contracting parties can easily avail themselves of the benefits of these flexibilities as they saw fit, because they simply transitioned to the WTO membership in 1995 (Rolland, 2012b).

In contrast with Rose (2004) who report no significant trade flows effect of the WTO membership, Subramanian and Wei (2007) observe that the GATT/WTO membership promotes trade but essentially for industrialized countries that participated actively in multilateral trade negotiations, and for the sectors that were the subject of reciprocal concessions during these negotiations. Interestingly, the authors find that the membership in the WTO has a positive and significant effect on trade flows for developing countries, while the GATT membership has not (i.e., WTO developing Members are compelled to liberalize trade, and hence enjoy higher trade flows, whereas such a positive effect is inexistant for GATT developing contracting parties that did not undertake strong liberalization commitments). In addition, GATT developing contracting parties that joined the WTO without taking on strong trade liberalization obligations experience no significant effect of their membership in the WTO on trade flows. These findings suggest that the lack of significant liberalization obligations has prevented developing countries that joined in the early GATT period from benefiting from higher trade flows upon their transition to the WTO. This has led Ornelas (2016) to infer that (lack of) S&D treatment seems critical for the WTO effectiveness in promoting trade - or in other words, there are compelling signs of a negative S&D treatment trade effect.

The study by Liu and Ornelas (2014) also provides another insight into the effect of S&D flexibilities on trade flows in free trade agreements (FTAs). The authors examine how the formation of FTAs affects the survival of democracy in the member countries through the destruction of protectionist rents. They use the lagged FTA import share as an effective proxy for the rent destruction effect engendered by those agreements. As per WTO rules, developing countries should notify to the WTO the FTAs (to which they are parties) either under GATT Article XXIV (under the condition that trade within the concerned FTA be substantially liberalized<sup>32</sup>) or under the Enabling Clause (also known as "Differential and More Favourable

<sup>&</sup>lt;sup>29</sup> The concept of "S&D treatment", "S&D flexibilities" and "S&D disciplines" are used interchangeably in the literature.

<sup>&</sup>lt;sup>30</sup> See the literature review provided by Ornelas (2016).

<sup>&</sup>lt;sup>31</sup> The liberalization commitments involve significant domestic reforms, largely because of the larger scope and coverage of the WTO agreements (e.g., Cattaneo et al., 2009; Drabek and Bacchetta, 2004; Lanoszka, 2001; Michalopoulos, 1998).

<sup>&</sup>lt;sup>32</sup> See information online at: <u>https://www.wto.org/english/docs\_e/legal\_e/gatt47\_e.htm#art24</u>

Treatment, Reciprocity and Fuller Participation of Developing Countries"). The Enabling Clause was adopted in 1979 as a GATT provision<sup>33</sup>, and allows for preferential trade arrangements in trade in goods between developing country Members "for the mutual reduction or elimination of tariffs and, in accordance with criteria or conditions which may be prescribed by the contracting parties, for the mutual reduction or elimination of nontariff measures, on products imported from one another" (see paragraph 2c of the Enabling Clause<sup>34</sup>). As such, the Enabling Clause imposes no constraints on the extent of trade liberalization within the trade bloc between developing countries. Liu and Ornelas (2014) obtain that the coefficient of the FTA import share is not statistically significant for FTAs notified under the Enabling Clause, but it is positive and statistically significant for notified under GATT Article XXIV. The authors conclude that trade liberalization under Enabling Clause-based FTAs (i.e., partial and incomplete processes of preferential trade liberalization) exerts no significant effect on the destruction of protectionist rents (and thus on democracy survival). This is in contrast with full-fledged FTAs (i.e., those notified under GATT Article XXIV where trade liberalization is deemed to be substantial) that exert a positive and significant effect on the destruction of protectionist rents. These findings also support the importance of commitments in trade agreements, and suggest instead that trade agreements based on S&D flexibilities (in the sense of partial and incomplete trade liberalization processes) do not destroy protectionist rents. In connection to this, Jakubik and Piermartini (2023) investigate the extent to which WTO rules and flexibilities shape member states' trade policy responses to import shocks. They demonstrate that WTO commitments do influence members' trade policy, as stringent bindings reduce the likelihood for Members to use trade policy (especially by increasing tariffs) in response to import shocks. Additionally, the fear of retaliation also reduces the likelihood of tariff increases.

Studies on the relationship between the WTO membership and economic growth provide additional insights into the relationship between S&D flexibilities and trade reforms, and trade flows. These studies emphasize the positive economic growth effect of the limited access to S&D flexibilities (i.e., greater trade liberalization). Tang and Wei (2009) argue that the commitments undertaken by developing countries that joined the WTO involve not only the implementation of greater trade policy liberalization reforms, but also other market-oriented reforms. They show that the WTO membership affects positively economic growth rates only for developing countries that underwent rigorous accession procedures. In particular, developing countries that join the WTO (under Article XII) experience higher growth and investment rates, and the growth rates remain high in the four subsequent years. These effects are particularly large in countries featured by weak governance, where external policy commitments have a bigger role to play. Brotto et al. (2021) extend the analysis by Tang and Wei (2009) by including additional 32 newly acceded countries to the WTO. They obtain that the WTO accession is positively and significantly associated with economic growth, and the magnitude of this positive effect is larger than the one obtained by Tang and Wei (2009). In addition, the economic growth impact is 30% larger five years after the WTO entry, and this positive effect even persists beyond the first five years. Brotto et al. (2024) investigaes how the process of accession to the WTO affects economic growth in a large sample (150 countries). They start from the premise that in contrast with the accessions during the GATT era, the entry into the WTO requires far-reaching reforms that go beyond conventional trade liberalization. They, then, develop an index that captures the reform progress in the pre-accession period. The empirical analysis has revealed that the reform efforts pay off and contribute to the economic development of acceding members. Specifically, the economic growth rates increased, on average, by 1.5 percentage points faster than they otherwise would have been in economies that implemented reforms and undertook deeper commitments during their WTO accession negotiations.

All these findings fuel the idea that greater S&D flexibilities in WTO Agreements (by limiting the scope of trade policy reforms) do not necessarily help beneficiary Members (especially

<sup>&</sup>lt;sup>33</sup> See information online at: <u>https://www.wto.org/english/tratop\_e/region\_e/regrul\_e.htm</u>

<sup>&</sup>lt;sup>34</sup> The information is accessible online at: <u>https://www.wto.org/english/docs\_e/legal\_e/enabling1979\_e.htm</u>

developing Members) expand trade and promote enjoy higher economic growth rates. While these findings are relevant for developing countries, it is unclear whether they apply equally to LDCs, and NonLDCs among developing countries (LDCs enjoy far greater flexibilities in WTO rules than do NonLDCs).

#### 4. Hypotheses formulation

Drawing from the discussion in sections 2 and 3, we formulate the following hypotheses.

*Hypothesis 1:* S&D flexibilities are associated with a greater extent of trade liberalization reforms in LDC Article XII Members than in LDC founding Members.

*Hypothesis 2:* S&D flexibilities are associated with an improvement in manufactured exports, and eventually a greater integration into the world market for manufactured products in LDC Article XII Members than in LDC founding Members.

*Hypothesis 3:* S&D flexibilities are associated with a greater export product upgrading in LDC Article XII Members than in LDC founding Members.

#### 5. Empirical strategy

WTO LDC Members enjoy greater S&D flexibilities in the WTO rules than other developing countries (NonLDCs among developing Members of the WTO). This suggests that there are criteria that determine the eligibility to LDC-specific S&D flexibilities in the WTO rules, that is, the criteria underpinning the entry into or graduation of the category of LDCs. In other words, benefiting from LDC-related S&D flexibilities is not exogenous, and the criteria for a country (among WTO developing Members) to have access to these LDC-related S&D flexibilities, is to be an LDC. The non-randomness nature of the choice of countries - among WTO developing Members - that benefit from LDC-related S&D flexibilities leads to a problem of self-selection into the treatment, which is being entitled to the benefits of LDC-related flexibilities in WTO rules.

Against this backdrop, and in order to test the hypotheses set out above, one can address the question as to how S&D flexibilities affect trade reforms, manufactured exports, and export upgrading in LDCs. Addressing this question requires that we examine for the full group of LDCs (both WTO LDC Members and NonWTO LDCs, i.e., LDCs that are not Members of the WTO) how S&D flexibilities affect WTO LDC Members (treatment group) relatively to NonWTO LDCs (control group). However, the limited data on variables concerning NonWTO LDCs<sup>35</sup> prevent us from addressing this question. Therefore, to test hypotheses 1 to 3, we investigate the effect of the strength of S&D flexibilities on trade reforms, manufactured exports, and export upgrading. This amounts to using the sample of WTO developing Members (including both LDC WTO Members and NonLDC WTO developing Members) and examining how S&D flexibilities affect trade reforms, manufactured exports, and export upgrading in LDC WTO Members relatively to NonLDC WTO Members. In other words, we use as treatment group (henceforth, "TG") the LDC WTO Members (as they benefit from stronger flexibilities in the WTO rules), and as control group a sub-set of NonLDC developing WTO Members (that de facto have access to relatively limited S&D flexibilities in the rules). The response to this question requires that we identify carefully a subset of NonLDC WTO developing Members that can act as the control group. In fact, we need to choose among NonLDC WTO developing Members, those countries whose economic features are closed to LDCs' economic characteristics. Drawing from the work by Klasen et al (2021), we use as control group, developing countries that are not classified as LDCs

<sup>&</sup>lt;sup>35</sup> In our attempt to address empirically this question, we ended up having data for only 5 NonWTO LDCs. Having a control group with only 5 countries would not lead to reliable outcomes.

by the United Nations, but would not have met the criteria for graduation from the LDC category if they had been in this category<sup>36</sup>. This control group is referred to as "CG1". In addition, as LDCs include essentially low-income countries and lower-middle income countries (identified as such by the World Bank), we use as alternative control group, a group of countries that are not LDCs among the World Bank's set of low-income countries and lower-middle income countries (this group is referred to as "CG2").

Given the above-mentioned selection bias into the treatment, we cannot use, in the present study, the conventional Difference-in-Difference (DiD) approach used to estimate the causal effects of a program when treatment assignment is non-random. Instead, our identification strategy consists of using an impact assessment approach that combines the DiD and "matching" techniques to investigate the effect of S&D flexibilities on LDC's trade reforms, manufactured exports and export upgrading, using samples that include the treatment group, and each of the control groups CG1 and CG2. In particular, we utilize the entropy balancing (EB) approach developed by Hainmueller (2012) and implemented by Neuenkirch and Neumeier (2016). This is a matching approach for impact analysis that allows computing exact weights (for the control group) such that a set of pre-treatment characteristics of the control (untreated) group matches those of the treatment group. In fact, the EB approach is a generalization of conventional matching methods (Hainmueller, 2012) and permits to create a balanced sample, where the control group is a perfect counterfactual for the treated group. Hence, the selection bias mentioned above (i.e., the bias associated with the selection into treatment) and the endogeneity concern<sup>37</sup> resulting from the treatment are overcome by controlling for a number of variables that may affect differently countries in both the treatment and control groups. In the present study, the EB approach allows estimating the average treatment effect of the strength of S&D flexibilities on trade reforms, manufactured exports and export upgrading. The balancing requirement (i.e., a high degree of covariate balance - for example, the same mean/variance of conditioning variables in the treatment group) is achieved by reweighing the observations in the control group (untreated units) so that all pre-treatment characteristics of the units be as similar as possible in the treated units and the untreated units. In particular, we use the mean (average) of covariates to ensure that the non-treated countries in the control group are as close as possible to treated countries (see also Apeti and Edoh, 2024; Gutmann et al. 2023; Neuenkirch and Neumeier, 2016). The weights that permit the covariate moments to be automatically balanced in the EB technique are automatically generated by an algorithm (Hainmueller, 2012).

There are many advantages of using the EB approach compared to other conventional matching methods such as the propensity score approaches. *First*, the propensity score matching does not uniformly improve the balance across all the covariates (e.g., Iacus et al., 2012), while the entropy balancing helps achieve a greater balance quality. Additionally, the EB technique does not discard units from either the treatment or control groups. *Second*, when using the conventional matching approaches, the estimates' biases associated with the low covariate balance are particularly severe in small samples that have limited control units: in this case, the conventional matching approach does not ensure a sufficient balance of pre-treatment characteristics across treatment and control groups (e.g., Caliendo and Kopeinig, 2008). Hainmueller (2012) shows that the EB approach performs better than conventional matching techniques (e.g., propensity score matching) in terms of estimation bias and mean square error. The theoretical results and simulations of Zhao and Percival (2017) show that the EB approach is doubly robust with respect to linear outcome regression and logistic propensity score regression. *Third*, the EB method's weights are as close as possible to the uniform base weights, thereby generating more efficiency in

<sup>&</sup>lt;sup>36</sup> The control group used by Klasen et al (2021) in their analysis includes 18 NonLDC developing countries identified using the last four tri-annual reviews (2006, 2009, 2012, 2015) performed by the United Nations' Committee of Development Policy (see Klasen et al 2021: p164).

<sup>&</sup>lt;sup>37</sup> See Neuenkirch and Neumeier (2016) for the list of advantages associated with the EB approach compared to other matching methods.

the subsequent estimations. Furthermore, the weighing approach in the EB does not require continuous adjustments in specifications between different stages, given that weights are derived automatically from the imposed balance constraints. As a result, researchers do not need to test the balancing of the treatment and control groups, i.e., to test the parallel trends assumption (e.g., Ogrokhina and Rodriguez, 2019). Fourth, as emphasized by Balima (2020), the EB approach is more versatile than simple regression-based techniques (e.g., the simple difference-in-difference approach, or conventional matching methods) in that it does not require that the researcher specify an empirical model for the selection into the treatment. In this way, the EB technique permits to avoid potential misspecification problems, multicollinearity, or wrong choice of the functional form. Finally, in employing the EB technique, the researcher exploits the dimensions of the panel dataset by controlling for time-variant characteristics of countries along with countries' heterogeneity (i.e., time invariant countries' specific effects) and time specific factors in the regression analysis. This is in contrast with conventional matching techniques that rely on the conditional independence assumption (that is, conditional to the vector of observable covariates, the treatment is independent of unobservable). Numerous empirical studies have used the EB approach (e.g., Baccini et al., 2019; Balima, 2020; Basri et al. 2021; Chadi and Hetschko, 2025; Egger et al., 2020; Gutmann et al. 2023; Neuenkirch and Neumeier, 2016 and Ogrokhina and Rodriguez, 2024).

In the present analysis, the assessment of effects of the strength of S&D flexibilities on trade reforms, manufactured exports and export upgrading by means of the EB approach is performed through measuring the average treatment effects of S&D flexibilities on trade reforms, manufactured exports and export upgrading. These "average treatment effects" are nothing else than the average difference in each of the indicators of trade reforms, manufactured exports, or export upgrading between WTO LDC Members and the (closest) NonLDC WTO developing Members. The countries' pre-treatment characteristics that are used to compute the weights utilized to achieve the balancing requirements are nothing else factors underpinning the entry into or graduation from the LDC category. These factors are essentially the criteria employed by the United Nations CDP to determine countries that are eligible to enter into or graduate from the LDC category (United Nations, 2024<sup>38</sup>). These factors include the real per capita Gross National Income (GNI) (used in natural logarithm); the structural economic vulnerability; and the human assets ("HAI") that represents the level of human capital. The real per capita GNI (constant 2015 US\$) was extracted from the WDI. The indicator of structural economic vulnerability ("EVI") was computed by the "Fondation pour les Etudes et Recherches sur le Developpement International (FERDI<sup>39</sup>)" as the simple arithmetic average of two sub-indexes, namely the intensity of exposure to shocks, and the intensity of exogenous shocks. The values of EVI range from 0 to 100, with higher values reflecting a higher EVI. For the sake of the analysis, we have re-scaled the EVI indicator so that its values range from 0 to 1. Finally, the human assets index ("HAI") is computed as the geometric mean of the indicators of life expectancy at birth, expected years of schooling, and mean years of schooling. Each of these sub-components of the human assets index has been normalized beforehand so that its values range from 0 to 1. Data on the indicators of life expectancy at birth, expected years of schooling, and mean years of schooling were collected from the database<sup>40</sup> developed by United Nations Development Programme (UNDP) on the human development index.

Having computed the weights and ensuring a balanced sample in the first step of the EB approach, we now perform the appropriate regressions that allow testing hypotheses 1 to 3. We consider the following baseline model specification:

<sup>&</sup>lt;sup>38</sup> See also the information online at: <u>https://www.un.org/development/desa/dpad/least-developed-country-category/ldc-criteria.html</u>

<sup>&</sup>lt;sup>39</sup> See for example, Feindouno and Goujon (2016) for further details on the computation of the EVI. The EVI index is accessible online at: <u>https://ferdi.fr/en/indicators/a-retrospective-economic-vulnerability-index</u>

<sup>&</sup>lt;sup>40</sup> The database is accessible online at: <u>https://hdr.undp.org/data-center/human-development-index#/indicies/HDI</u>

#### $DEP_{it} = \alpha_0 + \alpha_1 Treat_{it} + \alpha_2 [(Treat_{it}) * (Art12_{it})] + \alpha_3 Art12_{it} + \beta X_{it} + \gamma_t + \mu_i + \varepsilon_{it}$ (1)

where i is a country and t stands for a year in the unbalanced panel datasets constructed on the basis of data availability. Different samples that include essentially WTO developing Members, are used in the analysis, depending on the dependent variable under analysis. Data on variables used in these different full samples cover the period from 1995 to 2018 (as data on the indicator of EVI are available until 2018). To recall, besides the treatment group, there are two control groups. The main control group ("CG1") includes WTO developing countries that are not classified as LDCs, but would not have met the criteria for graduation from the LDC category if they had been in this category. The second group ("CG2") is used for robustness check, and includes the World Bank's low-income countries and lower-middle income countries, that are not LDCs. For the analysis concerning the effects of the strength of S&D flexibilities on trade reforms, the full sample includes 40 countries in the treatment group "TG", 16 countries in the control group "CG1", and alternatively, 23 countries in the control group "CG2". For the analysis of the effects of S&D flexibilities on manufactured exports and the integration into the world market for manufactured products, the full sample includes 33 countries in the treatment group, 15 countries in the control group "CG1", and 21 countries in the control group "CG2". For the analysis concerning the effects of the strength of S&D flexibilities on export upgrading, the treatment group includes 33 countries, the control group "CG1" contains 16 countries, and the alternative control group "CG2" includes 22 countries. Appendices 1.1 to 1.3 present the lists of countries used in each of these different full samples, including in the treatment group and control groups.

Following Rosenbaum and Rubin (1983), we report in Appendix 2.1 to 2.6 the outcomes (over each of these different full samples) of the (sample) 'means' of the matching covariates after computing the weights. These outcomes compare the means and the standardized difference in means of variables for countries in the treatment and control groups. They indicate that the reweighted means of covariates (column [4] of each of these Appendices) are almost identical to the target values of covariates (column [1] of each of the Appendices). Moreover, the standardized difference between the target value and the balanced value is close to zero for all variables (column [6] of each of the Appendices), which shows the achievement of a high degree of balance.

The dependent variable "DEP" is measured either by the indicators of trade reforms, the indicators of manufactured exports, the indicator of the integration into the world market for manufactured exports, or the indicators of export upgrading.

#### Indicators of trade policy reform

We use several indicators of trade reforms. The first set of indicators relate to trade reforms considered in the "narrower" sense of trade policy liberalization. They are the indicator of the overall "Measure of Aggregate Trade Restrictions" ("MATR"), its nontariff component ("MATRNT"), as well as its trade-related ("TRMATR") and capital-related components ("KMATR"). Higher values of each of these indicators show the adoption of greater restrictive measures. The overall "Measure of Aggregate Trade Restrictions" ("MATR") is developed by Estefania-Flores et al. (2024) (see also Estefania-Flores et al., 2023: p747), and reflects different facets of trade protectionism, including tariffs, non-tariff barriers, and restrictions on requiring, obtaining, and using foreign exchange for current transactions. The indicator "MATRNT" is obtained by excluding taxes and tariffs from the indicator "MATR". The indicator "TRMATR", which is the "trade component" of the index "MATR", encompasses restrictions directly related to trade, such as import/export licenses and tariffs/taxes (Campos et al., 2024). It is constructed as a simple average of each trade-related sub-component of the MATR index (see Campos et al., 2024: p767- Table 1; and the database developed by Estefania-Flores et al. 2024). Finally, the indicator "KMATR", the "capital-related component" of the index "MATR", encompasses the capital-related restrictions that affect trade flows. These include restrictions such as exchange

measures, restrictions on the use of domestic currency for capital transactions or controls on investment-related payments (Campos et al., 2024). This indicator is also constructed as a simple average of each capital-related sub-component of the MATR index (see Campos et al., 2024: p767-Table 1; and the database developed by Estefania-Flores et al. 2024). Even though the index "KMATR" is not a direct trade policy indicator, we do include it in the analysis, because it is part of the overall "MATR" indicator, and does affect trade flows. All these indicators are extracted from or constructed using the dataset<sup>41</sup> developed by Estefania-Flores et al. (2024). Finally, it is important to note that in contrast with existing trade policy indicators, the MATR has the advantage of being a simple indicator, built on the basis of sensible, plausible, and trade policy inputs obtained from a transparent, reliable and easily accessible source (e.g., Campos et al., 2023). The "MATR" has been used in recent studies such as Campos et al. (2023, 2024); Estefania-Flores et al. (2023); Hellwig (2023); IMF (2022); Kose et al. (2023); and Parente and Moreau (2024).

The second set of trade reform indicators are trade reform indicators considered in a broad sense (Ali and Milner, 2016), that is, reflecting trade costs (tariff costs and nontariff costs). The first of these indicators is the average comprehensive (overall) trade costs ("TRCOST") calculated for a given country in a given year, as the average of the bilateral overall trade costs on goods across all trading partners of this country. Data on bilateral trade costs have been computed by Arvis et al. (2012, 2016) using the approach proposed by Novy (2013). Arvis et al. (2012, 2016) build on the definition of trade costs by Anderson and van Wincoop<sup>42</sup> (2004) who consider bilateral comprehensive trade costs as all costs involved in trading goods (agricultural and manufactured goods) internationally with another partner (i.e., bilaterally) relative to those involved in trading goods domestically (i.e., intranationally). Thus, the bilateral comprehensive trade costs indicator captures trade costs in its wider sense, including not only tariffs and international transport costs, but also other trade cost components, such as the direct and indirect costs associated with differences in languages, currencies as well as cumbersome import or export procedures (see Anderson and van Wincoop, 2004). Higher values of the indicator of the average overall trade costs indicate higher overall trade costs. The second indicator of trade costs is the average tariff costs for both agricultural and manufactured products (the first component of "TARIFFC"). It is the tariff component of the average overall trade costs for both agricultural and manufactured products, and is computed for a given country in a given year, as the average of the bilateral comprehensive tariff costs across all trading partners of this country. Data on the bilateral tariff costs indicator are computed by Arvis et al. (2012, 2016). As the bilateral tariff costs indicator is (like the comprehensive trade costs) bi-directional in nature (i.e., it includes trade costs between a pair of countries), it is measured as the geometric average of the tariffs imposed by the two partner countries on each other's imports (of agricultural and manufactured goods) (see Arvis et al. 2016). The third measure of trade reforms considered from the perspective of trade costs reduction, is the indicator of the average nontariff costs (second component of the overall trade costs "TRCOST"). This is the indicator of the comprehensive trade costs, excluding the tariff costs. It is computed for a given country in a given year, as the average of the bilateral comprehensive nontariff costs across all trading partners of this country. Once again, data on the bilateral nontariff costs indicator have been computed by Arvis et al. (2012, 2016), following Anderson and van Wincoop (2004). Comprehensive trade costs excluding tariff encompass all additional costs other than tariff costs involved in trading goods (agricultural and manufactured goods) bilaterally rather than domestically. Higher values of the indicator of average nontariff costs

<sup>&</sup>lt;sup>41</sup> The database is available online at: <u>https://sites.google.com/view/m-atr/</u>

<sup>&</sup>lt;sup>42</sup> Anderson and van Wincoop (2004: p691) have defined "trade costs" in a broad sense as encompassing all costs incurred in getting a good to a final user other than the marginal cost of producing the good itself: transportation costs (both freight costs and time costs), policy barriers (tariffs and nontariff barriers), information costs, contract enforcement costs, costs associated with the use of different currencies, legal and regulatory costs, and local distribution costs (wholesale and retail).

reflect a rise in nontariff costs. Detailed information<sup>43</sup> on the methodology used to compute the bilateral nontariff costs is available in Arvis (2012, 2016). In addition to the indicators of overall trade costs, tariff costs, and nontariff costs for both agricultural and manufactured goods, we also use the same trade costs indicators for only manufactured goods, as the latter are critical variables in the analysis. These indicators are the average overall trade costs for manufactured export products ("TRCOSTMAN"), the average tariff costs for manufactured export products ("TARIFFCMAN"), and the average nontariff costs for manufactured export products ("NTARIFFCMAN"). Higher values of each indicator of the trade costs indicate higher trade costs. Bilateral trade costs data are collected from the ESCAP-World Bank Trade Cost Database<sup>44</sup>.

#### $\triangleright$

#### Indicators of manufactured exports

Let us now describe the manufactured export variables. We use several indicators of manufactured exports that represent different degrees of manufactures, and calculated as a share<sup>45</sup> of total manufactured exports. The first set of these indicators are based on the technological categories as defined by Lall (2000). These are the ratio of the exports of resource-based manufactures to total manufactured exports ("RBMAN"); the ratio of the exports of Low technology manufactures (textile, garment and footwear) to total manufactured exports ("LOWTEX"); the ratio of the exports of Low technology manufactures (other products) to total manufactured exports ("LOWOTH"); the ratio of the exports of medium technology manufactures to total manufactured exports ("MEDM"), and the share of high-technology manufactured exports in total exports ("HIGHM"). For robustness check, we use a set of alternative indicators of manufactured exports, by degree of manufactures (Standard International Trade Classification (SITC) 5 to 8 less 667 and 68). These are the ratio of the export of Labourintensive and resource-intensive manufactures to total manufactured exports ("LAB"); the ratio of the export of Low-skill and technology-intensive manufactures to total manufactured exports ("LOW"); the ratio of the exports of Medium-skill and technology-intensive manufactures to total manufactured exports ("MED"); and the ratio of the export of High-skill and technology-intensive manufactures to total manufactured exports ("HIGH"). Data used to compute all these indicators are expressed in nominal manufactured export values (current US\$) at the 3 digit level (SITC, extracted from the UNCTAD database Rev.3), and (https://unctadstat.unctad.org/datacentre/).All manufactured export indicators are proportion variables, as their values range between 0 and 1 (these indicators are not expressed in percentage). As a result, the values of the predictions of these variables (from the estimation of the specifications of model (1) with the manufactured export performance as dependent variables) could generate predictions of these variables whose values lie outside the unit interval, including nonsensical predictions for extreme values of regressors (Baum, 2008). We handle the bounded nature of these dependent variables by using the approach proposed by Baum (2008). This approach involves transforming the indicator using the 'logit' function, and then using the linear regression (including the appropriate estimator) to estimate the model specification with the transformed dependent variable. Concretely, the manufactured export indicators are transformed as follows: MAN1 = Logit(MAN), where "MAN" is one of the indicators of manufactured exports described above.

The last indicator of manufactured exports used in the analysis (i.e., the one that helps test hypothesis 2) is measured by countries' integration into the world market for manufactured products ("INTEG"). It is computed following Squalli and Wilson (2011: p1758) as the share of manufactured exports in GDP adjusted by the proportion of a country's manufactured exports

<sup>&</sup>lt;sup>43</sup> This information as well as in the short explanatory note accessible online at: <u>https://www.unescap.org/sites/default/d8files/Trade%20Cost%20Database%20-%20User%20note.pdf</u>

<sup>&</sup>lt;sup>44</sup> This database is available online at <u>https://www.unescap.org/resources/escap-world-bank-trade-cost-database</u>

<sup>&</sup>lt;sup>45</sup> For the sake of the analysis, the indicators of manufactured exports are not expressed in percentage.

relative to the average world manufactured exports. To compute this index, we use data on the GDP (current US\$) extracted from the World Development Indicators (WDI) of the World Bank, and data on the total manufactured exports (current US\$) extracted from the UNCTAD database (https://unctadstat.unctad.org/datacentre/).

#### Indicators of export upgrading

We measure export upgrading by means of several indicators. The first sets of these indicators<sup>46</sup> are the Theil index of overall export diversification ("EDI"), the Theil index of export product diversification ("EDIPR") and the Theil index of export market (per product) diversification ("EDIMA"). The indicator "EDI" is the sum of the Theil index of export product diversification ("EDIPR") and the Theil index of export market (per product) diversification ("EDIMA"). The Theil index of export product diversification is computed as the opposite of the Theil index of export product concentration ("ECIPR"), the latter being calculated using products at the 3-digit level (based on the SITC Revision 3) and derived from bilateral export flows of all individual products.  $EDIPR_{it} = -ECIPR_{it}$ , where the subscripts *i* and *t* represent respectively a country and a time. Likewise, the Theil index of export market (per product<sup>47</sup>) diversification ("EDIMA") is computed as the opposite of the Theil index of export market (per product) concentration ("ECIMA"). The latter is calculated using products based on the SITC Rev.3 (3-digit level), and derived from all bilateral export flows of all individual products.  $EDIMA_{it} = -ECIMA_{it}$ , where the subscripts i and t represent respectively a country and a time. Higher values of the index "EDI" indicate a higher degree of the overall export diversification, while lower values of this index reflect a tendency for a greater overall export concentration. Higher values of the index "EDIPR" indicate a higher degree of export product diversification, while lower values of the index reflect a tendency for a greater export product concentration. Similarly, Higher values of the index "EDIMA" indicate a higher degree of export market (for individual products) concentration, while lower values of this index reflect a tendency for a greater export market concentration for individual products. Further details on the method for computing "ECIPR" and "ECIMA" are available online at: https://unctadstat.unctad.org/datacentre/reportInfo/US.MerchTheilIndices

For robustness check analysis, we use the Herfindahl-Hirschmann index of the export product diversification ("EDIPRH"). It is computed as the opposite of the Herfindahl-Hirschmann index of the export product concentration ("ECIPRH"). The latter measures the extent to which an individual economy's export product basket is concentrated on a few products rather than being distributed in a more homogeneous manner among several products. Hence,  $EDIPRH_{it}$  =  $-ECIPRH_{it}$ , where the subscripts *i* and *t* represent respectively a country and a time. Higher values of the index "EDIPRH" indicate a higher degree of export product diversification, while lower values of this index reflect a tendency for a greater export product diversification. Data on "ECIPRH" are extracted from the UNCTAD database (https://unctadstat.unctad.org/datacentre/). Further details on the method for computing "ECIPRH" available are online at: https://unctadstat.unctad.org/datacentre/reportInfo/US.ConcentDiversIndices

The second set of export upgrading indicators that complement the Theil and Herfindahl-Hirschmann indices of export diversification (as measures of export upgrading indicators) are the indicator of the closeness of a country's export product structure with that of the world ("EXPSTR"), and the indicator of economic complexity ("ECONC"). The indicator "EXPSTR" measures the extent to which the structure of export products of a given country is closed to the world pattern. It is computed as the opposite of the UNCTAD's indicator that described to the extent to which a given country's structure of export products by a given country differs from the

<sup>&</sup>lt;sup>46</sup> All three export diversification indicators are calculated using indicators of export concentration extracted from the UNCTAD database (<u>https://unctadstat.unctad.org/datacentre/</u>)

<sup>&</sup>lt;sup>47</sup> This is a measure of the market export diversification for every export product but not a measure of the market concentration of total exports products.

world pattern<sup>48</sup>. Data on this indicator are extracted from the UNCTAD database (https://unctadstat.unctad.org/datacentre/). The index of economic complexity "ECONC" reflects the diversity and sophistication of a country's export structure and hence indicates the diversity and ubiquity of the country's export structure. It has been estimated using data connecting countries to the products they export, applying the methodology as described in Hausmann and Hidalgo (2009). Higher values of this index reflect a greater economic complexity. Data on the indicator "ECONC" are collected Massachusetts Institute of Technology (MIT)'s Observatory of Economic Complexity<sup>49</sup>.

#### Main regressor "Treat"

The variable "Treat" is the treatment variable (a dummy variable) that allows uncovering the average treatment effect of the strength of S&D flexibilities on trade reforms, manufactured exports and export upgrading. It is obtained by first creating for WTO LDC Members a dummy variable "ENTRYLDC" that takes the value of 1 from the first year a country enters into the LDC category until the end of the period of analysis for countries that never graduate from the LDC category, and until the year prior the graduation of the country from the LDC category. It takes the value of 0 for the other years. The years of entry into the LDC category or graduation from the category are obtained from the United Nations handbook on the LDC category (United Nations, 2024: page 3). The variable "Treat" is then computed by multiplying the dummy "ENTRYLDC" by the dummy "ENTRYWTO", which takes the value of 1 from the first year a country joined the WTO until the end of the period under analysis (no country quits the WTO after joining it). Data on the years of entry into the WTO are extracted from the WTO's website (https://www.wto.org/english/thewto e/whatis e/tif e/org6 e.htm).

#### Control variables in model (1)

The variable "Art12" is a dummy variable that represents LDC Article XII Members, taking into account the year they joined the WTO. It takes the value of 1 from the first year an LDC joins the WTO under Article XII of the Marrakesh Agreement establishing the WTO, until the end of the period (i.e., until 2018). It takes the value of 0 for the other years. Information used WTO to construct this dummy variable is extracted from the website (https://www.wto.org/english/thewto e/whatis e/tif e/org6 e.htm).

The vector of variables  $X_{it}$  includes a set of control variables that varies depending on the dependent variable introduced in model (1). The vector of parameters  $\beta$  contains coefficients relating to each variable in  $X_{it}$ .  $\alpha_0$  to  $\alpha_3$  and  $\beta$  are parameters that will be estimated. The coefficients  $\alpha_1$  and  $(\alpha_1 + \alpha_2)$  represent the average treatment effects of S&D flexibilities on the dependent variable respectively for LDC founding Members, and LDC Article XII Members.  $\gamma_t$ are time dummies that capture global shocks affecting the dependent variable simultaneously in all countries of the full sample under analysis.  $\mu_i$  are countries' time invariant specific effects, and  $\varepsilon_{it}$ is a well-behaving error term. The introduction of control variables, countries' unobserved time invariant specific effects, and time dummies in model (1) aims to limit the possible endogeneity concerns arising from omitted variables. As part of the set of control variables in the vector  $X_{it}$ , are the variables representing the above-mentioned pre-treatment characteristics of countries that were used to compute the weights in the first step of the EB approach. The indicators measuring countries' pre-treatment features are introduced with the one-year lag in the regressions to limit endogeneity concerns (potential reverse causality) (see Neuenkirch and Neumeier, 2016).

<sup>48</sup> further For details, the information online see at: https://unctadstat.unctad.org/datacentre/reportInfo/US.ConcentDiversIndices <sup>49</sup> The dataset is available online at https://oec.world/en/rankings/eci/hs6/hs96

For the specifications of model (1) where the dependent variable is measured by the indicators of trade reforms or the indicators of manufactured exports, the common control variables include the one-year lag of the variables (countries' pre-treatment characteristics) that allowed computing the weights to achieve the balancing of the treatment and control groups before the treatment. These variables are the indicator of structural economic vulnerability, the human assets index, and the real GNI. The additional (specific) control variables introduced in the specification of model (1) where the dependent variable is the indicator of trade reforms are drawn from the literature of the macroeconomic determinants of trade reforms (trade policy and trade costs) (e.g., Ancharaz, 2003; Estefania-Flores et al., 2023; Hou et al., 2021; Milner and Kubota, 2005; Pomfret and Sourdin, 2010; Rose, 2013; Rubínová and Mehdi, 2021; Svaleryd and Vlachos, 2002). These additional controls (introduced with a one-year lag) are the share (in percentage) in GDP of domestic credit supplied to the private sector by banks (a proxy for financial development) (denoted "FINDEV"); an indicator of institutional and governance quality<sup>50</sup> ("INST") and the cumulative number (over time) of Regional Trade Agreements (RTAs) in force to which a given country is party ("CUMRTA"). The participation in RTAs can influence the effect of S&D flexibilities on trade reforms insofar as it affects trade reforms, and may limit the utilization of S&D flexibilities in it involves taking on commitments that are stronger than the ones in WTO rules (e.g., UNCTAD, 2014: Chapter V). On the other hand, additional control variables in the specification of model (1) that permits to explore the effect of S&D flexibilities on manufactured exports (and the integration into the world market for manufactured goods) are also derived from the voluminous literature on the macroeconomic determinants of manufactured export performance (see for example, the recent study by Gnangnon, 2024). These controls are Control variables (introduced with a one-year lag) include the share of net foreign direct investment inflows in GDP ("FDI"), the real effective exchange rate ("REER") (in Log); the investment rare proxied by the share of gross fixed capital formation ("GFCF"); the terms of trade ("TERMS"); the share of total natural resource rents in GDP ("RENT"); as well as the above-mentioned indicators "FINDEV", "INST" and "CUMRTA".

Concerning the analysis of the effect of S&D flexibilities on export upgrading, we use as part of the control variables the pre-treatment countries' characteristics that allow achieve the balancing requirements. These are the one-year lag of the population size index ("POP"), the remoteness index ("REMOTE") (as components of EVI), along with the one-year lag of indicators "HAI" and "(GNI)" (in Log). It is worth noting that we do not include the indicator "EVI" in these specifications of model (1) but rather two sub-components of the latter (that contribute to explaining export product upgrading patterns) because the indicator of export product concentration (which is here a dependent variable) is one component of EVI. The additional control variables included in specifications of model (1) where the dependent variable is the export upgrading indicator, are derived from the extensive literature on the macroeconomic determinants of export product upgrading (e.g., export product diversification and economic complexity) (e.g., Adityaa, and Acharyya, 2015; Agosin et al. 2012; Amighini and Sanfilipo, 2014; Bahar and Santos, 2018; Gnangnon and Roberts, 2017; Hausmann et al. 2007; Harding and Javorcik, 2012; Imbs and Wacziarg, 2003; Kim, 2019; Lapatinas and Litina, 2019; Parteka, 2020; Vogel, 2024; Vu, 2022; Zhu and Fu, 2013). These additional control variables (introduced with a one-year lag) are the square term of "Log(GNI)", as well as the variables "FINDEV", "INST", "CUMRTA", "FDI", "Log(REER)", "GFCF", "TERMS" and "INST", as defined above.

Appendices 3 provides the description and source of all control variables utilized in the analysis. Appendices 4.1 to 4.6 report the descriptive statistics on variables used in the analysis,

<sup>&</sup>lt;sup>50</sup> This indicator is measured as the first principal component (from a factor analysis) of the six indicators of governance developed by the World Governance Indicators (see Kaufmann and Kraay, 2023). These are political stability and absence of violence/terrorism; regulatory quality; rule of law; government effectiveness; voice and accountability, and corruption.

including over each full sample comprising the treatment group and a control group (CG1 or CG2).

#### > Regressions performed in the second step of the EB approach

In the second step of the EB approach, we estimate specifications of model (1) with different dependent variables, and control variables, as described above. It is important to note at this stage of the analysis that to save space, we report only the estimates associated with the variables "Treat" and "Treat\*Art12".

The indicators of trade reforms and of export upgrading display larger between-country variations than the within-country variations. As a result, using the fixed effects approach to estimate the specifications of model (1) where these indicators are dependent variable would allow uncovering estimates that capture within-country variations and ignore the between country variations of variables. Therefore, the specifications of model (1) in which the different dependent variable is measured by the indicators of trade reforms and the export upgrading indicators, are estimated using the feasible generalized least squares ("FGLS") estimator proposed by Zellner (1962). This estimator helps address the heteroskedasticity, serial and cross-sectional correlations in the residuals (e.g., Bai et al., 2021; Zellner, 1962), and is particularly useful when the variance-covariance matrix of errors is unknown, as in such a case, the unknown matrix is estimated from the sample (e.g., Verbeek, 2012). The results of these outcomes are reported in Tables 1 and 2 for the specifications of model (1) that permit to examine the effect of S&D flexibilities on trade reforms, and in Table 6 for the specifications of model (1) that allows investigating the effect of S&D flexibilities on export upgrading.

On the other side, there are likely strong correlations among exports of different types of products. This applies particularly to manufactured exports. Therefore, we employ the Seemingly Unrelated Regression (SURE) estimator of Zellner (1962) to estimate jointly (through a system of equations) specification of model (1) where the dependent variables are the set of major components of total manufactured exports described above. To recall, these are RBMAN, LOWTEX, LOWOTH, MEDM and HIGHM, or alternatively the set of indicators LAB, LOW, MED and HIGH. The SURE technique allows taking account of contemporaneous correlations, and generates greater efficiency of parameters (e.g., Judge et al. 1988). Small-sample statistics are calculated, and the SURE estimator appropriately accounts for the presence of heteroscedasticity in the residuals. The outcomes of these estimations are presented in Tables 3 and 4.

Finally, the indicator of integration into the world market for manufactured products has a larger within-country variation than the between-country variation. As a result, we use the within fixed effects estimator to estimate the specification of model (1) where the dependent variable is measured by the indicator of integration into the world market for manufactured products. The standard errors of the estimates obtained are corrected - for the heteroscedasticity, serial correlation, and contemporaneous cross-sectional dependence in the residuals - by means of the Driscoll and Kraay (1998) technique. The results of the estimations are presented in Table 5.

#### 6. Empirical outcomes

To recall, the estimated parameters associated with the variable "Treat" in Tables 1 to 5 represent the average treatment effects of S&D flexibilities on a dependent variable for LDC founding Members. On the other hand, the effect of S&D flexibilities on a dependent variable for LDC Article XII Members is obtained by summing-up the coefficient associated with "Treat" and the interaction term associated with the variable "Treat\*Art12". This sum is computed at the 5% level and the outcomes obtained are reported in Tables 1 to 6 (see the coefficients reported in the line "net effect for Article XII Members" of all Tables).

#### [Insert Table 1, here]

Let us start with the outcomes reported in Table 1. We note in both upper and lower parts of the Table that S&D flexibilities result in a greater trade policy liberalization in LDC Article XII

Members than on LDC founding Members. S&D flexibilities are associated with a greater trade liberalization in LDC Article XII Members (see the coefficients reported in the line titled "net effect of Article XII Members"), while these flexibilities are associated with a lower extent of trade liberalization (i.e., the adoption of restrictive trade policy measures) in LDC founding Members (see the coefficients associated with the variable "Treat"). This suggests that despite the availability of S&D flexibilities for all LDCs, those that joined the WTO under Article XII tend to adopt trade liberalization measures - thanks surely to the stronger trade liberalization commitments adopted by these countries during their accession process. In contrast, as LDC founding Members did not undertake strong trade liberalization commitments, the utilization of S&D flexibilities by these countries is associated with a lower extent of trade liberalization reform, or in other words, with the adoption of restrictive trade policy measures, and trade-related measures such as capital-related policies that restrict trade flows. This is not really surprising as the primary objective of S&D flexibilities is to allow countries entitled to them to implement restrictive trade policy measures, with a view to promoting their exports. These outcomes confirm the findings in the literature that by limiting access to S&D flexibilities, stronger trade liberalization commitments lead to greater trade policy liberalization (e.g., Conconi and Perroni, 2015; Liu and Ornelas, 2014; Ornelas, 2016; Tobin and Busch, 2020).

#### [Insert Table 2, here]

Outcomes reported in Table 2 represent the effect of S&D flexibilities on trade costs (a measure of trade reforms in the broader sense) and mirror, to some extent, the estimates presented in Table 1. We obtain from both the upper and lower parts of this Table that S&D flexibilities induce a larger reduction of trade costs in LDC Article XII Members than in LDC founding Members. Specifically, estimates displayed in the upper part of the Table show that S&D flexibilities are associated with lower overall trade costs, including both tariff costs and nontariff costs (for agricultural and manufactured goods) in LDC Article XII Members (see columns [1] to [3] of the upper of Table 2). Interestingly, in LDC Article XII Members, S&D flexibilities are associated with the fall in the overall trade costs for manufactured goods, especially tariff costs for these goods (see columns [4] and [5]), but they lead to higher nontariff costs for manufactured products. In other words, the utilization of S&D flexibilities by LDC Article XII Members leads to lower tariff costs for manufactured products, but an increase in nontariff costs for manufactured goods. Outcomes in the lower part of Table 2 suggest slightly different outcomes. It appears that even though S&D flexibilities induce, in general, a larger reduction in trade costs in LDC Article XII Members than in LDC founding Members, this reflects different outcomes depending on the type of trade costs considered. S&D flexibilities lead, in net terms, to the decline in the overall trade costs (i.e., for both agricultural and manufactured goods), especially in lower tariff costs (see columns [1] and [2]). Concurrently, in net terms, S&D flexibilities are associated with an increase in the overall nontariff costs (i.e., for both agricultural and manufactured goods), and to higher overall trade costs for manufactured products, including both tariff costs and nontariff costs for manufactured products (see columns [3] to [6]). Interestingly, for LDC Article XII Members, the positive effect of S&D flexibilities on the nontariff costs for manufactured goods is larger than the positive effect of these flexibilities on tariff costs for the same goods (see results in both upper and lower parts of Table 2). These findings apply as well to LDC founding Members (see the coefficients of the variable "Treat" in columns [5] and [6] in both upper and lower parts of Table 2). More generally, the utilization of S&D flexibilities by LDC founding Members is associated with an increase in trade costs, including both the overall trade costs and its components for agricultural and manufactured goods, as well as the overall trade costs and its components for manufactured goods (see all columns in both upper and lower parts of Table 2). The differences between the findings in Tables 1 and 2 can be attributed to differences in the trade reforms indicators considered in the narrow sense and a broad sense. Indicators of trade reforms used in the narrow sense capture trade policy liberalization, while the indicators of trade reforms in a broad sense reflect trade costs, which embeds not only policy barriers (tariffs and nontariff barriers), but also transportation costs (both freight costs and time costs), information costs, contract enforcement costs, costs associated with the use of different currencies, and legal and regulatory costs. Thus, even though the utilization of S&D flexibilities leads to a greater trade policy liberalization reform (i.e., reduction in trade policy barriers, i.e., tariff and nontariff policy barriers) in LDC Article XII Members, it also results in higher trade costs, especially for manufactured goods because these countries have not been capable of reducing other important sources of trade costs such as transportation costs, information costs, contract enforcement costs, costs associated with the use of different currencies and legal and regulatory costs (in the sense of Anderson and van Wincoop, 2004). Once again, these findings align with those in the literature that reciprocal trade agreements provide greater incentives for trade reforms than non-reciprocal trade agreements do (e.g., Conconi and Perroni, 2015; Liu and Ornelas, 2014; Ornelas, 2016; Tobin and Busch, 2020).

Overall, results in Tables 1 and 2 suggest that the utilization of S&D flexibilities is associated with a greater extent of trade reforms in LDC Article XII Members than in LDC founding Members. In particular, the utilization of S&D flexibilities is associated with trade policy liberalization in LDC Article XII Members, but with a lower extent of trade policy liberalization reform (or the adoption of restrictive trade policy measures) in LDC founding Members. Concurrently, in both sub-groups of LDCs, the utilization of S&D flexibilities is associated, in net terms, with an increase in trade costs (including both tariffs and nontariff costs) for manufactured goods (although to a lesser extent in LDC Article XII Members than in LDC founding Members). This is particularly due to the fact that the utilization of S&D flexibilities has not gone along with the reduction of non-policy barriers related costs. These findings tend to support hypothesis 1.

#### [Insert Table 3, here]

The outcomes in the upper and lower parts of Table 3 are quite similar. We observe for LDC Article XII Members that the utilization of S&D flexibilities is positively associated with the export of all types of manufactures except for low-skill manufactures (textile, garment and footwear). When considering outcomes in the upper part of Table 3, we observe that the effect of the utilization of S&D flexibilities is the largest on resource-based manufactured exports, followed by high-skill manufactured exports, other low-skill manufactured exports (that is, low-skill manufactures excluding textile, garment and footwear), and finally by medium-skill manufactured exports. For LDC founding Members, the utilization of S&D flexibilities is positively associated with resource-based manufactured exports (to the same extent as it does for LDC Article XII Members) but is negatively associated with the export of low-skill and technology-intensive manufactures. The utilization of S&D flexibilities, however, exerts no significant effect on the export of the three other types of manufactures. Thus, the findings from Table 3 show that S&D flexibilities allow LDC Article XII Members to expand their exports across different types of manufactures, while LDC founding Members tend to concentrate on the export of only one type of manufactured exports, that is, the resource-based manufactured goods. The differentiated effect of S&D flexibilities on manufactured exports in LDC Article XII Members and in LDC founding Members can be explained (as we have seen from Tables 1 and 2) by the fact that the utilization of S&D flexibilities is accompanied by a greater trade policy liberalization in LDC Article XII Members but associated with the adoption of restrictive trade measures in LDC founding Members. Moreover, even though the S&D flexibilities are associated with higher trade costs for manufactured goods in both sub-groups of LDCs, the extent of increase in the trade costs for manufactured goods is larger for LDC founding Members than for LDC Article XII Members. In this context, we should not be surprised to obtain later in the analysis (i.e., from Table 6) that the utilization of S&D flexibilities leads to export diversification in LDC Article XII Members, but export concentration in LDC founding Members.

Results in Table 4 align, to some extent, with those in Table 3. The outcomes in the upper part of Table 4 are slightly different from those in the lower part of the Table, especially for LDC

Article XII Members. The utilization of S&D flexibilities affects positively and significantly the export of high-skill and technology-intensive manufactures, but it does not influence the other types of manufactures. The outcomes in the lower part of Table 4 suggest for LDC Article XII Members that the utilization of S&D flexibilities helps promote the export of low-skill, medium-skill and high-skill and technology-intensive manufactures, at the expense of labour and resource intensive manufactured exports. This positive effect of the utilization of S&D flexibilities is the largest on medium-skill and technology-intensive exports, followed by low-skill and technology-intensive manufactured exports. These findings apply to the outcomes reported in the upper part of Table 4 (although with different estimates), but with the exception that the utilization of S&D flexibilities exert here no significant effect on labour and resource intensive manufactured exports.

Summing-up, estimates in Tables 3 and 4 indicate that S&D flexibilities are utilized by LDC Article XII Members to diversify their goods exports across different types of manufactures. In contrast, LDC founding Members utilize S&D flexibilities to export items relating to a specific type of manufacture. These findings tend to support hypothesis 2, and align with the argument in the literature that trade liberalization can promote manufactured exports (e.g., Aditya and Acharyya, 2015; Dennis and Shepherd, 2011; Gaglio, 2017; Osakwe et al., 2018; Stojčić et al., 2018; World Bank, 2021: Chapter 3).

#### [Insert Table 4, here] [Insert Table 5, here]

Outcomes in Table 5 align in spirit with the previous findings. They show that the utilization of S&D flexibilities has been instrumental in fostering the integration of LDC Article XII Members into the world market for manufactured goods, while it has exerted no significant effect on the LDC founding Members' integration into the world market for manufactured goods.

Turning to results in Table 6, we find from the upper and lower parts of the Table that the utilization of S&D flexibilities has resulted in lower levels of economic complexity in LDC Article XII Members and LDC founding Members alike (see column [6] of the Table). This signifies that S&D flexibilities have not helped LDCs simultaneously diversify its export product baskets and exporting sophisticated products that a few other countries in the world export. This outcome is not surprising given the weak human and financial capabilities of these countries, as well as their weak trade capacity (these are indeed the rationale for offering S&D flexibilities to LDCs). However, this does not mean that LDCs or some countries among them have not diversified their export products. We observe from columns [1] to [5] (in both the upper and lower parts of Table 6) that for LDC founding Members, the utilization of S&D flexibilities leads to a higher export concentration (including a higher export market concentration and a higher export product concentration with the effect being larger on the latter than on the former), and an export structure that diverge from the world export patterns. In contrast, the utilization of S&D flexibilities by LDC Article XII Members is associated with a greater overall export diversification (see column [1]), in particular a higher export product diversification (see columns [2] and [4]) and an export structure that converges to the world export patterns. However, it does lead to an increase in export market (per product) concentration. It is worth noting that results associated with the Theil indices of export diversification (see columns [1] to [3]) are qualitatively similar to those obtained when the dependent variable is the Hirschman-Herfindahl index (see column [4]).

Overall, S&D flexibilities have been instrumental in fostering export product diversification in LDC Article XII Members, and inducing a greater export product concentration in LDC founding Members. However, they the utilization of these flexibilities has helped neither LDC Article XII Members, nor LDC founding Members diversify export markets (per product) (despite the generous market access schemes offered by both developed and developing countries to LDCs), nor have these flexibilities allowed LDCs to export sophisticated products that a few other countries in the world export. These findings lend support to hypothesis 3.

#### 7. Conclusion

This article investigates, for the first time, how S&D flexibilities in the WTO rules affect trade reforms, manufactured exports and export upgrading in LDCs. The empirical analysis has established many findings concerning LDC Article XII Members (LDCs that acceded to the WTO under the WTO Article XII, i.e., those that took on stronger trade liberalization commitments) on the one hand, and LDC founding Members (non-LDC developing countries that did not join the WTO under Article XII), on the other hand. First, the utilization of S&D flexibilities leads to a greater trade policy liberalization in LDC Article XII Members, but results in a lower extent of trade liberalization reforms (in other words, a greater trade protectionism) in LDC founding Members. The outcome concerning LDC founding Members is not blamable in itself, as the main purpose of S&D flexibilities is to allow beneficiary countries to be waived partially or fully from the implementation of WTO rules that aim to enhance trade liberalization. In the meantime, the utilization of S&D flexibilities is yet associated with higher greater trade costs for manufactured goods, but to a lesser extent for LDC Article XII Members than for LDC founding Members. Relatedly, it fosters manufactured exports across different types of manufactures, and export upgrading in LDC Article XII Members, but promotes the export of a few specific manufactures in LDC founding Members.

The analysis has revealed that the utilization of S&D flexibilities has helped LDC Article XII Members promote manufactured exports, diversify export products, and better integrate into the world market for manufactured products while the reverse outcomes are obtained for LDC founding Members. This is probably because these countries were able to liberalize trade (thanks to their stronger trade liberalization commitments) while using the S&D flexibilities they are entitled to in the WTO rules. These findings show that combining the utilization of S&D flexibilities with a certain degree of trade liberalization (instead of using S&D flexibilities with a lower extent of trade liberalization reforms) is surely conducive to the promotion of manufactured exports, export upgrading and the enhancement of LDCs' integration into the world market for manufactured products.

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# **Tables and Appendices**

	Full sample: TG + CG1					
Variables	MATR	MATRNT	TRMATR	KMATR		
	(1)	(2)	(3)	(4)		
Treat*Art12	-2.643***	-3.247***	-3.898***	-2.320***		
	(0.605)	(0.670)	(1.209)	(0.369)		
Treat	0.567**	1.212***	0.137	1.254***		
	(0.262)	(0.214)	(0.321)	(0.113)		
Art12	0.428	0.402	0.584	0.0544		
	(0.295)	(0.357)	(0.410)	(0.127)		
Net effect for Article XII Members	-2.076	-2.035	-3.898	-1.066		
Observations	878	878	878	878		
Countries	55	55	55	55		
Pseudo R-squared	0.9954	0.9937	0.9925	0.9905		
Wald Chi2 Statistic (D. value)	27975.79	27649.00	22740 76 (0.0000)	18706.33		
wald Chi2 Statistic (P-value)	(0.0000)	(0.0000)	<i>5574</i> 0.70 (0.0000)	(0.0000)		

**Table 1:** Effect of S&D flexibilities on trade reform (trade policy liberalization)

 *Estimator.* FGLS (with panel-specific first order autocorrelation)

	Full sample: TG + CG2				
Variables	MATR	MATRNT	TRMATR	KMATR	
	(1)	(2)	(3)	(4)	
Treat*Art12	-3.164***	-2.738***	-3.575***	-2.071***	
	(0.494)	(0.537)	(0.723)	(0.277)	
Treat	1.997***	1.982***	1.448***	1.589***	
	(0.274)	(0.329)	(0.374)	(0.156)	
Art12	-0.178	-0.398*	-0.826***	-0.115	
	(0.132)	(0.228)	(0.117)	(0.0896)	
Net effect for Article XII Members	-1.167	-0.756	-2.127	-0.482	
Observations	985	985	985	985	
Countries	63	63	63	63	
Pseudo R-squared	0.9546	0.9294	0.9260	0.9210	
Wald Chi2 Statistic (P-value)	12379.94 (0.0000)	7708.31 (0.0000)	5357.10 (0.0000)	8988.68 (0.0000)	

Note: \*p-value<0.1; \*\*p-value<0.05; \*\*\*p-value<0.01. Robust standard errors are in parenthesis. The Pseudo R2 has been calculated as the correlation coefficient between the dependent variable and its predicted values. Time dummies have been included in the FGLS-based regressions. Control variables include the one-year lag of "EVI", "HAI", "Log(GNI)", "FINDEV", "INST" and "CUMRTA". The net effects of S&D flexibilities on trade reform for Article XII Members are calculated at the 5% level, as the sum of the estimates of the variables "Treat" and "(Treat\*Art12)".

			Full	sample: TG + CG1		
Variables	Log(TRCOST)	Log(TARIFFC)	Log(NTARIFFC)	Log(TRCOSTMAN)	Log(TARIFFCMAN)	Log(NTARIFFCMAN)
	(1)	(2)	(3)	(4)	(5)	(6)
Treat*Art12	-0.353***	-0.0163***	-0.320***	-0.314***	-0.0170***	-0.249***
	(0.0490)	(0.00433)	(0.0378)	(0.0387)	(0.00417)	(0.0353)
Treat	0.268***	0.0114***	0.311***	0.200***	0.0111***	0.275***
	(0.0186)	(0.00167)	(0.0179)	(0.0257)	(0.00187)	(0.0231)
Art12	0.0339*	0.00464*	0.0170	0.0254**	0.00409*	0.0263***
	(0.0180)	(0.00282)	(0.0123)	(0.0126)	(0.00229)	(0.00779)
Net effect for Article XII Members	-0.085	-0.005	-0.009	-0.114	-0.006	+0.026
Observations	887	826	805	830	813	747
Countries	52	51	51	51	51	49
Pseudo R-squared	0.9998	0.9924	0.9997	0.9995	0.9924	0.9995
Wald Chi2 Statistic (P-value)	710167.43 (0.0000)	21722.91 (0.0000)	1164048 (0.0000)	1221161 (0.0000)	24255.97 (0.0000)	1076469 (0.0000)

**Table 2:** Effect of S&D flexibilities on trade reform (trade costs reduction) in Article XII Members versus NonArticle XII Members*Estimator.* FGLS (with panel-specific first order autocorrelation)

			Full	sample: TG + CG2		
Variables	Log(TRCOST)	Log(TARIFFC)	Log(NTARIFFC)	Log(TRCOSTMAN)	Log(TARIFFCMAN)	Log(NTARIFFCMAN)
	(1)	(2)	(3)	(4)	(5)	(6)
Treat*Art12	-0.319***	-0.0116***	-0.235***	-0.126***	-0.00881**	-0.0761**
	(0.0409)	(0.00436)	(0.0302)	(0.0291)	(0.00441)	(0.0335)
Treat	0.279***	0.0103***	0.329***	0.151***	0.0100***	0.202***
	(0.0205)	(0.00187)	(0.0183)	(0.0232)	(0.00199)	(0.0213)
Art12	-0.0474**	-0.000819	-0.00108	-0.0995***	0.00101	-0.0667***
	(0.0202)	(0.00247)	(0.0128)	(0.0201)	(0.00276)	(0.0153)
Net effect for Article XII Members	-0.04	-0.0013	+0.094	+0.025	+0.0012	+0.126
Observations	1,003	938	917	961	926	875
Countries	60	59	59	59	59	57
Pseudo R-squared	0.9986	0.9326	0.9986	0.9977	0.9361	0.9978
Wald Chi2 Statistic (P-value)	389362.64 (0.0000)	7904.60 (0.0000)	701829.01 (0.0000)	404235.25 (0.0000)	8518.97 (0.0000)	333853.80 (0.0000)

Note: \*p-value<0.1; \*\*p-value<0.05; \*\*\*p-value<0.01. Robust standard errors are in parenthesis. The Pseudo R2 has been calculated as the correlation coefficient between the dependent variable and its predicted values. Time dummies have been included in the FGLS-based regressions. Control variables include the one-year lag of "EVI", "HAI", "Log(GNI)", "FINDEV", "INST" and "CUMRTA". The net effects of S&D flexibilities on trade reform for Article XII Members are calculated at the 5% level, as the sum of the estimates of the variables "Treat" and "(Treat\*Art12)".

**Table 3:** Effect of S&D flexibilities on manufactured exports (based on technological categories defined by Lall et al. 2000)

	Full sample: TG + CG1					
Variables	RBMAN1	LOWTEX1	LOWOTH1	MEDM1	HIGM1	
	(1)	(2)	(3)	(4)	(5)	
Treat*Art12	0.310	0.405	1.308***	1.015**	1.712***	
	(0.429)	(0.436)	(0.343)	(0.483)	(0.322)	
Treat	1.179***	-1.542***	-0.207	-0.127	-0.0225	
	(0.215)	(0.202)	(0.162)	(0.232)	(0.203)	
Art12	0.169	1.521***	-0.0229	-0.162	-0.547	
	(0.344)	(0.482)	(0.309)	(0.402)	(0.348)	
Net effect for Article	+1.179	-1.542	+1.308	+1.015	+1.712	
XII Members						
Observations	762	762	762	762	762	
$\mathbb{R}^2$	0.848	0.950	0.941	0.851	0.940	
F-Statistic (P-value)	252.02 (0.0000)	392.82 (0.0000)	695.11 (0.0000)	240.12 (0.0000)	497.57 (0.0000)	
BP test <sup>a</sup>			369.738 (0.0000)			

*Estimator*. Seemingly Unrelated Regression (SURE)

		F			
Variables	RBMAN1	LOWTEX1	LOWOTH1	MEDM1	HIGM1
	(1)	(2)	(3)	(4)	(5)
Treat*Art12	0.574	0.126	1.161***	1.056**	1.663***
	(0.389)	(0.356)	(0.316)	(0.449)	(0.283)
Treat	0.994***	-1.309***	-0.0462	-0.142	-0.0660
	(0.192)	(0.157)	(0.136)	(0.201)	(0.175)
Art12	0.508	1.136***	0.0144	-0.146	-0.553
	(0.375)	(0.420)	(0.315)	(0.413)	(0.352)
Net effect for Article XII Members	+0.994	-1.309	+1.161	+1.056	+1.663
Observations	859	859	859	859	859
$\mathbb{R}^2$	0.845	0.955	0.947	0.872	0.943
F-Statistic (P-value)	212.25 (0.0000)	482.74 (0.0000)	676.85 (0.0000)	298.95 (0.0000)	445.39 (0.0000)
BP test <sup>a</sup>	· · ·	· ·	412 612 (0.0000)	• •	• •

BP test<sup>a</sup>

Note: \*p-value<0.1; \*\*p-value<0.05; \*\*\*p-value<0.01. Robust standard errors are in parenthesis. Time dummies and countries' unobservable time invariant fixed effects have been included in the regressions. (a): "BP test" refers to the Breusch-Pagan test of independence. We provide here the Chi-square statistic and the related p-value in brackets. Small-sample statistics have been computed and heteroscedasticity in the residuals have been accounted for in the regressions. R<sup>2</sup> is the R-squared of the regressions. Control variables include the one-year lag of "EVI", "HAI", "Log(GNI)", "FINDEV", "INST", "CUMRTA", "FDI", "Log(REER)", "GFCF", "TERMS" and "INST". The net effects of S&D flexibilities on manufactured exports for Article XII Members are calculated at the 5% level, as the sum of the estimates of the variables "Treat" and "(Treat\*Art12)".

 Table 4: Effect of S&D flexibilities on manufactured exports in Article XII Members versus

 NonArticle XII Members

		Full sample	e: TG + CG1	
Variables	LAB1	LOW1	MED1	HIGH1
	(1)	(2)	(3)	(4)
Treat*Art12	-2.790***	1.417*	2.464***	-0.218
	(0.579)	(0.738)	(0.426)	(0.343)
Treat	-0.0326	-0.239	-0.0832	0.805***
	(0.269)	(0.272)	(0.145)	(0.206)
Art12	1.821***	-2.052***	-0.288	1.708***
	(0.476)	(0.555)	(0.383)	(0.387)
Net effect for Article XII Members	-2.790	0	+2.464	+0.805
Observations	699	699	699	699
$\mathbb{R}^2$	0.864	0.801	0.890	0.818
F-Statistic (P-value)	162.47 (0.0000)	240.78 (0.0000)	1166.96 (0.0000)	102.65 (0.0000)
BP test <sup>a</sup>		371.698	3 (0.0000)	
		Full sample	e: TG + CG2	
Variables	LAB1	LOW1	MED1	HIGH1
	(1)	(2)	(3)	(4)
Treat*Art12	-2.480***	1.257**	2.514***	-0.248
	(0.435)	(0.595)	(0.390)	(0.327)
Treat	-0.0744	-0.252	-0.132	0.861***
	(0.233)	(0.234)	(0.127)	(0.182)
Art12	1.556***	-1.645***	-0.237	1.591***
	(0.446)	(0.538)	(0.399)	(0.383)
Net effect for Article XII Members	-2.480	+1.257	+2.514	+0.861
Observations	796	796	796	796
$\mathbb{R}^2$	0.869	0.826	0.894	0.820
F-Statistic (P-value)	129.39 (0.0000)	245.21 (0.0000)	175.32 (0.0000)	112.53 (0.0000)
BP test <sup>a</sup>	· · · · · ·	410.154	4 (0.0000)	\/

*Estimator*. Seemingly Unrelated Regression (SURE)

Note: \*p-value<0.1; \*\*p-value<0.05; \*\*\*p-value<0.01. Robust standard errors are in parenthesis. Time dummies and countries' unobservable time invariant fixed effects have been included in the regressions. (a): "BP test" refers to the Breusch-Pagan test of independence. We provide here the Chi-square statistic and the related p-value in brackets. Small-sample statistics have been computed and heteroscedasticity in the residuals have been accounted for in the regressions. R<sup>2</sup> is the R-squared of the regressions. Control variables include the one-year lag of "EVI", "HAI", "Log(GNI)", "FINDEV", "INST", "CUMRTA", "FDI", "Log(REER)", "GFCF", "TERMS" and "INST". The net effects of S&D flexibilities on manufactured exports for Article XII Members are calculated at the 5% level, as the sum of the estimates of the variables "Treat" and "(Treat\*Art12)". **Table 5:** Effect of S&D flexibilities on the integration into the world market for manufactured goods

## *Estimator*. FEDK

	Full sample: TG + CG1	Full sample: TG + CG2
Variables	Log(INTEG)	Log(INTEG)
	(1)	(2)
Treat*Art12	0.318***	0.322***
	(0.0709)	(0.0638)
Treat	0.0263	0.0383
	(0.0417)	(0.0396)
Net effect for Article XII Members	+0.318	+0.322
Observations	644	746
Countries	40	47
Within R <sup>2</sup>	0.9906	0.9894
F-Statistic (P-value)	78583.78 (0.0000)	63226.72 (0.0000)

Note: \*p-value<0.1; \*\*p-value<0.05; \*\*\*p-value<0.01. Robust standard errors are in parenthesis. Time dummies and countries' unobservable time invariant fixed effects have been included in the regressions. (a): "BP test" refers to the Breusch-Pagan test of independence. R<sup>2</sup> is the R-squared of the regressions. Control variables include the one-year lag of "EVI", "HAI", "Log(GNI)", "FINDEV", "INST", "CUMRTA", "FDI", "Log(REER)", "GFCF", "TERMS" and "INST". The net effects of S&D flexibilities on the integration into the world market for manufactured products for Article XII Members are calculated at the 5% level, as the sum of the estimates of the variables "Treat" and "(Treat\*Art12)".

# **Table 6:** Effect of S&D flexibilities on export upgrading*Estimator.* FGLS (with panel-specific first order autocorrelation)

			Full sample: T	G + CG1		
Variables	EDI	EDIPR	EDIMA	EDIPRH	EXPSTR	ECONC
	(1)	(2)	(3)	(4)	(5)	(6)
Treat*Art12	1.090***	1.010***	0.251	0.233***	0.0481***	0.107
	(0.149)	(0.161)	(0.156)	(0.0373)	(0.0132)	(0.158)
Treat	-0.885***	-0.253***	-0.340***	-0.118***	-0.0335***	-0.405***
	(0.0857)	(0.0675)	(0.0459)	(0.0147)	(0.00637)	(0.0736)
Art12	-0.185**	0.00161	0.000809	-0.0149**	-0.00390	0.00147
	(0.0897)	(0.0309)	(0.0584)	(0.00666)	(0.00570)	(0.0277)
Net effect for Article XII Members	+0.205	+0.757	-0.340	+0.115	+0.015	-0.405
Observations	778	778	778	778	778	436
Countries	49	49	49	49	49	35
Pseudo R-squared	0.9974	0.9863	0.9953	0.9567	0.9984	0.9444
Wald Chi2 Statistic (P-	169365.89	66503.72	46538 78 (0.0000)	12946.49	173541.91	3039.84
value)	(0.0000)	(0.0000)	40330.78 (0.0000)	(0.0000)	(0.0000)	(0.0000)
			Full sample: T	G + CG2		
Variables	EDI	EDIPR	EDIMA	EDIPRH	EXPSTR	ECONC
	(1)	(2)	(3)	(4)	(5)	(6)
Treat*Art12	1.118***	0.981***	0.309*	0.219***	0.0543***	0.0354
	(0.127)	(0.159)	(0.169)	(0.0359)	(0.0125)	(0.156)
Treat	-0.878***	-0.293***	-0.334***	-0.116***	-0.0366***	-0.386***
	(0.0726)	(0.0653)	(0.0456)	(0.0139)	(0.00553)	(0.0696)
Art12	-0.195***	-0.00281	-0.0255	-0.00413	-0.00413	-0.00156
	(0.0595)	(0.0234)	(0.0681)	(0.00484)	(0.00478)	(0.0166)
Net effect for Article XII Members	+0.24	+0.688	-0.334	+0.103	+0.018	-0.386
Observations	875	875	875	875	875	532
Countries	55	55	55	55	55	41

Pseudo R-squared	0.9974	0.9864	0.9950	0.9565	0.9985	0.9503
Wald Chi2 Statistic (P-	194376.12	64815.15	56034 08 (0 0000)	12469.26	171449.00	3142.79
value)	(0.0000)	(0.0000)	50054.98 (0.0000)	(0.0000)	(0.0000)	(0.0000)

Note: \*p-value<0.1; \*\*p-value<0.05; \*\*\*p-value<0.01. Robust standard errors are in parenthesis. The Pseudo R2 has been calculated as the correlation coefficient between the dependent variable and its predicted values. Time dummies have been included in the FGLS-based regressions. Control variables include the one-year lag of "REMOTE", "POP", "HAI", "Log(GNI)", the square term of "Log(GNI)", "FINDEV", "INST", "CUMRTA", "FDI", "Log(REER)", "GFCF", "TERMS" and "INST". The net effects of S&D flexibilities on export upgrading for Article XII Members are calculated at the 5% level, as the sum of the estimates of the variables "Treat" and "(Treat\*Art12)".

### **APPENDICES**

**Appendix 1.1:** List of the 40 countries in the treatment group ("TG"), 16 countries in the control group ("CG1") and 23 countries in the control group ("CG2")\_for the analysis of the effects of S&D flexibilities on trade reform

Treatment Group (TG)		Article XII Members of the Treatment Group	Control Group ("CG1")	Control Group ("CG2")
Afghanistan	Mali	Afghanistan	Cameroon	Bolivia
Angola	Mauritania	Cabo Verde	Congo, Rep.	Cameroon
Bangladesh	Mozambique	Cambodia	Cote d'Ivoire	Congo, Rep.
Benin	Myanmar	Lao PDR	Eswatini	Cote d'Ivoire
Botswana	Nepal	Liberia	Ghana	Egypt, Arab Rep.
Burkina Faso	Niger	Nepal	Guyana	Eswatini
Burundi	Rwanda	Samoa	Honduras	Ghana
Cabo Verde	Samoa	Vanuatu	India	Honduras
Cambodia	Senegal	Yemen, Rep.	Kenya	India
Central African Republic	Sierra Leone		Mongolia	Jordan
Chad	Solomon Islands		Namibia	Kenya
Congo, Dem. Rep.	Tanzania		Nicaragua	Kyrgyz Republic
Djibouti	Togo		Nigeria	Morocco
Gambia, The	Uganda		Pakistan	Nicaragua
Guinea	Vanuatu		Papua New Guinea	Nigeria
Guinea-Bissau	Yemen, Rep.		Viet Nam	Pakistan
Haiti	Zambia			Papua New Guinea
Lao PDR				Philippines
Lesotho				Sri Lanka
Liberia				Tajikistan
Madagascar				Tunisia
Malawi				Viet Nam
Maldives				Zimbabwe

Treatment Group (TG)		Article XII Members of	Control Group	Control Group
		the Treatment Group	("CG1")	("CG2")
Angola	Niger	Cambodia	Cameroon	Bolivia
Bangladesh	Rwanda	Lao PDR	Congo, Rep.	Cameroon
Benin	Samoa	Nepal	Cote d'Ivoire	Congo, Rep.
Botswana	Senegal	Samoa	Eswatini	Cote d'Ivoire
Burkina Faso	Sierra Leone	Vanuatu	Ghana	Egypt, Arab Rep.
Burundi	Solomon Islands	Yemen, Rep.	Guyana	Eswatini
Cambodia	Tanzania		Honduras	Ghana
Central African Republic	Togo		India	Honduras
Chad	Uganda		Kenya	India
Congo, Dem. Rep.	Vanuatu		Mongolia	Jordan
Djibouti	Yemen, Rep.		Namibia	Kenya
Gambia, The	Zambia		Nicaragua	Kyrgyz Republic
Guinea			Pakistan	Morocco
Guinea-Bissau			Papua New Guinea	Nicaragua
Haiti			Viet Nam	Pakistan
Lao PDR				Papua New Guinea
Lesotho				Philippines
Madagascar				Sri Lanka
Mali				Tajikistan
Mauritania				Tunisia
Nepal				Viet Nam

**Appendix 1.2**: List of the 33 countries in the treatment group ("TG"), 15 countries in the control group ("CG1"), and 21 countries in the control group ("CG2")\_for the analysis of the effects of S&D flexibilities on manufactured exports and integration into the world manufactured market

Appendix 1.3: List of the 33 countries in the treatment group ("TG"), 16 countries in the control group ("CG1") and 22 countries in the control group
("CG2")_for the analysis of the effects of S&D flexibilities on export product upgrading

Treatment Group (TG)		Article XII Members of the Treatment Group	Control Group ("CG1")	Control Group ("CG2")
Angola	Rwanda	Cambodia	Cameroon	Bolivia
Bangladesh	Samoa	Lao PDR	Congo, Rep.	Cameroon
Benin	Senegal	Nepal	Cote d'Ivoire	Congo, Rep.
Botswana	Sierra Leone	Samoa	Eswatini	Cote d'Ivoire
Burkina Faso	Solomon Islands	Vanuatu	Ghana	Egypt, Arab Rep.
Burundi	Tanzania	Yemen, Rep.	Guyana	Eswatini
Cambodia	Togo		Honduras	Ghana
Central African Republic	Uganda		India	Honduras
Chad	Vanuatu		Kenya	India
Congo, Dem. Rep.	Yemen, Rep.		Mongolia	Jordan
Djibouti	Zambia		Namibia	Kenya
Gambia, The			Nicaragua	Kyrgyz Republic
Guinea			Pakistan	Morocco
Guinea-Bissau			Papua New Guinea	Nicaragua
Haiti			Viet Nam	Pakistan
Lao PDR			Zimbabwe	Papua New Guinea
Lesotho				Philippines
Madagascar				Sri Lanka
Mali				Tajikistan
Mauritania				Tunisia
Nepal				Viet Nam
Niger				Zimbabwe

	Target Value	Unbalanced		Balanced	
	(1)	(2)	(3)	(4)	(5)
		Value	Standardized difference	Value	Standardized difference
Log(GNI) <sub>t-1</sub>	7.555	8.363	1.385	7.555	7.61e-15
EVI <sub>t-1</sub>	0.400	0.330	-0.591	0.400	-4.24e-15
$\mathrm{HAI}_{t-1}$	0.484	0.467	-0.058	0.484	-6.52e-15

**Appendix 2.1:** Covariates balance for the analysis of the effect of S&D flexibilities on **Trade reform**\_Over the Full sample (TG + CG1)

**Appendix 2.2:** Covariates balance for the analysis of the effect of S&D flexibilities on **Trade reform\_**Over the Full sample (TG + CG2)

	Target Value	Unbalanced		Balanced	
	(1)	(2)	(3)	(4)	(5)
		Value	Standardized	Value	Standardized
		value	difference	value	difference
Log(GNI) <sub>t-1</sub>	7.554	8.345	1.509	7.554	2.03e-14
EVI <sub>t-1</sub>	0.400	0.366	-0.297	0.400	-1.72e-14
HAI <sub>t-1</sub>	0.482	0.445	-0.125	0.482	5.36e-15

**Appendix 2.3:** Covariates balance for the analysis of the effect of S&D flexibilities on manufactured exports and integration into the manufactured world markets\_Over the Full sample (TG + CG1)

	Target Value	Unbalanced		Balanced	
	(1)	(2)	(3)	(4)	(5)
		Value	Standardized difference	Value	Standardized difference
Log(GNI) <sub>t-1</sub>	7.555	8.266	1.237	7.555	1.55e-15
EVI <sub>t-1</sub>	0.399	0.373	-0.235	0.399	0
HAI <sub>t-1</sub>	0.484	0.445	-0.131	0.484	-1.85e-16

**Appendix 2.4:** Covariates balance for the analysis of the effect of S&D flexibilities on manufactured exports and integration into the manufactured world markets\_Over the Full sample (TG + CG2)

	Target Value	Unbalanced		Balanced	
	(1)	(2)	(3)	(4)	(5)
		Value	Standardized difference	Value	Standardized difference
Log(GNI) <sub>t-1</sub>	7.561	8.403	1.593	7.561	-1.68e-15
EVI <sub>t-1</sub>	0.401	0.317	-0.749	0.401	1.00e-15
HAI <sub>t-1</sub>	0.494	0.454	-0.134	0.494	-5.56e-16

	Target Value	Unbalanced		Balanced	
	(1)	(2)	(3)	(4)	(5)
		Value	Standardized	Value	Standardized
			difference		difference
Log(GNI) <sub>t-1</sub>	7.555	8.363	1.385	7.555	7.61e-15
$EVI_{t-1}$	0.399	0.330	-0.591	0.399	-4.24e-15
HAI <sub>t-1</sub>	0.484	0.467	-0.058	0.484	-6.52e-15

Appendix 2.5: Covariates balance for the analysis of the effect of S&D flexibilities on export upgrading\_Over the Full sample (TG + CG1)

Appendix 2.6: Covariates balance for the analysis of the effect of S&D flexibilities on export upgrading\_Over the Full sample (TG + CG2)

	Target Value	Unbalanced		Balanced	
	(1)	(2)	(3)	(4)	(5)
		Waluo	Standardized	Value	Standardized
		value	difference	value	difference
$Log(GNI)_{t-1}$	7.561	8.403	1.593	7.561	-1.68e-15
EVI <sub>t-1</sub>	0.401	0.317	-0.749	0.401	1.00e-15
HAI <sub>t-1</sub>	0.494	0.454	-0.134	0.494	-5.56e-16

Appendix 3: Definition and source of control variables used in the analysis

Variables	Definition	Source
GFCF	This is the share (in percentage) of Gross fixed capital formation of GDP.	World Development Indicators (WDI)
CUMRTA	This is the cumulative number (over time) of Regional Trade Agreements (RTAs) in force to which a given country is party.	Data collected by the author from the WTO database (available at: <u>https://rtais.wto.org/UI/charts.asp</u> <u>x#</u> )
FDI	This is the share (in percentage) of net foreign direct investment inflows in GDP.	WDI
GNI	Per capita Gross National Income (constant 2015 US\$)	WDI
EVI	This is indicator of structural economic vulnerability, also referred to as the Economic Vulnerability Index. It has been set up by the United Nations Committee for Development Policy (CDP), and used as one of the criteria for the entry or graduation from the category of LDCs. It has been computed for 145 developing countries (including 48 LDCs) by the "Fondation pour les Etudes et Recherches sur le Developpement International". The EVI is the simple arithmetic average of two sub-indexes, namely the intensity of exposure to shocks (exposure sub-index), and the intensity of exogenous shocks (shocks sub-index). These two sub-indexes are calculated using a weighted average of different component indexes, with the sum of components' weights equals 1 so that the values of EVI range between 0 and 100. For the sake of the analysis, we re-scale the indicator "EVI" so that its values range from 0 to 1. The components of the exposure sub-index are the population size; the remoteness	Data on EVI is extracted from the database of the Fondation pour les Etudes et Recherches sur le Developpement International (FERDI) - see online at: <u>https://ferdi.fr/donnees/un- indicateur-de-vulnerabilite-</u> <u>economique-EVI-retrospectif</u>

	from world markets index; the export product concentration; the share of agriculture, forestry and fisheries in GDP and the index of the share of population living in low elevated coastal zone. The components of the shocks sub-index are the agricultural production instability; the export instability; and the index of the victims of natural disasters. For further details on the computation of the EVI, see for example Feindouno and Goujon (2016).	
REMOTE	This is the index of remoteness from world markets. As described above, it is the sub-component of the indicator of structural economic vulnerability. Higher values of this index indicate a higher remoteness from the world markets.	The data on this variable are extracted from the database of the Fondation pour les Etudes et Recherches sur le Developpement International (FERDI) - see online at: <u>https://ferdi.fr/donnees/un- indicateur-de-vulnerabilite-</u> <u>economique-EVI-retrospectif</u>
РОР	This is the index of population from world markets. As described above, it is the sub-component of the indicator of structural economic vulnerability. Higher values of this index indicate a higher population size.	The data on this variable are extracted from the database of the Fondation pour les Etudes et Recherches sur le Developpement International (FERDI) - see online at: <u>https://ferdi.fr/donnees/un- indicateur-de-vulnerabilite- economique-EVI-retrospectif</u>
HAI	This is the human assets index. It is computed as the geometric mean of the indicators of life expectancy at birth, expected years of schooling, and mean years of schooling (each of these components has been normalized beforehand so that its values range from 0 to 1). Data on the indicators of life expectancy at birth, expected years of schooling, and mean years of schooling were extracted from the database developed by United Nations Development Programme (UNDP) on the human development index.	Authors' computation using the Database developed by the United Nations Development Programme (UNDP), which is accessible online at: <u>https://hdr.undp.org/data- center/human-development- index#/indicies/HDI</u>
REER	This is the measure of the real effective exchange rate (based on the consumer price index), computed using a nominal effective exchange rate based on 65 trading partners. An increase in the values of this index indicates an appreciation of the real effective exchange rate, i.e., an appreciation of the home currency against the basket of currencies of trading partners.	Bruegel Datasets (see Darvas 2012a, 2012b). The dataset can be found online at: <u>http://bruegel.org/publications/da</u> <u>tasets/real-effective-exchange-rates-</u> <u>for-178-countries-a-new-database/</u>
TERMS	This is the indicator of terms of trade, measured by the net barter terms of the trade index $(2000 = 100)$ .	WDI
RENT	Share (in percentage) of total natural resources rents in GDP.	WDI
FINDEV	This is the proxy for financial development. It is measured by the share (%) of domestic credit to private sector by banks in GDP.	WDI
INST	This is the variable capturing the institutional and governance quality. It has been computed by extracting the first principal component (based on factor analysis) of the following six indicators of governance. These indicators are respectively: political stability and absence of violence/terrorism; regulatory quality; rule of law; government effectiveness; voice and accountability, and corruption.	Data on the components of "INST" have been extracted from World Bank Governance Indicators developed by Kaufmann and Kraay (2023). See online at: <u>https://info.worldbank.org/govern</u> <u>ance/wgi/</u>

Higher values of the index "INST" are associated with better	
governance and institutional quality, while lower values reflect	
worse governance and institutional quality.	

**Appendix 4.1:** Descriptive statistics on variables used in the analysis of S&D flexibilities on Trade reform\_Over the Full Sample (TG + CG1)

Variable	Observations	Mean	Standard deviation	Minimum	Maximum
MATR	878	12.894	3.950	3	20
MATRNT	878	11.975	4.257	2	18
TRMATR	878	11.571	4.685	2	19
KMATR	878	5.788	2.084	1	10
TRCOST	799	347.852	67.295	129.296	849.916
TARIFFC	765	1.102	0.022	1.046	1.191
NTARIFFC	744	305.403	65.183	112.987	781.022
TRCOSTMAN	756	318.962	65.236	108.394	668.200
TARIFFCMAN	752	1.102	0.023	1.049	1.207
NTARIFFCMAN	700	280.028	62.367	93.561	603.378
EVI	878	0.369	0.094	0.164	0.687
HAI	878	0.580	0.282	0	1
GNI	878	3484.181	2898.394	535.314	18055.720
FINDEV	876	20.071	17.570	0.002	105.276
INST	758	-1.598	1.189	-4.273	2.105
CUMRTA	878	2.669	2.394	0	16

**Appendix 4.2:** Descriptive statistics on variables used in the analysis of S&D flexibilities on trade reform\_Over the Full Sample (TG + CG2)

Variable	Observations	Mean	Standard deviation	Minimum	Maximum
MATR	985	12.858	3.910	3	20
MATRNT	985	11.919	4.175	2	20
TRMATR	985	11.583	4.641	2	19
KMATR	985	5.824	2.073	1	10
TRCOST	906	344.341	67.034	129.296	849.916
TARIFFC	870	1.105	0.025	1.046	1.214
NTARIFFC	849	300.351	66.044	112.987	781.022
TRCOSTMAN	865	319.148	64.267	108.394	668.200
TARIFFCMAN	858	1.105	0.026	1.048	1.209
NTARIFFCMAN	808	278.243	62.708	93.561	603.378
EVI	985	0.354	0.104	0.143	0.687
HAI	985	0.591	0.280	0	1
GNI	985	3783.818	3018.680	535.314	18055.720
FINDEV	982	21.946	18.230	0.002	105.276
INST	849	-1.639	1.125	-4.289	2.106
CUMRTA	985	3.106	2.563	0	16

Variable	Observations	Mean	Standard deviation	Minimum	Maximum
LAB	758	0.373	0.295	0	0.979
LOW	758	0.141	0.182	0	1
MED	758	0.196	0.160	0	1
HIGH	758	0.279	0.223	0	1
RBMAN	762	0.437	0.289	0.005	0.987
LOWTEX	762	0.108	0.151	0.00004	0.487
LOWOTH	762	0.035	0.036	0.0002	0.197
MEDM	762	0.100	0.127	0.0021	0.960
HIGM	762	0.036	0.062	0.0006	0.500
INTEG	644	0.031	0.023	0.00005	0.156
EVI	762	0.365	0.098	0.164	0.700
HAI	762	0.596	0.273	0	1
GNI	762	3425.277	2441.415	662.036	14333.86
FINDEV	759	21.110	18.348	0.0015	105.276
FDI	761	3.604	5.071	-37.172	43.912
REER	762	106.652	17.110	59.0026	186.216
GFCF	760	22.288	8.317	4.468	78.0009
TERMS	762	88.840	65.848	0.108	568.643
INST	680	-1.589	1.232	-4.214	2.102
CUMRTA	762	2.720	2.478	0	16
RENT	762	9.715	10.085	0.265	53.315

**Appendix 4.3**: Descriptive statistics on variables used in the analysis of S&D flexibilities on manufactured exports and integration into the world manufactured market\_Over the Full Sample (TG + CG1)

**Appendix 4.4:** Descriptive statistics on variables used in the analysis of S&D flexibilities on manufactured exports and integration into the world manufactured market\_Over the Full Sample (TG + CG2)

Variable	Observations	Mean	Standard deviation	Minimum	Maximum
LAB	855	0.374	0.279	0	.978922
LOW	855	0.128	0.174	0	1
MED	855	0.196	0.154	0	1
HIGH	855	0.292	0.220	0	1
RBMAN	859	0.398	0.284	0.005	0.987
LOWTEX	859	0.120	0.149	0.00004	0.487
LOWOTH	859	0.039	0.036	0.0002	0.197
MEDM	859	0.109	0.125	0.00206	0.960
HIGM	859	0.048	0.093	0.0006	0.645
INTEG	746	0.027	0.023	0.00004	0.139
EVI	859	0.342	0.106	0.143	0.700
HAI	859	0.605	0.270	0	1
GNI	859	3911.143	2800.506	662.036	14333.860
FINDEV	856	23.993	20.166	0.002	105.276
FDI	858	3.390	4.272	-10.038	37.323
REER	859	107.453	17.969	59.003	187.273
GFCF	857	22.187	7.918	4.468	78.001

TERMS	859	100.797	22.094	18.698	237.970
INST	763	-1.576	1.145	-4.196	2.094
CUMRTA	859	3.213	2.672	0	16
RENT	859	8.757	9.528	0.065	53.315

**Appendix 4.5:** Descriptive statistics on variables used in the analysis of S&D flexibilities on export upgrading\_Over the Full Sample (TG + CG1)

Variable	Observations	Mean	Standard deviation	Minimum	Maximum
EDI	778	-7.527	10.248	-96.477	-0.00012
EDIPR	778	-3.261	4.535	-39.831	-0.00004
EDIMA	778	-4.266	5.815	-62.485	-0.00007
EDIPRH	778	-0.421	0.583	-6.218	-0.00001
EXPSTR	778	-0.818	1.176	-11.232	-0.00001
ECONC	436	-1.110	1.785	-15.526	0.312
REMOTE	778	58.980	17.195	25.637	98.37
POP	778	35.643	21.670	0	96.696
HAI	778	0.596	0.274	0	1
GNI	778	3390.239	2428.887	662.036	14333.86
INST	693	-1.622	1.245	-4.213	2.1014
FINDEV	774	21.088	18.225	0.0015	105.276
FDI	777	3.559	5.030	-37.173	43.912
GFCF	776	22.033	8.444	2	78
CUMRTA	778	2.753	2.464	0	16
TERMS	778	99.995	22.549	18.7	237.97
RENT	778	9.644	9.997	0.265	53.315

**Appendix 4.6:** Descriptive statistics on variables used in the analysis of S&D flexibilities on export upgrading\_Over the Full Sample (TG + CG2)

Variable	Observations	Mean	Standard deviation	Minimum	Maximum
EDI	875	-6.694	9.609	-96.152	-0.00009
EDIPR	875	-2.894	4.244	-38.808	-0.00003
EDIMA	875	-3.800	5.459	-62.275	-0.00005
EDIPRH	875	-0.373	0.545	-5.634	-0.000007
EXPSTR	875	-0.726	1.103	-11.195	-0.000008
ECONC	532	-0.884	1.620	-15.648	0.289
REMOTE	875	54.691	22.664	0	98.37
POP	875	32.778	20.915	0	96.7
HAI	875	0.605	0.271	0	1
GNI	875	3871.105	2790.743	662.036	14333.86
INST	776	-1.606	1.160	-4.195	2.093
FINDEV	871	23.923	20.042	0.0015	105.276
FDI	874	3.354	4.242	-10.038	37.323
GFCF	873	21.963	8.042	2	78
CUMRTA	875	3.233	2.653	0	16
TERMS	875	100.672	21.927	18.698	237.97
RENT	875	8.711	9.451	0.065	53.315