

Structural Economic Vulnerability and the Utilization of Unilateral Trade Preferences: Does Development Aid Matter?

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Structural Economic Vulnerability and the Utilization of Unilateral Trade Preferences: Does Development Aid Matter?

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Abstract

This article has investigated the effect of structural economic vulnerability on the utilization of non-reciprocal trade preferences (NRTPs) offered by the 'Quadrilaterals' and whether development aid flows alter this effect. It considers two major blocks of NRTPs, namely the Generalized System of Preferences (GSP) programs and 'other trade preferences programs'. The analysis uses a panel dataset of 84 beneficiary countries of both NRTPs and development aid, over the period of 2002-2019. Results reveal that a rise in the level of structural economic vulnerability reduces the utilization rates of both GSP programs and other trade preference programs. At the same time, when the level of structural economic vulnerability falls, countries tend to use both blocks of NRTPs in a complementarity way. While development aid inflows foster the utilization of the two blocks of NRTPs, the increase of these resource inflows in the context of greater structural economic vulnerability leads beneficiary countries to strengthen the utilization of other trade preferences programs at the expense of the utilization of GSP programs. The implications of these results are discussed in the conclusion section of the article.

Keywords: Utilization of non-reciprocal trade preferences; Structural economic vulnerability; Development Aid; QUAD countries; Developing countries.

JEL Classification: O11; F13; F35.

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1. Introduction

The proneness of developing countries to shocks, including environmental, economic and financial shocks, and more recently to health shocks such as the COVID-19 pandemic has had deleterious effects on these countries' economic growth and development prospects². To help the international community and national policymakers in developing countries address the challenges related to the vulnerability of their economies to shocks, the Committee for Development Policy (CDP) of the United Nations has developed the concept of 'structural economic vulnerability', which encapsulates the structural impediments to sustainable development in developing countries, and notably in least developed countries³ (LDCs) (e.g., Briguglio et al. 2009; Guillaumont, 2011a). The 'structural economic vulnerability' refers to a country's extent of exposure to exogenous shocks, and the size and frequency of these shocks. It differs from the concept of 'economic resilience', which reflects a country's capacity to react to shocks, and depends on recent policy choices that are easily reversible (Cariolle et al. 2016; Goujon and Guillaumont, 2016; Guillaumont, 2009, 2010; 2011a). The CDP has developed an index of structural economic vulnerability⁴, also referred to as 'economic vulnerability index (EVI)' as one of the criteria used to include a country in the category of LDCs or graduate it out of this category. This group of countries receives special attention from the international community, including through international support measures (e.g., United Nations, 2018, Chapter 2).

Some studies have documented the negative effect of structural economic vulnerability on economic growth in developing countries (e.g., Guillaumont and Wagner, 2012; Gnangnon, 2021a; Cordina, 2004; Wagner, 2014). The importance of development aid for addressing structural impediments to growth and development, and the usefulness of using the EVI (along with other standard indicators) as a criterion for aid allocation, has been pointed out by some studies (e.g., Guillaumont, 2009, 2010, 2011a, 2013; Guillaumont et al., 2017).

In addition to the supply of development aid flows to developing countries, donors also offer non-reciprocal trade preferences (NRTPs) to countries, with a view to helping them 'increase export earnings, promote industrialization and accelerate economic growth rates' as stated in the Resolution⁵ 21(II) of the United Nations Conference on Trade and Development (UNCTAD) (e.g., Grossman and Sykes, 2005). Specifically, the Resolution 21 (II) of the second conference of the UNCTAD held in 1968 called for the establishment of a "generalized, non-reciprocal, non-discriminatory system of preferences in favour of the developing countries, including special measures in favour of the least advanced among the developing countries". The "generalized, non-

² See for example Almansour et al. (2015); Inegbedion (2021); Azomahou et al. (2021); Barrot et al. (2018); Blecker (2021); Commonwealth Secretariat (2021); Caruso (2017); Dabla-Norris and Gündüz (2014); Felbermayr Gröschl (2014); Kim et al. (2020); Kose and Riezman (2001); Noy (2009); Rasaki and Malikane (2015) and Yang and Yang (2021).

³ LDCs are considered as the poorest and most vulnerable countries to environmental and external shocks in the world. Detailed information on the set of criteria used (of which, the 'EVI') to identify LDCs as well as other relevant information on LDCs could be found online at: <https://www.un.org/ohrrls/content/least-developed-countries>

⁴ The 'Fondation pour les Etudes et Recherches sur le Développement International (FERDI)' has constructed on a retrospective basis, a dataset on the index of structural economic vulnerability (e.g., Feindouno and Goujon, 2016).

⁵ See the document "Preferential or Free Entry of Exports of Manufactures and Semi-Manufactures of Developing Countries to the Developed Countries, the United Nations Conference on Trade and Development Resolution 21(II) adopted by the General Assembly, 26 March 1968."

reciprocal, non-discriminatory system of preferences" also referred to as the "Generalized System of Preferences (GSP)", could involve non-reciprocal preferential tariff concessions (e.g., lower tariffs on selected products) to developing countries, and more generous concessions to LDCs that could take, for example, the form of duty-free-quota-free market access for LDCs. The permanent legal basis for providing GSP schemes to developing countries is the Enabling Clause adopted in 1979 by the parties to the GATT⁶, and also termed "Differential and More Favourable Treatment, Reciprocity and Fuller Participation of Developing Countries".

Besides GSP schemes, donor-countries could also provide specific NRTPs⁷ to a set of selected developing countries, after being granted a special Waiver by the members of the World Trade Organization (WTO). Such NRTPs could be for example, the African Growth and Opportunity Act (AGOA) provided by the United States to Sub-Saharan African countries, the "Caribbean Basin Economic Recovery Act" supplied by the US to Caribbean countries, the special trade preferences offered by the US to Nepal, the NRTP offered by the European Union (EU) to the Western Balkans, and the Commonwealth Caribbean Countries Tariff preferences provided by Canada to a set of Caribbean countries.

Does structural economic vulnerability hamper beneficiary countries' utilization of NRTPs? Does development aid play a critical role in the relationship between structural economic vulnerability and the usage of NRTPs by beneficiary countries? The present paper aims to address these two questions, which to the best of our knowledge, have not been investigated in the literature. It makes use of a unique and comprehensive database recently developed by the UNCTAD on the utilization of trade preferences by the "Quadrilaterals", i.e., QUAD countries, namely Canada, the EU, Japan, and the US.

The importance of examining the effect of structural economic vulnerability on the usage of NRTPs lies on the fact that if structural economic vulnerability hinders the capacity of developing countries to make the best usage of the NRTPs, then the mere provision of NRTPs by developed countries would not be sufficient to help developing countries expand their exports, develop their industrial base, and ultimately promote economic growth, as envisaged by the UNCTAD's Resolution 21 (II). The international community should, therefore, explore other complementary tools that could help developing countries to reduce their level of structural economic vulnerability so as to, *inter alia*, enhance the usage of the NRTPs they enjoy. Development aid could be one of these tools⁸, notably its part allocated for addressing the supply-side capacity and trade-related infrastructure constraints faced by developing countries in their efforts to integrate into the multilateral trading system - this is the so-called Aid for Trade⁹ (AfT) (e.g., OECD/WTO, 2019). While at this stage of the analysis, we do not prejudge the outcome of the empirical exercise, we may expect that higher aid inflows would be instrumental in enhancing the usage of NRTPs.

⁶ The GATT is the "General Agreement on Tariffs and Trade", which was the predecessor of the World Trade Organization created in 1995.

⁷ Detailed information on the NRTPs is contained in the WTO Preferential Trade Arrangements database, accessible online at: <http://ptadb.wto.org/default.aspx>

⁸ Other tools could be related to migration policies that influence remittances amounts sent by migrants to their host countries, policies that affect the costs of sending these remittances, as well as climate-related policies that could affect the recurrence of environmental-related shocks.

⁹ Paragraph 57 of the Declaration Hong Kong Ministerial Conference of the WTO states that AfT Initiative aims to "help developing countries, particularly LDCs build the supply-side capacity and trade-related infrastructure that they need to assist them to implement and benefit from WTO Agreements and more broadly to expand their trade" (see WTO, 2005).

To address empirically these questions, the present paper builds essentially on the recent work by Gnanon and Iyer (2021) that has considered the macroeconomic factors underpinning the utilization of NRTPs by the QUAD countries, and focused on the effect of AfT flows and inward foreign direct investment inflows on the utilization of NRTPs. The advantage of building on the study by Gnanon and Iyer (2021) is that it relies on a country-year framework to perform the analysis, in contrast with previous studies on the determinants of the utilization of NRTPs that have used a country-product/year framework. The country-product/year framework is in fact not appropriate for conducting empirically the current analysis.

The empirical exercise uses a panel dataset of 84 developing countries (that are both beneficiary countries of the QUAD's NRTPs and recipients of development aid) over the period of 2002-2019. The main estimator used in the analysis is the two-step system generalized method of moments (GMM). The empirical work has revealed that a higher degree of structural economic vulnerability leads to lower utilization rates of both GSP programs and other trade preference programs, while higher development aid flows enhance the utilization of NRTPs. Additionally, the analysis shows that in the context of rising structural economic vulnerability, higher development aid flows lead beneficiary countries to enhance the usage of other trade preferences programs at the expense of GSP programs.

Hereafter, the paper is organized around four sections. Section 2 presents the theoretical explanation concerning the effect of structural economic vulnerability and development aid on the utilization of NRTPs, as well as how both factors interact influencing the usage of NRTPs. Section 3 lays down the empirical strategy, including the model specifications, the analysis of data concerning our main variables of interest in the analysis, and the econometric approach used to perform the empirical analysis. Section 4 interprets the estimations' outcomes, and Section 5 concludes.

2. Theoretical explanation

This section provides a theoretical discussion on the effect of both structural economic vulnerability (sub-section 2.1) and the effect of development aid on the utilization of NRTPs (sub-section 2.2), as well as on the joint effect of structural economic vulnerability and development aid on the utilization of NRTPs (sub-section 2.3).

2.1. On the effect of structural economic vulnerability on the utilization of NRTPs

Discussing the effect of structural economic vulnerability on the utilization of NRTPs involves examining how the two different components of the structural economic vulnerability index (i.e., EVI) affects the usage of NRTPs. The indicator EVI is the simple arithmetic average of two sub-indexes, which are the intensity of exposure to shocks (exposure sub-index) and the intensity of exogenous shocks (shocks sub-index). These two sub-indexes¹⁰ have been computed using a weighted average of different component indexes, with the sum of components' weights being equal to 1 so that the values of EVI range between 0 and 100 (see for example, Feindouno and Goujon, 2016).

The exposure sub-index is a composite index of five components, and the shocks sub-index has three component indexes. The five component indexes of the exposure sub-index (with their

¹⁰ Further details on the computation of the EVI could be found in Feindouno and Goujon (2016).

weights in brackets) are as follows: the population size (25%), the remoteness from world markets (25%), the export product concentration (12.5%), the share of agriculture, forestry, and fishery in GDP (12.5%), and the share of population living in low elevated coastal zone (25%).

The three component indexes of the shocks sub-index (with their weights in brackets) are as follows: the victims of natural disasters (25%), the instability in the agricultural production (25%), and the instability in exports of goods and services (50%). A rise in the values of EVI indicate greater structural economic vulnerability.

Before discussing how each of these sub-components of EVI could affect the utilization of NRTPs, it is worth noting that NRTPs offered by industrialized countries to developing countries can overlap in terms of product coverage, and lead the beneficiary countries either to make use of all available NRTPs, or to utilize some NRTP(s) at the expense of others (e.g., Gnanon and Iyer, 2021; Hakobyan, 2015; Keck and Lendle, 2012). This suggests that a factor that affects positively the utilization of a given NRTP (let us say GSP programs) may affect negatively the utilization of other available NRTPs (which we henceforth refer to as 'other trade preferences'). Moreover, beside structural economic vulnerability (which is specific to each beneficiary country of NRTPs), other factors exogenous to beneficiary countries could limit the utilization of preferential schemes. These factors include the erosion of preference margins¹¹, the inadequate product coverage, the instability or uncertainty associated with the duration of the preferential scheme, and the stringent nature of rules of origin associated with the preferences schemes (e.g., Hakobyan, 2020; Inama, 2003; Keane, 2013; Persson, 2015; WTO, 2019, 2021).

Let us now consider the effect of the sub-components of EVI on the utilization of NRTPs. Remoteness from the world markets increases significantly the transportation costs and imposes constraints on economic diversification (e.g., Agosin et al., 2012). A higher remoteness¹² from the world markets is likely to limit exports of beneficiary countries of NRTPs. Even in the context of declining transports costs, distance can still be an important impediment to trade (e.g., Agosin et al., 2012; Briguglio, 1995; Brun et al., 2005; Guillaumont, 2010; Guttmann and Richards, 2006; Winters and Martins, 2004). Nevertheless, Behrens et al. (2006) have demonstrated that remoteness might not be a geographical disadvantage, in particular for a landlocked region, as the location of the latter may help it attract the larger share of firms, in the context of high internal transport costs, which act as a barrier to competition from abroad.

Counties with a small size (measured by the size of the population) experience diseconomies of scale that would make it difficult for them to diversify export products at low costs (e.g., Briguglio, 1995; Briguglio et al. 2009; Easterly and Kraay, 2000; Guillaumont, 2010). According to Winters and Martins (2004), factors such as small consignment size, small-scale infrastructure and a lack of competition may inflate trade costs for small economies, and hence make the physical cost of goods and services in these countries always higher than world minima. In addition, small economies are particularly vulnerable to terms of trade shocks (e.g., Easterly and Kraay, 2000; Santos-Paulino, 2010) and this could limit the benefits they could derive from trade, including from exporting under preferential regimes. Against this background, one could expect that smaller

¹¹ Preference margins refer to the difference between the preferential tariff rate and the most favoured nations (MFN) tariff rate.

¹² Remoteness has been computed as is the trade-weighted minimum average distance to reach 50% of the world markets, using the same methodology as the CDP in its 2012 and 2015 Reviews (see Feindouno and Goujon, 2016).

countries would tend to export less than bigger countries (in terms of population size). At the same time, small economies (i.e., with small internal markets) may increase their export supply for the world markets (e.g., Easterly and Kraay, 2000), including under the preference regimes. This signifies that the lower the population size, the higher the utilization rate of NRTPs. Gnanon and Iyer (2021) have also noted that the population size can matter for the effect of rules of origin (associated with the preferential schemes) on countries' capacity to use the available NRTPs. This is particularly the case when the available labour force in small countries is not sufficient to produce the intermediate inputs needed to produce final exportable goods. In this scenario, the concerned small countries might not have any other choice than to import intermediate inputs and be, therefore subject to the constraints imposed by the rules of origin covered by the preferential schemes if they were to export the final goods to the markets of the preference granting countries. As a result, the lower the size of a country, the lower is its utilization rate of NRTPs. Overall, the direction of the effect of the population size on the utilization rate of NRTPs, is a priori unknown and is to be determined empirically, even though a negative effect is likely to dominate a positive effect.

As for the effect of export product concentration on the utilization of NRTPs, Funke and Ruhwedel (2001) have shown for East Asian countries that export variety, i.e., the export of highly differentiated goods provides a competitive advantage to countries and generates a higher export growth. Similar results have been observed by Funke and Ruhwedel (2002) for OECD countries. The work by Camanho da Costa Neto and Romeu (2011) on a set of emerging and developed countries has confirmed these findings. The authors have obtained that a rise in the diversity of both export sectors and export products within sectors by a one standard deviation reduces the quarterly decline in exports by approximately 4.7 per cent. Nevertheless, in a recent study, del Rosal (2019) has uncovered for Spain that an increase in the level of export product concentration leads to a higher export performance by destination countries. As Spain is an exporter of goods that are relatively more sophisticated than the ones exported by developing countries, one may conclude that it is rather export product diversification (and not export product concentration) that matters the most for export performance in developing countries. A recent work by Abreha et al. (2020) has used firm–product–destination level data on Danish firms, and established empirically that firms' diversification of export portfolio beyond their core products and markets helps to spur export growth. Building on this short literature review, we can infer that export product diversification is likely to result in a higher utilization rate of NRTPs by developing countries, provided that the product coverage of NRTPs is wide and includes manufacturing products.

Similarly, the effect of countries' dependence on agriculture, forestry, and fishery products (featured by a high share of these products in GDP) on the utilization of NRTPs would depend on the product coverage of these preferential schemes. The choice of the set of products covered by the preferential regimes is at the discretion of preference-granting countries. Nevertheless, as the aim of these schemes is to help the beneficiary countries expand their industrial base¹³ (see the Resolution 21(II) of the UNCTAD), one may expect that preferential schemes that cover many manufactured products (even light manufactured products) might not be well utilized by

¹³ Manchin (2006) has shown that, in the context of the EU's preferential regime in favour of African, Caribbean and Pacific countries, textiles, clothing, and agriculture are the main sectors where the probability of request for preferential market access to the EU tends to be high.

beneficiary countries whose economic structure is highly dominated by the production of agriculture, forestry, and fishery products. This is because such countries may lack upstream intermediates industries needed to exploit the opportunities offered by the NRTPs (e.g., Hakobyan, 2015), and unless the rules of origin associated with the preferential regimes are highly flexible, firms in the countries would face significant difficulties to source intermediate inputs from the most efficient producers. This would increase their production costs, and limit their capacity to make use of preference schemes that provide the opportunities to export manufacturing products. In contrast, if the product coverages of the NRTPs is dominated by unprocessed primary products, and agricultural products, countries whose economic structure is highly dependent on those products are likely to experience a high utilization rate of the NRTPs. For such countries, the production of agricultural goods is heavily based on locally sourced inputs (e.g., Hakobyan, 2015). Hakobyan (2015) has obtained empirical evidence that the utilization of the GSP scheme offered by the United States falls with the degree of processing of products, i.e., as processed goods tend to be less exported than unprocessed ones. In this case, one could expect countries that are dependent on unprocessed products to enjoy a higher rate of usage of NRTPs than countries that export processed products. Summing-up, the net effect of the share of agriculture, forestry and fishery in GDP on the utilization of NRTPs is a priori undetermined, and becomes an empirical matter.

Countries with a high share of population living in low elevated coastal zone (this share being the latest sub-component of the exposure sub-index) are likely to be exposed to high risks of hazards related to climate change and sea level rise (e.g., Liu et al., 2015) may suffer from the lack of the requisite infrastructure that would enable trade (e.g., Barbier, 2015). Unless appropriate policies are designed to enhance key infrastructure investments, and improve the coastal community response capability, such countries will not be able to seize the opportunities associated with the usage of the unilateral trade preferences.

On the basis of this discussion, we could not conclude, a priori, on the direction of the theoretical effect of countries' exposure to shocks on the utilization of NRTPs. Nonetheless, we can postulate that the negative theoretical effects of the components of the exposure to shocks sub-index on the utilization of NRTPs are likely dominate their positive effects, thereby leading potentially to a net negative effect of a higher exposure to shocks on the utilization of NRTPs.

Turning now to the components of the shocks sub-index, the effect of the instability of agricultural production on the utilization of NRTPs can be positive or negative. A higher instability in agricultural production would make it difficult for exporters of agricultural products located in countries with a high share of agriculture in GDP, to increase their sale of agricultural products in the markets of the preference granting countries. At the same time, countries that experience a high instability of agricultural production (whatever the causes of such instability) may opt for shifting their production structure towards higher value-added products such as manufacturing products (including light manufacturing products such as apparel, textile, and clothing). In such a case, an increase in the instability of agricultural production may lead to a rise in the utilization rate of NRTPs, notably if the latter encourage the export of manufacturing products.

On another note, we expect that the instability in exports of goods and services would result in the volatility of export earnings for trading firms, which would in turn, increase uncertainty about firms' investment decisions. Instability of export earnings could undermine the efforts of risk-averse firms for planning and supplying the investments needed to expand their export

activities (e.g., Dawe, 1996; Agosin, 2009). The insufficient investment in trade activities would likely undermine firms' capacity to exploit the opportunities offered by the NRTPs, and lead to a low utilization of NRTPs.

The effect of natural disasters (proxied by the victims of natural disasters) on the utilization of NRTPs is straightforward. For example, Oh and Reuveny (2010) have found that natural disasters reduce both imports and exports. According to Jones and Olken (2010), temperatures and precipitations reduce poor countries' exports to the US, a 1 Celsius degree warmer leads to a fall in exports by 2-5.7 percentage points. Gassebner et al. (2010) have uncovered that the number of natural and technological disasters adjusted for the surface of the country deters exports and imports, with the magnitude of the negative effect being particularly stronger in autocratic and smaller countries. Hadri et al. (2019) have examined the exports effects of many types of disasters (storms, floods, earthquakes, and changes in temperatures) and shown that an earthquake appears to reduce agricultural exports of about 3%, regardless of its location, while windstorm shock, regardless of its intensity, has hardly any export impact. Floods appear to restrict export flows of a small country by nearly 3%, while changes in temperatures have ambiguous impacts on exports. In light of the foregoing, we expect that natural disasters would lead to a fall in the utilization of NRTPs.

Based on the above discussion concerning the effects of the components of the shocks sub-index on the utilization of NRTPs, it would be difficult to conclude on the direction of this effect. This is because, while the instability of exports of goods and services, and the prevalence of natural disasters are likely to result in lower utilization rates of NRTPs, the effect of the instability of agricultural production on the usage of NRTPs is, a priori, ambiguous. Nevertheless, we could be tempted to anticipate that the negative effects of the instability of exports of goods and services, and the prevalence of natural disasters on the utilization of NRTPs would likely dominate the possible positive effect of the instability of agricultural production on the utilization of NRTPs.

2.2. On the effect of development aid on the utilization of NRTPs

Development aid could affect the utilization of NRTPs through many conduits, of which the reduction of trade costs, the liberalization of trade regimes, and the strengthening of productive capacities (via its AfT component). Other channels include the human capital (i.e., education and health), the institutional and governance quality, and the real exchange rate.

In a recent paper, Gnanngnon and Iyer (2021) have found empirically that AfT flows exert a positive effect on the utilization of NRTPs, including both the GSP programs and other NRTPs offered by the QUAD countries. Additionally, AfT flows are complementary with foreign direct investment (FDI) inflows in fostering the utilization of both the GSP programs and other NRTPs. The positive effect¹⁴ of AfT flows on the usage of NRTPs can materialize through the positive effect of AfT flows for economic infrastructure on exports (e.g., Cali and TeVelde 2011; Limao and Venables, 2001; Portugal-Perez and Wilson, 2012; Vijil and Wagner, 2012), the positive impact of AfT interventions for productive capacities on exports (as such interventions strengthen the capacity of firms in the recipient countries to supply the goods and services needed in the international markets), and finally via the positive effect of AfT for trade policy and regulation

¹⁴ See Gnanngnon and Iyer (2021) for a detailed discussion on the effect of AfT flows on the usage of NRTPs.

(including through its positive impact on trade facilitation and trade policy liberalization) (e.g., Cadot et al., 2014; Gnanngnon, 2018).

Other development aid flows (i.e., NonAfT flows) could also affect the utilization of NRTPs. For example, development aid allocated to the education and health sectors in the recipient countries can help accumulate human capital: it can help improve educational outcomes (e.g., Abby and Nio-Zarazua, 2016; Birchler and Michaelowa, 2016; Dreher et al. 2008; Miningou, 2019) and health outcomes (e.g., Kotsadam et al. 2018; Pickbourn and Ndikumana, 2016). In light of the positive effect of human capital on exports of goods and services - including high value-added exports (e.g., Andersson and Johansson, 2010; Contractor and Mudambi, 2008; Stucki, 2016), one may expect NonAfT flows, including the ones targeting the education and health sectors to contribute to promoting exports, and strengthening the utilization of NRTPs.

Aid may also influence (positively or negatively) the institutional and governance quality in the recipient countries. For example, Kalyvitis and Vlachaki (2012) have reported that aid flows have reduced the likelihood of observing a democratic regime in a recipient country, although this negative relationship is moderated when economic liberalization reforms precede aid inflows. Askarov and Doucouliagos (2015) have observed that aid has exerted a positive effect on democratization, especially on constraints on the executive and political participation, but it does not influence the overall quality of governance. According to Freytag and Heckelman (2012), development aid facilitates the acceptance and implementation of reforms in the recipient countries. It can contribute to the improvement of economic institutions (e.g., Dzhumashev and Hailemariam, 2021), but it can also deteriorate the institutional quality by encouraging rent-seeking behaviour and creating moral hazard problem (e.g., Bräutigam, 2000), encouraging corruption (e.g., Svensson, 2000), and worsening governance (e.g., Busse and Gröning, 2009). According to Jones and Tarp (2016), aid might not always affect adversely political institutions, and Dijkstra (2018) has pointed out that the negative effects of aid on governance tend to be exaggerated, given that most studies have reported a positive effect of aid on political stability. Gnanngnon (2020a) has obtained that the cumulated amount of total ODA has exerted a positive effect on the regulatory policies quality in recipient countries. Overall, the effect of development aid on the institutional and governance quality in the recipient countries is still uncertain. Thus, even though improving the institutional and governance quality can help reduce the transaction costs and uncertainty faced by firms in their trade-related activities, and enforce contracts (e.g., Hernández et al., 2021; Sun et al., 2015; Wu and Chen, 2014), it is still difficult to anticipate the direction of the effect of development aid on the utilization of trade preference through the improvement of the institutional and governance quality.

The effect of development aid on the utilization of NRTPs may also work through the conduit of financial development. In fact, Maruta (2019) has established empirically that development aid targeted to the financial sector (this type of aid is part of AfT flows) has influenced positively financial development. As greater financial development can ease exporting firms' credit constraints, and facilitates firms' engagement in export activities (e.g., Fauceglia, 2015; Li and Ye, 2021; Nieminen, 2020).

Development aid can affect the utilization rate of NRTPs through its effect on the real exchange rate in the recipient countries. Yet, many studies have shown that higher development aid inflows can induce the Dutch Disease effect in the recipient-countries by raising the relative price of non-tradables to tradables, and leading to a movement of resources (including labour and

capital) away from the tradable sector toward the non-tradable sector, which would lead to an appreciation of the real exchange rate (e.g., Addison and Balamoune-Lutz, 2017; Adu and Denkyirah, 2018; Ouattara and Strobl 2008). As an appreciation of the real exchange rate undermines export performance (e.g., Eichengreen and Gupta, 2013; Nouira et al., 2011; Sekkat, 2016; Sekkat and Varoudakis, 2000), one may expect that higher development aid flows would result in lower utilization rate of NRTPs. At the same time, the possible supply-side effects of development aid (for example through the strengthening of productive capacities) may compensate for the possible competitiveness losses that could arise from the Dutch Disease effect of development aid. This could lead to a depreciation of the real exchange rate (e.g., Adams, 2005; Addison and Balamoune-Lutz, 2017; Barder, 2006; Nkusu, 2004) and promote exports, including through a better utilization of NRTPs. Authors such as Arhenful (2013); Nkusu (2004) and Nyoni (1998) have found that development aid inflows have been associated with a depreciation of the real exchange rate. In a recent study, Gnanon (2021b) has shown that AfT flows have been associated with a depreciation of the real exchange rate in recipient economies, while NonAfT flows (other development aid flows) have led to an appreciation of the real exchange rate in recipient economies. In light of the findings by Gnanon (2021b), one may expect AfT flows to foster the utilization of NRTPs through its real exchange rate depreciation effect, while NonAfT flows can lead to a lower utilization rate of NRTPs through its real exchange rate appreciation effect.

Finally, development aid could dampen the effects of shocks on economies. For example, Chauvet and Guillaumont (2009) have noted that development aid contributes to stabilizing economic growth. In the same vein, Collier and Goderis (2009) have shown that development aid lowers the adverse effects of negative shocks (notably negative commodity export price shocks) on economic growth in the commodity-dependent countries. Gnanon (2020b) have uncovered that both AfT flows and NonAfT flows exert a negative effect on the size of shocks. Against this background, higher development aid flows can help dampen the effect of adverse shocks on economies, and reduce the uncertainty introduced by these shocks for investors and trading firms. In turn, this could facilitate the utilization of NRTPs. Likewise, AfT flows can promote export product diversification (e.g., Gnanon, 2019; Kim, 2019), the latter having the potential for dampening the effect of adverse shocks on economies, through lowering aggregate output volatility¹⁵, the volatility of firms' output¹⁶, and terms of trade instability¹⁷. We, therefore, argue that AfT flows can contribute to helping reduce the rise in uncertainty faced by trading firms when hit by adverse shocks. Trading firms could then undertake the requisite investments to take advantage of available NRTPs.

2.3. On the joint effect of structural economic vulnerability and development aid on the utilization of NRTPs

In light of the discussion in sub-sections 2.1 and 2.2, we can expect that by dampening the adverse economic effects of shocks and exposure to shocks, and hence reducing the uncertainty generated by these shocks for trading firms, development aid could help reduce the possible

¹⁵ See for example, Camanho da Costa Neto and Romeu (2011); di Giovanni et al. (2014); Haddad et al. (2013); Joya (2015); Koren and Tenreyro (2007); Malik and Temple (2009) and McIntyre (2018).

¹⁶ See for example, Kramarz et al. (2020), and Vannoorenberghe et al. (2016).

¹⁷ See for example, Asheghian and Saidi (2002) and Athukorola (2000).

negative effect (if any at all) of structural economic vulnerability on the utilization of NRTPs. At the same time, it is important to recall that the multiple NRTPs available to a country may overlap in terms of product coverage, and lead countries to make use of some NRTPs at the expense of others. In this case, development aid may mitigate the effect of structural economic vulnerability on the utilization of some NRTPs at the expense of the utilization of other NRTPs.

3. Empirical strategy

This section presents the model specifications used to investigate empirically the relationship between structural economic vulnerability, development aid and the utilization of NRTPs (sub-section 3.1). It then looks at the developments of the structural economic vulnerability index and the indicators of the utilization of NRTPs as well as their correlation patterns (see sub-section 3.2). Finally, it discusses the appropriate econometric approach to estimate the models (as well as their different variants discussed later) (sub-section 3.3).

3.1. Model specification

To recall, the objective of the analysis is to investigate empirically the effect of structural economic vulnerability on the utilization of NRTPs and additionally whether development aid flows matter for this effect.

As noted above, many works on the determinants of the utilization of NRTPs have relied on the country-product/year framework to perform their empirical analysis (e.g., Manchin, 2006; Nilsson, 2016; Sytsma, 2021). In a recent work, Gnanngnon and Iyer (2021) have used a country-year framework to investigate empirically how AfT flows and FDI inflows on the utilization of NRTPs by beneficiary countries. The present analysis takes cue from previous works that have used the country-product/year analytical framework, and relies essentially on the work by Gnanngnon and Iyer (2021) to address empirically the issues at hand. In particular, we use the country-year analytical framework to examine the effect of structural economic vulnerability on the utilization of NRTPs, including whether development aid matters for this effect.

Our main regressors of interest in the analysis are the indicator of structural economic vulnerability and development aid whose theoretical effects on the utilization rates of NRTPs have been discussed in section 2. Drawing from Gnanngnon and Iyer (2021), we include a set of control variables in the analysis. The first of these control variables is the indicator of the utilization rate of other trade preferences programs in model (1) and the indicator of the utilization rate of GSP programs in model (2). This is to capture the interplay between the two blocks of NRTPs: in light of the overlapping nature of non-reciprocal preferential schemes available to beneficiary countries the usage of one block of NRTP may be at the expense of the other block of NRTP (e.g., Gnanngnon and Iyer, 2021; Hakobyan, 2015; Keck and Lendle, 2012).

It is important to note that given the interplay between the two blocks of NRTPs available to beneficiary countries (i.e., GSP programs and other trade preferences), the other control variables described below could affect the utilization rates of each of the two blocks in different ways. For example, a control variable may positively affect GSP programs, and negatively affect other trade preferences, i.e., for example, the relevant control variable may influence positively GSP programs at the expense of other trade preferences programs. On another note, it is possible that a control variable affect negatively and significantly both blocks of NRTPs. This may reflect

the fact that an improvement in this control variable (let us say, for example the institutional quality) lead the country to export under the MFN rates rather than under preferential regimes to the markets of preference granting countries. This situation may be attributed to a number of factors (e.g., stringent rules of origin, conditionalities associated with the benefit of the preference schemes) that discourage the usage of NRTPs and encourage export under MFN rates.

The other regressors include the real per capita income ("GDPC"), trade openness ("OPEN"), financial development ("FINDEV"), human capital ("HUM") and the institutional and governance quality ("INST"). The real per capita income acts as a proxy for a country's development level, and aims to capture the extent to which the utilization rates of NRTPs varies across countries. The rise in the real per capita income may reflect a greater export supply capacity (e.g., Manchin, 2006), and hence the capacity to export both at MFN rates and under preferential regimes. Greater trade openness measured by the share (%) of the sum of exports and imports in GDP can positively affect the utilization of trade preferences. On the one hand, higher exports induce a higher utilization of NRTPs (e.g., Hakobyan, 2015). On the other hand, higher imports, including of intermediate inputs needed in the process of producing final exportable products under preferential regimes are likely to boost the utilization of NRTPs. For example, many studies have emphasized the strong positive connection between the import of intermediate inputs and exports (e.g., Castellani and Fassio, 2019; Feng et al., 2016; Hayakawa et al., 2020).

We also argue that a developed financial sector can facilitate the export of products by alleviating the credit constraints faced by firms. This could encourage new firms to export or existing firms to expand their exports (e.g., Aghion et al., 2010; Beck, 2003; Hur et al., 2006; Manova, 2013; Minetti and Zhu, 2011). However, it is not clear whether after benefitting from higher credits from the financial sector, trading firms export under preferential regimes or at MFN rates, as this would depend on many factors, including the extent of constraints faced in utilizing NRTPs (see discussion above). Overall, the direction of the effect of financial development on the utilization rates of NRTPs is a priori unknown, and is to be determined empirically.

The human capital indicator has been introduced in model (1) given the strong importance of human capital accumulation for the development of exports (e.g., Andersson and Johansson, 2010; Fontes et al. 2020). An improvement in the human capital may be positively or negatively associated with the usage of NRTPs depending on whether it encourages export of products under preferential regimes or at MFN rates, even though it may affect positively one block of NRTP at the detriment of the utilization of the other block of NRTPs. For the same reasons, even though an improvement in the institutional and governance quality is expected to affect positively exports in general (e.g., Álvarez et al., 2018; Bah et al., 2021; Martínez-Zarzoso and Márquez-Ramos, 2018), it may influence negatively the utilization of NRTPs (at the benefit of exporting at MFN rates), or affect positively the usage of one block of NRTP (e.g., GSP programs) at the expense of the other block of NRTP (e.g., other trade preferences programs).

Against this backdrop, we consider the following two model specifications (i.e., one model for the utilization of each block of NRTP):

$$URGSP_{it} = \alpha_0 + \alpha_1 URGSP_{it-1} + \alpha_2 EVI_{it} + \alpha_3 \text{Log}(ODA)_{it} + \alpha_4 UROTP_{it} + \alpha_5 \text{Log}(GDPC)_{it} + \alpha_6 OPEN_{it} + \alpha_7 FINDEV_{it} + \alpha_8 HUM_{it} + \alpha_9 INST_{it} + \mu_i + \delta_t + \epsilon_{it} \quad (1)$$

$$UROTP_{it} = \beta_0 + \beta_1 UROTP_{it-1} + \beta_2 EVI_{it} + \beta_3 \text{Log}(ODA)_{it} + \beta_4 URGSP_{it} + \beta_5 \text{Log}(GDPC)_{it} + \beta_6 OPEN_{it} + \beta_7 FINDEV_{it} + \beta_8 HUM_{it} + \beta_9 INST_{it} + \rho_i + \theta_t + \omega_{it} \quad (2)$$

A country and the time-period are represented respectively by the subscripts i and t . The dataset has been constructed on the basis of data available. It covers 84 countries and the period from 2002 to 2019. To dampen the effects of business cycles on variables in the two models (and hence avoid modelling business cycles), we use non-overlapping sub-periods of 3-year average. There are overall six sub-periods, which are 2002-2004, 2005-2007, 2008-2010, 2011-2013, 2014-2016 and 2017-2019. The parameters α_0 to α_9 , and β_0 to β_9 will be estimated. μ_i and ρ_i are time invariant specific characteristic of each country in the panel dataset. δ_t and θ_t are temporal dummies that represent global shocks affecting simultaneously all beneficiaries' utilization rates of NRTPs. ϵ_{it} and ω_{it} are well-behaving error-terms.

The dependent variables "URGSP" and "UROTP" are respectively the utilization rate of GSP programs, and the utilization rate of other trade preferences programs, both offered by the QUAD countries. These two indicators are respectively the outcomes of the transformation of the original indicators of the utilization rates of NRTPs, i.e., "URGSP1" for GSP programs, and "UROTP1" for other trade preferences programs. The indicator "URGSP1" shows the extent to which eligible imports for trade preferences are actually imported under these preferences, and is computed as follows: $URGSP1 = 100 * (\text{GSP Received Imports}) / (\text{GSP Covered Imports})$. Values of "URGSP1" range between 0 and 100, with higher values indicating a greater utilization rate of GSP programs.

The indicator "UROTP1" is computed in the same spirit as "URGSP1": $UROTP1 = 100 * (\text{Other-Preferential Imports}) / (\text{Other Preferential Covered Imports})$, where "Other-Preferential Imports" refers to the value of imports that benefitted from other NRTPs than GSP. "Other-Preferential Covered Imports" refers to the value of imports that are classified in tariff lines that are dutiable and covered by the other-preferential schemes. The 'other trade preferences schemes' here include those granted by USA under the African Growth and Opportunity Act (AGOA) and the Caribbean Basin Initiative; in the case of the European Union, it includes preferences under the Economic Partnership Agreements (EPAs) entered with selected Sub-Saharan African countries. Values of "UROTP1" range between 0 and 100, and higher values reflect a greater utilization rate of other trade preferences programs.

In light of their skewed distribution, the indicators "URGSP1" and "UROTP1" have been transformed (see Yeyati et al. 2007) so as to obtain respectively the variables "URGSP" and "UROTP": $URGSP = \text{sign}(URGSP1) * \log(1 + |URGSP1|)$ (2), where $|URGSP1|$ is the absolute value of the variable "URGSP1"; and $UROTP = \text{sign}(UROTP1) * \log(1 + |UROTP1|)$ (2), where $|UROTP1|$ refers to the absolute value of "UROTP1".

The indicator of structural economic vulnerability ("EVI") has been computed by the "Fondation pour les Etudes et Recherches sur le Developpement International (FERDI)" as the simple arithmetic average of two sub-indexes, namely the intensity of exposure to shocks (exposure sub-index) (denoted "EXPOSURE"), and the intensity of exogenous shocks (shocks sub-index) (denoted "SHOCK"). These two sub-indexes have been obtained 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 further details on the computation of the EVI, see for example Feindouno and Goujon, 2016).

The regressors "GDPC", "OPEN", "FINDEV", "HUM", and "INST" are fully described in Appendix 1, and their source is provided in this Appendix. The variable "GDPC" has been logged using the natural logarithm in order to reduce the skewness of its distribution.

3.2. Data analysis

This section uses the panel dataset based on non-overlapping sub-periods to depict the developments (over time) of both the indicator of structural economic vulnerability, and the indicators of the utilization of NRTPs. It does so over the full sample, and the sub-samples of LDCs and NonLDCs (i.e., countries in the full sample that are not categorized as LDCs) (see Figures 1 and 2). Figures 3 and 4 use the same dataset to display the correlation patterns (in the form of scatter plot) between these indicators, respectively over the full sample, and the sub-samples of LDCs and NonLDCs.

[Insert Figure 1, here]

Figure 1 shows that the EVI indicator exhibited a downward trend, which signifies that on average, over the full sample, structural economic vulnerability had declined. Over the full sample and the full period, the utilization rate of GSP programs was consistently higher than that of other trade preferences programs. Additionally, the usage rate of the two blocks of programs tended to increase steadily from 2008-2010 onwards, although before 2008-2010, they exhibited somewhat opposite directions. The utilization rate of GSP programs moved from 35.25% in 2002-2004 to 53.97% in 2017-2019, while the usage rate of other trade preference programs reached 38.45% in 2017-2019 against 32.73% in 2002-2004. Overall, Figure 1 tends to show that EVI and the indicators of the utilization of NRTPs moved in opposite directions, especially from 2008-2010 onwards.

[Insert Figure 2, here]

We note from Figure 2 that while the structural economic vulnerability has been declining over time both in LDCs and NonLDCs, it remained far lower in NonLDCs than in LDCs. This is not surprising since EVI is one of the criteria of the inclusion of (and graduation out of) countries in the category of LDCs. Thus, de facto, LDCs exhibit a higher structural economic vulnerability than NonLDCs. As for the indicators of the usage of NRTPs, we find that while LDCs tended to make more use of other trade preferences programs than of GSP programs during the sub-periods 2002-2004 and 2005-2007, they relied more on the usage of GSP programs at the detriment of other trade preferences between 2008-2010 and 2017-2019. Reverse patterns are observed for NonLDCs. The latter had a higher utilization of other trade preferences programs than of GSP programs from 2002-2004 to 2011-2013, but from 2011-2013 to 2017-2019, their utilization rates of these two blocks of trade preferences were quite similar, although in 2017-2019, the utilization rate of other trade preferences was slightly higher than that of GSP programs. Concretely, for LDCs, the utilization rates of GSP programs and other trade preferences programs were respectively 17.7% and 43.85% in 2002-2004, while in 2017-2019, they reached respectively 66.86% and 14%. In contrast, for NonLDCs, the utilization rates of GSP programs and other trade preferences programs were respectively 44% and 27.17% in 2002-2004, while in 2017-2019,

they reached 47.52% and 50.63%. It is worth pointing out that in 2017-2019, the utilization rate of GSP programs by LDCs (66.86%) was far higher than that of NonLDCs (47.52%), whereas the utilization rate of other trade preferences by NonLDCs (50.63%) far outweighed that of LDCs (14%).

[Insert Figure 3, here]

Figure 3 indicates that over the full sample, there is a negative correlation between structural economic vulnerability and the utilization rate of both GSP programs and other trade preferences, with the slope of the negative correlation pattern being far higher for other trade preferences programs than for GSP programs. When considering these correlations over LDCs and NonLDCs (see Figure 4), we observe for LDCs that there exist a strong negative correlation pattern between structural economic vulnerability and the utilization rate of GSP programs but an unclear correlation pattern between structural economic vulnerability and the utilization rate of other trade preferences programs. In contrast, for NonLDCs, there is a positive correlation between structural economic vulnerability and the utilization rate of GSP programs, but a negative correlation between structural economic vulnerability and the utilization rate of other trade preferences programs.

3.3. Econometric approach

Following Gnangnon and Iyer (2021), we estimate models (1) and (2) primarily by the two-step system Generalized Method of Moments (GMM) estimator proposed by Blundell and Bond (1998). This estimator is suitable for dynamic panel datasets where the time dimension is small, and the cross-sectional dimension is large. It is widely used in the empirical research, including in the macroeconomic empirical studies to address endogeneity concerns, including those stemming from the bi-directional causality among the dependent variable and the regressors, measurement errors, omitted variables, and the bias introduced by the correlation between the lagged dependent variable and the fixed effects in the error term when the time dimension is small, and the cross-sectional dimension of the panel is large (i.e., the Nickell bias - see Nickell, 1981). It involves the estimation of (for each model) a system of equations that contains an equation in differences and an equation in levels, where lagged first differences variables are used as instruments for the levels equation, and lagged levels of variables are used as instruments for the first-difference equation. The two-step system GMM estimator generates estimates that are more consistent and efficient than the ones generated by the difference-GMM estimator (of Arellano and Bond, 1991) when variables are persistent over time (e.g., Blundell and Bond, 1998; Blundell et al., 2001). This is because in the presence of persistent variables, the instruments generated when using the difference-GMM estimator are weak due to the weak correlation between lagged variables in level and variables in first difference (e.g., Alonso-Borrego and Arellano, 1999; Roodman, 2009).

In the present analysis, we treat our two main variables of interest, namely the indicator of structural economic vulnerability, and the development aid variable as endogenous. This is because while we expect these two variables to influence the rates of utilization of NRTPs, preference granting countries could also offer NRTPs to countries that experience a high level of structural economic vulnerability, and supply higher development aid flows to developing countries that have a weak export supply capacity with a view to helping them enhance their export performance (i.e., for exporting both under preferential regimes and at MFN rates). Such aid can target trade-related

sectors, as well as other sectors (such as education, health, addressing humanitarian crises) that also have affect (directly or indirectly) recipient countries' export performance.

Likewise, we treat the regressors that represent trade openness, financial development, human capital and the institutional and governance quality as endogenous due to the potential bi-directional causality issue raised above (see Gnangnon and Iyer, 2021).

We check the correctness of the specifications of models (1) and (2) estimated by the two-step system GMM estimator - i.e., the appropriateness of using this estimator to estimate models (1) and (2) as well as all their variants described below - by means of a series of diagnostic tests. These are the Arellano-Bond test of the presence of first-order serial correlation in the first-differenced error term (AR¹⁸(1)); the Arellano-Bond test of the absence of second-order serial correlation in the first-differenced error term (denoted AR¹⁹(2)) and the Sargan/Hansen test of over-identifying restrictions (OID)²⁰ that tests the validity of instruments used in the regressions. Additionally, we present the outcomes of the test of absence of third-order serial correlation in the first-differenced error term (denoted AR²¹(3)), as the absence of such a serial correlation may signal that the model specification is not plagued by the omitted variables problem. Finally, we ensure that number of instruments used in the regressions is lower than the number of countries (e.g., Roodman, 2009) so to avoid instruments proliferation problems in the estimations of the models (1) and (2) (as well as of their different variants described below).

Even though the two-step system GMM technique is our preferred estimator, we also present the estimations' outcomes arising from the estimations of the dynamic models (1) and (2) using the standard econometric estimators, namely the pooled ordinary least squares and the within fixed effects estimators. Standard errors of the estimates obtained here are corrected by means of the Driscoll and Kraay (1998) for the heteroscedasticity, autocorrelation, and any form of temporal dependence in the residuals. The outcomes of these estimations are presented in Table 1. These outcomes could be compared with the ones obtained when using the two-step system GMM estimator. Results in the other Tables (Tables 2 to 5) are based on the two-step system GMM estimator. Estimates reported in these four Tables are based on the following regressions.

Outcomes reported in columns [1] and [2] of Table 2 are obtained by estimating models (1)/(2). Columns [3] and [4] of the same Table are obtained by estimating a variant of models (1)/(2) that contains a dummy variable capturing LDCs, and the interaction between this dummy and the variable "EVI". This dummy denoted "LDC" takes the value 1 for LDCs, and 0, otherwise (see Appendix 3 for the list of LDCs in the full sample).

Outcomes in Table 3 allow exploring how the two main components of EVI (i.e., the extent of shocks and the extent of exposure to shocks) affect the utilization rate of NRTPs. To obtain these outcomes, we estimate two variants of models (1) and (2) in which the variable "EVI" is replaced respectively with the components "SHOCK" and "EXPOSURE".

The estimates reported in Table 4 help to deepen the findings in Table 2 concerning the effect of structural economic vulnerability on the utilization of NRTPs by investigating how countries behave in terms of the utilization of one block of NRTP when the utilization rate of the

¹⁸ It is expected that the p-value associated with the statistic of the AR(1) test should be lower than 0.1 at the 10% level.

¹⁹ The p-value associated with the statistic of the AR(2) test is expected to be higher than 0.1 at the 10% level.

²⁰ The p-value associated with the statistic of the Sargan test is expected to be higher than 0.1 at the 10% level.

²¹ The p-value associated with the statistic of the AR(3) test is expected to be higher than 0.1 at the 10% level.

other block of NRTP declines in the context of higher structural economic vulnerability, especially given that the interplay between the utilization of the two blocks of NRTPs. In other words, we try to answer the question as to which block of NRTP (either GSP programs or other trade preferences) do beneficiary countries prefer to use when they face lower levels of structural economic vulnerability. The estimates presented in Table 4 to address this issue are obtained by estimating a variant of each of models (1) and (2) in which we introduce a variable that captures the interaction between the indicator of structural economic vulnerability and the indicator of the utilization of NRTP (i.e., the variable "UROTP" in model (1) and "URGSP" in model (2)).

Finally, we address the question as to whether development aid matters for the effect of structural economic vulnerability on the utilization of NRTPs by estimating several variants of models (1) and (2). The first variant of each of these models contains a variable capturing the interaction between "EVI" and the variable representing total development aid ("ODA"). For the other variants of models (1) and (2), we replace the variable "ODA" with its components, namely Aid for Trade flows ("AfT") and NonAfT flows ("NonAfT"), and interact the ODA component with the variable "EVI". The outcomes of the estimations of these different specifications of models (1) and (2) are reported in Table 5.

4. Interpretation of estimations' outcomes

At the outset, we would note that the estimations' results would be interpreted at the conventional significance levels (i.e., at least at the 10% level), unless otherwise stated.

[Insert Table 1, here]

Across all columns of Table 1, we note that the coefficient of the lagged dependent variable is positive and significant at least at the 5% level. These findings are in line with those of Gnanon and Iyer (2021), and show that the utilization rates of NRTPs exhibits a state dependence path, whereby the utilization rate of an NRTP in period t-1 is positively associated with the utilization rate of the same NRTP in period t. Results in columns [1] and [2] of Table 1 (i.e., those based on the pooled ordinary least squares estimator) show that a rise in the level of structural economic vulnerability does not significantly affect the usage rate of GSP programs, but exerts a negative and significant effect on the usage rate of other trade preferences. Meanwhile, results in columns [3] and [4] of Table 1 (i.e., those based on the within fixed effects estimator) show that a higher degree of structural economic vulnerability influences negatively and significantly the utilization rate of GSP programs, but exerts no significant effect on the utilization rate of other trade preferences programs. These outcomes show that the effect of structural economic vulnerability on the utilization of NRTPs is not consistent across the columns of Table when we use the standard econometric estimators. This is likely due to the endogeneity of the structural economic vulnerability variable as well as other potential regressors in models (1) and (2). The same conclusion applies to the development aid variable. It appears to influence positively and significantly (at the 1% level) the utilization rate of the two blocks of NRTPs in columns [1] and [2], but exerts a negative effect on the usage rate of NRTPs in columns [3] and [4] (the estimates are significant only at the 10% level here).

Likewise, the estimates related to control variables are not consistent across the four columns of the Table, thereby suggesting once again that estimates reported in Table 1 are likely biased due to the endogeneity concerns raised in section 3.3. As a result, we rely on the estimates

generated by the use of the two-step system GMM estimator to estimate the specifications of model (1) and (2) presented in section 3.3.

Results in all columns of Tables 2 to 5 suggest that the lagged dependent variable holds coefficients that are significant at the 1% level. This confirms the state dependence nature of the indicators of the utilization rate of NRTPs. The outcomes of the tests concerning the validity of the two-step system GMM estimator presented at the bottom of Tables 2 to 5 show that all variants of models (1) and (2) whose estimates are presented in these Tables, are well specified. This is exemplified by the fact that the p-values of the AR(1) tests are lower than 0.1, and the p-values of the AR(2), AR(3) and OI tests are or equal to, or higher than 0.10. These results suggest that the two-step system GMM estimator is a suitable estimator for conducting the empirical analysis. The appropriateness of the two-step system GMM estimator is also confirmed by the fact that the coefficients of the lagged dependent variable in Tables 2 to 5 are all lower than the coefficients of the lagged dependent variable obtained when using the pooled ordinary least squares estimator (see column [1] for "URGSP" and column [2] for "UROTP"). At the same time, they are concurrently all higher than the coefficients of the lagged dependent variable obtained when using the within fixed effects estimator (see column [1] for "URGSP" and column [2] for "UROTP"). In fact, according to Bond et al. (2001), the estimate associated with the dependent variable in the regression based on the two-step system GMM estimator should lie between the estimate generated by the within fixed effects estimator and the one generated by the pooled ordinary least squares estimator.

Let us now interpret the estimates in Tables 2 to 5.

[Insert Table 2, here]

Starting with the estimates in Table 2, we find that structural economic vulnerability exerts a negative and significant effect (at the 1% level) on the utilization rates of GSP programs and other trade preferences, with the magnitude of this effect being the same on the two blocks of trade preferences. A one percentage point increase in the level of structural economic vulnerability reduces, on average, the utilization rates of GSP programs and other trade preferences programs respectively by 4.04% and 4.08% (see columns [1] and [2]). Higher development aid flows induce a rise in the utilization rates of both GSP programs and other trade preferences, with the magnitude of this positive effect being higher on the usage of GSP programs than on the utilization of other trade preference programs (estimates are significant at the 1% level). A one percentage increase in development aid flows is associated with an increase in the utilization rate of GSP programs by 0.192 percentage and the utilization rate of other trade preferences programs by 0.134 percentage. These outcomes that structural economic vulnerability reduces the rates of using NRTPs, while development aid increases these rates.

Estimates in columns [3] and [4] of Table 2 allow examining the net effect of structural economic vulnerability on the utilization of NRTPs in LDCs versus NonLDCs. Results in column [3] of the Table suggest that LDCs experience a lower effect of the structural economic vulnerability on the utilization of GSP programs (the coefficient of the variable ["EVI*LDC"] is positive and significant at the 1% level) while structural economic vulnerability exerts similar effects on the usage of other trade preferences programs in LDCs and NonLDCs. The net effects of structural economic vulnerability on the utilization rate of GSP programs in LDCs and NonLDCs amount respectively to -0.029 [= -0.0733+0.0439] and -0.0733. Likewise, the net effects of structural economic vulnerability on the utilization rate of other trade preference programs in

LDCs and NonLDCs are the same and amount to -0.029. Overall, further to an increase in the level of structural economic vulnerability, NonLDCs make less use of GSP programs than do LDCs, even though the utilization rate of GSP programs is negatively affected in the two groups of countries. At the same time, the utilization rate of other trade preferences is equally (and negatively) affected by a greater structural economic vulnerability in both LDCs and NonLDCs. Note that in columns [3] and [4], higher development aid flows foster the utilization of both GSP programs and other trade preferences (the coefficients of "ODA" (in Log) are still positive and significant at the 1% level).

As expected, the utilization of GSP programs and other trade preferences programs by beneficiary countries are substitutable. This is because a higher utilization rate of other trade preferences induces a lower utilization rate of GSP programs (see columns [1] and [3]) and vice-versa (see columns [2] and [4]).

Concerning the other control variables, we obtain, as expected, that an improvement in the real per capita income influences positively and significantly the utilization rate of both blocks of NRTPs, although the magnitude of this positive effect is higher on the usage rate of GSP programs than on that of other trade preferences. A higher trade openness leads to a rise in the utilization rate of GSP programs but exerts no significant effect on the utilization rate of other trade preferences. Financial development reduces, on average, the usage of GSP programs, but exerts no significant effect on the usage of other trade preferences. This may signify that the development of the financial sector and the related increase in the credits supplied to exporting firms lead them to export under MFN rates rather than under the existing preferential regimes. The same reasoning applies to the human capital variable that hold negative and significant coefficients in the two columns of the Table. Finally, an improvement in the institutional quality tends to encourage the utilization of other trade preferences programs, but exerts no significant effect on the usage of GSP programs.

It is worth noting at this stage of the analysis that, with some few exceptions, outcomes concerning control variables in columns [3] and [4] of Table 2, and in Tables 3 to 5 are, to a large extent, in line with those in Table 2.

[Insert Table 3, here]

With regard to our variables of interest, we obtain from Table 3 that a higher extent of exogenous shocks reduces the usage of both GSP programs and other trade preferences, with the magnitude of the negative effect of shocks being higher on (i.e., almost doubling) the utilization of GSP programs than on the utilization of other trade preferences (see columns [1] and [2]). Especially, a one percentage point increase in the indicator of the extent of shocks lowers the utilization rates of GSP programs by 2.25%, and the utilization rate of other trade preferences programs by 1.20%. In contrast, while a greater exposure to shocks reduces the utilization rates of the two blocks of NRTPs, the magnitude of this negative effect is higher on the utilization rate of other trade preferences than on that of GSP programs (see columns [3] and [4]). A one percentage point increase in the indicator of the extent of exposure to shocks reduces the utilization rates of other trade preferences programs by 4.8%, and the utilization rate of GSP programs by 3.22%. All these findings confirm that a higher level of structural economic vulnerability, reflected by a greater exposure to shocks and a higher extent of shocks, lowers the utilization rates of GSP programs and other trade preferences. Development aid appears to exert a positive and significant

effect on the usage rate of the two blocks of NRTPs in all columns of Table 3, but in column [4] of the Table where its effect is statistically null.

[Insert Table 4, here]

In Table 4, we observe that the interaction terms related to both ["EVI*UROTP"] and ["EVI*URGSP"] are negative and significant at the 1% level, with the interaction term of the former being higher than that of the latter. We deduce that in the context of a lower level of structural economic vulnerability, other trade preferences and GSP programs are strongly complementary. For declining levels of the EVI indicator, a higher utilization rate of other trade preferences programs generates a higher utilization rate of GSP programs (see column [1]), and an improvement in the utilization of GSP programs leads to a rise in the utilization of other trade preferences. Overall, on the one hand, results in Table 2 suggest that reducing the degree of structural economic vulnerability fosters the utilization of both GSP programs and other trade preference programs, and results in Tables 2 and 3 indicate that countries tend to use these two blocks of NRTPs in a complementary way. On the other hand, the findings from Table 4 indicate that beneficiary countries of NRTPs tend to use GSP programs and other trade preferences in a complementary way when they experience a lower level of structural economic vulnerability. Hence, addressing factors underpinning the rise in the structural economic vulnerability would not only help beneficiary countries of NRTPs foster their utilization of these NRTPs (i.e., both GSP programs and other trade preferences), but it would also allow them to increase simultaneously (i.e., in a complementarity way) the usage of these two blocks of NRTPs.

[Insert Table 5, here]

Outcomes in Table 5 allow assessing the extent to which development aid, including its two main components matters for the relationship between structural economic vulnerability and the utilization of NRTPs. We notice across columns [1], [3] and [5] of the Table that the interaction terms of the interaction variables between the aid variables (be the latter total development aid, AfT or NonAfT) and the variable "EVI" are negative and significant at the 1% level. These concern instances where we examine the interplay between development aid and the structural economic vulnerability in affecting the utilization of GSP programs. In the meantime, estimates in columns [2], [4] and [6] of Table 5 indicate that the interaction terms of the variables ["EVI*Log(ODA)"], ["EVI*Log(AfT)"] and ["EVI*Log(NonAfT)"] are positive and significant at the 1% level. These results are related to instances where we examine the interplay between development aid and the structural economic vulnerability in affecting the utilization of other trade preferences programs. Taking together these outcomes, we conclude that in the context of rising degrees of structural economic vulnerability, higher development aid flows enhance the utilization rate of other trade preferences programs at the expense of the utilization of GSP programs. This conclusion applies to both total development aid flows, as well as to AfT flows, and NonAfT flows. Thus, higher development aid flows appear to dampen the negative effect of structural economic vulnerability on the utilization of other trade preferences programs (and even make this effect positive). This signifies that when facing a higher level of structural economic vulnerability, and receiving higher development aid inflows, beneficiary countries abandon the usage of GSP programs at the benefit of other trade preferences programs. Interestingly, NonAfT flows exert a slightly higher positive effect on the utilization of other trade preferences programs than AfT flows do, when beneficiary countries face a higher degree of structural economic vulnerability.

5. Conclusion

The present work has examined the effect of structural economic vulnerability on the utilization of NRTPs (i.e., GSP programs and other trade preferences programs) as well as how development aid flows alter this effect. The empirical analysis builds on a panel dataset containing 84 beneficiary countries of both NRTPs and development aid, over the period from 2002 to 2019. It has established that a higher degree of structural economic vulnerability influences negatively and equally (in terms of magnitude) the utilization rates of both GSP programs and other trade preference programs. In addition, an increase in the extent of both shocks and exposure to shocks (that is, the two major components of the indicator of structural economic vulnerability) leads to a lower utilization rate of the two blocks of NRTPs, although not with the same magnitude of the effect. On another note, while countries tend to use GSP programs and other trade preferences programs in a substitutable way, the two types of preferences programs are utilized in a complementary way when the level of structural economic vulnerability declines. This signifies that reducing the degree of structural economic vulnerability helps countries improve the utilization rates of the two blocks of NRTPs, including in a strong complementarity way. Higher development aid inflows foster the utilization rates of the two blocks of NRTPs, although they tend to induce a higher utilization of GSP programs than of the utilization of other trade preference programs. Finally, the provision of higher development aid flows to countries that suffer from higher degrees of structural economic vulnerability, lead them to foster the usage of other trade preferences programs at the expense of GSP programs.

What do these findings suggest in terms of policy implications? Many studies have underlined the adverse effects of structural economic vulnerability on economic growth and development, and call for significant increases in development aid flows so as to help developing countries facing higher structural economic vulnerability to cope with the adverse effects of the latter and engage their economies in a sustainable economic growth and development paths.

The present analysis shows that helping countries reduce the level of structural economic vulnerability they face would contribute to spurring the utilization of the NRTPs that they enjoy, including in a complementary way. The scale-up of development aid flows in favour of structurally vulnerable countries could contribute to achieving this objective, but other options (that are not the subject of the present analysis) could be explored (e.g., Essers, 2013; Guillaumont, 2011b; Johnson, 2006). These include for example ways to facilitate the sending of remittances to developing countries, given the role of remittances inflows to dampen the adverse economic effects of shocks (e.g., Bettin et al., 2017; Combes et al., 2014; Su, 2022), policies for fostering industrialization (e.g., Atolia et al., 2020; Morris and Fessehaie, 2014) and measures to reduce disasters risks, including through the development of infrastructure that resilient to natural disasters (e.g., Hofmann, 2021; Mart et al., 2018). On another note, as far as trade is concerned, policies that promote the development of services exports could also contribute to mitigating countries' vulnerability to external shocks and consequently facilitate the utilization of NRTPs because services exports contribute to strengthening countries' resilience to shocks and financial crises than do goods exports (e.g., Ariu, 2016; Borchert and Mattoo, 2010).

References

- Abby, R., A., and Nio-Zarazua, M. (2016). The effectiveness of foreign aid to education. What can be learned? *International Journal of Educational Development*, 48, 23-36.
- Abreha, K.G., Smeets, V., and Warzynski, F. (2020). Coping with the crisis and export diversification. *The World Economy*, 43(5), 1452-1481.
- Adams, C. S. (2005). Exogenous Inflows and Real Exchange Rates: Theoretical Quirk or Empirical Reality? Seminar organized by the International Monetary Fund (IMF) on Foreign Aid and Macroeconomic Management in Maputo, Mozambique, March 14-15, 2005.
- Addison, T., and Balamoune-Lutz, M. (2017). Aid, the Real Exchange Rate and Why Policy Matters: The Cases of Morocco and Tunisia, *The Journal of Development Studies* 53(7): 1104-1121.
- Adu, D.T., and Denkyirah, E.K. (2018). Foreign aid - real exchange rate Nexus: Empirical evidence from Ghana. *Cogent Economics & Finance* 6(1), 1499184.
- Aghion, P., Angeletos, G-M., Banerjee, A., and Manova K. (2010). Volatility and Growth: Credit Constraints and the Composition of Growth. *Journal of Monetary Economics*, 57, 246-265.
- Agosin, M.R., Alvarez, R., and Bravo-Ortega, C. (2012). Determinants of Export Diversification Around the World: 1962-2000. *The World Economy*, 35(3), 295-315.
- Agosin, R. (2009). Export Diversification and Growth in Emerging Economies. *Cepal Review*, 97, 115-131.
- Almansour, A., Aslam, A., Bluedorn, J., and Duttagupta, R. (2015). How vulnerable are emerging markets to external shocks? *Journal of Policy Modeling*, 37, 460-483.
- Alonso-Borrego, C., and Arellano, M. (1999). Symmetrically normalized instrumental-variable estimation using panel data. *Journal of Business & Economic Statistics*, 17, 36-49.
- Álvarez, I.C., Barbero, J., Rodríguez-Pose, A., and Zofío, J.L. (2018). Does Institutional Quality Matter for Trade? Institutional Conditions in a Sectoral Trade Framework. *World Development*, 103, 72-87.
- Andersson, M., and Johansson, S. (2010). Human capital and the structure of regional export flows. *Technology in Society*, 32(3), 230-240.
- Arellano, M., and Bond, S. (1991). Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations. *Review of Economic Studies*, 58(2), 277-297.
- Ariu, A. (2016). Crisis-Proof Services Why Trade in Services Did Not Suffer During the 2008-2009 Collapse. *Journal of International Economics*, 98, 138-149.
- Asheghian, P., and Saidi, R. (2002). Commodity Concentration and Export Earning Instability:

The Case of Venezuela. *Development Policy Review*, 17(4), 419-427.

Askarov, Z., and Doucouliagos, H. (2015). Aid and institutions in transition economies. *European Journal of Political Economy*, 38, 55-70.

Atolia, M., Loungani, P., Marquis, M., and Papageorgiou, C. (2020). Rethinking development policy: What remains of structural transformation? *World Development*, 128, 104834.

Athukorola, P. C. (2000). Manufacturing exports and terms of trade of developing countries: evidence from Sri Lanka. *Journal of Development Studies*, 36, 89-104.

Azomahou, T. T., Ndung'u, N., and Ouédraogo, M. (2021). Coping with a dual shock: The economic effects of COVID-19 and oil price crises on African economies. *Resources Policy*, 72, 102093.

Bah, M., Ondo, H.A., Kpogon, K. D. (2021). Effects of governance quality on exports in Sub-Saharan Africa. *International Economics*, 167, 1-14.

Barbier, E.B. (2015). Climate change impacts on rural poverty in low-elevation coastal zones. *Estuarine, Coastal and Shelf Science*, 165, A1-A13.

Barder, O. (2006). A Policymakers' Guide to Dutch Disease. CDG Working Paper Number 91, Center for Global Development, Washington, D.C.

Barrot, L.D., Calderón, C., and Servén, L. (2018). Openness, specialization, and the external vulnerability of developing countries. *Journal of Development Economics*, 134, 310-328.

Beck, T. (2003). Financial Dependence and International Trade. *Review of International Economics*, 11(2), 296-316.

Behrens, K., Gaigné, C., Ottaviano, G.I.P., and Thisse, J-F. (2006). Is remoteness a locational disadvantage?, *Journal of Economic Geography*, 6(3), 347-368.

Bettin, G., Presbitero, A.F., and Spatafora, N. L. (2017). Remittances and Vulnerability in Developing Countries. *World Bank Economic Review*, 31(1), 1-23.

Birchler, K., and Michaelowa, K. (2016). Making aid work for education in developing countries: an analysis of aid effectiveness for primary education coverage and quality. *International Journal of Educational Development*, 48, 37-52.

Blecker, R.A. (2009). External Shocks, Structural Change, and Economic Growth in Mexico, 1979-2007. *World Development*, 37(7), 1274-1284.

Blundell, R., and Bond, S. (1998). Initial Conditions and Moment Restrictions in Dynamic Panel Data Models. *Journal of Econometrics*, 87(1), 115-143.

Blundell, R., Bond, S., and Windmeijer, F. (2001). Estimation in dynamic panel data models: Improving on the performance of the standard GMM estimator. In *Nonstationary Panels, Panel Cointegration, and Dynamic Panels*, pages 53-91. Emerald Group Publishing Limited, 2001.

Bond, S., Hoeffler, A., and Temple, J. (2001). GMM estimation of empirical growth models. CEPR Paper DP3048. Centre for Economic Policy Research, London, United Kingdom.

Borchert, I., and Mattoo, A. (2010). The crisis-resilience of services trade. *The Service Industries Journal*, 30(13), 2115-2136.

Bräutigam, D. (2000). Aid dependence and governance. Report prepared for the Division for International Development Cooperation. Ministry for Foreign Affairs, Sweden. Expert group on development issues. Almqvist and Wiksell International, Stockholm.

Briguglio, L. (1995). Small island developing states and their economic vulnerabilities. *World Development*, 23(9), 1615-1632.

Briguglio, L., Cordina, G., Farrugia, N., and Vella, S. (2009). Economic Vulnerability and Resilience: Concepts and Measurements. *Oxford Development Studies*, 37(3), 229-247.

Brun, J-F., Carrere C., Guillaumont P. and de Melo J. (2005). Has Distance Died? Evidence from a Panel Gravity Model. *World Bank Economic Review*, 19 (1), 99-101.

Busse, M., and Gröning, S. (2009). Does foreign aid improve governance? *Economics Letters*, 104(2), 76-78.

Cadot, O., Fernandes, A., Gourdon, J., Mattoo, A., and de Melo, J. (2014). Evaluating Aid for Trade: A Survey of Recent Studies. *The World Economy*, 37(4), 516-529.

Cali, M. and TeVelde, D. (2011). Does Aid for Trade Really Improve Trade Performance? *World Development*, 39(5), 725-740.

Camanho da Costa Neto, N., and Romeu, R. (2011). Did export diversification soften the impact of the global financial crisis? IMF Working Paper WP/11/99. International Monetary Fund, Washington, D.C.

Caruso, G. D. (2017). The legacy of natural disasters: The intergenerational impact of 100 years of disasters in Latin America. *Journal of Development Economics*, 127, 209-233.

Castellani, D., and Fassio, C. (2019). From new imported inputs to new exported products. Firm-level evidence from Sweden. *Research Policy*, 48(1), 322-338.

Chauvet, L., and Guillaumont, P. (2009). Aid, Volatility, and Growth Again: When Aid Volatility Matters and When it Does Not. *Review of Development Economics*, 13(3), 452-463.

Collier, P., and Goderis, B. (2009). Does Aid Mitigate External Shocks? *Review of Development Economics*, 13(3), 429-451.

Combes, J-L., Ebeke, C.H., Etoundi, S.M.N., and Yogo, T.U. (2014). Are Remittances and Foreign Aid a Hedge Against Food Price Shocks in Developing Countries? *World Development*, 54, 81-98.

Commonwealth Secretariat (2021). The Commonwealth Universal Vulnerability Index - For a Global Consensus on the Definition and Measurement of Vulnerability. The Commonwealth Secretariat, London.

Contractor, F.J., and Mudambi, S.M. (2008). The influence of human capital investment on the exports of services and goods: An analysis of the top 25 services outsourcing countries. *Management International Review*, 48, 433-445.

Cordina, G. (2004). Economic Vulnerability and Economic Growth: Some Results from a Neo-Classical Growth Modelling Approach. *Journal of Economic Development*, 29(2), 21-39.

Dabla-Norris, E., and Gündüz, Y. B. (2014). Exogenous Shocks and Growth Crises in Low-Income Countries: A Vulnerability Index. *World Development*, 59, 360-378.

Dawe, D. (1996). A new look at the effects of export instability on investment and growth. *World Development*, 24(12), 1905-1914.

del Rosal, I. (2019). Export diversification and export performance by destination country. *Bulletin of Economic Research*, 71(1), 58-74.

Driscoll, J. C., and Kraay, A.C. (1998). Consistent Covariance Matrix Estimation with Spatially Dependent Panel Data. *Review of Economics and Statistics*, 80(4), 549-560.

di Giovanni, J., Levchenko, A., and Méjean, M. (2014). Firms, destinations and aggregate fluctuations. *Econometrica*, 82(4), 1303-1340.

Dijkstra, G. (2018). Aid and good governance: Examining aggregate unintended effects of aid. *Evaluation and Program Planning*, 68, 225-232.

Dreher, A., Nunnenkamp, P., and Thiele, R. (2008). Does Aid for Education Educate Children? Evidence from Panel Data. *World Bank Economic Review*, 22(2), 291-314.

Driscoll, J. C., and Kraay, A.C. (1998). Consistent Covariance Matrix Estimation with Spatially Dependent Panel Data. *Review of Economics and Statistics*, 80(4), 549-560.

Dzhumashev, R., and Hailemariam, A. (2021). Foreign aid and the quality of economic institutions. *European Journal of Political Economy*, 38, 55-70.

Easterly, W., and Kraay, A. (2000). Small States, Small Problems? Income, Growth, and Volatility in Small States. *World Development*, 28(11), 2013-2027.

Eichengreen, B., and Gupta, P. (2013). The Real Exchange Rate and Export Growth: Are Services Different? Policy Research Working Paper 6629. The World Bank, Washington, D.C.

Essers, D. (2013). Developing country vulnerability in light of the global financial crisis: Shock therapy? *Review of Development Finance*, 3(2), 61-83.

Fauceglla, D. (2015). Credit constraints, firm exports, and financial development: Evidence from developing countries. *The Quarterly Review of Economics and Finance*, 55, 53-66.

Feenstra, R., C., Inklaar, R., and Timmer, M.P. (2015). The Next Generation of the Penn World Table. *American Economic Review*, 105(10), 3150-3182.

Feindouno, S., and Goujon, M. (2016). The retrospective economic vulnerability index, 2015 update. Working paper n°147, Fondation pour les Etudes et Recherches sur le Developpement International (FERDI), Clermont-Ferrand, France.

Felbermayr, G., and Gröschl, J. (2014). Naturally negative: The growth effects of natural disasters. *Journal of Development Economics*, 111, 92-106.

Feng, L., Li, Z., and Swenson, D.L. (2016). The connection between imported intermediate inputs and exports: Evidence from Chinese firms. *Journal of International Economics*, 101, 86-101.

Fontes, L.F., Granitoff, I., Tai, S.H.T. (2020). Export wage premium for south Brazilian firms: Interaction between export, human capital, and export destination. *Economia*, 21(3), 365-376.

Funke, M., and Ruhwedel, R. (2001). Export variety and export performance: empirical evidence from East Asia. *Journal of Asian Economics*, 12, 493-505.

Funke, M., and Ruhwedel, R. (2002). Export variety and export performance: empirical evidence for the OECD Countries. *Review of World Economics*, 138, 97-114.

Gassebner, M., Keck, A., and Teh, R. (2010). Shaken, not stirred: The impact of disasters on international trade. *Review of International Economics*, 18(2), 351-368.

Gnangnon, S. K. (2018). Aid for trade and trade policy in recipient countries. *The International Trade Journal*, 32(5), 439-464.

Gnangnon, S.K. (2019). Aid for trade and export diversification in recipient-countries. *World Economy*, 42(2), 396-418.

Gnangnon, S.K. (2020a). Development Aid and Regulatory Policies in Recipient-Countries: Is there a Specific Effect of Aid for Trade? *Economics Bulletin*, 40(1), 316-337.

Gnangnon, S.K. (2020b). International Trade Cooperation and Exogenous Economic Shocks in Developing Countries. *Arthaniti: Journal of Economic Theory and Practice*, <https://doi.org/10.1177/0976747920945188>

Gnangnon, S.K. (2021a). Productive Capacities, Economic Growth and Economic Growth Volatility in Developing Countries: Does Structural Economic Vulnerability Matter? Preprints 2021, 2021040491 (doi: 10.20944/preprints202104.0491.v1).

Gnangnon, S.K. (2021b) Aid for Trade and the Real Exchange Rate. *The International Trade Journal*, DOI: 10.1080/08853908.2021.1989349

Gnangnon, S.K. and Iyer, H. (2021). Effect of Aid for Trade and Foreign Direct Investment Inflows on the Utilization of Unilateral Trade Preferences offered by the QUAD countries. *EconStor Preprints 238211*, ZBW - Leibniz Information Centre for Economics.

Goujon, M., and Guillaumont, P. (2016). Has Structural Economic Vulnerability Decreased in Least Developed Countries? Lessons Drawn from Retrospective Indices. *The Journal of Development Studies*, 52(5), 591-606.

Goujon, M., and Guillaumont, P. (2016). Has Structural Economic Vulnerability Decreased in Least Developed Countries? Lessons Drawn from Retrospective Indices. *The Journal of Development Studies*, 52(5), 591-606.

Grossman, G. M., and Sykes, A. O. (2005). A Preference for Development: The Law and Economics of GSP. *World Trade Review*, 4(1), 41-67.

Guillaumont, P. (2009). An Economic Vulnerability Index: Its Design and Use for International Development Policy. *Oxford Development Studies*, 37(3), 193-228.

Guillaumont, P. (2010) Assessing the Economic Vulnerability of Small Island Developing States and the Least Developed Countries. *The Journal of Development Studies*, 46(5), 828-854.

Guillaumont, P. (2011a). The concept of structural economic vulnerability and its relevance for the identification of the Least-developed Countries and other purposes (Nature, measurement, and evolution). CDP Background Paper No. 12 - ST/ESA/2011/CDP/12. Department of Economic and Social Affairs, New York.

Guillaumont P. (2011b). Making development Financing in LDCs More Conducive to Development. FERDI Working Paper, No 18. Fondation pour les Études et Recherches sur le Développement International (FERDI), Clermont-Ferrand.

Guillaumont, P. (2013). Measuring Structural Vulnerability to Allocate Development Assistance and Adaptation Resources. FERDI Working Paper, 68, Fondation pour les Etudes et Recherches sur le Développement International (FERDI), Clermont-Ferrand, France.

Guillaumont, P., and Wagner, L. (2012). Aid and Growth Accelerations: Vulnerability Matters. UNU-WIDER Working Paper Series WP-2012-031, UNU World Institute for Development Economics Research (UNU-WIDER), Helsinki, Finland.

Guillaumont, P., Guillaumont Jeanneney, S., Wagner, L. (2017). How to Take into Account Vulnerability in Aid Allocation Criteria and Lack of Human Capital as Well: Improving the Performance Based Allocation. *World Development*, 90, 27-40.

Guttmann, S., and Richards, A. (2006). Trade Openness: An Australian Perspective. Reserve Bank of Australia. *Australian Economic Papers*, 45(3), 188-203.

Haddad, M., Lim, J. J., Pancaro, C., and Saborowski, C. (2013). Trade openness reduces growth volatility when countries are well diversified. *Canadian Journal of Economics*, 46(2), 765-790.

Hadri, H.E., Mirza, D., and Rabaud, I. (2019). Natural disasters and countries' exports: New insights from a new (and an old) database. *The World Economy*, 42(9), 2668-2683.

Hakobyan, S. (2015). Accounting for underutilization of trade preference programs: The US generalized system of preferences. *Canadian Journal of Economics*, 48(2), 408-436.

Hakobyan, S. (2020). GSP expiration and declining exports from developing countries. *Canadian Journal of Economics*, 53(3), 1132-1161.

Hayakawa, K., Ishikawa, J., and Tarui, N. (2020). What goes around comes around: Export-enhancing effects of import-tariff reductions. *Journal of International Economics*, 126, 103362.

- Hernández, V., Nieto, M.J., and Rodríguez, A. (2021). Home country institutions and exports of firms in transition economies: Does innovation matter? *Long Range Planning*, 102087.
- Hofmann, S.Z. (2021). 100 Resilient Cities program and the role of the Sendai framework and disaster risk reduction for resilient cities. *Progress in Disaster Science*, 11, 100189.
- Hur, J., Raj, M., and Riyanto, Y. (2006). Finance and Trade: A Cross-Country Empirical Analysis on the Impact of Financial Development and Asset Tangibility on International Trade. *World Development*, 34(10), 1728-41.
- Inama, S. (2003). Trade Preferences and the WTO Negotiations on Market Access - Battling for Compensation of Erosion of GSP, ACP and Other Trade Preferences or Assessing and Improving their Utilization and Value. *Journal of World Trade*, 37(5), 959-976.
- Inegbedion, H. (2021). Impact of COVID-19 on economic growth in Nigeria: opinions and attitudes. *Heliyon*. 7(5), e06943.
- Jones, B. F., and Olken, B. A. (2010). Climate shocks and exports. *The American Economic Review: Papers and Proceedings*, 100, 454-459.
- Jones, S., and Tarp, F. (2016). Does foreign aid harm political institutions? *Journal of Development Economics*, 118, 266-281.
- Johnson, W. (2006). Policy responses to economic vulnerability. CDP Background Paper No. 9 - ST/ESA/2006/CDP/9. United Nations Development Policy and Analysis Division- Department of Economic and Social Affairs, United Nations, New York.
- Joya, O. (2015). Growth and volatility in resource-rich countries: Does diversification help? *Structural Change and Economic Dynamics*, 35, 38-55.
- Kalyvitis, S., and Vlachaki, I. (2012). When does more aid imply less democracy? An empirical examination. *European Journal of Political Economy*, 28(1), 132-146.
- Kaufmann, D, Kraay, A. and Mastruzzi, M. (2010). The Worldwide Governance Indicators Methodology and Analytical Issues. World Bank Policy Research N° 5430 (WPS5430), Washington, D.C.
- Keane, J. (2013). Rethinking Trade Preferences for Sub-Saharan Africa: How Can Trade in Tasks Be the Potential Lifeline? *Development Policy Review*, 31(4), 443-462.
- Keck, A., and Lendle, A. (2012). New evidence on preference utilization. WTO Staff Working Papers ERSD-2012-12. World Trade Organization (WTO), Geneva, Switzerland.
- Kim, Y.R. (2019). Does aid for trade diversify the export structure of recipient countries? *The World Economy*, 42(9), 2684-2722.
- Kim, Y., Lim, H., and Sohn, W. (2020). Which external shock matters in small open economies? Global risk aversion vs. US economic policy uncertainty. *Japan and the World Economy*, 54, 101011.

- Koren, M., and Tenreyro, S. (2007). Volatility and development. *Quarterly Journal of Economics*, 122 (1), 243-287.
- Kose, M.A., and Riezman, R. (2001). Trade shocks and macroeconomic fluctuations in Africa. *Journal of Development Economics*, 65(1), 55-80.
- Kotsadam, A., Østby, G., Rustad, S.A., Tollefsen, A.F., and Urdal, H. (2018). Development aid and infant mortality: Micro-level evidence from Nigeria. *World Development* 105, 59-69.
- Li, Z., and Ye, H. (2021). Credit constraint and firm's export mode choice. *China Economic Quarterly International*, 1(1), 43-58.
- Limao, N., and Venables, A. J. (2001). Infrastructure, geographical disadvantage, transport costs, and trade. *World Bank Economic Review*, 15(3), 451-79.
- Liu, J., Wen, J., Huang, Y., Shi, M., Meng, Q., Ding, J., and Xu, H. (2015). Human settlement and regional development in the context of climate change: a spatial analysis of low elevation coastal zones in China. *Mitigation and Adaptation Strategies for Global Change*, 20, 527-546.
- Malik, A., and Temple, J. R. W. (2009). The geography of output volatility. *Journal of Development Economics*, 90(2), 163-178.
- Manchin, M. (2006). Preference utilisation and tariff reduction in EU imports from ACP countries. *World Economy*, 29(9), 1243-66.
- Manova, K. (2013). Credit Constraints, Heterogeneous Firms and International Trade. *Review of Economic Studies*, 80(2), 711-44.
- Mart, R., Papageorgiou, C., and Klyuev, V. (2018). Building resilience to natural disasters: An application to small developing states. *Journal of Development Economics*, 135, 574-586.
- Martínez-Zarzoso, I., and Márquez-Ramos, L. (2018). Exports and governance: Is the Middle East and North Africa region different? *The World Economy*, 42(1), 143-174.
- Maruta, A.A. (2019). Can aid for financial sector buy financial development? *Journal of Macroeconomics*, 62, 103075.
- McIntyre, A., Li, M. X., Wang, K., and Yun, H. (2018). Economic Benefits of Export Diversification in Small States. *International Monetary Fund Working Paper N° WP/18/86*, Washington, D.C.
- Minetti, R., and Zhu, S.C. (2011). Credit Constraints and Firm Export: Microeconomic Evidence from Italy. *Journal of International Economics*, 83(2), 109-25.
- Miningou, E.W. (2019). Effectiveness of education aid revisited: Country-level inefficiencies matter. *International Journal of Educational Development*, 71, 102123.
- Morris, M., and Fessehaie, J. (2014). The industrialisation challenge for Africa: Towards a commodities-based industrialisation path. *Journal of African Trade*, 1(1), 25-36.
- Nickell, S. (1981). Biases in Dynamic Models with Fixed Effects. *Econometrica*, 49(6), 1417-1426.

- Nieminen, M. (2020). Multidimensional financial development, exporter behavior and export diversification. *Economic Modelling*, 93, 1-12.
- Nilsson, L. (2016). EU exports and uptake of preferences: A first analysis. *Journal of World Trade*, 50(2), 219-252.
- Nkusu, M. (2004). *Aid and the Dutch Disease in Low-Income Countries: Informed Diagnoses for Prudent Prognoses*. IMF Working Paper 04/49 (Washington: International Monetary Fund).
- Nouira, R., Plane, P., and Sekkat, K. (2011). Exchange rate undervaluation and manufactured exports: A deliberate strategy? *Journal of Comparative Economics*, 39(4), 584-60.
- Noy, I. (2009). The macroeconomic consequences of disasters. *Journal of Development Economics*, 88(2), 221-231.
- OECD/WTO (2019). *Aid for Trade at a Glance 2019: Economic Diversification and Empowerment*. Contributed by the Organisation for Economic Cooperation and Development. WTO, Geneva/OECD Publishing, Paris.
- Oh, C. H., and Reuveny, R. (2010). Climatic natural disasters, political risk, and international trade. *Global Environmental Change*, 20, 243-254.
- Ouattara, B., and Strobl, E. (2008). Foreign aid inflows and the real exchange rate in the CFA franc zone. *International Economics*, 2008/4 (n° 116), 37-51.
- Persson, M. (2015). From Trade Preferences to Trade Facilitation: Taking Stock of the Issues. *Economics*, 6(1), 2012-17.
- Pickbourn, L., and Ndikumana, L. (2016). The impact of the sectoral allocation of foreign aid on gender inequality. *Journal of International Development*, 28, 396-411.
- Portugal-Perez A., and Wilson, J.S. (2012). Export Performance and Trade Facilitation Reform: Hard and Soft Infrastructure. *World Development*, 40(7), 1295-1307.
- Rasaki, M.G., and Malikane, C. (2015). Macroeconomic shocks and fluctuations in African economies. *Economic Systems*, 39(4), 675-696.
- Roodman, D. M. (2009). A note on the theme of too many instruments, *Oxford Bulletin of Economic and Statistics*, 71(1), 135-158.
- Sahay, R., Čihák, M., N'Diaye, P., Barajas, A., Bi, R., Ayala, D., Gao, Y., Kyobe, A., Nguyen, L., Saborowski, C., Sviryzdenka, K., and Yousefi, S.R. (2015). *Rethinking Financial Deepening: Stability and Growth in Emerging Markets*. IMF Staff Discussion Note, SDN/15/08, International Monetary Fund, Washington, D.C.
- Santos-Paulino, A.U. (2010). Terms of Trade Shocks and the Current Account in Small Island Developing States. *The Journal of Development Studies*, 46(5), 855-876.
- Sekkat, K. (2016). Exchange rate misalignment and export diversification in developing countries. *The Quarterly Review of Economics and Finance*, 59, 1-14.

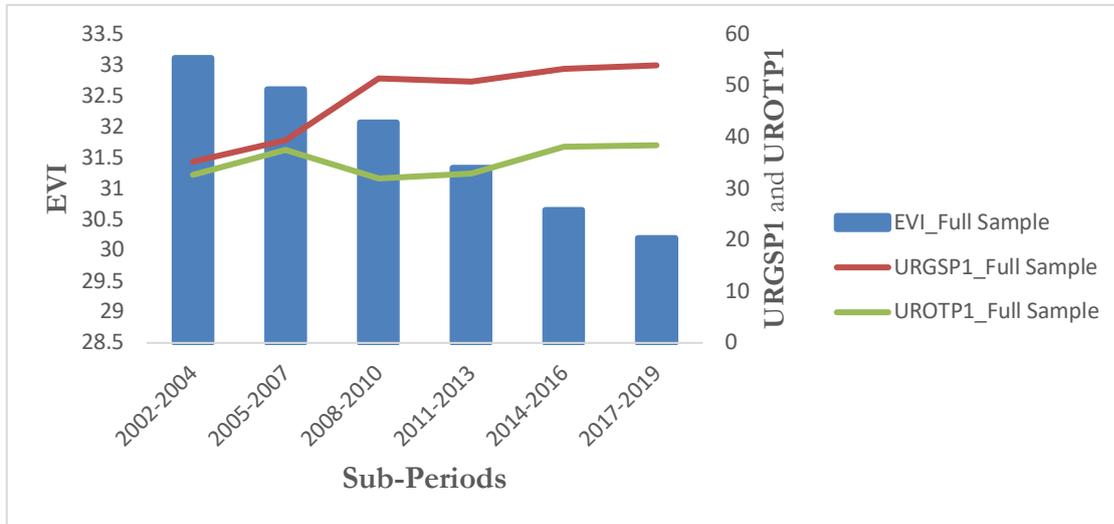
- Sekkat, K., and Varoudakis, A. (2000). Exchange rate management and manufactured exports in Sub-Saharan Africa. *Journal of Development Economics*, 61(1), 237-253.
- Stucki, T. (2016). How the founders' general and specific human capital drives export activities of start-ups. *Research Policy*, 45(5), 1014-1030.
- Su, Y. (2022). Networks of recovery: Remittances, social capital and post-disaster recovery in Tacloban City, Philippines. *International Journal of Disaster Risk Reduction*, 67, 102641.
- Sun, S.L., Peng, M.W., Lee, R.P., Tan, W. (2015). Institutional open access at home and outward internationalization. *Journal of World Business*, 50(1), 234-246.
- Svensson, J. (2000). Foreign aid and rent-seeking. *Journal of International Economics*, 51(2), 437-461.
- Sytsma, T. (2021). Rules of Origin and Trade Preference Utilization Among Least Developed Countries. *Contemporary Economic Policy*, 39(4), 701-718.
- United Nations (2018). *Handbook on the Least Developed Country Category: Inclusion, Graduation and Special Support Measures, Third Edition*. Committee for Development Policy and United Nations Department of Economic and Social Affairs, United Nations, New York.
- Vijil, M. and Wagner, L. (2012). Does Aid for Trade Enhance Export Performance? Investigating on the Infrastructure Channel. *World Economy* 35 (7), 838-868.
- Wagner, L. (2014). Identifying thresholds in aid effectiveness. *Review of World Economics*, 150 (3), 619-638.
- Winters, A. L., and Martins, P. (2004). When comparative advantage is not enough: Business costs in small remote economies. *World Trade Review*, 3(3), 347-383.
- WTO (2005). 'Ministerial Declaration on Doha Work Programme', WT/MIN(05)/DEC, Adopted on 18 December 2005 at the Sixth Session of Trade Ministers Conference. Ministerial Conference, Hong Kong, China, December 13-18. World Trade Organization, Geneva, Switzerland.
- WTO (2016). Modalities for the calculation of "Preference Utilization". Note by the Secretariat for the Committee on Rules of Origin, document G/RO/W/161. World Trade Organization, Geneva, Switzerland.
- WTO (2019). Utilization rates under preferential trade arrangements for Least Developed Countries under the LDC duty scheme. Note by the WTO Secretariat for the Committee on Rules of Origin contained in document G/RO/W/185 issued on 9 May 2019. World Trade Organization, Geneva, Switzerland.
- WTO (2021). Utilization of trade preferences by least developed countries: 2015-2019 patterns and trends. Note by the WTO Secretariat for the Committee on Rules of Origin contained in document G/RO/W/204 issued on 7 May 2021. World Trade Organization, Geneva, Switzerland.
- Wu, J., and Chen, X. (2014). Home country institutional environments and foreign expansion of emerging market firms. *International Business Review*, 23(5), 862-872.

Yang, J., and Yang, C. (2021). Economic policy uncertainty, COVID-19 lockdown, and firm-level volatility: Evidence from China. *Pacific-Basin Finance Journal*, 68, 101597.

Yeyati, E. L., Panizza U, and Stein, E (2007). The cyclical nature of North-South FDI flows. *Journal of International Money and Finance*, 26, 104-130.

FIGURES

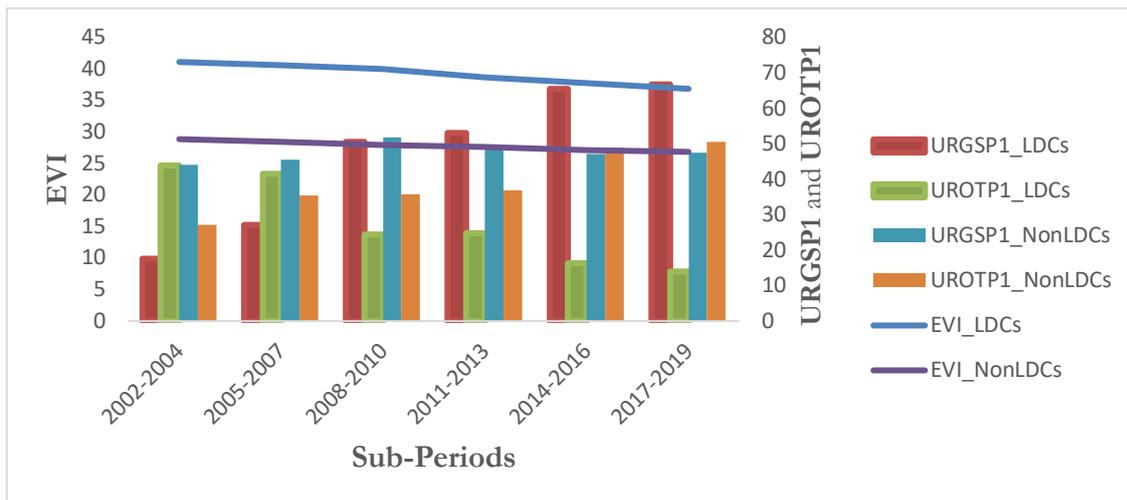
Figure 1: EVI and the utilization rate of NRTPs_Over the full sample



Source: Author

Note: The variables "URGSP1" and "UROTP1" are the non-transformed indicators respectively of the utilization rate of GSP programs, and the utilization rate of other trade preferences programs (see Appendix 1).

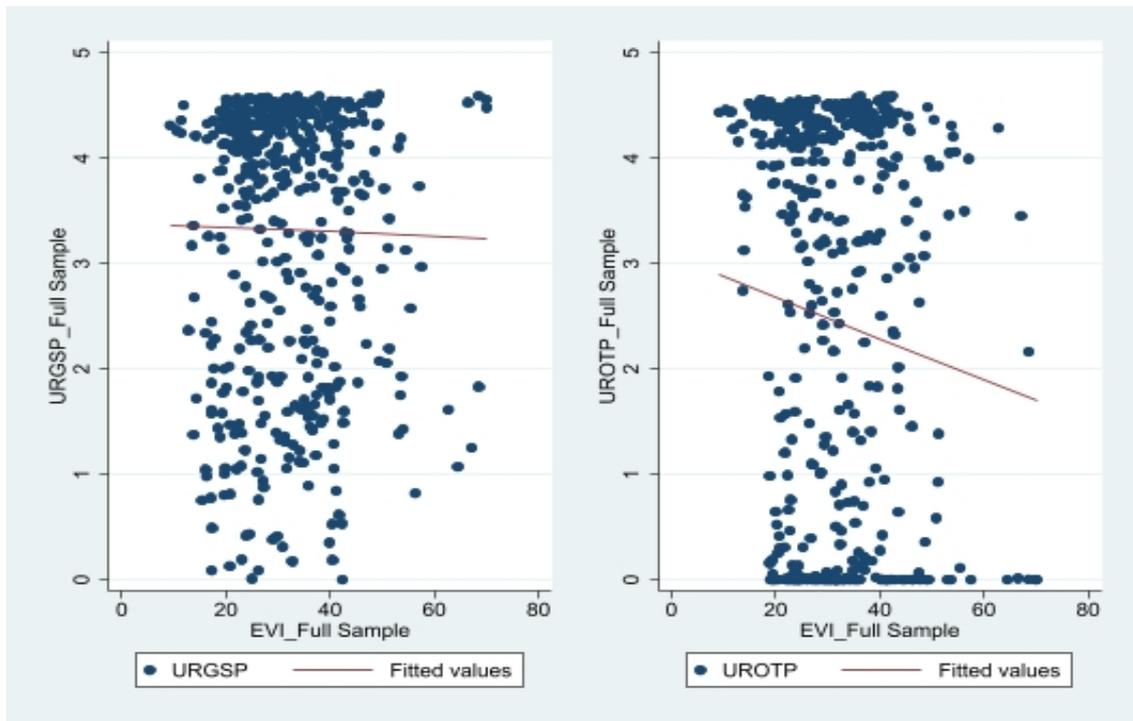
Figure 2: EVI and the utilization rate of NRTPs_Over the sub-samples of LDCs and NonLDCs



Source: Author

Note: The variables "URGSP1" and "UROTP1" are the non-transformed indicators respectively of the utilization rate of GSP programs, and the utilization rate of other trade preferences programs (see Appendix 1).

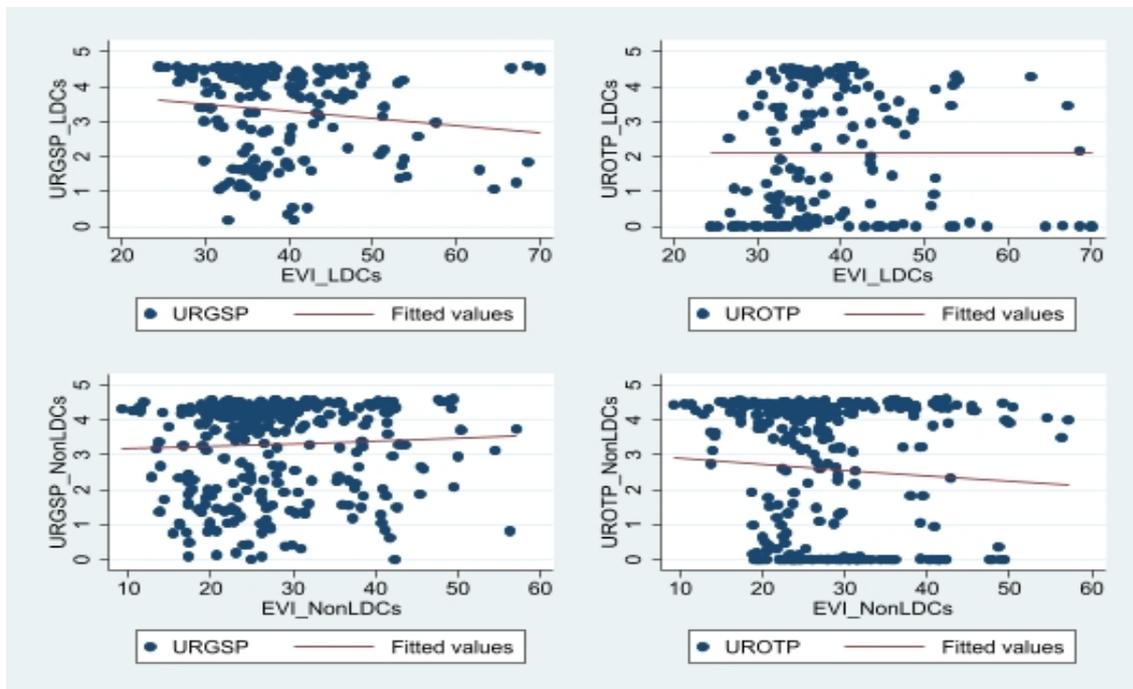
Figure 3: Scatter plot between EVI and the utilization rate of NRTPs_Over the full sample



Source: Author

Note: The variables "URGSP" and "UROTP" are the transformed indicators respectively of the utilization rate of GSP programs, and the utilization rate of other trade preferences programs (see Appendix 1).

Figure 4: Scatter plot between EVI and the utilization rate of NRTPs_Over LDCs and NonLDCs



Source: Author

Note: The variables "URGSP" and "UROTP" are the transformed indicators respectively of the utilization rate of GSP programs, and the utilization rate of other trade preferences programs (see Appendix 1).

TABLES and APPENDICES

Table 1: Effect of structural economic vulnerability on the utilization of NRTPs

Estimators: Pooled Ordinary Least Squares and Within Fixed Effects

Variables	Pooled Ordinary Least Squares Estimator		Within Fixed Effects	
	URGSP (1)	UROTP (2)	URGSP (3)	UROTP (4)
One period lag of the dependent variable	0.615*** (0.0620)	0.704*** (0.0472)	0.344*** (0.112)	0.221** (0.109)
EVI	0.000614 (0.00309)	-0.0126*** (0.00462)	-0.0592*** (0.00786)	-0.0113 (0.0358)
Log(ODA)	0.0645*** (0.0152)	0.142*** (0.0329)	-0.122* (0.0699)	-0.249* (0.134)
UROTP	-0.151*** (0.0330)		-0.338*** (0.0676)	
URGSP		-0.258*** (0.0771)		-0.453*** (0.127)
Log(GDPC)	0.103 (0.103)	0.303*** (0.0492)	0.555* (0.321)	1.252*** (0.361)
OPEN	0.00160* (0.000936)	0.00427*** (0.000761)	0.00677*** (0.00186)	0.00538 (0.00414)
FINDEV	-0.306 (0.677)	-0.947 (0.708)	-2.709** (1.361)	-2.447*** (0.775)
HUM	-0.144*** (0.0400)	-0.00598 (0.196)	0.599** (0.260)	0.737*** (0.259)
INST	-0.0642 (0.0397)	0.0331 (0.0406)	-0.184** (0.0701)	0.119* (0.0657)
Constant	-0.114 (0.646)	-3.181*** (0.959)	1.752 (2.465)	-2.186 (5.728)
Observations - Countries	388 - 84	388 - 84	388 - 84	388 - 84
R-squared	0.628	0.743		
Within R-squared			0.4007	0.3404

Note: *p-value<0.1; **p-value<0.05; ***p-value<0.01. Robust Standard Errors are in parenthesis.

Table 2: Effect of structural economic vulnerability on the utilization of NRTPs
Estimator: Two-Step System GMM

Variables	URGSP	UROTP	URGSP	UROTP
	(1)	(2)	(3)	(4)
One period lag of the dependent variable	0.462***	0.655***	0.443***	0.628***
	(0.0248)	(0.0271)	(0.0292)	(0.0194)
EVI	-0.0404***	-0.0408***	-0.0733***	-0.0289**
	(0.00450)	(0.00559)	(0.0107)	(0.0130)
EVI*LDC			0.0439***	-0.00220
			(0.0109)	(0.0132)
LDC			-1.695***	-1.043**
			(0.418)	(0.439)
Log(ODA)	0.192***	0.134**	0.209***	0.0763*
	(0.0411)	(0.0578)	(0.0364)	(0.0418)
UROTP	-0.192***		-0.257***	
	(0.0227)		(0.0159)	
URGSP		-0.230***		-0.293***
		(0.0403)		(0.0279)
Log(GDPC)	0.723***	0.566***	0.817***	0.329***
	(0.0940)	(0.113)	(0.102)	(0.103)
OPEN	0.00904***	-0.00195	0.00992***	0.000107
	(0.00154)	(0.00153)	(0.00142)	(0.00128)
FINDEV	-4.780***	-0.792	-6.052***	-1.629**
	(0.477)	(0.842)	(0.525)	(0.688)
HUM	-0.984***	-0.921***	-1.340***	-1.268***
	(0.157)	(0.169)	(0.179)	(0.125)
INST	-0.0411	0.136**	0.105**	0.214***
	(0.0592)	(0.0613)	(0.0532)	(0.0520)
Constant	-3.463***	-1.538	-2.153*	2.697*
	(1.118)	(1.652)	(1.205)	(1.524)
Observations - Countries	388 - 84	388 - 84	388 - 84	388 - 84
AR1 (P-Value)	0.0000	0.0063	0.0001	0.0080
AR2 (P-Value)	0.1240	0.7420	0.2078	0.8280
AR3 (P-Value)	0.8147	0.9622	0.9145	0.8830
OID (P-Value)	0.1922	0.3740	0.2233	0.4050

Note: *p-value<0.1; **p-value<0.05; ***p-value<0.01. Robust standard errors are in parenthesis. In the regressions based on the two-step system GMM estimator, the variables "EVI", "ODA", "URGSP", "UROTP", "OPEN", "FINDEV", "HUM", "INST" and the interaction variables have been treated as endogenous. Time dummies have been included in the regressions. The regressions based on the two-step system GMM estimator have used a maximum of 2 lags of the dependent variable as instruments, and 2 lags of endogenous variables as instruments.

Table 3: Effect of the two major components of the index of structural economic vulnerability on the utilization of NRTPs

Estimator: Two-Step System GMM

Variables	URGSP	UROTP	URGSP	UROTP
	(1)	(2)	(3)	(4)
One period lag of the dependent variable	0.482***	0.671***	0.514***	0.656***
	(0.0229)	(0.0265)	(0.0215)	(0.0170)
SHOCK	-0.0225***	-0.0120***		
	(0.00328)	(0.00363)		
EXPOSURE			-0.0322***	-0.0478***
			(0.00960)	(0.00808)
Log(ODA)	0.218***	0.175***	0.213***	-0.0145
	(0.0318)	(0.0622)	(0.0556)	(0.0517)
UROTP	-0.162***		-0.175***	
	(0.0226)		(0.0259)	
URGSP		-0.215***		-0.213***
		(0.0396)		(0.0348)
Log(GDPC)	0.628***	0.482***	0.611***	0.288***
	(0.0924)	(0.115)	(0.0768)	(0.0756)
OPEN	0.00778***	-0.00475***	0.00811***	0.00105
	(0.00146)	(0.00154)	(0.00167)	(0.00160)
FINDEV	-3.590***	-0.332	-4.702***	-1.729**
	(0.478)	(0.765)	(0.588)	(0.701)
HUM	-0.962***	-0.576***	-0.577***	-0.593***
	(0.148)	(0.189)	(0.120)	(0.169)
INST	-0.0733	0.167***	0.0192	0.435***
	(0.0612)	(0.0520)	(0.0510)	(0.0682)
Constant	-4.207***	-3.305**	-3.979***	3.323**
	(0.917)	(1.685)	(1.449)	(1.617)
Observations - Countries	388 - 84	388 - 84	396 - 84	396 - 84
AR1 (P-Value)	0.0000	0.0060	0.0000	0.0079
AR2 (P-Value)	0.1153	0.7296	0.10	0.7519
AR3 (P-Value)	0.7546	0.9867	0.6511	0.8610
OID (P-Value)	0.2018	0.4109	0.3471	0.3281

Note: *p-value<0.1; **p-value<0.05; ***p-value<0.01. Robust standard errors are in parenthesis. In the regressions based on the two-step system GMM estimator, the variables "SHOCK", "EXPOSURE", "ODA", "URGSP", "UROTP", "OPEN", "FINDEV", "HUM", "INST" and the interaction variables have been treated as endogenous. Time dummies have been included in the regressions. The regressions based on the two-step system GMM estimator have used a maximum of 2 lags of the dependent variable as instruments, and 2 lags of endogenous variables as instruments.

Table 4: Interaction effect between the index of structural economic vulnerability and the utilization of one NRTP on the utilization of the other NRTP

Estimator: Two-Step System GMM

Variables	URGSP	UROTP
	(1)	(2)
One period lag of the dependent variable	0.473***	0.623***
	(0.0198)	(0.0210)
EVI*UROTP	-0.00969***	
	(0.00173)	
EVI*URGSP		-0.00698***
		(0.00126)
EVI	-0.0308***	-0.0101
	(0.00356)	(0.00634)
Log(ODA)	0.181***	0.184***
	(0.0375)	(0.0426)
UROTP	0.147**	
	(0.0575)	
URGSP		-0.0434
		(0.0523)
Log(GDPC)	0.557***	0.630***
	(0.0636)	(0.0743)
OPEN	0.00619***	-0.000552
	(0.00101)	(0.00129)
FINDEV	-4.719***	-0.791
	(0.473)	(0.544)
HUM	-0.930***	-0.871***
	(0.149)	(0.136)
INST	0.0731*	0.167***
	(0.0426)	(0.0361)
Constant	-2.142**	-3.807***
	(0.862)	(1.280)
Observations - Countries	388 - 84	388 - 84
AR1 (P-Value)	0.0000	0.0066
AR2 (P-Value)	0.1490	0.7223
AR3 (P-Value)	0.7467	0.9357
OID (P-Value)	0.3628	0.5578

Note: *p-value<0.1; **p-value<0.05; ***p-value<0.01. Robust standard errors are in parenthesis. In the regressions based on the two-step system GMM estimator, the variables "EVI", "ODA", "URGSP", "UROTP", "OPEN", "FINDEV", "HUM", "INST" and the interaction variables have been treated as endogenous. Time dummies have been included in the regressions. The regressions based on the two-step system GMM estimator have used a maximum of 2 lags of the dependent variable as instruments, and 2 lags of endogenous variables as instruments.

Table 5: Interaction effect between development aid and structural economic vulnerability on the utilization of NRTPs

Estimator: Two-Step System GMM

Variables	URGSP	UROTP	URGSP	UROTP	URGSP	UROTP
	(1)	(2)	(3)	(4)	(5)	(6)
One period lag of the dependent variable	0.494***	0.628***	0.509***	0.679***	0.437***	0.593***
	(0.0166)	(0.0190)	(0.0126)	(0.0137)	(0.0146)	(0.0151)
EVI	0.315***	-0.325***	0.177***	-0.221***	0.348***	-0.418***
	(0.0291)	(0.0564)	(0.0325)	(0.0444)	(0.0369)	(0.0560)
EVI*Log(ODA)	-0.0175***	0.0148***				
	(0.00141)	(0.00277)				
EVI*Log(AfI)			-0.0111***	0.0110***		
			(0.00168)	(0.00236)		
EVI*Log(NonAfI)					-0.0191***	0.0187***
					(0.00179)	(0.00281)
Log(ODA)	0.517***	-0.281***				
	(0.0494)	(0.0857)				
Log(AfI)			0.372***	-0.251***		
			(0.0582)	(0.0747)		
Log(NonAfI)					0.640***	-0.359***
					(0.0654)	(0.0884)
Log(GDPC)	0.271***	0.812***	0.339***	0.600***	0.225***	0.788***
	(0.0740)	(0.0542)	(0.0704)	(0.0634)	(0.0619)	(0.0670)
UROTP	-0.165***		-0.213***		-0.191***	
	(0.0147)		(0.0122)		(0.0161)	
URGSP		-0.231***		-0.227***		-0.257***
		(0.0224)		(0.0251)		(0.0237)
OPEN	0.00569***	0.000455	0.00642***	-0.00171	0.00544***	-0.00122
	(0.000981)	(0.00127)	(0.000674)	(0.00114)	(0.000859)	(0.00106)
FINDEV	-3.221***	-1.459**	-3.093***	0.0882	-2.947***	-0.290
	(0.290)	(0.629)	(0.259)	(0.460)	(0.350)	(0.516)
HUM	-0.693***	-1.020***	-0.456***	-0.843***	-0.618***	-1.128***
	(0.100)	(0.111)	(0.0917)	(0.113)	(0.0761)	(0.113)
INST	0.0375	0.155***	-0.139***	-0.000632	-0.00259	0.0130
	(0.0459)	(0.0360)	(0.0348)	(0.0402)	(0.0381)	(0.0514)
Constant	-7.228***	4.803***	-5.486***	4.256***	-9.347***	7.179***
	(1.051)	(1.850)	(1.279)	(1.550)	(1.609)	(1.797)
Observations - Countries	388 - 84	388 - 84	401 - 84	401 - 84	401 - 84	401 - 84
AR1 (P-Value)	0.0000	0.0073	0.0000	0.0069	0.0000	0.0088
AR2 (P-Value)	0.10	0.7476	0.10	0.6254	0.10	0.6948
AR3 (P-Value)	0.6271	0.9544	0.7685	0.9666	0.8313	0.8701
OID (P-Value)	0.3988	0.4497	0.3438	0.4200	0.3202	0.5561

Note: *p-value<0.1; **p-value<0.05; ***p-value<0.01. Robust standard errors are in parenthesis. In the regressions based on the two-step system GMM estimator, development aid variables, and the variables "EVI", "URGSP", "UROTP", "OPEN", "FINDEV", "HUM", "INST" and the interaction variables have been treated as endogenous. Time dummies have been included in the regressions. The regressions based on the two-step system GMM estimator have used a maximum of 2 lags of the dependent variable as instruments, and 2 lags of endogenous variables as instruments.

Appendix 1: Definition and Source of variables

Variables	Definition	Source
EVI	<p>This is indicator of structural economic vulnerability, also referred to as the Economic Vulnerability Index. It has been set up at the United Nations by the Committee for Development Policy (CDP), and used by the latter as one of the criteria for identifying LDCs. It has been computed on a retrospective basis for 145 developing countries (including 48 LDCs) by the "Fondation pour les Etudes et Recherches sur le Developpement International (FERDI)". The EVI has been computed as the simple arithmetic average of two sub-indexes, namely the intensity of exposure to shocks (exposure sub-index) (denoted "EXPOSURE"), and the intensity of exogenous shocks (shocks sub-index) (denoted "SHOCK"). These two sub-indexes have been 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 further details on the computation of the EVI, see for example Feindouno and Goujon (2016).</p> <p>The components of the exposure sub-index are the population size; the remoteness 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.</p>	<p>Data on EVI is extracted from the database of the Fondation pour les Etudes et Recherches sur le Developpement International (FERDI) – see online at: https://ferdi.fr/donnees/un-indicateur-de-vulnerabilite-economique-EVI-retrospectif</p>
URGSP	<p>This is the "transformed" indicator of the utilization rate of unilateral trade preferences under the Generalized System of Preferences (GSP) schemes provided by the so-called "Quadrilaterals" (i.e., QUAD countries), namely Canada, European Union (EU), Japan and the United States of America (USA). It captures the extent to which imports that are eligible for trade preferences are actually imported under these preferences (e.g., WTO, 2016).</p> <p>This indicator has been computed using a formula adopted both by the WTO (see WTO, 2016) and the UNCTAD and which goes as follows:</p> $\text{URGSP1} = 100 * (\text{GSP Received Imports}) / (\text{GSP Covered Imports}),$ <p>where "GSP received imports" refers to the value of imports that received GSP treatment, and "GSP covered imports" indicates the value of imports that are</p>	<p>United Nations Conference on Trade and Development (UNCTAD) Dataset: https://gsp.unctad.org/utilization</p>

	<p>classified in tariff lines that are dutiable and covered by the GSP scheme of the preference-granting country. Detailed information on the dataset is available over the Internet at: https://gsp.unctad.org/about</p> <p>Values of the indicator "URGSP1" range between 0 and 100, with higher values indicating a greater utilization rate of GSP programs.</p> <p>Given the skewed distribution of this variable "URGSP1", it has been transformed as followed (e.g., Yeyati et al. 2007): $URGSP = sign(URGSP1) * \log(1 + URGSP1)$ (2), where $URGSP1$ refers to the absolute value of the variable "URGSP1".</p>	
UROTP	<p>This is the 'transformed' indicator of the utilization rate of the other trade preferences than the GSP programs provided by the QUAD countries to developing countries, including least-developed countries among them. In particular, this covers preferences granted by USA under the African Growth and Opportunity Act (AGOA) and the Caribbean Basin Initiative; in the case of the European Union, it includes preferences under the Economic Partnership Agreements (EPAs) entered with selected Africa Sub-Saharan countries.</p> <p>This indicator has been calculated using a formula similar to the one used to compute the indicator "USGSP1". The formula goes as follows: $UROTP1 = 100 * (\text{Other-Preferential Imports}) / (\text{Other Preferential Covered Imports})$, where "Other-Preferential Imports" refers to the value of imports that benefitted from NRTPs other than GSP and under selected Economic Partnership Agreements that the EU has entered with some African countries. "Other-Preferential Covered Imports" refers to the value of imports that are classified in tariff lines that are dutiable and covered by the other-preferential schemes. Detailed information on the dataset is available over the Internet at: https://gsp.unctad.org/about</p> <p>Values of the indicator "UROTP1" range between 0 and 100, with higher values indicating a greater utilization rate of other trade preferences programs.</p> <p>Given the skewed distribution of the variable "UROTP1", it has been transformed as followed (e.g., Yeyati et al. 2007): $UROTP = sign(UROTP1) * \log(1 + UROTP1)$ (2), where $UROTP1$ refers to the absolute value of the variable "UROTP1".</p>	<p>United Nations Conference on Trade and Development (UNCTAD) Dataset: https://gsp.unctad.org/utilization</p>
ODA,	<p>"ODA" is the real gross disbursements of total Official Development Assistance (ODA) expressed in constant prices 2019, US Dollar.</p>	<p>Author's calculation based on data extracted from the database OECD statistical database on</p>

AFT and NonAFT	<p>"AFT" is the total real gross disbursements of Aid for Trade. It is the sum of the real gross disbursements of Aid for Trade allocated to the buildup of economic infrastructure, the real gross disbursements of Aid for Trade for building productive capacities, and the real gross disbursements of Aid allocated for trade policies and regulation. All aid variables are expressed in constant prices 2019, US Dollar.</p> <p>"NonAFT" is the measure of the development aid allocated to other sectors in the economy than the trade sector. It is calculated as the difference between the gross disbursements of total ODA and the gross disbursements of total Aid for Trade (both being expressed in constant prices 2019, US Dollar).</p>	<p>development, in particular the OECD/DAC-CRS (Organization for Economic Cooperation and Development/Donor Assistance Committee)-Credit Reporting System (CRS). Aid for Trade data cover the following three main categories (the CRS Codes are in brackets):</p> <p><u>Aid for Trade for Economic Infrastructure</u>, which includes transport and storage (210), communications (220), and energy generation and supply (230);</p> <p><u>Aid for Trade for Building Productive Capacity</u>, which includes banking and financial services (240), business and other services (250), agriculture (311), forestry (312), fishing (313), industry (321), mineral resources and mining (322), and tourism (332); and</p> <p><u>Aid for Trade policy and regulations</u>, which includes trade policy and regulations and trade-related adjustment (331).</p>
GDP	Gross Domestic Product (constant 2010 US\$).	World Development Indicators (WDI)
OPEN	This is the indicator of trade openness, measured by the share of sum of exports and imports of goods and services in GDP. This variable is not expressed in percentage.	Author's calculation based on data extracted from the WDI.
HUM	This is the indicator of human capital, measured by the number of years of schooling and returns to education in a given country and in a given year t, developed by Feenstra et al. (2015).	Penn World Tables PWT 10.0 (see Feenstra et al., 2015)
FINDEV	This is the financial development index, which summarizes how developed financial institutions and financial markets are in terms of their depth (size and liquidity), access (ability of individuals and companies to access financial services), and efficiency (ability of institutions to provide financial services at low costs and with sustainable revenues, and the level of activity of capital markets). The values of this indicator range between 0 and 1.	Data extracted from the IMF Financial Development Index Database (see online at: https://data.imf.org/?sk=F8032E80-B36C-43B1-AC26-493C5B1CD33B) - See also Sahay et al. (2015).

INST	<p>This is the variable representing the institutional and governance quality in a given country. It has been computed by extracting the first principal component (based on factor analysis) of the following six indicators of institutional quality and governance.</p> <p>These indicators include an index of: political stability and absence of violence/terrorism; regulatory quality; rule of law; government effectiveness; voice and accountability; and corruption.</p> <p>Higher values of this index are associated with better governance and institutional quality, while lower values reflect worse governance and institutional quality.</p>	<p>Author's computation based on data on the six indicators components of institutional quality and governance collected from World Bank Governance Indicators (WGI) developed by Kaufmann, Kraay and Mastruzzi (2010) and recently updated (see data online at: https://info.worldbank.org/governance/wgi/)</p>
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Appendix 2: Descriptive statistics on variables used in the analysis

Variable	Observations	Mean	Standard deviation	Minimum	Maximum
URGSP1	388	49.19	33.76	0.00	97.64
UROTP1	388	37.18	37.35	0.00	98.15
EVI	388	31.32	10.22	9.22	70.04
ODA	388	789	865	9.9633	6740
AfT	388	281	447	1.1893	3640
NonAfT	388	744	794	17.8	6840
GDPG	388	3685.25	3547.47	212.47	15079.86
OPEN	388	72.37	35.53	0.25	286.29
FINDEV	388	0.23	0.13	0.05	0.71
HUM	388	2.15	0.55	1.13	3.55
INST	388	-1.14	1.28	-4.23	3.00

Note: The variables "ODA", "AfT" and "NonAfT" are expressed in millions of US dollars.

Appendix 3: List of countries contained in the full sample

Full sample			LDCs
Algeria	Ghana	Niger	Angola
Angola	Guatemala	Nigeria	Bangladesh
Argentina	Guyana	Pakistan	Benin
Armenia	Haiti	Panama	Burkina Faso
Bangladesh	Honduras	Paraguay	Burundi
Belize	India	Peru	Cambodia
Benin	Indonesia	Philippines	Central African Republic
Bolivia	Iran, Islamic Rep.	Rwanda	Ethiopia
Botswana	Jamaica	Senegal	Gambia, The
Brazil	Jordan	Sierra Leone	Haiti
Burkina Faso	Kazakhstan	South Africa	Lao PDR
Burundi	Kenya	Sri Lanka	Lesotho
Cambodia	Kyrgyz Republic	Sudan	Liberia
Cameroon	Lao PDR	Tajikistan	Madagascar
Central African Republic	Lesotho	Tanzania	Mali
Chile	Liberia	Thailand	Mauritania
China	Madagascar	Togo	Mozambique
Colombia	Malaysia	Tunisia	Myanmar
Congo, Rep.	Maldives	Turkey	Nepal
Costa Rica	Mali	Uganda	Niger
Cote d'Ivoire	Mauritania	Uruguay	Rwanda
Dominican Republic	Mauritius	Venezuela, RB	Senegal
Ecuador	Mexico	Vietnam	Sierra Leone
Egypt, Arab Rep.	Mongolia	Zambia	Sudan
El Salvador	Morocco		Tanzania
Eswatini	Mozambique		Togo
Ethiopia	Myanmar		Uganda
Fiji	Namibia		Zambia
Gabon	Nepal		
Gambia, The	Nicaragua		