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The Least Developed Countries' Services Waiver and the Stability of Least Developed Countries' Services Exports

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Abstract

The least developed countries (LDCs) are weakly integrated into the global trading system. To foster their participation in international trade in services, the Members of the World Trade Organization (WTO) adopted in 2011 a Decision ("LDC Services Waiver") that allows any WTO Member to offer preferential treatment to LDC services and service suppliers. This Decision became operational only from 2014, and is valid until 2030, or before 2030 for beneficiaries that lose the LDC status. The present analysis investigates whether the LDC Services Waiver Decision has been instrumental in dampening the volatility of LDCs' commercial services exports. We submit the theoretical hypothesis that by providing certainty to the access of trading partners' markets, and hence improving the predictability of such market access for LDCs' trading firms, the LDC Services Waiver could contribute to dampening the volatility of LDCs' commercial services exports. The analysis uses the difference-in-difference approach where the treatment group contains 38 LDCs and the control group contains 22 Low-income countries that are not eligible for the benefits of this Waiver. It covers the period from 2004 to 2019, with the treatment period (i.e., the period of operationalization of the LDC Services Waiver) running from 2014 to 2019. Based on within fixed effects and random-effects Mundlak estimators, the empirical exercise has provided support to the hypothesis that the LDC Services Waiver has been instrumental in dampening the volatility of total commercial services exports, and in particular the volatility of modern commercial services. Thus, meaningful preferences to LDCs, under the Services Waiver, would provide significant benefits to LDCs, including in terms of stability of services exports.

Keywords: Least developed countries' Services Waiver; Volatility of commercial services exports; World Trade Organization.

Jel Classification: F13; F14.

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1. Introduction

The group of least developed countries (LDCs) has been defined by the United Nations as the poorest and most vulnerable countries to environmental and exogenous economic shocks. LDCs represent a small share (less than 1 per cent) in the global trade in goods and services. According to WTO (2021a), LDCs' share in world exports of goods and commercial services increased slightly from 0.92% in 2017 to 0.96% in 2019, but fell back to 0.91% in 2020 due to the COVID-19 pandemic. Their commercial services exports represented 0.57% of the world commercial services exports in 2020, against 0.70% in 2019, and their share in global goods exports amounted to a mere 1.01% in 2020, from 1.05% in 2019. This explains why the integration of least developed countries into the global trading system has attracted a great attention from the international trade community (e.g., Flentø and Ponte, 2017; Sibanda, 2015; United Nations, 2021; UNCTAD, 2021; WTO, 2021a,b, 2022a).

In light of the importance of international trade for economic growth and development (e.g., Atkin and Donaldson, 2021; Chang et al., 2009; Singh, 2010), and in view of LDCs' minuscule share in the world exports, Members of the World Trade Organization (WTO) adopted a series of Decisions in favour of these countries so as to enhance their integration into the global trading system (see WTO, 2021c), and in particular, in the international trade in services market (see Gnanon, 2022 and UNCTAD, 2020 for a literature review on these Decisions). As far as trade in services is concerned, WTO Trade Ministers adopted in 2011, a Decision that allows WTO Members (both developing and developed countries) to provide preferential treatment to services and service suppliers originating in LDCs (see WTO, 2011). This Decision, also termed the "LDC Services Waiver²", states that the Waiver lasts 15 years (from the date of its adoption) or when an LDC beneficiary of the Waiver graduates from the LDC category. This time horizon of the Waiver is essential for reducing the uncertainty (and hence enhancing the predictability) concerning the access by LDCs to the markets of preference-granting countries. It would incentivize LDCs' trading firms to undertake relatively long term investments in the services sector, which would in turn, contribute to reducing the volatility of services exports.

To operationalize the Waiver Decision, WTO Members adopted another Ministerial Decision in 2013, which established a process for the operationalization of the LDC Services Waiver (see WTO, 2013). An additional ministerial Decision adopted in 2015 (see WTO, 2015) did not only reaffirm the LDC Services Waiver, but also emphasize the time horizon of the Waiver Decision: the LDC Services Waiver is extended until 31 December 2030.

Most of the existing works related to the LDC Services Waiver has considered the issue either from a legal perspective (e.g., Carpio and Mir, 2014; Chanda and Raihan, 2016) or by relying on case studies with a view to providing recommendations to national policymakers and international institutions on how to enhance the benefits of the Waiver for beneficiary countries (e.g., Chanda and Raihan, 2016; Drake-Brockman et al., 2015; Mendoza et al., 2016; UNCTAD, 2020). Only recently has a study by Gnanon (2022) investigated empirically the causal effect of the LDC Services Waiver on LDCs' modern and traditional commercial services exports. The study has shown that while the LDC Services Waiver has led to an increase in both modern and traditional services exports in very low-income LDCs, relatively higher per capita income LDCs

² See Carpio and Mir (2014) for a discussion of the legal scope of the LDC Services Waiver, in particular its background, the preferences covered, and the conditions applying to these preferences.

experience yet an increase in modern services exports (including to a greater extent than in very low-income LDCs), but a fall in traditional services exports.

The present paper complements the work by Gnanangnon (2022a), by investigating the effect of the LDC Services Waiver on the volatility of LDCs' services exports. The relevance of this topic lies on the fact that the instability of export earnings discourages exporting firms, in particular risk-averse ones from undertaking the requisite investments in exporting sectors (e.g., Agosin, 2009; Gnanangnon, 2021). The consequences of this could, *inter alia*, be the fall in the terms of trade gains, the increase in macroeconomic uncertainty, the encouragement of corruption, and bleak long-run economic prospects (e.g., Araujo et al., 1999; Athukorola, 2000; Bleaney and Greenaway, 2001; Dawe, 1996; Ghosh and Ostry, 1994; Hesse, 2008; United Nations, 2014).

The argument at the heart of the analysis is, as mentioned above, that by enhancing the predictability of trading partners' market access, the LDC Services Waiver could contribute to dampening the volatility of services exports in the beneficiary countries of the Services Waiver, that is, LDCs.

The empirical analysis uses the difference-in-difference approach to test this hypothesis. LDCs constitute the treatment group, and the control group are low-income countries that are yet not LDCs, but eligible for the Poverty Reduction and Growth Trust (PRGT) facilities of the International Monetary Fund (IMF). The panel dataset contains 38 LDCs and 22 countries in the control group, over the period from 2007 to 2019. The empirical exercise has lent support for the hypothesis set out above, including by establishing that the LDC Services Waiver has helped reduce the volatility of LDCs' services exports.

The remaining part of the analysis contains four sections. Section 2 discusses the effect of the LDC Services Waiver on LDCs services export volatility. Section 3 presents the empirical strategy, including the model specification that helps address the question at heart of the paper, and the econometric approaches used to estimate it. Section 4 interprets empirical outcomes, and Section 5 concludes.

2. Discussion on the effect of the Services Waiver on services export volatility

A major Decision to facilitate the access by LDCs' services suppliers to trading partners' markets was the Decision adopted on 17 December 2011 by WTO Trade Ministers. This Decision allows WTO Members (both developing and developed countries) to depart from the most favoured nations (MFN) principle³ of the General Agreement on Trade in Services (GATS) and provide preferential treatment to services and service suppliers originating in LDCs (see WTO, 2011). This Decision, also referred to as "LDC Services Waiver"⁴, acts as an "Enabling Clause for services"⁵, specific for LDCs". It is similar to the Enabling Clause⁶ for goods. While this Decision does not oblige WTO Members to offer preferential treatment to services and service suppliers originating in LDCs (e.g., Carpio and Mir, 2014), it has the merit of incentivizing WTO members

³ The LDC Services Waiver exempts WTO Members from meeting their legal obligation to provide non-discriminatory (MFN) treatment to all trading partners (as contained in Article II:1 of the GATS) when offering trade preferences to LDCs.

⁴ See Carpio and Mir (2014) for a discussion of the legal scope of the LDC Services Waiver, in particular its background, the preferences covered, and the conditions applying to these preferences.

⁵ The expression "Enabling Clause for trade in services" was first used by Schloemann (2012).

⁶ Established in 1979, the Enabling Clause for goods represents the permanent legal basis for granting unilateral trade preferences to products originating from developing countries.

to expand market access for LDCs services and services suppliers (preferential treatment that non-LDC WTO Members could not enjoy). The LDC Services Waiver Decision also states that the "Waiver shall terminate upon the expiration of a period of 15 years from the date of its adoption" (WTO, 2011, paragraph 7). This provides certainty for the access by LDCs' trading firms to the markets of preference granting countries. The Decision has also called on WTO Members to enhance technical assistance and capacity building for LDCs in order to enable them to take advantage of the Waiver.

It was noticed that two years after the adoption of the DC Services Waiver, no preferential treatments for LDC services and services suppliers were extended to LDCs. WTO Trade Ministers, then, adopted another Decision to make operational the LDC Services Waiver. This Decision also termed the "Operationalization of the Waiver Concerning Preferential Treatment to Services and Service Suppliers of Least-Developed Countries" (see WTO, 2013), established a process that would enable the effective operationalization of the LDC Services Waiver (see WTO, 2013, paragraph 1.2). This process entailed the organization of a High-level meeting (a kind of a pledging conference) six months after the LDCs would submit a "Collective Request" that would identify the sectors and modes of supply of particular export interest to them.

The WTO LDC Group submitted its Collective Request in July 2014 (see WTO, 2014), after which, the expected High-Level meeting⁷ was held in February 2015. At that meeting, 24 developed and developing countries made announcements of the sectors and modes of supply where they intend to provide preferential treatment to LDC services and service suppliers (see WTO, 2015a). Building on the success of this meeting, WTO Trade Ministers adopted at the 2015 Nairobi Ministerial Conference, a Decision that emphasizes, *inter alia*, the need for developed countries, and developing Members in a position to do so, to extend preferential market access to LDCs services and services suppliers. The Decision also provides that the time horizon of the LDC Services Waiver is extended to 31 December 2030⁸ (see WTO, 2015b: paragraph 1.1). The Nairobi Ministerial Decision, additionally, urges WTO Members to give special priority to addressing regulatory barriers to LDCs' services exports (pursuant to GATS Article VI:4) (see WTO, 2015b: paragraph 1.3), and reaffirms the criticality of specific technical assistance and capacity building measures that would allow LDC service suppliers to utilize the preferences granted (see WTO, 2015b: paragraph 1.4).

As of May 2022, 25 WTO members⁹ submitted to the WTO, notifications of measures under the LDC services waiver, in response to the LDCs' Collective Request (WTO, 2021a, 2022a).

At the 12th WTO Ministerial Conference held in Geneva in June 2022, WTO Members reaffirmed the above-mentioned 2015 Bali Ministerial Decision, and instructed the WTO Secretariat to, *inter alia*, review and promote the operationalization of the Waiver (see WTO, 2022b: paragraph 8).

⁷ Further information on this High level meeting can be found online at: https://www.wto.org/english/news_e/news15_e/serv_05feb15_e.htm

⁸ It is important to note here that the LDC Services Waiver Decision (WTO, 2011: paragraph 8) also provides that the Waiver shall terminate when the graduation of an LDC beneficiary of Waiver becomes effective. Thus, for a given LDC, "*the LDC Services Waiver is valid until 2030 or until a member's date of graduation from LDC status - whichever occurs earlier*" (WTO, 2022: page 10).

⁹ These included the 24 Members that made announcements at the High-level meeting in February 2015, and the United Kingdom, which after its withdrawal from the European Union, submitted, on 1 January 2021, to the WTO its notification concerning the preferential treatment accorded to LDC services and services suppliers. The list of these 25 Members is accessible in document WTO (2021a: page 29, Table 6).

The meaningfulness of the preferences offered is still being debated in the academic and policy circles (see for example the study by UNCTAD, 2020). However, the benefits of the LDC Services Waiver in terms of its duration certainty, and of the reduction of potential barriers encountered by LDCs' services and services suppliers, could incentivize LDCs services exporting firms to make relatively long term investments in the services sectors. In turn, this would help stabilize their services exports.

The debate concerning the adverse effects of the uncertainty over the benefits of non-reciprocal trade preferences for trading firms in developing countries, is not new. While it has focused mostly on trade in goods, it could apply to trade in services. In fact, the discretion of preference-granting countries over the choice of beneficiary countries of the preference schemes, the products (or services) coverage of the schemes, the rules that govern the benefit of the preferences, and the criteria of graduation from the programs, create uncertainty over the benefits of the preference schemes for trading firms in beneficiary countries (e.g., Borchert and Di Ubaldo, 2020; Brenton and Ikezuki, 2005; Carpio and Mir, 2014; Grossman and Sykes 2005; Persson, 2015a,b). Taking the case of goods, the literature has noted that the uncertainty surrounding the preferences scheme (for example, in terms of security and stability of the preferential market access) can, in the long-run, distort the economic structure of beneficiary countries' trading patterns (e.g., Hoekman and Özden, 2006; Panagariya, 2004), and reduce firms' incentives to make long term investments in products eligible for the preferential regimes (e.g., Borchert and Di Ubaldo, 2020; Persson, 2015a,b). Persson (2015a) has underlined the difficulties for firms to take advantage of a market access agreement that last only a few years compared to a one with unlimited duration. Onguglo (1999) has proposed that a multi-year waiver of a reasonable duration for non-reciprocal preferences would be appropriate to ensure a long term obligation from the side of preference-granting countries. UNCTAD (2003) has proposed that stable benefits would accrue to beneficiary countries if preference granting countries developed enforceable and durable preference arrangements that could not be cancelled ad hoc. Such arrangements would cover all products from developing countries and rely on simple rules of origin. Bartels and Häberli (2010) have suggested that binding obligations in existing WTO rules could be used as a tool for increasing the predictability of market access.

Against this backdrop, we submit the following hypothesis.

Hypothesis: Key features of the LDC Services Waiver are likely to improve the predictability and stability of market access for LDCs services and services suppliers, encourage long term investments in the services sectors by LDCs trading firms (including both local firms and multinationals located in LDCs), and reduce the volatility of LDCs' services exports. These elements of the Waiver are the 15-year time-frame for the Waiver duration, the incentives provided to preference-granting countries to reduce potential barriers encountered by LDC services and services suppliers when acceding to their markets, and the technical assistance and capacity building that could be provided by preference granting countries to LDCs so as to help them take advantage of the preferences granted. On the other hand, the LDC Services Waiver Decision and the subsequent Decisions to make it operationalize could encourage LDC governments to adopt regulatory measures that would promote domestic investments, and attract foreign direct investments in the services sectors eligible for these preferences. Overall, we expect the LDCs services exports to be less volatile (i.e., more stable) after the operationalization of the Waiver compared to the preceding period.

3. Empirical approach

In this section, we first lay down the model specification that helps address empirically the question at the heart of the present analysis (see sub-section 2.1). Second, we discuss the econometric approaches used to estimate this model (see sub-section 2.2).

3.1. Model specification

Existing studies on determinants of export volatility have mostly focused on goods exports, and been performed at the macro-level (e.g., Charette, 1985; Chowdhury et al., 2021; Gnangnon, 2018; Han, 2021; Mansfield and Reinhardt, 2008; Stanley and Bunnag, 2001) or at the firm-level (e.g., Hirsch and Lev, 1971; Juvenal and Monteiro, 2013; Kramarz et al. 2020; Vannoorenberghe et al., 2016). However, the works on the macroeconomic determinants of services export volatility are scarce. One of these rare studies is that of Gnangnon (2021a) who has explored the effect of services export diversification on services export volatility.

The present analysis uses the difference-in-difference framework to assess the effect of the LDC Services Waiver on the volatility of LDCs' commercial services exports. The LDC Services Waiver and subsequent Decisions to operationalize it are fully exogenous to a particular LDC decision because both they were adopted at the international level by WTO Members. In other words, the adoption of the LDC Services Waiver Decision does not depend on the willing of a specific LDC (given its services export volatility degree), but rather on the willing of the entire membership of the WTO to promote LDCs' participation in international trade. As a result, the variable capturing the LDC Services Waiver Decision is treated as exogenous in the empirical analysis.

As also noted above, while the LDC Services Waiver was adopted in 2011, it only became operational after the ministerial Decision on its operationalization, adopted by Trade Ministers in December 2013. Therefore, it would make more sense to consider that the treatment period starts from 2014 onwards. Thus, we perform the difference-in-difference analysis using the period after 2013, that is, from 2014 to 2019¹⁰ as the treatment period.

We investigate empirically the effect of the LDC Services Waiver Decision on LDCs' services exports volatility by considering the following parsimonious baseline model:

$$\begin{aligned} \text{Log}(SEXPVOL)_{it} = & \alpha_0 + \alpha_1[(LDC_i) * (WAIVER)_t] + \alpha_2LDC_i + \alpha_3WAIVER_t + \\ & \alpha_4\text{Log}(ODA)_{it-3} + \alpha_5\text{Log}(GDPC)_{it-3} + \alpha_6INST_{it-3} + \alpha_7FINDEV_{it-3} + \mu_i + \omega_{it} \end{aligned} \quad (1)$$

The dependent variable is the indicator of export volatility in country i between the year $t-2$ and the year t (this indicator is described below). The analysis covers 60 countries, of which 38 LDCs and 22 countries in the control group. Following Gnangnon (2022a), the set of 22 countries in the control group are low-income countries¹¹ (LICs) designated as such by the International Monetary Fund (IMF). The lists of countries in the treatment group (i.e., LDCs) and in the control

¹⁰ As explained below, the panel dataset used in the analysis concerning the effect of the LDC Waiver Decision on services export volatility covers the period from 2007 to 2019, based on data availability.

¹¹There are 69 countries designated as LICs by the IMF. These are countries eligible for the Poverty Reduction and Growth Trust (PRGT) facilities, and are located in Africa, Asia, and Latin America (see IMF, 2021: p34). To build the list of countries of the control group, we excluded from the list of the 69 LICs (as defined by the IMF) all countries defined as LDCs by the United Nations. As a result, we obtained 22 countries in the control group. It is worth noting that all LDCs except for 'Angola' are in the category of the PRGT-eligible LICs.

group are provided in Appendix 2. α_0 to α_7 are parameters that will be estimated. μ_i are time invariant countries' specific effects. ω_{it} is an error-term. All variables contained in model (1) are described in Appendix 1. The standard descriptive statistics related to these variables are reported in Appendices 3a, 3b and 3c respectively for the full sample, the treatment group, and the control group.

The dependent variable "SEXPVOL" is the indicator of the volatility of commercial services exports, expressed either in percentage of GDP (or in values, for robustness check). The measures of the volatility of commercial services exports have been computed as the standard deviation over 3-year rolling windows¹² (that is, from t-2 to t) of the growth rate of total commercial services exports¹³ (either as a share of GDP, or in values). Data¹⁴ on services exports were initially available from 2005 to 2019. As the indicator of services export volatility has been computed using the 3-year rolling windows, we lost two years in the analysis, so that the final dataset ultimately covers the period from 2007 to 2019. Overall, the two measures of services export volatility are the volatility of services exports (where services exports are expressed as a share of GDP) (denoted "CSEGDPVOL") and the volatility of the values of services exports, denoted "CSEVALVOL".

"LDC" is a dummy variable for LDCs in the full sample. It takes the value of 1 for LDCs, and 0 for countries in the control group. The variable "WAIVER" is the dummy variable capturing the period of the operationalization of the LDC Services Waiver, that is, from 2014 onwards. It takes the value of 1 from 2014 to 2019 and 0 from 2007 to 2013.

The parameter α_2 represents the difference-in-difference effect between control countries in the pre-and-post-operationalization of the LDC Services Waiver, and treated countries in the pre-and post-operationalization of the Waiver. It uncovers the causal effect of the LDC Services Waiver on services exports volatility. For the sake of simplicity, we denote $DiD = [(LDC_i) * (WAIVER)_t]$ in the empirical analysis.

The variable "GDPC" is the real per capita income. It acts as a proxy for countries' development level, given the heterogeneity of the group of LDCs in terms of per capita income, even though all these countries are qualified as the poorest in the world. The introduction of this variable in model (1) aims to account for the differences among LDCs of the volatility of services exports.

The variable "ODA" represents the real net disbursements of total official development assistance, expressed in constant prices 2019, US dollar. The development aid variable has been introduced in model (1) to account for the potential stabilizing effect of aid on exports. In fact, adverse exogenous shocks can result in lower investments in the productive sectors, including the services sectors, and lead to higher services export volatility (Gnangnon, 2021a). On the other hand, the literature has established empirically that development aid has a stabilizing effect on economies affected by adverse exogenous shocks, including on their output (e.g., Chauvet and Guillaumont, 2009; Collier and Goderis, 2009; Guillaumont, 2006; Guillaumont-Jeanneney and Tapsoba, 2012). It ensues that by helping dampen the effects of adverse shocks on economies,

¹² We use the 3-year rolling windows because of the short time span of the dataset used in the analysis.

¹³ See Bayraktar (2019), Bekaert et al. (2006); Ebeke and Ehrhart (2012), Gnangnon (2021b) and Museru et al. (2014) who have also used the approach in their analyses.

¹⁴ As noted in Appendix 1, this dataset was extracted from the database developed by the World Trade Organization (WTO)/United Nations Conference on Trade and Development (UNCTAD), in cooperation with International Trade Centre (ITC) and United Nations Statistics Division (UNSD).

development aid could reduce the volatility of exports of goods and services, and especially services export volatility. On another note, Guillaumont and Le Goff (2010) have found that development aid has a stabilizing effect on exports of goods and services, that is, it has helped reduce the instability of export of goods and services. Gnanon (2022b) has demonstrated empirically that development aid has enhanced the resilience of exports to shocks by strengthening countries' productive capacities (including by enhancing beneficiary countries' supply response capacity). Overall, we expect higher development aid to be negatively associated with services exports volatility.

A better access to credit supplied by the banking sector for financing export activities could help firms not only increase their exports (e.g., Becker et al., 2013; Chaney, 2016; Leibovici, 2021; Sahoo and Dash, 2014, 2017), but also cope with the effects of adverse shocks on their export activities. In fact, exogenous adverse shocks result in the tightening of global financial conditions, a reversal of capital inflows, which could constrain trading firms' ability to finance trade (e.g., IMF, 2020). According to Bems et al. (2013), shocks to credit supply have amplified the decline in trade flows in the wake of the 2008-2009 global recession. While trade finance is, in general, critical for firms' participation in international trade (e.g., Auboin and Engemann, 2014; Vaubourg, 2016), its importance is even more evident during adverse global shocks. This is because the decline in trade finance after adverse shocks, leads to a significant fall in trade flows (e.g., Auboin, 2009; 2021). Against this background, one could expect financial development to help mitigate the adverse effects of shocks on services exports, and hence, reduce services export volatility. This could particularly be the case if financial development contributed to enhancing financial stability (e.g., Naceur et al. 2019). Gnanon (2021a) has reported that financial development has been associated with lower services export volatility. However, the volatility of services export can increase if greater financial development results in the occurrence of banking crises (e.g., Binici and Ganioglu, 2021; Mathonnat and Minea, 2018). Summing-up, this theoretical discussion on the effect of financial development on services export volatility has not provided a clear guidance on the effect of financial development on services export volatility. The issue will, therefore, be addressed empirically.

Finally, countries with good quality of institutions and governance are more likely to cope with adverse shocks than those with weak institutional and governance quality (e.g., Acemoglu et al., 2003; Caldera Sánchez and Röhn, 2016). We, therefore, expect that an improvement in the institutional and governance quality could be associated with lower volatility of services exports.

We have applied the natural logarithm to the variables "ODA" and "GDPC" to reduce the skewness of their distributions. All control variables have been introduced in model (1) at the year $t-3$ to ensure their exogeneity (i.e., the reverse causality) with respect to the dependent variable.

Before discussing the appropriate econometric approaches for performing the empirical analysis, we find useful to check the validity of the difference-in-difference framework used in the present study to uncover the causal effect of the LDC services Waiver on the volatility of commercial services exports. In fact, the use of this framework rests on the assumption of parallel trends between the indicator of services export volatility of the treatment group (i.e., LDCs) and the control group, in the absence of the intervention (i.e., over the period preceding the operationalization of the Waiver). In other words, the difference between the outcome variable under analysis (which is here, the indicator of services export volatility) of the treatment group (i.e., LDCs) and the control group, should remain constant over time in the absence of the

intervention. This signifies that the average outcomes of treatment and control groups would follow parallel trends in the absence of the intervention (Abadie, 2005). However, according to Fredriksson and Oliveira (2019), this assumption is fundamentally untestable, insofar as the treatment group is only observed as treated.

We examine the validity of the parallel trends assumption in the present analysis through graphical analyses of the developments of the indicator of the volatility of total commercial services exports over the treatment and control groups (e.g., Wing et al. 2018). To that effect we present in Figure 1, such developments for the main indicator of services export volatility (i.e., the one computed using the total commercial services exports as a share of GDP). Figure 2 displays the developments of the alternative indicator of services export volatility (i.e., the one computed based on services exports values) over the treatment and control groups.

[Insert Figure 1, here]

We note from Figure 1 that before the operationalization of the LDC Services Waiver, there were parallel movements of the volatility of total commercial services exports, between the treatment and control groups. At the same time, over the full period, and in particular before the operationalization of the LDC Services Waiver, the volatility of services exports has been less strong for LDCs than for LICs in the control group. Moreover, the volatility of services exports declined after 2013 in both LDCs and the LICs in control group, although it remained higher for LICs in the control group than for LDCs. This may suggest that there had been a higher dampening effect of the LDC Services Waiver on services exports volatility in LDCs than in the LICs of the control group.

[Insert Figure 2, here]

Figure 2, which is based on the volatility of commercial services export values, shows parallel movements in the volatility of services exports between LDCs and the control group, especially from 2007 to 2011. While the volatility of services exports in LDCs was higher than that of LICs in the control group between 2011 and 2013, the pattern reversed from 2014 to 2018, as LDC services exports became less volatile than the average services exports in the control group. From 2018 to 2019, the services exports volatility of LDCs was higher than the volatility of services exports for countries in the control group.

Overall, we can consider that the parallel movements assumption holds in this exercise. Consequently, we can perform the empirical analysis using the difference-in-difference framework.

3.2. Econometric approach

We estimate model (1) using the within fixed effects model and the random-effects Mundlak model (Mundlak, 1978). While the fixed effects model has the advantage of controlling for the time-invariant variables, and hence accounting for biases induced by omitted and unobserved variables, it has the drawback of disregarding between-country effects, while taking essentially into account within-country effects. As a result, all countries' time-invariant regressors (such as the "LDC" dummy in the present analysis) are withdrawn from the regression. The random-effects Mundlak model accounts for differences within and between-countries. It is considered as a hybrid model because it involves introducing in the random effects specification, both the time-invariant variables with the demeaned coefficients from the fixed-effects model. The Mundlak approach is also referred to as the 'correlated random effects model' because it assumes that the unobserved heterogeneity depends on the country-level time averages of regressors. This signifies that the

introduction of the vector of time-averaged regressors allows controlling for time-invariant unobserved heterogeneity (between-country effects) in the regressions. As a result, the coefficient α_1 in equation (1) will capture the within effects estimates (as the between effects are controlled for by the averages of regressors across years and per country) in the regressions. According to Wooldridge (2010), the Mundlak model provides the advantage of measuring the effects of time-constant regressors, as allowed for by a traditional random-effects model.

Overall, in estimating model (1) using the random-effects Mundlak approach, the averages¹⁵ of all time-varying covariates for each country in the panel dataset have been introduced in the random-effects regressions.

Note that in estimating model (1) by means of the within fixed effects estimator, we apply the Driscoll and Kraay (1998) technique that helps correct the standard errors of coefficients for the autocorrelation, heteroscedasticity, and any form of cross-sectional dependence in the error-term.

In the empirical exercise, we use both the within fixed effects and the Mundlak estimators. Table 1 reports the estimates arising from the estimation of the specifications of model (1) where the dependent variable is the volatility of services exports (services exports being measured in terms of percentage of GDP, and in terms of values).

4. Empirical results

Results in the four columns of Table 1 suggest that the coefficient of the variable "DiD" is negative and significant at least at the 5% level. Especially, the coefficients of "DiD" in columns [1] and [3] are significant at the 1% level, while the coefficients of "DiD" in columns [2] and [4] are significant respectively at the 1% level, and 5% level. As noted above, one advantage of the random-effects Mundlak approach is its usefulness in obtaining estimates of time-invariant covariates, while the fixed effects estimator does not allow obtaining such estimates. This explains why no estimates have been reported for the dummy variable "LDC" in columns [1] and [2] (outcomes based on the fixed effects model).

[Insert Table 1, here]

These outcomes lend support to our theoretical hypothesis by revealing that the LDC Services Waiver has been instrumental in dampening the volatility of LDCs' total commercial services exports. In terms of magnitude of the effects, we note from columns [1] and [3] of Table 1 that the LDC Services Waiver has led to a decrease in the volatility of LDCs' total commercial services exports (expressed in percentage of GDP) by 47.7 per cent between 2014 and 2019 compared to the period from 2007 to 2013. Similarly, the operationalization of the LDC Services Waiver has resulted in a fall of the volatility of commercial services export values by 35.3 per cent between 2014 and 2019 compared to the period from 2007 to 2013.

Regarding control variables, we obtain across all four columns of Table 1 that at least at the 10% level, higher development aid inflows are associated with lower volatility of total commercial services exports. This finding aligns with our theoretical hypothesis. At the 1% level, an increase in the real per capita income is also associated with lower volatility of total commercial services exports (expressed either in percentage of GDP or in values). This signifies that countries with

¹⁵ These 'averages' indicators have the same value for a given country across years, but different values across countries in the panel dataset.

relatively higher per capita incomes are better equipped to cope with the adverse effects of shocks on services exports than very low-income countries. On another note, we obtain, across all columns of the Table that at least at the 5% level, an improvement in the institutional and governance quality results in a greater volatility of services exports. This surprising outcome may reflect differentiated effects of the institutional and governance quality on the volatility of total commercial services exports across countries in the full sample, which to recall, contains both LDCs and well as countries of the control group.

We also find that at the 5% level, financial development enhances the volatility of total commercial services exports (expressed in percentage of GDP), but at the conventional significance levels, it exerts no significant effect on the volatility of total commercial services exports values. Once again, while these outcomes may hide differentiated effects across countries in the full sample, the 'positive effects' obtained may also indicate that when facing adverse shocks, trading firms in the services sectors do not benefit from financial support from the banking sector so as to alleviate the negative effects of these shocks on their services export activities.

5. Further analysis

We deepen the analysis performed thus far by exploring how the LDC Services Waiver has affected the volatility of each of the two main components of total commercial services exports, that is, the modern services exports, and the traditional services exports.

Following previous works that made the distinction between modern and traditional services exports (e.g., Eichengreen and Gupta, 2013; Gnanon, 2022a; Sahoo and Dash, 2014; 2017), the category of "modern services" includes the sub-sectors of 'Insurance and pension services'; 'Financial services'; 'Telecommunications, computer, and information services'; 'Charges for the use of intellectual property n.i.e'; and 'Other business services'. The category of "traditional services" covers the sub-sectors of 'goods-related services (i.e., manufacturing services on physical inputs owned by others and Maintenance and repair services)'; 'Transport'; 'Travel'; 'Construction'; and 'Personal, cultural, and recreational services' (see Appendix 1).

Based on this categorization of total commercial services exports, we first compute the indicators of modern services exports (in percentage of GDP and in values terms) as well as the indicators of traditional services exports (in percentage of GDP and in values terms). In turn, we use these indicators to calculate the volatility of the share of modern and traditional services exports in GDP. The indicator of the volatility of the share of modern services exports in GDP (denoted "MSEGDPVOL") is calculated as the standard deviation over 3-year rolling windows of the growth rate of modern services exports (in percentage of GDP). The indicator of the volatility of the values of modern services exports (denoted "MSEVALVOL") is calculated as the standard deviation over 3-year rolling windows of the growth rate of modern services exports (in values terms).

Likewise, the indicator of the volatility of the share of traditional services exports in GDP (denoted "TSEGDPVOL") is calculated as the standard deviation over 3-year rolling windows of the growth rate of the share of traditional services exports in GDP. The indicator of the volatility of traditional services exports (expressed in values) denoted "TSEVALVOL" is calculated as the standard deviation over 3-year rolling windows of the growth rate of the value of traditional services exports.

We also use here the within fixed effects estimator and the random-effects Mundlak approach to investigate empirically the effect of the LDC Services Waiver on the volatility of modern and traditional services.

Table 2 reports the outcomes arising from the estimation of the specifications of model (1) where the dependent variable is measured by the volatility of the share of modern services exports in GDP, and the volatility of the share of traditional services exports in GDP.

Table 3 reports the outcomes arising from the estimation of specifications of model (1) where the dependent variable is the volatility of modern services export values, and traditional services export values.

[Insert Table 2, here]

At the outset, we note that, with few exceptions, estimates of control variables in Tables 2 and 3 broadly align with those in Table 1. These exceptions concern for example, the different signs and statistical significances of the variable capturing financial development in Tables 2 and 3. In addition to the explanation provided above concerning the effect of financial development on services exports volatility, these different outcomes may suggest that the effect of financial development on the volatility of commercial services exports depends on the component of services exports under investigation, and the way it is measured (that is, in percentage of GDP or in values terms). This is not the subject-matter for the present analysis, and would require further investigation in future research.

Turning now to the estimates of our variable of interest (i.e., "DiD"), we observe in Table 2 that regardless of the estimator used, the coefficients of "DiD" are always negative and significant at the 1% level, and additionally have the same magnitude for a given dependent variable. These outcomes clearly support our theoretical hypothesis, and suggest that the LDC Services Waiver has been instrumental in mitigating the volatility of both modern and traditional services exports (expressed in percentage of GDP). In terms of magnitude, the operationalization of the LDC Services Waiver has allowed LDCs to reduce the volatility of the share of modern services exports in GDP by 50.1 per cent, and the volatility of the share of traditional services exports by 40.1 per cent. Thus, in LDCs, the LDC Services Waiver has exerted a higher reducing effect on the volatility of the share of modern services exports in GDP than on the volatility of the share of traditional services exports in GDP.

[Insert Table 3, here]

At the same time, results in Table 3 indicate that at the conventional significance levels, the LDC Services Waiver has exerted no significant effect on the volatility of the value of traditional services exports (see results in columns [2] and [4]). However, the coefficients of "DiD" are the same across columns [1] and [3], but do not have the same statistical significance in these two columns of the Table. In column [1] (i.e., for results based on the within fixed effects estimator), the coefficient is significant at the 1% level, while in column [3] (i.e., results based on the random-effects Mundlak approach), it is significant at the 5% level. We conclude that thanks to the LDC Services Waiver, LDCs have enjoyed a reduction in the volatility of the values of modern commercial services exports by 54.4 per cent.

6. Conclusions

To promote LDCs' integration into the global trade in services market, WTO Members adopted in 2011 a Waiver that allows them to depart from the MFN principle of the GATS, and offer preferential treatment to LDCs services and services suppliers. This Waiver has been operationalized from 2014, through the submission by LDCs of a Collective Request (that identified the sectors and modes of supply of particular export interest to them). In response to this Collective Request, 25 WTO Members made announcements of sectors and modes of supply where they intend to provide preferential treatment to LDC services and service suppliers, under the Waiver. The present paper has investigated whether the LDC Services Waiver has helped reduce the volatility of LDCs' services exports (or in other words, ensure the stability of services exports).

The analysis uses the difference-in-difference approach over a sample of 38 LDCs in the treatment group (countries that are de facto beneficiaries of the Services Waiver) and 22 LICs in the control group (countries that are not eligible for the benefits of the LDC Services Waiver), over the entire period from 2004 to 2019. The use of the Difference-in-Difference framework allows uncovering the causal effect of the LDC Services Waiver on the volatility of commercial services by comparing LDCs' performance in terms of the volatility of commercial services to the performance of the 22 LICs in terms of the volatility of commercial services over the period 2014-2019 (period post-operationalization of the Waiver) versus the pre-Waiver operationalization period (i.e., from 2004 to 2013).

Based on the within fixed effects and random-effects Mundlak estimators, the analysis has established that the LDC Services Waiver has been instrumental in dampening the volatility of total commercial services exports. In addition, the LDC Services Waiver has led to a lower volatility of modern services exports (regardless of whether the indicators of modern services exports are expressed as a share of GDP or in values terms). However, the negative effect of the LDC Services Waiver on the volatility of traditional services exports is obtained only when the indicator of traditional services export is expressed as a share of GDP. In fact, we found no significant effect of the LDC Services Waiver on the volatility of the values of traditional services exports.

The take-home message of this analysis is that the LDC Services Waiver has genuinely helped stabilize LDCs' services exports, including to a greater extent than LICs that have not benefited from this Services Waiver. This work complements the recent study by Gnanon (2022a), which has found a positive effect of the LDC Services Waiver on commercial services exports (notably modern services exports). These findings indicate that the LDC Services Waiver has been providing significant benefits to LDCs. Thus, the supply by a higher number of WTO Members (both developed and developing countries) of meaningful preferential treatment (under the LDC Services Waiver) to LDC services and service suppliers would surely contribute to enhancing these benefits to the LDCs.

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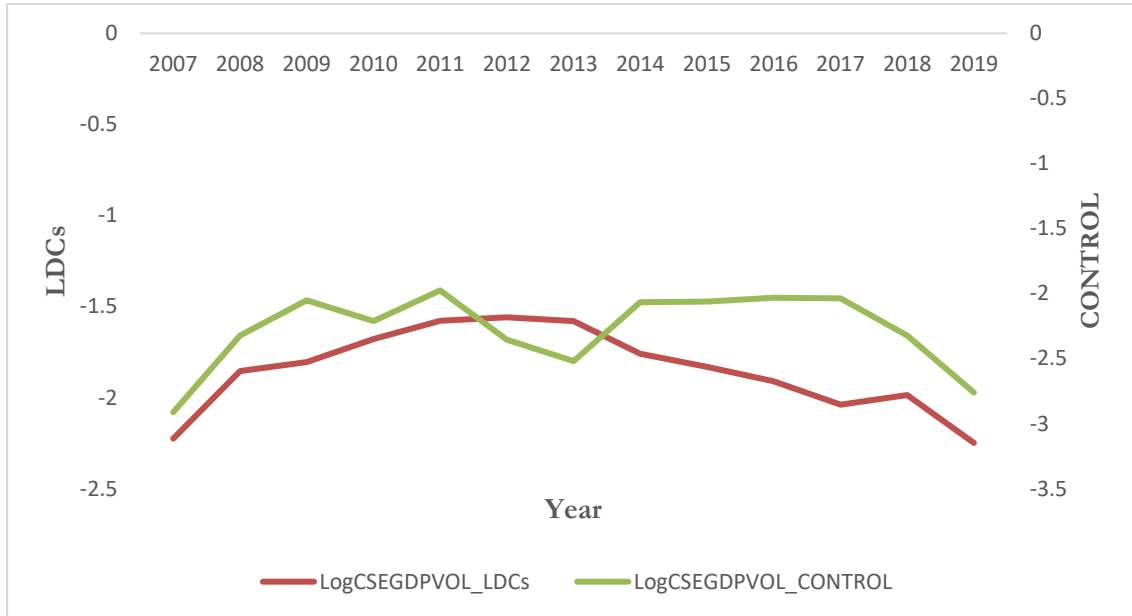
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FIGURES

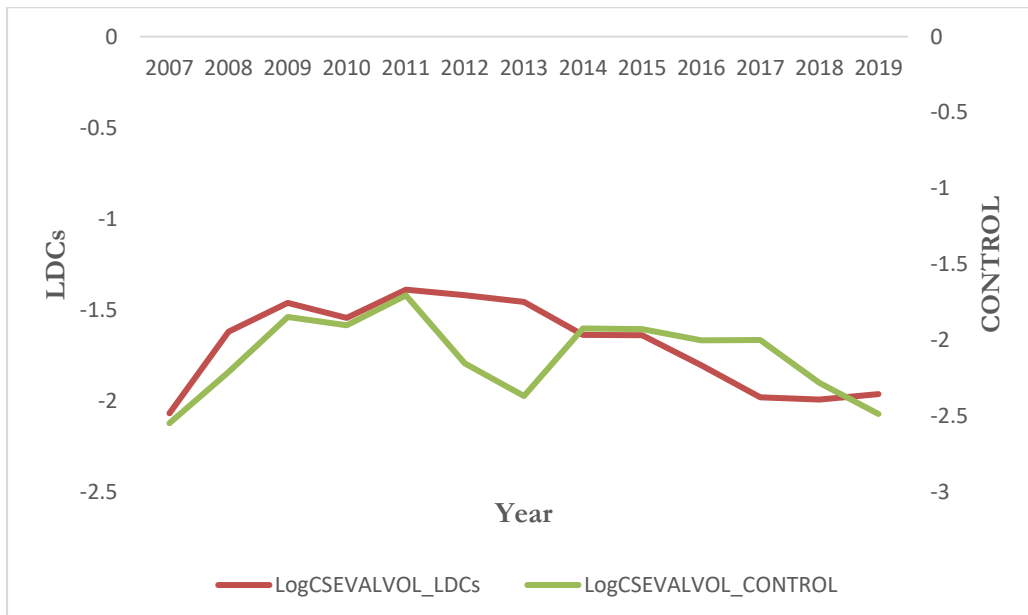
Figure 1: Development of the volatility of total commercial services exports (% GDP)



Source: Author

Note: The variable used to construct this graph is the natural logarithm of "CSEGDPVOL". It is the natural logarithm of the volatility of the share of total commercial services exports in GDP. "CONTROL" is the control group, and refers to the PRGT-Eligible Low-Income Countries. "LDCs" is the treated group (i.e., the group of LDCs).

Figure 2: Development of the volatility of the total values of commercial services exports



Source: Author

Note: The variable used to construct this graph is the natural logarithm of "CSEVALVOL". It is the natural logarithm of the volatility of the value of total commercial services exports. "CONTROL" is the control group, and refers to the PRGT-Eligible Low-Income Countries. "LDCs" is the treated group (i.e., the group of LDCs).

TABLES and APPENDICES

Table 1: Effect of the LDC Services Waiver on the volatility of services exports in LDCs
Estimators: FEDK and Random-effects Mundlak

Variables	FEDK		Random-effects Mundlak	
	Log(CSEGDPVOL)	Log(CSEVALVOL)	Log(CSEGDPVOL)	Log(CSEVALVOL)
	(1)	(2)	(3)	(4)
DiD	-0.477*** (0.0891)	-0.353*** (0.122)	-0.477*** (0.145)	-0.353** (0.140)
WAIVER	0.298*** (0.103)	0.166 (0.136)	0.298** (0.125)	0.166 (0.120)
LDC			-1.352 (1.504)	-2.653* (1.387)
Log(ODA) _{t-3}	-0.187*** (0.0642)	-0.348*** (0.0536)	-0.187* (0.102)	-0.348*** (0.0977)
Log(GDPC) _{t-3}	-2.574*** (0.700)	-2.223*** (0.689)	-2.574*** (0.543)	-2.223*** (0.523)
INST _{t-3}	0.275*** (0.0626)	0.388*** (0.102)	0.275** (0.140)	0.388*** (0.134)
FINDEV _{t-3}	0.0158** (0.00690)	0.00944 (0.00814)	0.0158** (0.00658)	0.00944 (0.00633)
Constant	20.23*** (5.476)	21.37*** (5.824)	3.223 (3.402)	4.531 (3.125)
Observations - Countries	578 - 60	578 - 60	578 - 60	578 - 60
Within R ²	0.0877	0.1003	0.0877	0.1003
Between R ²			0.2749	0.3017
Overall R ²			0.1884	0.2069

Note: *p-value<0.1; **p-value<0.05; ***p-value<0.01. Robust Standard Errors are in parenthesis. The full sample contains both the control group (i.e., 22 countries) and the treated group (i.e., 38 LDCs). The dummy variable "WAIVER" takes the value 1 after the year 2013, i.e., from 2014, and 0 for the other years. The variable "DiD" is the interaction between the dummy "WAIVER" and the dummy "LDC", the latter taking 1 for LDCs, and 0, for countries in the control group.

Table 2: Effect of the LDC Services Waiver on the volatility of modern and traditional services exports (expressed in percentage of GDP) in LDCs
Estimators: FEDK and Random-effects Mundlak

Variables	FEDK		Random-effects Mundlak	
	Log(MSEGDPVOL)	Log(TSEGDPVOL)	Log(MSEGDPVOL)	Log(TSEGDPVOL)
	(1)	(2)	(3)	(4)
DiD	-0.501*** (0.123)	-0.401*** (0.0640)	-0.501*** (0.159)	-0.401*** (0.152)
WAIVER	0.289** (0.121)	0.0281 (0.0865)	0.289** (0.135)	0.0281 (0.129)
LDC			-1.414 (1.459)	-0.283 (1.354)
Log(ODA) _{t-3}	-0.297*** (0.0892)	-0.231** (0.110)	-0.297*** (0.110)	-0.231** (0.106)
Log(GDPC) _{t-3}	-0.408 (0.477)	-1.963*** (0.567)	-0.408 (0.589)	-1.963*** (0.563)
INST _{t-3}	0.187* (0.0980)	0.434*** (0.0998)	0.187 (0.152)	0.434*** (0.146)
FINDEV _{t-3}	-0.00858** (0.00352)	0.0161* (0.00931)	-0.00858 (0.00713)	0.0161** (0.00681)
Constant	7.861* (4.393)	17.09*** (5.763)	3.167 (3.391)	3.016 (3.154)
Observations - Countries	572 - 60	570 - 60	572 - 60	570 - 60
Within R ²	0.0513	0.1006	0.0513	0.1006
Between R ²			0.2548	0.2849
Overall R ²			0.1514	0.1939

*Note: *p-value<0.1; **p-value<0.05; ***p-value<0.01. Robust Standard Errors are in parenthesis. The full sample contains both the control group (i.e., 22 countries) and the treated group (i.e., 38 LDCs). The dummy variable "WAIVER" takes the value 1 after the year 2013, i.e., from 2014, and 0 for the other years. The variable "DiD" is the interaction between the dummy "WAIVER" and the dummy "LDC", the latter taking 1 for LDCs, and 0, for countries in the control group.*

Table 3: Effect of the LDC Services Waiver on the volatility of the values of modern and traditional services exports in LDCs

Estimators: FEDK and Random-effects Mundlak

Variables	FEDK		Random-effects Mundlak	
	Log(MSEVALVOL)	Log(TSEVALVOL)	Log(MSEVALVOL)	Log(TSEVALVOL)
	(1)	(2)	(3)	(4)
DiD	-0.544*** (0.151)	0.286 (0.208)	-0.544** (0.219)	0.286 (0.398)
WAIVER	0.374** (0.153)	0.0221 (0.0724)	0.374** (0.186)	0.0221 (0.339)
LDC			-3.694* (2.216)	-1.552 (3.642)
Log(ODA) _{t-3}	-0.298*** (0.0963)	-0.897*** (0.288)	-0.298** (0.152)	-0.897*** (0.277)
Log(GDPC) _{t-3}	-1.539*** (0.524)	-2.477*** (0.590)	-1.539* (0.813)	-2.477* (1.481)
INST _{t-3}	0.432*** (0.146)	0.817*** (0.236)	0.432** (0.210)	0.817** (0.383)
FINDEV _{t-3}	-0.00773*** (0.00252)	0.0140 (0.0102)	-0.00773 (0.00983)	0.0140 (0.0179)
Constant	16.24*** (5.222)	34.57*** (8.507)	4.367 (5.205)	7.596 (8.458)
Observations - Countries	572 - 60	572 - 60	572 - 60	572 - 60
Within R ²	0.0417	0.0308	0.0417	0.0308
Between R ²			0.1546	0.0937
Overall R ²			0.1006	0.0598

Note: **p*-value<0.1; ***p*-value<0.05; ****p*-value<0.01. Robust Standard Errors are in parenthesis. The full sample contains both the control group (i.e., 22 countries) and the treated group (i.e., 38 LDCs). The dummy variable "WAIVER" takes the value 1 after the year 2013, i.e., from 2014, and 0 for the other years. The variable "DiD" is the interaction between the dummy "WAIVER" and the dummy "LDC", the latter taking 1 for LDCs, and 0, for countries in the control group.

Appendix 1: Definition and Source of variables

Variables	Definition	Source
CSEGDPVOL	<p>This is the indicator of the volatility of the share of total commercial services exports in GDP.</p> <p>The indicator of the volatility of the share of total commercial services exports in GDP has been computed as the standard deviation over 3-year rolling windows (that is, from t-2 to t) of the growth rate of the share of total commercial services exports in GDP (see Bayraktar, 2019; Bekaert et al. 2006; Ebeke and Ehrhart, 2012; Gnangnon, 2021; and Museru et al., 2014 who have also used the approach in their respective analyses).</p>	<p>Author's calculation based on services export data compiled by the World Trade Organization (WTO/United Nations Conference on Trade and Development (UNCTAD) in cooperation with International Trade Centre (ITC) and United Nations Statistics Division (UNSD). See below for details on the services sectors used in the analysis. Data on GDP (US\$ current prices) from the World Development Indicators (WDI).</p>
CSEVALVOL	<p>This is the indicator of the volatility of the value of total commercial services exports (US\$).</p> <p>It has been computed as the standard deviation over 3-year rolling windows (that is, from t-2 to t) of the growth rate of the value of total commercial services exports.</p>	<p>Author's calculation based on services export data (detailed sectoral data) compiled by WTO/UNCTAD in cooperation with the ITC and UNSD. See below for details on the services sectors used in the analysis. Data on GDP (US\$ current prices) is collected from the WDI.</p>
MSEGDPVOL	<p>This is the indicator of the volatility of the share of modern commercial services exports in GDP.</p> <p>This indicator has been computed as the standard deviation over 3-year rolling windows (that is, from t-2 to t) of the growth rate of the share of modern commercial services exports in GDP.</p>	<p>Author's calculation based on services export data (detailed sectoral data) compiled by the World Trade Organization (WTO/United Nations Conference on Trade and Development (UNCTAD) in cooperation with International Trade Centre (ITC) and United Nations Statistics Division (UNSD). Modern services cover the following major sub-sectors: 'Insurance and pension services'; 'Financial services'; 'Telecommunications, computer, and information services'; 'Charges for the use of intellectual property n.i.e'; and 'Other business services'. Data on GDP (US\$ current prices) is collected from the WDI.</p>
TSEGDPVOL	<p>This is the indicator of the volatility of the share of traditional commercial services exports in GDP.</p>	<p>Author's computation based on data on services exports compiled by the WTO/UNCTAD in</p>

	This indicator has been calculated as the standard deviation over 3-year rolling windows (that is, from t-2 to t) of the growth rate of the share of traditional commercial services exports in GDP.	cooperation with ITC and UNSD, and data on GDP (US\$ current prices) from the WDI. The share of traditional commercial services exports in percentage of GDP is computed as the difference between the share of total commercial services exports in percentage of GDP and the share of modern commercial services exports in percentage of GDP.
MSEVALVOL	This is the volatility of the value of modern commercial services exports. This indicator has been computed as the standard deviation over 3-year rolling windows (that is, from t-2 to t) of the growth rate of the values of modern commercial services exports.	Author's calculation based on services export data (detailed sectoral data) compiled by the World Trade Organization (WTO/United Nations Conference on Trade and Development (UNCTAD) in cooperation with International Trade Centre (ITC) and United Nations Statistics Division (UNSD).
TSEVALVOL	This is the volatility of the value of traditional commercial services exports. This indicator has been calculated as the standard deviation over 3-year rolling windows (that is, from t-2 to t) of the growth rate of the values of traditional commercial services exports.	Author's computation based on data on services exports compiled by the WTO/UNCTAD in cooperation with ITC and UNSD. The indicator of the values of traditional commercial services exports is computed as the difference between the total commercial services exports (in values) and modern commercial services exports (in values).
GDPC	Real per capita Gross Domestic Product (constant 2010 US\$).	WDI
ODA	This is the real net disbursements of total Official Development Assistance (ODA), expressed in constant prices 2019, US dollar.	OECD (Organization for Economic Cooperation and Development) database on development indicators.
FINDEV	This is the proxy for financial development. It is measured by the share (%) of domestic credit to private sector by banks in GDP.	WDI
INST	This is the variable capturing the institutional and governance quality. It has been computed by extracting the first principal component (based on factor analysis) of the following six indicators of governance. These indicators are respectively: political stability and absence of violence/terrorism; regulatory quality; rule of law; government effectiveness; voice and accountability, and corruption. 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: List of the 60 countries used in the full sample, of which the 38 LDCs and 22 countries in the control group_ For the analysis concerning the volatility of exports

Group treated (LDCs)		Control Group (PRGT-Eligible Low-Income Countries that are not LDCs)
Afghanistan	Myanmar	Cabo Verde
Angola	Nepal	Cameroon
Bangladesh	Niger	Congo, Rep.
Benin	Rwanda	Cote d'Ivoire
Bhutan	Sao Tome and Principe	Dominica
Burkina Faso	Senegal	Ghana
Burundi	Sierra Leone	Grenada
Cambodia	Solomon Islands	Honduras
Comoros	Sudan	Kenya
Congo, Dem. Rep.	Tanzania	Kyrgyz Republic
Gambia	Timor-Leste	Maldives
Guinea	Togo	Micronesia, Fed. Sts.
Guinea-Bissau	Uganda	Moldova
Haiti	Vanuatu	Nicaragua
Lao PDR	Yemen, Rep.	Papua New Guinea
Lesotho	Zambia	Samoa
Liberia		St. Lucia
Madagascar		St. Vincent and the Grenadines
Malawi		Tajikistan
Mali		Tonga
Mauritania		Uzbekistan
Mozambique		Zimbabwe

Note: The list of PRGT-Eligible Low-Income Countries has been extracted from IMF (2021: p34).

Appendix 3a: Descriptive statistics on variables used in the analysis over the full sample

Variable	Observations	Mean	Standard deviation	Minimum	Maximum
Log(CSEGDPVOL)	578	-1.966	1.140	-6.802	1.963
Log(CSEVALVOL)	578	-1.821	1.083	-7.067	2.146
Log(MSEGDPVOL)	572	-1.432	1.160	-5.491	2.130
Log(TSEGDPVOL)	570	-1.913	1.115	-6.206	2.229
Log(MSEVALVOL)	572	-1.491	1.575	-13.190	2.224
Log(TSEVALVOL)	572	-1.591	2.728	-6.694	33.081
Log(ODA)	578	19.776	1.413	15.606	22.612
Log(GDPC)	578	7.219	0.817	5.338	9.143
INST	578	-1.350	1.420	-4.501	2.198
FINDEV	565	27.150	20.192	3.230	114.194

Appendix 3b: Descriptive statistics on variables used in the analysis over the treatment Group, i.e., LDCs

Variable	Observations	Mean	Standard deviation	Minimum	Maximum
Log(CSEGDPVOL)	367	-1.812	1.081	-6.802	1.963
Log(CSEVALVOL)	367	-1.676	1.001	-5.773	2.146
Log(MSEGDPVOL)	362	-1.322	1.138	-4.042	1.968
Log(TSEGDPVOL)	360	-1.791	1.070	-6.206	2.229
Log(MSEVALVOL)	362	-1.350	1.370	-9.454	2.096
Log(TSEVALVOL)	362	-1.355	3.300	-4.346	33.081
Log(ODA)	367	20.161	1.145	16.885	22.612
Log(GDPC)	367	6.829	0.586	5.338	8.254
INST	367	-1.751	1.146	-4.501	1.490
FINDEV	355	21.942	17.489	3.230	114.194

Appendix 3c: Descriptive statistics on variables used in the analysis over the control Group

Variable	Observations	Mean	Standard deviation	Minimum	Maximum
Log(CSEGDPVOL)	211	-2.234	1.191	-5.371	0.564
Log(CSEVALVOL)	211	-2.074	1.174	-7.067	0.712
Log(MSEGDPVOL)	210	-1.621	1.176	-5.491	2.130
Log(TSEGDPVOL)	210	-2.124	1.160	-5.302	0.698
Log(MSEVALVOL)	210	-1.734	1.854	-13.190	2.224
Log(TSEVALVOL)	210	-1.997	1.123	-6.694	0.821
Log(ODA)	211	19.107	1.578	15.606	21.883
Log(GDPC)	211	7.897	0.714	6.619	9.143
INST	211	-0.651	1.576	-3.463	2.198
FINDEV	210	35.954	21.406	5.980	92.443