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Do Unilateral Trade Preferences Help Reduce Poverty in Beneficiary Countries?

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Abstract

This paper has investigated the utilization of non-reciprocal (or unilateral) trade preferences (NRTPs) provided by QUAD countries on poverty in recipient-countries. It uses a panel dataset of 77 beneficiaries of NRTPs over the period of 2002-2019, and considers two main blocks of NRTPs, namely 'Generalized System of Preferences' (GSP) programs and 'other trade preferences programs'. The analysis relies on two main indicators of poverty, i.e., the poverty headcount ratio at $1.90 and the poverty gap at $1.90, but also provides a robustness check using indicators of poverty at $3.20 and $5.50. Empirical findings obtained from the use of the two-step generalized methods of moments indicate that over the full sample, an increase in the utilization rates of both GSP programs and other trade preferences programs is associated with poverty reduction in beneficiary countries, with the magnitude of this effect being higher for least developed countries (LDCs) than for other countries in the full sample. Additionally, GSP programs and other trade preferences programs are strongly complementary in helping reduce poverty in beneficiary countries. Finally, the effect of the utilization of each type of NRTPs on poverty works through the economic complexity channel, as the greater the level of economic complexity, the higher is the negative effect of the utilization of these NRTPs on poverty.

Keywords: Utilization of non-reciprocal trade preferences; Poverty; QUAD countries; Beneficiary countries.
JEL Classification: F13; F14; O14.

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1. Introduction

Reducing poverty, including in developing countries, is a shared objective of the international community. For example, the first goal of the Agenda[2] 2030 is to "end poverty in all its forms everywhere". Trade policies, development aid policies and migration policies are major policy tools available to developed countries to help developing ones in their efforts to promote economic growth and development (Mitchell et al., 2021).

As far as trade policies are concerned, developed countries (also referred here to as "old-industrialized countries") have been providing unilateral trade preferences to developing countries over several decades. These unilateral trade preferences (also called non-reciprocal trade preferences (NRTPs)) can take the form of the Generalized System of Preferences (GSP) and/or other specific unilateral trade concessions provided to selected developing countries. The theoretical rationale for the offer of NRTPs to developing countries is rooted in the seminal work by Prebisch (1950) and Singer (1950). The authors have underlined the downward secular trend of the price of primary commodities relative to those of manufacturers, and argued that only manufacturing products could provide stability and jobs in developing countries (UNCTAD, 1985). Hence, the need for wealthier nations to help (for example through the offer of NRTPs) developing countries promote manufactured exports.

The Resolution 21 (II) adopted by member states at the second conference of the United Nations Conference on Trade and Development (UNCTAD) held in 1968, called for the establishment of a "generalized, non-reciprocal, non-discriminatory system of preferences[3] in favour of the developing countries, including special measures in favour of the least advanced among the developing countries" (see Cernat et al., 2003; Grossman and Sykes, 2005). According to this Resolution, these preferences[4] should "increase export earnings for developing countries, promote industrialization and accelerate developing countries' rates of economic growth" (e.g., Bartels, 2003, Grossman and Sykes, 2005). The 'Enabling Clause[5]' adopted in 1979 represents the permanent legal basis for granting trade preferences to developing countries.

As mentioned above, NRTPs are not confined to GSP programs, and also include other special trade preference programs whereby wealthier countries provide non-reciprocal trade concessions to selected developing countries. The offer of these special preferences is legally governed by a Waiver granted by WTO members (see WTO, 2010). These 'other trade preferences[6]' for example, the offer by Canada of a tariff treatment to products originating in Commonwealth Caribbean countries; the offer by the United States of the African Growth and

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[2] The document '*Transforming our world: the 2030 Agenda for Sustainable Development*' was adopted by the General Assembly of the United Nations on 25 September 2015. It is the new universal Agenda that contains 17 Sustainable Development Goals (of which the first is related to poverty) and 169 targets which are to be met by the international community by the 2030. This United Nations symbol of this document is A/RES/70/1, and could be found online at:https://www.un.org/en/development/desa/population/migration/generalassembly/docs/globalcompact/A_RES_70_1_E.pdf

[3] These preferences are also referred to as "Generalized System of Preferences (GSP)".

[4] The history of GSPs could be found in Cunha et al. (2005).

[5] It is also referred to as the "Differential and More Favourable Treatment, Reciprocity and Fuller Participation of Developing Countries" provides the legal basis for the supply of GSP schemes by wealthier countries to developing countries.

[6] It is important to note that while the present study focuses on preferences supplied by developed nations (notably some of them) to developing ones, developing countries also provide special trade concessions to least developed countries. The WTO database on preferential trade arrangements provides information on the existing set of NRTPs (see online at: http://ptadb.wto.org/default.aspx)

Opportunity Act (AGOA) to eligible countries in Sub-Saharan Africa; the United States' trade preferences for Nepal; and the European Union's trade preferences for countries of the Western Balkans (Albania, Bosnia and Herzegovina, Montenegro, North Macedonia, Serbia, Kosovo).

Do NRTPs help to reduce poverty in beneficiary countries? The empirical work on this issue is scant. This issue is related, in spirit, to the literature on the effect of foreign trade policy (by rich countries) on poverty and living standards in developing countries (e.g., Brambilla et al., 2012; McCaig, 2011). In the context of the bilateral trade agreement between the United States and Vietnam, McCaig (2011) has examined whether the improvement of Vietnam's access to United States' market has contributed to poverty reduction in Vietnam. He has obtained that provinces in Vietnam that were more exposed to the tariff cuts by the United States had experienced faster decreases in poverty. In particular, in the most exposed provinces to the tariff cuts, wage growth rose quickly for workers with low levels of education, but not for highly educated workers. Brambilla et al. (2012) have shown that the imposition by the United States of anti-dumping duties on exports of Vietnamese catfish products has led to a significant fall of income of households that were relatively specialized in the production of aquaculture products.

The present paper aims to contribute to the nascent literature on the effect of the improved access (for developing countries) to the market of rich countries on poverty in developing countries. It does so by investigating the effect of the utilization of NRTPs provided by QUAD countries (Canada, European Union, Japan, and the United States) on poverty in beneficiary countries[7], using a recent database developed by the UNCTAD on the utilization rates of NRTPs offered by the QUAD countries.

While a voluminous and inconclusive literature has investigated whether NRTPs have been effective in increasing export earnings of beneficiary countries, few other works have investigated whether NRTPs have helped expand the industrial based in beneficiary countries (e.g., de Melo and Portugal-Pérez, 2008; Gamberoni, 2007; Gnangnon, 2021a; Gradeva and Martínez-Zarzoso, 2016; Persson and Wilhelmsson, 2016; Yannopoulos, 1986). A recent work has also investigated the economic growth performance effect of NRTPs, with a view to assessing the effectiveness of NRTPs in promoting economic growth in recipient countries (Gnangnon, 2021b).

The relationship between NRTPs and poverty in beneficiary countries is not borne out by empirical evidence. The existing work on the effect of NRTPs on poverty has provided essentially a correlation-based analysis of the issue, and not whether NRTPs genuinely cause poverty while controlling for other factors that could affect poverty in beneficiary countries.

For example, Page and Hewitt (2002) have noted that the provision by the European Union (under its Everything But Arms (EBA) initiative) of duty-free-quota-free market access for products originating from Least developed countries (LDCs) is likely to result in trade diversion from other sometimes poorer countries, insofar as the LDCs group is not a 'neutral measure of poverty'. Thus, while the EBA initiative may reduce poverty in LDCs, it could raise poverty in other poor countries. The authors have, therefore, concluded that the European Union's EBA policy was adopted essentially on political grounds, and not based on developmental motives.

[7] Studies such as that of Stibora and de Vaal (2015) have rather looked at the effect of preferential trade agreements (i.e., reciprocal trade agreements) on poverty. They have obtained, among others, that the membership to preferential trade agreements only generate welfare gains for countries that are too poor to import the goods produced by rich countries, as for all other countries, the welfare effects of joining those agreements depend on the world income distribution and on the strength of comparative advantages.

Freres and Mold (2004) have noted that the European Union's GSP had not been successful in reducing poverty in the Latin American countries, due to a variety of reasons. The reasons underpinning the poor performance of GSP in reducing poverty could be found in both the side of recipient countries (i.e., Latin American countries), as well as in the side of preference-grantors (i.e, the European Union). From the side of the recipient countries, factors included domestic social and economic conditions, while from the side of the European Union, problems concerned the weaknesses in the design and implementation of the GSP scheme itself. These problems included the uncertainty associated with these preferences, a poor knowledge of the European market, lack of strong support for strengthening the technological capacity of small-scale producers in recipient countries in Latin America, and the excessively strict rules of origin of the preference scheme. Freres and Mold (2004) then provided policy recommendations for ensuring sustainable benefits of the European Union's GSP scheme in favour of Latin American countries.

The former Ambassador of the United States, Michael Froman, has built on statistical facts to conclude that the NRTPs provided by the United States (i.e., the GSP program, the Caribbean Basin Economic Recovery Act (CBERA) and the African Growth and Opportunity Act (AGOA)) had been successful in "*helping smaller and poorer countries to compete, develop value-added industries, and support higher-quality employment*." (see Froman, 2016: p31). Froman (2016) has concluded his analysis by stating that these unilateral trade preference programs have contributed to significantly alleviate poverty and reducing hunger in the developing world. He, nevertheless, noted that as beneficiary countries improve their trade capacity (including thanks to NRTPs), they should further open domestic markets, and implement the requisite internal reform for promoting exports and economic growth. At the same time, as the increasing number of free trade agreements will erode the competitive advantage of NRTPs over time, Froman (2016: p31) has proposed that "*It will be important to help beneficiary countries to not only fully utilize preference programs in their formative years but, over time, to look to advancing beyond preferences to more stable, reciprocal arrangements that can more fully integrate them into the global economy.*" While the factual analysis by Froman (2016) provides an insight into the correlation between the United States' trade preferences and poverty (and hunger) in beneficiary countries, it remains uncertain whether these NRTPs had really caused poverty reduction, as this would require an analysis, which in the context of a partial equilibrium, would control for other potential factors that could affect poverty.

In investigating empirically the effect of the utilization of NRTPs by the QUAD countries on poverty in beneficiary countries, the present analysis postulates that this effect works through the economic complexity channel. The concept of economic complexity is developed on the ground that the positioning of an economy's tradeable sectors within the global trade network matters significantly for the trajectory of its economic growth (e.g., Hausmann et al., 2007; Hidalgo et al., 2007; Hidalgo and Hausmann, 2009). Thus, economic complexity captures the information about the amount of "productive knowledge" (i.e., the technical know-how/the set of capabilities) required to produce a product. Given that there is a cost of acquiring productive knowledge, and that the latter cannot be easily transferred to other countries, the economic complexity (or productive knowledge) of a product in a country is greater, the difficult it is for other countries to obtain the capabilities required to produce that product. In other words, an economy is qualified as complex if it produces a diversity of products (i.e., it enjoys a greater export product diversification, measured by the number of exported products) and if the capabilities required to

produce those products are such exclusive that few other countries can export them (i.e., the country has a low ubiquity).

The theoretical argument builds on the fact that on the one hand, NRTPs may help promote manufacturing exports (e.g., de Melo and Portugal-Pérez, 2008; Gradeva and Martínez-Zarzoso, 2016), diversify export products (e.g., Gamberoni, 2007; Persson and Wilhelmsson, 2016; Yannopoulos, 1986), and their utilization can be associated with greater economic complexity in recipient countries (e.g., Gnangnon, 2021a). On the other hand, greater economic complexity helps to reduce poverty (Gnangnon, 2021c). Hence, by hypothesizing that the effect of the utilization of NRTPs on poverty in recipient-countries works through the economic complexity channel, the paper tests whether the utilization of NRTPs in countries that endeavour to produce and export increasingly complex (sophisticated) goods helps these countries achieve a greater poverty reduction.

The empirical analysis utilizes a set of 77 beneficiaries of NRTPs over the period of 2002-2019, and the two-step generalized methods of moments. The main indicators of poverty are the poverty headcount ratio at $1.90 and the poverty gap at $1.90. Results suggest that over the full sample, the utilization of both GSP programs and other trade preferences programs contributes to reducing poverty in beneficiary countries. These two blocks of NRTPs tend to exert a higher poverty reduction effect in LDCs than in NonLDCs. Moreover, GSP programs and other trade preferences are strongly complementary in helping to reduce poverty in beneficiary countries. Finally, the effect of the utilization of NRTPs (GSP programs and other trade preferences) on poverty genuinely works through the economic complexity channel. In fact, the greater the level of economic complexity, the higher is the magnitude of the poverty reduction effect of the utilization these NRTPs.

In the remainder of the paper, section 2 provides the theoretical framework underpinning the effect of the utilization of NRTPs on poverty through the economic complexity channel. Section 3 presents the empirical strategy, and Section 4 interprets empirical outcomes. Section 5 concludes.

2. Theoretical framework on the effect of the utilization of NRTPs on poverty

The bulk of the work on the links between international trade and poverty has focused on the effect of trade liberalisation on poverty (e.g., Deaton, 1989; Porto, 2006; Winters et al., 2004). Building on the reasoning of the Heckscher-Ohlin model, the standard trade theory provides that a country would export products that use intensively factors of production it has in abundance. This signifies that the abundance of labour in developing countries leads them to specialize in exports of labour-intensive products, while importing products intensive in skills and capital. According to the Heckscher-Ohlin model, countries that participate in international trade experience higher export product prices than if they were to sell those products in the domestic market. In general, exporting firms are often better-off than firms that do not engage in export activities (e.g., De Loecker, 2007; Fabling and Sanderson, 2013; Kasahara and Lapham, 2013; Van Biesebroeck, 2005). The Stolper-Samuelson theorem, which is a corollary of the Heckscher-Ohlin model, predicts that participation in international trade also alters the remunerations of factors of production. While the prices of imported products decline and the wages in the import-competing

sector consequently move downward, the prices of export products increase, and lead to higher wages in the exporting sectors of the economy. The Stolper-Samuelson theorem, additionally, provides that the translation of changes in product prices to the changes in the prices of factors of production is not proportional, as the dispersion of wages is particularly higher than the dispersion of the related product prices.

On another note, the trade theory has predicted that countries that participate in international trade enjoy a higher economic growth performance thanks, *inter alia*, to an efficient allocation of resources, an increased competition in domestic markets, the productivity enhancement (e.g., Melitz, 2003), economies of scale (e.g., Alesina et al., 2005) and the diffusion of technology and knowledge (e.g., Grossman and Helpman, 1991; Grossman and Helpman, 2015; Krugman 1987). At the same time, Chang et al. (2009) have established empirically that the economic growth effect of trade openness depends on a wide range of countries' structural characteristics such as the level of educational investment, financial depth, inflation stabilization, public infrastructure, governance, labor market flexibility, ease of firm entry, and of firm exit. In other words, the economic growth effect of trade openness may be significantly improved if certain complementary reforms are undertaken.

The relationship between poverty and international trade is rather complex[8], and works through a variety of macroeconomic and microeconomic channels. For example, according to Winters et al. (2004), these channels include changes in relative prices; remuneration of factors; technical progress and the technological diffusion process; the extent to which macroeconomic shocks and vulnerability affect trade (including export earnings), and other factors that influence both the demand for exports and supply capacity. Specifically, the price transmission mechanisms play a key role in the effect of international trade on poverty, and their ultimate effects depend on the sources of income of economic agents as well as their employment conditions (Porto 2006; Winters et al., 2004).

Recent works have examined the effect of exports on poverty. For example, according to the World Bank (2020), regions in Mexico and Vietnam that have increased their participation in global value chains, have experienced a significant poverty reduction. Artuç et al. (2019) have obtained that higher exports per workers in South Asia would result in higher wages, notably for the better-off groups (e.g., the better-educated workers, men, and the more-experienced workers), although the less-skilled and rural workers would enjoy new job opportunities outside of the informal sector. Robertson et al. (2020) have shown, among others, that export growth in Bangladesh has had significant impacts in the short term, including through the wage and informal employment channels at the local level, and these effects spread through the economy over time. For example, subdistricts that were greatly exposed to export shocks experienced higher average annual wages than those that were less exposed to export growth. The increase in exports helped to draw women out of informality and into the formal sector. Greater export orientation has also resulted in poverty reduction and labour shifts away from the agricultural sector in China and Vietnam (e.g., Erten and Leight 2019; McCaig and Pavcnik 2018).

In light of the foregoing, we now discuss how the utilization of NRTPs can affect poverty, including through the economic complexity channel. Our line of reasoning is as follows. The effect

[8] Engel et al. (2021) have provided an excellent literature review on the distributional impacts of trade, including inter alia, the poverty impact of trade.

of the usage of NRTPs on poverty through the economic complexity channel would depend on (i) how the utilization of NRTPs affects economic complexity, and ii) how economic complexity, in turn, influences poverty in developing countries (that are here beneficiaries of NRTPs).

Utilizing NRTPs entails (for a given country) the exportation of a range of products covered by the preference schemes to the markets of preference granting countries. This allows the beneficiary country to take advantage of preference concessions compared to other exporters of the same products to the markets of the preference grantors. A voluminous literature has assessed empirically whether NRTPs have been effective in improving export earnings in beneficiary countries. Some studies[9] have found that NRTPs have contributed to expanding beneficiary countries' exports, while other works[10] have established that the export effects of NRTPs vary across beneficiary countries, sectors, and products. A number of studies[11] have also reported a negative effect of NRTPs on beneficiary countries' exports, and concluded that developing countries should abandon NRTPs in favour of reciprocal trade agreements. Factors that could limit the effectiveness of NRTPs in promoting exports include the erosion of preference margins (i.e., the difference between the preferential tariff rate and the MFN tariff rate), the inadequate product coverage, the instability or uncertainty associated with the improved market access, the complexity and restrictive nature of rules of origin associated with the preferences (e.g., Persson, 2015), and supply-side factors (e.g., Low et al. 2009; Prowse, 2006; 2010). In a nutshell, it is not clear whether NRTPs have always been helpful in expanding the exports of beneficiary countries.

Another strand of the literature has looked at whether NRTPs have helped to expand the industrial base of beneficiary countries, as envisaged by the UNCTAD's Resolution 21(II). According to de Melo and Portugal-Pérez (2008), the high flexible preferential rules of origin under the AGOA scheme of the United States has allowed the top seven beneficiaries of this regime to significantly expand the number of products exported (the export volume increased by 300%). Gradeva and Martínez-Zarzoso (2016) have shown that while the European Union's EBA initiative has led to an increase in the agricultural products and natural resources exports of ACP countries, this initiative has not significantly influenced the manufacturing exports of these countries. Yannopoulos (1986) has shown that Mediterranean countries have diversified their export product baskets thanks to the preferences offered by the European Union. Gamberoni (2007) has obtained that the export diversification effect of the EU's GSP scheme varies across beneficiary countries. For example, while the GSP scheme and the drug regime (within this scheme) have, in general, been associated with export diversification at the extensive margins, this was not the case for African, Caribbean and Pacific (ACP) countries as well as LDCs. For ACP countries, the preferences have generated an anti-export diversification effect, while for the effects have been unstable. Persson and Wilhelmsson (2016) have uncovered that while the GSP and other NRTPs supplied by the EU have been associated with greater export product diversification, preferences enjoyed by Mediterranean countries have not generated significant effects on the range of products exported by these countries. Gnangnon (2021a) has investigated empirically whether

[9] These works include for example, Brown (1987, 1989); Frazer and Van Biesebroeck (2010); Gil-Pareja et al. (2014); Hakobyan (2020); Ito and Aoyagi (2019); Ornelas and Ritel (2020); Sapir and Lundberg (1984) and Tobin and Busch (2019).

[10] Cipollina and Demaria (2017, 2020); Fernandes et al. (2019); Herz and Wagner (2011); Klasen et al. (2021); and Low et al. (2009).

[11] See for example, Admassu (2020); Borchert (2009); Gil-Pareja et al. (2019); Gradeva and Martínez-Zarzoso (2016); Seyoum (2006); and Zappile (2011).

the utilization of NRTPs offered by the QUAD countries has resulted in greater economic complexity in beneficiary countries. He has observed that while GSP programs (rather than other trade preferences) have been associated with greater economic complexity, both GSP programs and other trade preferences are strongly complementary in enhancing economic complexity in beneficiary countries. *In light of these findings, we could expect that the utilization of NRTPs would lead to greater poverty reduction if the export of increasingly complex products contributed to poverty reduction (hypothesis 1).*

Then, what about the effect of economic complexity on poverty?

The literature has established theoretically and empirically that it is not merely exporting that matters for a country's economic performance, but rather the mix of goods that the country produces and exports (e.g., Aditya and Acharyya, 2013; Hausman et al. 2007; Kim and Lin, 2009). Specially, countries that export sophisticated goods, i.e., goods associated with high productivity levels, grow more rapidly (e.g., Hausman et al., 2007). Many other studies[12] have shown that exporting complex products is associated with a higher performance in terms of economic growth and development. As higher economic growth performance can contribute to reducing poverty[13], one could expect that the mix of goods exported by a country, and in particular the export of complex products could help achieve the poverty reduction objective. For example, manufacturing exports help to lower poverty rates for many reasons, including because manufacturing trade is subject to far less price volatility than commodity-dependent trade (e.g., Cashin et al., 2002; Koren and Tenreyro, 2007), and manufacturing exports generate higher employment[14] (including in labor-intensive industries) in developing countries and notably for workers operating in the informal sectors[15]. Santos-Paulino (2017) has obtained empirical evidence that exporting manufacturing products has helped to reduce poverty in developing countries, even though the increase in agricultural exports has also been instrumental in reducing poverty in low-income countries.

On the other hand, greater economic complexity can exert a significant poverty reduction effect in developing countries (Gnangnon[16], 2021c). This effect can take place through multiple avenues.

One theoretical argument underpinning the poverty reduction effect of economic complexity resides in the fact that a country's level of economic complexity can reflect its degree of social capital and the health of its institutions (Hartman et al., 2017), since the ability of people to form social and professional networks plays a crucial role in a country's ability to produce sophisticated products (Hidalgo, 2015). In addition, as economic complexity exerts a strong positive effect on economic growth (see above), and as economic growth can help to reduce poverty (see above),

[12] See for example, Albeaik et al. (2017); Bustos et al. (2012); Caldarelli et al. (2012); Cristelli et al. (2013); Cristelli et al. (2015); Hausmann and Hidalgo (2009, 2011); Hidalgo (2021); Hidalgo et al. (2007); Koch, 2021; Poncet and Starosta de Waldemar (2013); and Tacchella et al. (2013).

[13] See for example, Bagchi and Svejnar (2015); Brambilla et al. (2015); Banerjee et al. (2015); Begum et al., (2012); Breunig and Majeed (2020); Datt and Ravallion (2002); Dollar and Kraay (2002); Donaldson (2008); Fosu (2015, 2018); and Ravallion (2012).

[14] Nevertheless, Jenkins (2008), for example, has reported that both imports and exports have reduced labor demand in South African manufacturing.

[15] studies include for example, Brambilla et al. (2012); Lavopa and Szirmai (2012); Lin (2012); Milner and Tandrayen (2004); United Nations (2013). See also the works by Aryeetey and Baah-Boateng (2015); Eckardt et al. (2018); Ghani et al. (2015) respectively for Ghana, Vietnam, and India.

[16] See Gnangnon (2021d) for a detailed theoretical analysis on the avenues through which economic complexity can affect poverty.

one could also expect that a higher level of economic complexity would be associated with a greater poverty reduction. Economic complexity can also contribute to poverty reduction through its negative effect on income inequality effect[17] (e.g., Hartmann et al., 2017; Hidalgo, 2021), insofar as countries could make a real dent in poverty when they experienced an improved economic growth performance in the context of lower income inequality[18].

Incidentally, the literature has established that adverse shocks (for example negative terms of trade shocks) lead to higher poverty levels in developing countries (e.g., Álvarez et al., 2021; Bredenkamp and Bersch, 2012; Gnangnon, 2020a; Ivanic and Martin, 2008; Moncarz et al., 2020). Likewise, higher output volatility (which may itself arise from external shocks - see for example, Barrot et al. 2018) has been welfare reducing (e.g., Dabla-Norris and Gündüz, 2014; Hnatkovska and Loayza, 2005). As greater economic complexity helps to reduce output volatility (e.g., Güneri and Yalta, 2021; Maggioni et al., 2016; Miranda-Pinto, 2021), and mitigates economic growth cycles (e.g., Canh and Thanh, 2020), we could expect that it would ultimately contribute to alleviating the adverse effects of shocks on economies, and hence allow achieving greater poverty reduction.

Economic complexity can also affect poverty through its positive effect on employment that could benefit to poor people. As introducing complex products can lead to the automation of tasks (through a higher use of machines and robots for the execution of some tasks), greater economic complexity could reduce employment (e.g., Acemoglu and Restrepo, 2020; Graetz and Michaels, 2018). In the meantime, a higher automation of occupations can be associated with the increasing complexification of tasks, and therefore generate jobs for the high-skilled workers (e.g., Autor and Salomons, 2018). Thus, the net effect of economic complexity on employment is a priori unknown. Arif (2021) has shown that greater economic sophistication has led to a rise in labor share both in OECD and non-OECD countries, and the magnitude of this positive effect is greater in countries that enjoy a high level of human capital. Adam et al. (2021) have demonstrated empirically that OECD and non-OECD countries that export increasingly complex products enjoy lower unemployment and higher employment. This, thereby, suggests that in net terms, economic complexity does not induce job loss. On the basis of these discussions on the variety of channels through which economic complexity can affect poverty, we *hypothesize that an improvement in the level of economic complexity is likely to result in a greater poverty reduction (hypothesis 2).*

Overall, by combining hypotheses 1 and 2, we postulate the ***hypothesis 3*** that an improvement in the utilization of NRTPs would result in greater poverty reduction in countries that export increasingly complex products: the higher the utilization rate of NRTPs (GSP programs or other trade preferences), the greater is the degree of poverty reduction in the context of greater economic complexity. The empirical analysis will test **hypothesis 3**.

3. Empirical analysis

This section presents the model specification that helps address empirically the issues at the heart of the analysis (see sub-section 3.1), and the econometric method used to estimate this model (and its different variants) (see sub-section 3.2).

[17] It is important to note that economic complexity might not dampen income inequality, but rather enhances it (Kang-Kook and Trung, 2020).

[18] Relevant studies include for example, Adams (2004); Bigsten et al. (2003); Fosu (2009; 2010; 2015; 2017; 2018); Goh et al. (2009); Iniguez-Montiel (2014); Kulkarnia and Gaiha (2020); Salvatore (2004) and Ravallion (1997).

3.1. Model specification

We assess empirically the effect of the utilization of NRTPs on poverty by considering a model specification that includes the two main indicators of the utilization of NRTPs offered by the QUAD countries (i.e., the utilization rate of GSP programs and the utilization rate of other trade preferences) and a set of control variables derived from the previous works on the macroeconomic determinants of poverty, notably on the poverty impact of exports (e.g., Gnangnon, 2019; 2020b; 2021c; Le Goff and Singh, 2014; McCaig, 2011; Santos-Paulino, 2017; Santos-Paulino et al., 2019). We use control variables that could potentially influence the effect of the utilization of NRTPs on poverty. These control variables are the real per capita income ("GDPC"), which acts as a proxy for the development level of a given country, the degree of trade openness ("OPEN"), the level of financial sector development ("FINDEV"), the institutional and governance quality ("INST"), the education level ("EDU") and the population size ("POP").

We control for the effect of the development level in order to account for the fact that countries with different levels of the real per capita income are likely to experience different poverty levels (e.g., Dollar and Kraay, 2004; Gnangnon, 2021c,d,e; Guillaumont-Jeanneney and Kpodar, 2011; Honohan, 2004; Rewilak, 2020; Singh and Huang, 2015). We expect an increase in the real per capita income to be associated with lower poverty rates, in particular if the income improvement does benefit mostly to the poor segments of the population (i.e., it does not benefit to rich people).

The empirical analysis also controls for the trade openness variable because higher trade openness can contribute to poverty reduction (e.g., Fajgelbaum and Khandelwal, 2016; Le Goff and Singh, 2014). For example, Fajgelbaum and Khandelwal (2016) have considered the effect of international trade on poverty, and found a pro-poor bias of trade in every country through the consumption channel. Trade openness increases the gains for the 10th percentile of the income distribution by 63 per cent, and the gains for the 90th percentile by 28 per cent. Le Goff and Singh (2014) have obtained empirically that trade openness contributes to lowering poverty in African countries that with a higher level of financial development, higher education levels, and strong institutions. Porto (2005) has shown that the improvement of export practices (i.e., reducing informal barriers) in Moldova (which was then a poor country) (in addition to lowering formal trade barriers) has significantly contributed to poverty reduction in that country. Those informal barriers include the improvement of transport infrastructure, the fight against corruption, and the improvement of regulations and customs practices.

Financial deepening can also be an important determinant of poverty because it allows the most efficient banks to deliver financial services to the poor in a cost-effective manner, for example, by identifying the poor who are low credit risk, and offer them with the services they need. The offer of these services is facilitated by the existence of a low interest rate spreads and the facilitation of administrative procedures (e.g., Mookerjee and Kalipioni, 2010; Prokopenko and Holden, 2001; Rewilak, 2017). Many studies have underlined that financial deepening reduces poverty (e.g., Beck et al., 2007; Burgess and Pande, 2005; Guillaumont-Jeanneney and Kpodar, 2011; Honohan, 2004; Rewilak, 2017; Singh and Huang, 2015).

A higher educational attainment can help lower poverty rates by improving the labor force participation and full-time employment, and by enhancing the population health (e.g., Hofmarcher, 2021; Teffo, 2008).

According to de Soto (2003), the absence of legal institutions that establish and defend ownership and property rights prevents the poor from leveraging their informal ownership into capital. Singh and Huang (2015) have shown that property rights needed to be strengthened if policymakers were to ensure that financial deepening would translate into poverty reduction. Incidentally, better institutional and governance quality can be associated with poverty reduction not only through its positive economic growth effect (e.g., Aracil et al. 2021), but also because it can enhance the effectiveness of government expenditure (e.g., Grindle, 2004). Tebaldi and Mohan (2010) have shown that by market inefficiencies, higher corruption, ineffective governments, and political instability hurt income levels, raise income inequality, and ultimately induce higher poverty incidence. In light of these, we expect the improvement in the institutional and governance quality to be associated with lower poverty rates.

Finally, the population size has been introduced as a regressor in the analysis because a fall in the population size - which reflects lower fertility rates - can contribute to enhancing economic development and help individuals and families to escape from poverty (e.g., Sinding, 2009; Wakabi, 2006). At the same time, given that the rise in the share of working-age population has the potential to boost economic growth and reduce poverty (e.g., Cruz and Ahmed, 2018), one could expect the rise in the population size to lead to the reduction of poverty in the medium to long term.

Against this backdrop, we postulate the following baseline model specification:

$$POV_{it} = \beta_1 \mathrm{POV}_{it-1} + \beta_2 \mathrm{URGSP}_{it} + \beta_3\, \mathrm{UROTP}_{it} + \beta_4\, Log(\mathrm{GDPC})_{it} + \beta_5 OPEN_{it} + \beta_6 \mathrm{FINDEV}_{it} + \beta_7 INST_{it} + \beta_8 \mathrm{EDU}_{it} + \beta_9 \mathrm{Log(POP)}_{it} + \mu_i + \vartheta_t + \omega_{it} \qquad (1)$$

i and t are respectively the subscripts for a country and a time-period. Based on available data, an unbalanced panel of 77 countries over the period 2002-2019 has been used to perform the empirical analysis. Following previous works in the literature (e.g., Gnangnon, 2019; 2020a,b; 2021c,d,e; Santos-Paulino et al., 2019), we employ non-overlapping sub-periods (here, of 3-year average data) so as to limit the effect of business cycles on variables at hand. There are overall six sub-periods, which include 2002-2004, 2005-2007, 2008-2010, 2011-2013, 2014-2016 and 2017-2019. β_1 to β_9 are parameters to be estimated. μ_i are for countries' fixed effects; ϑ_t are time dummies that represent the global shocks that influence simultaneously the poverty level in all countries in the full sample. ω_{it} is an idiosyncratic error-term.

The variable "POV" is the 'transformed' indicator of poverty. It has primarily been measured using the poverty headcount ratio at $1.90 a day (PHC190I), and alternatively the poverty gap indicator at $1.90 a day (PGAP190I). In terms of definition of these indicators, poverty headcount ratio at $1.90 a day indicates the percentage of the population living with less than $1.90 a day. Likewise, poverty gap at $1.90 a day represents the depth and incidence of poverty, and measures the mean shortfall in income or consumption from the poverty line $1.90 a day (counting the nonpoor as having zero shortfall) as a share (in percentage) of the poverty line. For robustness check analysis, we use two other indicators of poverty headcount ratio, and two indicators of poverty gap. These are the poverty headcount ratio at $3.20 a day (PHC320I) and the poverty gap at $3.20 a day (PGAP320I); and the poverty headcount ratio at $5.50 a day (PHC550I), and the poverty gap at $5.50 a day (PGAP550I). All poverty indicators are expressed at the 2011

international prices, and have been collected from the World Development Indicators of the World Bank.

As all poverty indicators contain many zeros and show skewed distributions, we have transformed them using the method proposed by Yeyati et al. (2007) that goes as follows (see also Gnangnon, 2021c,d,e): POV $= sign(\text{"POVI"}) * \log(1 + |\text{POVI}|)$, where $|\text{POVI}|$ is the absolute value of the variable "POVI", the latter being the original relevant poverty indicators collected from the world development database. As a result, "PHC190", "PHC320", "PHC550", "PGAP190", "PGAP320", "PGAP550" are the transformed indicators respectively of "PHC190I", "PHC320I", "PHC550I", "PGAP190I", "PGAP320I" and "PGAP550I". Appendix 1 provides a description of all poverty indicators as well as all of other variables used in the analysis.

The variables "URGSP" and "UROTP" are our two main variables of interest, and stand respectively for the utilization rate of GSP programs offered by the QUAD countries, and the utilization rate of other trade preferences 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., "URGSPI" for GSP programs, and "UROTPI" for other trade preferences programs. The indicator "URGSPI" shows the extent to which eligible imports for trade preferences are actually imported under these preferences, and is computed as follows: URGSP1 = 100*(GSP Received Imports)/(GSP Covered Imports). Values of "URGSP1" range between 0 and 100, with higher values indicating a greater utilization rate of GSP programs.

The indicator "UROTPI" is computed in the same way as the indicator "URGSPI": UROTP1 = 100*(Other-Preferential Imports)/(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' 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-Sahara African countries. Values of "UROTP1" range between 0 and 100, and higher values reflect a greater utilization rate of other trade preferences programs.

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

The control variables are described in Appendix 1. Note that the natural logarithm has been applied to the variables "GDPC" and "POP" because of their high skewed distribution. Appendix 2 shows the descriptive statistics on all variables used in the analysis, and Appendix 3 displays the list of the 77 developing countries (beneficiaries of NRTPs) used in the analysis.

Figures 1 and 2 provide a first insight into the relationship between the poverty indicators (poverty headcount ratio at $1.90 as well as poverty gap at $1.90) and the utilization rate of GSP and other trade preferences, namely "URGSPI" and "UROTPI". The two Figures are constructed using the panel dataset of non-overlapping sub-periods of 3-year. Figure 1 presents the

development of the poverty indicators and the indicators of usage of NRTPs over the full sample. Figure 2 shows the correlation patterns between these indicators over the full sample.

The utilization rate of GSP programs moved upward from 12.6% in 2002-2004 to 54.6% in 2011-2013, and then slightly fell to 51.4% in 2014-2016. It, then, remained relatively stable, to reach 52.5% in 2017-2019. The utilization rate of 'other trade preferences' had always been lower than that of the GSP programs. It slightly increased from 19.6% in 2002-2004 to 22.4% in 2005-2007, and declined to 18.2% in 2008-2010. It, then rose steadily to reach 32.2% in 2017-2019. In the meantime, after a slight increase in poverty rates (both poverty headcount ratio and poverty gap) between 2002-2004 and 2005-2007, the two indicators experienced a downward trend, which may reflect efforts by the international community and national policymakers to reduce poverty rates. Summing up, Figure 1 shows that the utilization rates of NRTPs and poverty indicators tend to move in opposite directions.

Turning to Figure 2, we observe that the utilization rate of NRTPs (either the GSP programs or other trade preferences) is positively correlated with the poverty indicators, although the positive correlation slope is higher for the graphs based on the poverty headcount ratio than for those based on poverty gap indicator. These positive correlation patterns do not signify causality, and the regression-based analysis would provide guidance on the direction of the poverty effect of the utilization rates of NRTPs.

3.2. Econometric approach

We follow previous recent studies on the poverty effects of trade (e.g., Gnangnon, 2019; 2020b; 2021b,c; Le Goff and Singh, 2014; Santos-Paulino, 2017; Santos-Paulino et al., 2019) and utilize the two-step system Generalized Method of Moments proposed by Arellano and Bover (1995) and Blundell and Bond (1998). This estimator, which is suitable for dynamic panel datasets with large cross-section and small-time dimensions, helps to address several endogeneity concerns, including the ones stemming from the bi-directional causality between the dependent variable and some explanatory variables, the potential correlation between the lagged dependent variable and the fixed effects in the error term (and the resulting Nickell bias - see Nickell, 1981), measurement errors, and omitted variables problems.

The two-step system GMM estimator helps to overcome the weaknesses of the difference GMM estimator developed by Arellano and Bond (1991) when time series as persistent over time (as it is the case in the present study). In fact, in the presence of persistent time series, the difference GMM estimator generates weak instruments (e.g., Alonso-Borrego and Arellano, 1999; Bond, 2002), and the two-step system GMM estimator improves the consistency and efficiency of the estimates by combining in a system of equations, an equation in differences and an equation in levels. Lagged first differences are used as instruments for the levels equation, and lagged levels are used as instruments for the first-difference equation.

The present analysis considers the indicators of the utilization rates of NRTPs as endogenous because the level of poverty in a developing country could influence the decision by a preference grantor to offer unilateral trade concessions to that country. For example, countries with a high poverty rates are more likely to be selected (by QUAD countries) as beneficiaries of NRTPs than countries with low poverty rates. In addition, the use of the two-step system GMM

estimator helps to correct for the omission of variables capturing the utilization rates of NRTPs provided by other industrialized preference-granting countries[19].

Following studies highlighted above on the poverty effect of trade, we consider the variables that represent the education level, trade openness, financial development. and institutional and governance quality as endogenous due to the potential bi-directional causality between each of them and the dependent variable.

We check the correctness of the different specifications of model (1) estimated by means of the two-step system GMM technique by performing the Arellano-Bond test of the presence of first-order serial correlation in the first-differenced error term (denoted AR(1)) (the p-value associated with the statistic obtained from the implementation of this test should be lower than 0.1 at the 10% level); the Arellano-Bond test of absence of second-order autocorrelation in the first-differenced error term (denoted AR(2)) (the p-value associated with the relevant statistic should be higher than 0.1 at the 10% level); and the Sargan/Hansen test of over-identifying restrictions (OID) (the p-value associated with the statistic obtained from the implementation of this test should be higher than 0.1 at the 10% level).

Finally, we need to ensure that the number of instruments used in the regressions is fewer than the number of countries so as to avoid instrument proliferation (e.g., Bowsher, 2002; Roodman, 2009). To do so, we utilize a maximum of 3 lags of the dependent variable as instruments, and 2 lags of endogenous variables as instruments in the regressions based on the two-step system GMM estimator.

We estimate the following regressions by means of the two-step system GMM estimator. First, we estimate specifications model (1) where the dependent variable is measured alternatively by the poverty headcount ratio at $1.90, and the poverty gap at $1.90. Results of these estimations are reported in columns [1] and [2] of Table 1.

Second, outcomes presented in columns [3] and [4] of the Table help to examine the effect of the utilization of NRTPs on poverty indicators (at $1.90) in LDCs versus other countries in the full sample (i.e., NonLDCs). This involves estimating two other specifications of model (1) using as the dependent variable, each of the two poverty indicators at $1.90. In each of these two model specifications, we introduce the dummy "LDC" and its interaction with each of the two indicators of the utilization rate of NRTPs. The dummy "LDC" takes the value 1 for LDCs and 0, otherwise. It is worth emphasizing that given the small number (i.e., 13) of LDCs in the full sample (see Appendix 3 for the list of LDCs), results concerning LDCs versus NonLDCs should be considered with caution.

Third, we estimate different other specifications of model (1) where the dependent variable is measured alternatively by the poverty headcount ratio at $3.20 and $5.50, and the poverty gap at $3.20 and $5.50. The results of these estimations (performed for robustness check analysis) are presented in Table 2.

Fourth, we test whether the two blocks of NRTPs (i.e., GSP programs and other trade preferences) are complementary or substitutable in influencing poverty rates. To do so, we estimate different other variants of model (1) where the variable "POV" is measured by each of the four

[19] As a matter of fact, data on the utilization rates of NRTPs provided by other wealthier nations than the QUAD countries is not available for the time being.

indicators of poverty highlighted, and in which we include the interaction between the variables "URGSP" and "UROTP". The outcomes of these different estimations are provided in Table 3.

Lastly, we test the hypothesis set out above, i.e., the economic complexity is a conduit through which the utilization rates of NRTPs affects poverty. To that end, we estimate other variants of model (1) (i.e., with each of the six indicators of poverty as the dependent variable, i.e., our two main indicators of poverty and the four other poverty indicators used for robustness check analysis) in which we introduce both the indicator of economic complexity (denoted "ECI") and its interaction with each indicator of the utilization of NRTPs. Table 4 contains the outcomes of the estimations of these different specifications of model (1). In particular, for the sake of brevity, Table 4 presents the main outcomes of interest in the analysis[20] (i.e., it does not contain the estimates related to control variables).

4. Results' interpretation

In Tables 1 to 4, the coefficient of the one-period lag of the dependent variable is positive and significant at the 1% level. This confirms the findings of previous studies that poverty rates indicators are state-dependent, as a rise in the poverty rate in period t-1 is associated with an increase in poverty rate in period t. In addition, all variants of model (1) whose results are reported in Tables 1 to 5 are well specified. This is because the p-values of the AR(2) and OID tests are higher than 0.1 (as expected), and the p-values related to the AR(1) test are lower than 0.1. In light of these outcomes, we conclude that the two-step system GMM estimator is appropriate for undertaking the empirical analysis.

Turning to estimates reported in Table 1, we find in the first two columns that the utilization of GSP programs and the utilization of other trade preferences exert a negative and significant effect on poverty. In fact, the coefficients of the variables "URGSP" and "UROTP" are negative and significant at the 1% level in the two columns of Table 1. A 1 percentage increase in the utilization of GSP programs is associated with a 0.016 percent fall in the poverty headcount rate at $1.90, and a 0.014 percentage fall in the poverty gap rate at 1.90$. In addition, a 1 percentage increase in the utilization of other trade preference programs is associated with a 0.026 percentage fall in the poverty headcount rate at $1.90, and a 0.01 percentage decline in the poverty gap rate at 1.90$. These outcomes suggest that the utilization of other trade preferences exerts a higher negative effect on poverty headcount ratio at $1.90 than the utilization of GSP programs does (see results in column [1] of table 1). From results in column [2] of Table 1, we note that the poverty gap (at $1.90) reduction effect of the utilization of GSP programs is slightly higher than the poverty gap (at $1.90) reduction effect of other trade preferences programs. Summing-up, these outcomes lend support to our hypothesis 3, and indicate that the utilization of NRTPs (GSP programs and other trade preferences programs) contribute to reducing poverty.

Estimates related to control variables in columns [1] and [2] of Table 1 show that an improvement in the real per capita income leads to an increase in poverty rates. These findings may reflect the fact the improvement in the real per capita income does not benefit to the poor segments of the population, i.e., it accrues mainly to richer people. Greater trade openness, the improvement in the education level and the increase in the population size are significantly associated with poverty reduction (both poverty headcount ratio and poverty gap at $1.90). A

[20] The full outcomes of regressions could be obtained upon request.

better access to credits offered by the banking system (i.e., the development of the financial sector) exerts a negative and significant effect on poverty headcount ratio, while it influences positively the poverty gap at $1.90. It is difficult to explain the differences in these outcomes concerning the poverty effect of financial development, but we believe that the way poverty is measured may be part of the explanation. An improvement in the institutional and governance quality has no significant effect (at the conventional significance levels) on poverty headcount ratio at $1.90, while it contributes to reducing poverty gap at $1.90 at the 1% level.

Results in columns [3] and [4] of Table 1 help to examine the effect of the utilization rate of NRTPs on our two main poverty indicators (i.e., poverty headcount ratio and poverty gap at $1.90) in LDCs versus NonLDCs. We note that the utilization of each of these two types of NRTPs exerts a higher poverty reduction effect in LDCs than in NonLDCs. At least at the 5% level, the net effects of the utilization of GSP programs on poverty headcount ratio at 1.90$ in LDCs and NonLDCs are negative, and amount respectively to -0.311 and -0.3 (= -0.0123 - 0.286) (see column [3] of Table 2). Similarly, the net effects of the utilization of other trade preferences programs on poverty headcount ratio at 1.90$ in LDCs and NonLDCs are also negative, and amount respectively to 0 and -0.01 (see column [3] of Table 2). These findings suggest that both GSP programs and other trade preferences reduce the poverty headcount ratio in LDCs. However, for NonLDCs, there is no significant effect of the utilization of GSP programs on poverty headcount ratio at $1.90, while the utilization of other trade preferences leads to a lower poverty headcount rate at $1.90. As per results in column [4] of Table 1, NonLDCs experience no significant effect of the utilization of both types of NRTPs on poverty gap at $1.90. In contrast, for LDCs, both GSP programs and other trade preferences help to reduce poverty gap at $1.90, with the effect of the latter (it amounts to -0.15) be slightly higher than the effect of the former (which amounts to -0.13).

Outcomes displayed in Table 2 confirm the findings in Table 1 that the utilization of NRTPs helps to reduce poverty in beneficiary countries. We observe that across all four columns of the Table, the coefficients of the variables "URGSP" and "UROTP" are negative and significant at the 1%. Specially, a 1 percentage increase in the utilization rate of GSP programs leads to a reduction in the poverty headcount ratio (at $3.20) by 0.027 percentage, and a 1 percentage rise in the utilization rate of other trade preferences reduces the poverty headcount ratio (at $3.20) by 0.03 per cent. At the same time, the improvement in the utilization rate of GSP programs by a 1 percent rise is associated with a decrease in the poverty gap at $3.20 by 0.02 percentage, and an improvement in the utilization rate of other trade preferences programs by a 1 percentage induces a decline in the poverty gap (at $3.20) by 0.03 percentage. Concerning the effect of the poverty indicators at $5.50, an improvement in the utilization rate of GSP programs by 1 percentage leads to a fall in poverty gap rate (at $5.50) by 0.008 percent, and an increase in the utilization rate of other trade preference programs by a 1 percentage results in a decline in the poverty gap rate at $5.50 by 0.03 percentage. At the same time, the improvement in the utilization rate of GSP programs by a 1 percentage is associated with a rise in poverty headcount ratio by 0.02 percentage, while a higher usage rate of other trade preferences induces a decline in the poverty headcount ratio at $5.50 by 0.01 percentage. All these outcomes suggest that apart from the case where the poverty headcount ratio at $5.50 is negatively affected by the usage of other trade preferences, but positively affected by the utilization of GSP programs, both GSP programs and other trade preferences programs exert a negative effect on poverty (i.e., poverty headcount ratio at $3.20; and

poverty gap rates at both $3.20 and $5.50). It is also worth noting that for these three poverty indicators, the utilization rate of other trade preferences exerts a higher poverty reduction effect than the usage of GSP programs does.

Estimates related to control variables in Table 2 are slightly different from those observed in Table 1. These differences in outcomes in these two Tables are attributable to the measure of poverty (i.e., at $3.30 and $5.50 in Table 2 versus $1.90 in Table 1). The real per capita income exerts a negative and significant effect on all poverty indicators (except for the poverty gap at $3.20 where the effect is statistically null). Greater trade openness and an improvement in the education level are negatively and significantly associated with all four poverty indicators in Table 2, while the institutional and governance quality appears to affect positively and significantly the four poverty indicators. The latter outcome may reflect the fact that poor people does not benefit from the improvement in the institutional and governance quality when we consider poverty indicators at $3.20 and $5.50. This may eventually be due to an insufficient fiscal redistribution in the context of improved institutions and governance quality. These results could also signal that the improvement of the institutions and governance quality should reach a certain threshold so as to really benefit to the poor segments of the population. This subject-matter goes beyond the present study and could be addressed in another research paper.

Financial development induces lower poverty rates for poverty indicators, except for the poverty headcount ratio at the $5.50, as the latter rises as financial development improves. Finally, the population size exerts no significant effect on the poverty gap at $3.20 and at $5.50, but a negative and significant effect on poverty headcount ratio at $5.50. In contrast, a rise in the population size is associated with a rise in poverty headcount ratio at $3.20.

In a nutshell, the effect of control variables on the poverty indicators depends on the type of poverty indicator used, although some findings (for example concerning the effect of trade openness and the education level) are consistent across for all four poverty indicators.

Outcomes in Table 3 help to examine whether GSP programs and other trade preferences are complementary or substitutable in reducing poverty in beneficiary countries. Taking our poverty indicators of interest, namely poverty headcount ratio and poverty gap at $1.90 (i.e., columns [1] and [2] of Table 3), we obtain that the coefficients of "URGSP" and "UROTP" are not significant at the conventional significance levels, while the interaction terms related to the variable ["URGSP*UROTP"] are negative and significant at the 1% level. We, therefore, conclude that GSP programs and other trade preferences are strongly complementary in helping to reduce poverty in beneficiary countries. This finding is confirmed by the estimates reported in other four columns of the Table, as in these columns, the coefficients of the interaction variable ["URGSP*UROTP"] are negative and significant at the 1% level. Overall, we deduce that not only do GSP programs and other trade preferences (taken separately) help to reduce poverty in beneficiary countries, but they are also strongly complementary in achieving the poverty reduction objective in these countries.

Outcomes in Table 4 allow investigating whether the effect of the utilization of NRTPs works through the economic complexity channel. Let us start with the results in the upper part of the Table, i.e., those that help assess the effect of the utilization of GSP programs on poverty through the economic complexity channel. Focusing on our main variables of interest (poverty headcount ratio and poverty gap at $1.90 - see columns [1] and [2] of the Table), we obtain that the coefficients of "URGSP" are respectively not statistically significant, and significant at least at

the 5% level, while the interaction terms related to the variable ["URGSP*ECI"] are negative and significant at the 1% level. On the basis of these outcomes, we conclude that the utilization of GSP programs helps to achieve a greater reduction of poverty headcount ratio at $1.90, as countries improve their level of economic complexity, i.e., as their export products become increasingly sophisticated. This finding is confirmed in columns [3] and [4] of the same Table, with the caveat here that the interaction term of the variable ["URGSP*ECI"] is negative and significant only at the 10% level for results in column [3] of the Table (where the dependent variable is the poverty headcount ratio at $3.20), while it is significant at the 1% level in column [4] (where the dependent variable is the poverty gap at $3.20). For results in columns [5] and [6] of Table 3, we find no significant evidence that the utilization of GSP programs affects poverty indicators at $5.50 through the economic complexity channel. This is because the coefficients of the interaction variable ["URGSP*ECI"] are not significant at the conventional significance levels in columns [5] and [6] of Table 3.

We now consider the results presented in the second half of Table 4, i.e., those that help explore the effect of the utilization of other trade preferences programs on poverty through the economic complexity channel. In column [1] of this Table, the coefficients of the variable "UROTP" and ["UROTP*ECI"] are both negative and significant at the 1% level. These outcomes suggest that the negative poverty headcount ratio effect of the utilization of other trade preferences works through the economic complexity channel, and the greater the level of economic complexity, the higher is the magnitude of the negative effect of the utilization of other trade preferences on poverty headcount ratio. Results in column [2] of the Table indicate that the coefficient of "UROTP" is positive and the coefficient of ["UROTP*ECI"] is negative, both being significant at the 1% level. These estimates suggest that other trade preferences contribute to the reduction of poverty gap at $1.90 only when the level of economic complexity exceeds the value of 0.21 (= 0.0107/0.0518), bearing in mind that the values of the indicator of economic complexity range between -1.54 and 1.87 (see Appendix 2). This signifies that countries that use other trade preferences and whose levels of economic complexity range between -1.54 and 0.21, do not end up reducing poverty gap, as their poverty gap at $1.90 rises. In contrast, the usage of other trade preferences is associated with lower poverty gap at $1.90 when the level of economic complexity in beneficiary countries exceeds the value of 0.21.

At the 1% level, results of the second half of the Table contained in columns [3], [4] and in column [6] are consistent with those in column [1] of the second half of the same Table. We conclude that other trade preferences programs always contribute to reduce the poverty headcount ratio and poverty gap at $3.20, as well as poverty gap at $5.50 for any level of the economic complexity, and the magnitude of this reduction effect increases as the degree of economic complexity rises. Finally, we find no significant evidence that the utilization of other trade preferences programs affects poverty headcount ratio at $5.50 through the economic complexity avenue. This is because the coefficient of the variable "UROTP" is not significant at the conventional significance levels. Summing-up, the main message conveyed by Table 4 is that the poverty reduction effect of the utilization of NRTPs (GSP programs and other trade preferences) works through the economic complexity channel, at least when we consider poverty indicators at $1.90 and $5.50. In particular, GSP programs and other trade preferences help to achieve greater poverty reduction in the context of greater economic complexity.

Overall, results in Table 4 tend to support hypothesis 3 that the effect of the utilization of NRTPs on poverty works through the economic complexity channel. The higher the level of economic complexity, the greater the poverty reduction effect of the utilization of NRTPs.

Finally, with few exceptions, estimates related to control variables in Tables 2 to 4 line-up with those in Table 1 (as noted above, the full Table 5, including with estimates of control variables could be obtained upon request).

5. Conclusion

This paper has assessed the effect of NRTPs offered by QUAD countries on the poverty level of beneficiary countries. It has shown that both GSP programs and 'other trade preferences programs have contributed significantly to poverty reduction in beneficiary countries, with their impact being higher in LDCs than in NonLDCs. It is worth noting that few LDCs are contained in the full sample. The analysis also reveals that GSP programs and other trade preferences are strongly complementary in reducing poverty in beneficiary countries. Finally, the effect of the utilization of NRTPs on poverty works through the economic complexity channel, as the greater the level of economic complexity, the higher is the negative effect of their utilization on poverty.

In terms of policy implications, this study shows that the provision of NRTPs by wealthier countries contributes to the achievement of the poverty objectives of policymakers in beneficiary countries. It results from these findings that preference-grantors could contribute to further enhancing the poverty reduction effect of NRTPs by alleviating the constraints that weigh on the potential opportunities offered by NRTPs to beneficiary countries. These constraints can include the inadequacy of the product coverage of the NRTP schemes, the uncertainty surrounding the improved market access, and the stringency of rules of origin associated with the preferences. Additionally, efforts by beneficiary countries to increase public spending to address the supply-side constraints faced by trading firms, combined with greater financial assistance by preference granting countries to also address these constraints would contribute to fostering the utilization of NRTPs, and hence to reducing poverty.

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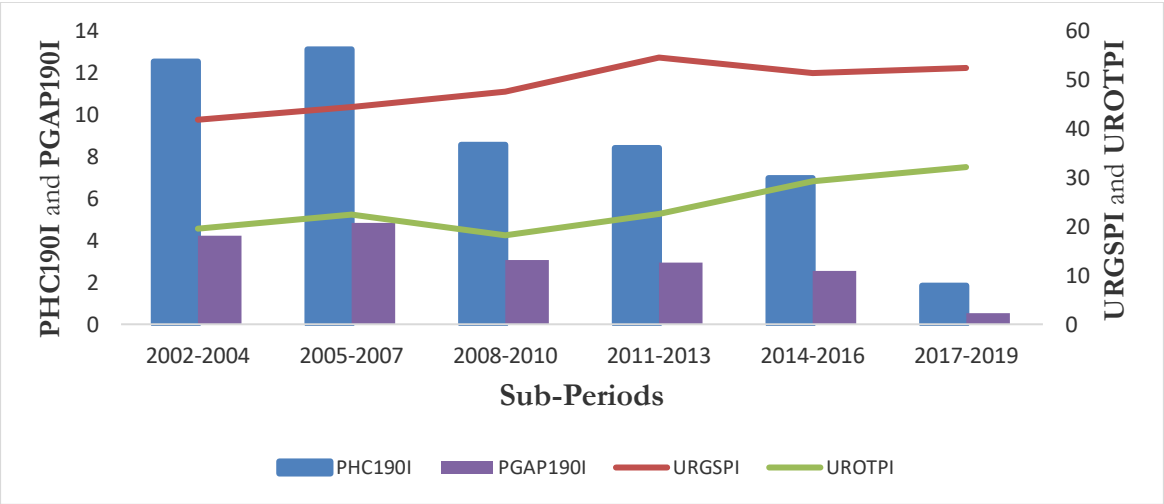
FIGURES

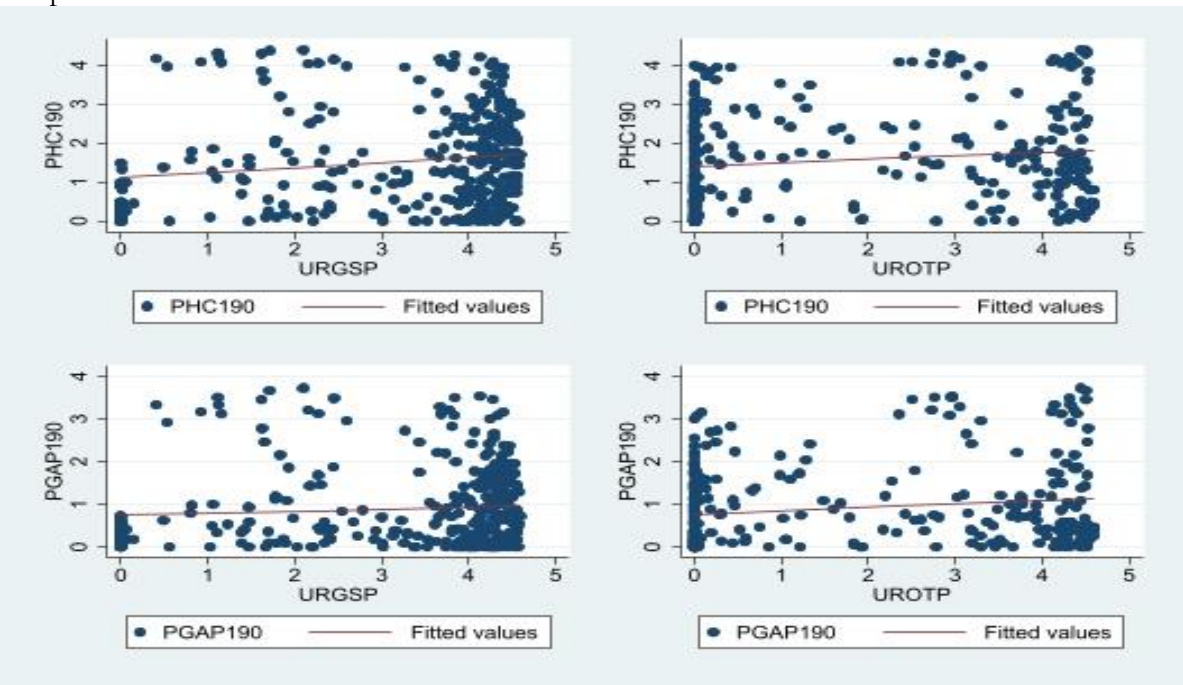
Figure 1: Poverty and the utilization rate of trade preferences_Over the full sample



Source: Author

Note: "PHC190I" and "PGAP190I" represent the non-transformed indicators respectively of the poverty headcount ratio at $1.90 a day, and the Poverty gap at $1.90 a day. Likewise, "URGSPI" and "UROTPI" are the non-transformed indicators respectively of the utilization rate of GSP programs, and the utilization rate of Other Trade Preferences programs.

Figure 2: Correlation between poverty and the utilization rate of trade preferences_Over the full sample



Source: Author

Note: "PHC190" and "PGAP190" represent the transformed indicators respectively of the poverty headcount ratio at $1.90 a day, and the Poverty gap at $1.90 a day. Likewise, "URGSP" and "UROTP" are the transformed indicators respectively of the utilization rate of GSP programs, and the utilization rate of Other Trade Preferences programs.

TABLES and APPENDICES

Table 1: Effect of the utilization of NRTPs on Poverty
Estimators: Two-Step System GMM

Variables	PHC190	PGAP190	PHC190	PGAP190
	(1)	(2)	(3)	(4)
One-period lag of the dependent variable	0.920***	0.873***	0.916***	0.827***
	(0.0208)	(0.0140)	(0.0182)	(0.0145)
URGSP	**-0.0161*** **	**-0.0135*** **	**0.00494**	**0.000123**
	(0.00607)	**(0.00363)**	**(0.00572)**	**(0.00305)**
UROTP	**-0.0261*** **	**-0.00970*** **	**-0.0123** **	**0.000843**
	(0.00460)	**(0.00298)**	**(0.00583)**	**(0.00295)**
URGSP*LDC			**-0.311*** **	**-0.128*** **
			(0.0566)	**(0.0279)**
UROTP*LDC			**-0.286*** **	**-0.171*** **
			(0.0415)	**(0.0371)**
LDC			1.841***	0.998***
			(0.280)	(0.137)
Log(GDPC)	0.112***	0.0534***	0.166***	0.0717***
	(0.0255)	(0.0132)	(0.0272)	(0.0161)
OPEN	-0.000975**	-0.000685**	-0.00101**	-0.00109***
	(0.000402)	(0.000293)	(0.000403)	(0.000292)
FINDEV	-0.536***	0.178**	-0.636***	0.134*
	(0.0932)	(0.0822)	(0.123)	(0.0758)
INST	0.0163	-0.0447***	0.0249**	-0.0320**
	(0.0128)	(0.0127)	(0.0125)	(0.0135)
EDU	-0.00570***	-0.00268***	-0.00555***	-0.00301***
	(0.000989)	(0.000883)	(0.000855)	(0.000724)
Log(POP)	-0.0288***	-0.0559***	-0.0330***	-0.0632***
	(0.00810)	(0.00976)	(0.0113)	(0.0107)
Observations - Countries	240 - 77	240 - 77	240 - 77	240 - 77
Number of Instruments	68	68	68	68
AR1 (P-Value)	0.0086	0.0017	0.0067	0.0022
AR2 (P-Value)	0.8524	0.9363	0.9331	0.8571
OID (P-Value)	0.4694	0.3034	0.5743	0.5653

*Note: *p-value < 0,1; **p-value < 0,05; ***p-value < 0,01. Robust Standard errors are in parenthesis. The variables "URGSP", "UROTP", "OPEN", "FINDEV", "EDU" and "INST" have been considered as endogenous. Time dummies have been included in the regressions.*

Table 2: Robustness check of the effect of the utilization of NRTPs on Poverty
Estimator: Two-Step System GMM

Variables	PHC320	PGAP320	PHC550	PGAP550
	(1)	(2)	(3)	(4)
One-period lag of the dependent variable	0.847***	0.886***	0.864***	0.848***
	(0.00889)	(0.0174)	(0.0149)	(0.00886)
URGSP	**-0.0273*** **	**-0.0192*** **	**0.0193*** **	**-0.00767** **
	(0.00389)	**(0.00358)**	**(0.00419)**	**(0.00378)**
UROTP	**-0.0341*** **	**-0.0295*** **	**-0.0113*** **	**-0.0287*** **
	(0.00299)	**(0.00302)**	**(0.00331)**	**(0.00291)**
Log(GDPC)	-0.120***	0.0360	-0.302***	-0.207***
	(0.0175)	(0.0246)	(0.0346)	(0.0168)
OPEN	-0.00194***	-0.00145***	-0.00225***	-0.00228***
	(0.000191)	(0.000195)	(0.000306)	(0.000169)
FINDEV	-0.821***	-0.619***	0.479***	-0.133*
	(0.0703)	(0.116)	(0.0952)	(0.0808)
INST	0.120***	0.0452***	0.0832***	0.0985***
	(0.00627)	(0.00980)	(0.0121)	(0.0117)
EDU	-0.00783***	-0.00551***	-0.00286***	-0.00563***
	(0.000529)	(0.000718)	(0.000603)	(0.000471)
Log(POP)	0.0382***	0.00384	-0.0287***	-0.00413
	(0.00721)	(0.00724)	(0.00969)	(0.00974)
Observations - Countries	240 - 77	240 - 77	240 - 77	240 - 77
Number of Instruments	68	68	68	68
AR1 (P-Value)	0.0559	0.0081	0.0262	0.0467
AR2 (P-Value)	0.7644	0.9771	0.10	0.3029
OID (P-Value)	0.5246	0.5491	0.8451	0.5896

*Note: *p-value < 0,1; **p-value < 0,05; ***p-value < 0,01. Robust Standard errors are in parenthesis. The variables "URGSP", "UROTP", "OPEN", "FINDEV", "EDU" and "INST" have been considered as endogenous. Time dummies have been included in the regressions.*

Table 3: Interaction effect of the utilization of NRTPs on Poverty
Estimator: Two-Step System GMM

Variables	PHC190	PGAP190	PHC320	PGAP320	PHC550	PGAP550
	(1)	(2)	(3)	(4)	(5)	(6)
One-period lag of the dependent variable	0.909***	0.863***	0.809***	0.862***	0.842***	0.833***
	(0.0207)	(0.0154)	(0.0126)	(0.0232)	(0.0123)	(0.0151)
URGSP	0.00366	0.00386	0.0224***	-0.00428	0.0464***	0.0145
	(0.00931)	(0.00688)	(0.00768)	(0.00448)	(0.00766)	(0.00911)
UROTP	0.00738	0.00813	0.0421***	-0.000978	0.0246***	0.00636
	(0.0120)	(0.00762)	(0.00906)	(0.00767)	(0.00666)	(0.00825)
URGSP*UROTP	**-0.0104*** **	**-0.00631*** **	**-0.0194*** **	**-0.00869*** **	**-0.0107*** **	**-0.00997*** **
	(0.00247)	**(0.00206)**	**(0.00204)**	**(0.00153)**	**(0.00201)**	**(0.00240)**
Log(GDPC)	0.118***	0.0388***	-0.120***	0.0106	-0.289***	-0.211***
	(0.0266)	(0.0147)	(0.0212)	(0.0251)	(0.0340)	(0.0214)
OPEN	-0.00117**	-0.000793**	-0.00154***	-0.00116***	-0.00190***	-0.00211***
	(0.000496)	(0.000361)	(0.000311)	(0.000310)	(0.000352)	(0.000303)
FINDEV	-0.701***	0.181**	-1.296***	-0.629***	0.259**	-0.272**
	(0.111)	(0.0737)	(0.106)	(0.0858)	(0.116)	(0.113)
INST	0.0464***	-0.0290**	0.183***	0.0675***	0.111***	0.120***
	(0.0144)	(0.0137)	(0.0145)	(0.0103)	(0.0158)	(0.0164)
EDU	-0.00594***	-0.00249***	-0.00784***	-0.00501***	-0.00381***	-0.00553***
	(0.00112)	(0.000938)	(0.000680)	(0.000552)	(0.000751)	(0.000605)
Log(POP)	-0.0190*	-0.0545***	0.0796***	0.0157*	-0.0167	0.0120
	(0.00984)	(0.0109)	(0.0121)	(0.00905)	(0.0117)	(0.0107)
Observations - Countries	240 - 77	240 - 77	240 - 77	240 - 77	240 - 77	240 - 77
Number of Instruments	67	67	67	67	67	67
AR1 (P-Value)	0.0108	0.0025	0.0555	0.0111	0.0199	0.0436
AR2 (P-Value)	0.9725	0.7760	0.9109	0.8483	0.10	0.3844
OID (P-Value)	0.3245	0.4859	0.3948	0.3668	0.7701	0.5526

*Note: *p-value < 0,1; **p-value < 0,05; ***p-value < 0,01. Robust Standard errors are in parenthesis. The variables "URGSP", "UROTP", "OPEN", "FINDEV", "EDU" and "INST" have been considered as endogenous. Time dummies have been included in the regressions.*

Table 4: Effect of the utilization of NRTPs on Poverty through the economic complexity channel
Estimator: Two-Step System GMM

	Effect of the utilization of GSP Programs on Poverty through the economic complexity channel					
Variables	**PHC190**	**PGAP190**	**PHC320**	**PGAP320**	**PHC550**	**PGAP550**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
URGSP	-0.00981	-0.00689	-0.0391***	-0.0267***	0.0258***	-0.0147**
	(0.00733)	(0.00497)	(0.00658)	(0.00616)	(0.00682)	(0.00580)
UROTP	-0.0196***	-0.00826**	-0.0345***	-0.0252***	-0.00773	-0.0254***
	(0.00413)	(0.00328)	(0.00292)	(0.00255)	(0.00542)	(0.00379)
URGSP*ECI	**-0.0549*** **	**-0.0198*** **	**-0.0134* **	**-0.0343*** **	**-0.0115**	**-0.0101**
	(0.00708)	**(0.00488)**	**(0.00784)**	**(0.00509)**	**(0.00976)**	**(0.00646)**
ECI	0.220***	0.159***	-0.101***	0.0841***	-0.0624	-0.0957***
	(0.0309)	(0.0248)	(0.0372)	(0.0272)	(0.0694)	(0.0294)
	Effect of the utilization of Other Trade Preference Programs on Poverty through the economic complexity channel					
Variables	**PHC190**	**PGAP190**	**PHC320**	**PGAP320**	**PHC550**	**PGAP550**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
URGSP	-0.0382***	-0.000290	-0.0407***	-0.0415***	0.0180**	-0.0180***
	(0.00543)	(0.00307)	(0.00250)	(0.00409)	(0.00713)	(0.00348)
UROTP	-0.0178***	0.0107***	-0.0297***	-0.0207***	-0.0105	-0.0234***
	(0.00343)	(0.00183)	(0.00237)	(0.00249)	(0.00678)	(0.00347)
UROTP*ECI	**-0.0603*** **	**-0.0518*** **	**-0.0288*** **	**-0.0459*** **	**0.0183**	**-0.0240*** **
	(0.00708)	**(0.00208)**	**(0.00758)**	**(0.00519)**	**(0.0124)**	**(0.00566)**
ECI	0.135***	0.0848***	-0.0768***	0.0681***	-0.153***	-0.0802***
	(0.0325)	(0.0113)	(0.0252)	(0.0174)	(0.0325)	(0.0280)

*Note: *p-value < 0,1; **p-value < 0,05; ***p-value < 0,01. Robust Standard errors are in parenthesis. The variables "URGSP", "UROTP", "ECI", "OPEN", "FINDEV", "EDU" and "INST" have been considered as endogenous. Time dummies have been included in the regressions. It is worth noting all model specifications whose outcomes are reported in this Table are correctly specified as the p-values of the AR(2) and OID tests are higher than 0.10, while the p-values of the AR(1) are lower than 0.1. In addition, the one-period lag of the dependent variable is always positive and significant at the conventional significance levels. The full results of the regressions could be obtained upon request.*

Appendix 1: Definition and Source of variables

Variables	Definition	Source
PHC190	Poverty headcount ratio at $1.90 a day is the percentage of the population living on less than $1.90 a day at 2011 international prices (denoted "PHC190I"). As the variable "PHC190I" contains many zeros, and displays a high skewness, it has been transformed using the following formula (see Yeyati et al. 2007): PHC190 $= sign(\text{"PHC190I"}) * \log(1 + \lvert\text{PHC190I}\rvert)$, where $\lvert\text{PHC190I}\rvert$ refers to the absolute value of the variable "PHC190I".	Data on this indicator are collected from the Word Development Indicators (WDI) of the World Bank, 2021
PGAP190	Poverty gap at $1.90 a day (2011 PPP) is the mean shortfall in income or consumption from the poverty line $1.90 a day (counting the nonpoor as having zero shortfall), expressed as a percentage of the poverty line. This measure reflects the depth of poverty as well as its incidence (denoted "PGAP190I"). This measure reflects the depth of poverty as well as its incidence. As the variable "PGAP190I" contains many zeros, and displays a high skewness, it has been transformed using the following formula: PGAP190 $= sign(\text{"PGAP190I"}) * \log(1 + \lvert\text{PGAP190I}\rvert)$, where $\lvert\text{PGAP190I}\rvert$ refers to the absolute value of the variable "PGAP190I".	Data on this indicator are collected from the WDI, 2021
PHC320	Poverty headcount ratio at $3.20 a day is the percentage of the population living on less than $3.20 a day at 2011 international prices (denoted "PHC320I"). As the variable "PHC320I" contains many zeros, and displays a high skewness, it has been transformed using the following formula: PHC320 $= sign(\text{"PHC320I"}) * \log(1 + \lvert\text{PHC320I}\rvert)$, where $\lvert\text{PHC320I}\rvert$ refers to the absolute value of the variable "PHC320I".	Data on this indicator are collected from the WDI, 2021
PGAP320	Poverty gap at $3.20 a day (2011 PPP) is the mean shortfall in income or consumption from the poverty line $3.20 a day (counting the nonpoor as having zero shortfall), expressed as a percentage of the poverty line. This measure reflects the depth of poverty as well as its incidence (denoted "PGAP320I"). This measure reflects the depth of poverty as well as its incidence. As the variable "PGAP320I" contains many zeros, and displays a high skewness, it has been transformed using the following formula: PGAP320 $= sign(\text{"PGAP320I"}) * \log(1 + \lvert\text{PGAP320I}\rvert)$, where $\lvert\text{PGAP320I}\rvert$ refers to the absolute value of the variable "PGAP320I".	Data on this indicator are collected from the WDI, 2021
PHC550	This is transformed indicator of the poverty headcount ratio at $5.50 a day is the percentage of the population living on less than $5.50 a day at 2011 international prices (denoted "PHC550I"). As the variable "PHC550I" contains many zeros, and displays a high skewness, it	Data on this indicator are collected from the WDI, 2021

	has been transformed using the following formula: PHC550 $= sign(\text{"PHC550I"}) * \log(1 + \lvert\text{PHC550I}\rvert)$, where $\lvert\text{PHC550I}\rvert$ refers to the absolute value of the variable "PHC550I".	
PGAP550	Poverty gap at $5.50 a day (2011 PPP) is the mean shortfall in income or consumption from the poverty line $5.50 a day (counting the nonpoor as having zero shortfall), expressed as a percentage of the poverty line (denoted "PGAP550I"). This measure reflects the depth of poverty as well as its incidence. As the variable "PGAP550I" contains many zeros, and displays a high skewness, it has been transformed using the following formula: PGAP550 $= sign(\text{"PGAP550I"}) * \log(1 + \lvert\text{PGAP550I}\rvert)$, where $\lvert\text{PGAP550I}\rvert$ refers to the absolute value of the variable "PGAP550I".	Data on this indicator are collected from the WDI, 2021
URGSP	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). This indicator has been computed using a formula adopted both by the WTO (see WTO, 2016) and the UNCTAD and which goes as follows: URGSPI = 100*(GSP Received Imports)/(GSP Covered Imports), 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 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 Values of the indicator "URGSP1" range between 0 and 100, with higher values indicating a greater utilization rate of GSP programs. Given the skewed distribution of this variable "URGSPI", it has been transformed as followed: URGSP $= sign(\text{URGSPI}) * \log(1 + \lvert\text{URGSPI}\rvert)$ (2), where $\lvert\text{URGSPI}\rvert$ refers to the absolute value of the variable "URGSPI".	United Nations Conference on Trade and Development (UNCTAD) Dataset: https://gsp.unctad.org/utilization
UROTP	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.	United Nations Conference on Trade and Development (UNCTAD) Dataset: https://gsp.unctad.org/utilization

	This indicator has been calculated using a formula similar to the one used to compute the indicator "USGSPI". The formula goes as follows: UROTPI = 100*(Other-Preferential Imports)/(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 Values of the indicator "UROTPI" range between 0 and 100, with higher values indicating a greater utilization rate of other trade preferences programs. Given the skewed distribution of the variable "UROPTI", it has been transformed as followed (e.g., Yeyati et al. 2007): $\text{UROTP} = sign(\text{UROTPI}) * \log(1 + \lvert\text{UROTPI}\rvert)$ (2), where $\lvert\text{UROTPI}\rvert$ refers to the absolute value of the variable "UROTPI".	
ECI	This is the economic complexity index. It is calculated using the approach described in Hausman and Hidalgo (2009). The economic complexity indicator reflects both the diversity and sophistication of a country's export structure, and indicates the diversity and ubiquity of that country's export structure. Higher values of this index reflect greater economic complexity.	MIT's Observatory of Economic Complexity (https://atlas.media.mit.edu/rankings)
GDP	Gross Domestic Product (constant 2010 US$).	WDI, 2021
POP	This is the measure of the total Population	WDI, 2021
OPEN	Measure of trade openness calculated as the share (in percentage) of the sum of exports and imports of goods and services in GDP.	Author's calculation based on data extracted from the WDI
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).	Data extracted from the International Monetary Fund (IMF) Financial Development Index Database (see online at: https://data.imf.org/?sk=F8032E80-B36C-43B1-AC26-493C5B1CD33B) - See also Sahay et al. (2015).

EDU	This is the measure of the education level. It is calculated as the average of the gross primary school enrolment rate (in percentage), secondary school enrolment rate (in percentage) and tertiary school enrolment rate (in percentage).	WDI, 2021
INST	This is the variable capturing the institutional quality. It has been computed by extracting the first principal component (based on factor analysis) of the following six indicators of governance. These indicators are respectively: political stability and absence of violence/terrorism; regulatory quality; rule of law; government effectiveness; voice and accountability, and corruption. Higher values of the index "INST" are associated with better governance and institutional quality, while lower values reflect worse governance and institutional quality.	Data on the components of "INST" variables has been extracted from World Bank Governance Indicators developed by Kaufmann et al. (2010) and updated recently. See online at: https://info.worldbank.org/governance/wgi/

Appendix 2: Descriptive statistics on variables used in the analysis

Variable	Observations	Mean	Standard deviation	Minimum	Maximum
PHC190I	240	7.270	14.276	0.000	78.800
PGAP190I	240	2.564	6.077	0.000	40.300
PHC320I	240	16.675	21.352	0.000	91.500
PGAP320I	240	6.336	10.697	0.000	59.100
PHC190I	240	33.369	27.432	0.067	97.500
PGAP190I	240	14.232	16.091	0.000	74.200
URGSPI	240	47.905	32.542	0.000	97.887
UROTPI	240	24.767	33.569	0.000	97.940
ECI	237	0.133	0.692	-1.544	1.873
OPEN	240	80.701	36.104	24.045	206.364
FINDEV	240	0.327	0.167	0.066	0.850
INST	240	-0.374	1.441	-3.209	2.993
EDU	240	72.247	17.771	10.614	105.463
GDPC	240	7349.008	6824.517	466.391	33300.050
POP	240	64,600,000	192,000,000	189090	1,370,000,000

Appendix 3: List of countries contained in the full sample

Full sample				**LDCs**
Albania	Egypt, Arab Rep.	Lithuania	Rwanda	Bangladesh
Argentina	El Salvador	Madagascar	Samoa	Benin
Armenia	Estonia	Malaysia	Slovak Republic	Bhutan
Azerbaijan	Fiji	Mali	Slovenia	Guinea
Bangladesh	Georgia	Mexico	South Africa	Lao PDR
Belarus	Ghana	Moldova	Sri Lanka	Madagascar
Benin	Greece	Mongolia	Tajikistan	Mali
Bhutan	Guinea	Myanmar	Thailand	Myanmar
Bolivia	Honduras	Nicaragua	Togo	Niger
Brazil	Hungary	Niger	Tunisia	Rwanda
Bulgaria	India	North Macedonia	Turkey	Togo
Chile	Indonesia	Pakistan	Uganda	Uganda
China	Iran, Islamic Rep.	Panama	Ukraine	Zambia
Colombia	Israel	Paraguay	Uruguay	
Costa Rica	Jordan	Peru	Venezuela, RB	
Croatia	Kazakhstan	Philippines	Vietnam	
Cyprus	Korea, Rep.	Poland	Zambia	
Czech Republic	Kyrgyz Republic	Portugal		
Dominican Republic	Lao PDR	Romania		
Ecuador	Latvia	Russian Federation		