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**Working Paper**

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*Suggested Citation:* Gnangnon, Sèna Kimm (2021) : Effect of Multilateral Trade Liberalization on Services Export Diversification, ZBW - Leibniz Information Centre for Economics, Kiel, Hamburg

This Version is available at:

<https://hdl.handle.net/10419/229152>

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# Effect of Multilateral Trade Liberalization on Services Export Diversification

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**Manuscript date:** February 2021

## Abstract

The present study is an extension of the work on the effect of multilateral trade liberalization (MTL) on export product diversification undertaken by Gnanon (2019b). The analysis focuses on the effect of MTL on services export diversification. The analysis has revealed that MTL is associated with greater services export diversification in both developed and developing countries alike. This is particularly the case in countries with a high reliance on manufactured goods exports or those that enjoy greater export product diversification. Interestingly, MTL enhances services export diversification in countries that experience higher foreign direct investment inflows. Overall, through its positive effect on both export product diversification and services export diversification, greater cooperation among World Trade Organization (WTO) Members on trade matters could help revive economic growth, particularly in the current COVID-19 pandemic that has significantly plummeted it.

**Keywords:** Multilateral trade liberalization; Services export diversification; Export product diversification; Foreign direct investment inflows.

**JEL Classification:** O14; F13; F14.

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# 1. Introduction

Multilateral trade liberalization, which reflects greater cooperation among countries in the world on trade matters, has experienced a setback<sup>2</sup> in recent years. Several papers<sup>3</sup> have underlined the potential positive macroeconomic effects of multilateral trade liberalization. In many of these papers, multilateral trade liberalization has been defined as "*all trade-related decisions - including those adopted at the multilateral level under the ambit of the WTO - that ultimately contribute to the reduction of tariffs and non-tariffs barriers to trade by all countries, or at least by the overwhelming majority of countries*". Among studies that have focused on the international trade effects of multilateral trade liberalization, Gnanon (2019b) is the one that has investigated the effect of multilateral trade liberalization on export product diversification. Using a set of both developed and developing countries, the author has found that multilateral trade liberalization promotes export product diversification, and exerts a higher positive effect in less-developed economies than in relatively advanced economies. At the same time, less attention has been paid to the effect of multilateral trade liberalization on services export diversification. The present paper aims to complement the study by Gnanon (2019b) by examining the effect of multilateral trade liberalization on services export diversification. To carry out the analysis, the paper builds on recent studies on the macroeconomic determinants of services export diversification<sup>4</sup> (e.g., Gnanon, 2020c to 2020f) as well as on the paper by Gnanon (2019b) concerning the effects of multilateral trade liberalization on export product diversification. The reliance of the present study on services export diversification is dictated by the crucial and increasing role played by services production, and services exports in the development process (e.g., Fiorini, and Hoekman, 2018; François and Hoekman, 2010; Hoekman, 2017; Hoekman and Shepherd, 2017; Mishra et al. 2011; Roy, 2019; WTO, 2019).

From a theoretical perspective, multilateral trade liberalization could affect services export diversification primarily through its effect on export product diversification. On the one hand, and as noted above, Gnanon (2019b) has used a panel of both developed and developing countries, to obtain empirically that multilateral trade liberalization promotes export product diversification, particularly in less developed countries compared to relatively advanced countries. This effect can take place through several theoretical channels. These include the rise in the world demand for domestic products due to the decline in tariffs and non-tariff barriers induced by greater

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<sup>2</sup> See for example the recent book entitled 'Revitalising Multilateralism: Pragmatic ideas for the new WTO Director General', Centre for Economic Policy Research, edited by Simon J. Evenett and Richard E. Baldwin, 2020. See online at: <https://voxeu.org/content/revitalising-multilateralism-pragmatic-ideas-new-wto-director-general>

<sup>3</sup> Collie, 2011; Egger et al. (2004); Gnanon (2017a,b,c; 2018a,b; 2019a,b,c,d; 2020a,b); Gnanon and Bunn, (2018); Hertel et al. (2004); Hoekman, 2020; Stibora and de Vaal (2012); Ratnaike (2012).

<sup>4</sup> It is worth noting that a study by Anand et al. (2012), although not focused specifically on exports, has considered the determinants and impact of goods and services sophistication.

multilateral trade liberalization; the reducing effect of multilateral trade liberalization on tariffs peaks and tariff escalations, which hinder export product diversification in developing countries; the incentives provided by greater multilateral trade liberalization to governments to create a conducive business environment for domestic traders; the potential positive public revenue effect of multilateral trade liberalization (e.g., Gnanon, 2017d); and the potential effect of multilateral trade liberalization on attracting FDI inflows (e.g., Collie, 2011; Gnanon, 2017b).

On the other hand, Eichengreen and Gupta (2013) has developed the "network hypothesis" to explain why a rise in goods exports (including manufacturing exports) could be associated with a higher demand for services exports. This is because by expanding their goods exports, countries establish a network in the international markets that can be used to enhance services exports. Eichengreen and Gupta (2013) have provided empirical support for this hypothesis, i.e., higher goods exports are associated with greater services exports. Similar findings have been obtained by Sahoo and Dash (2014). Furthermore, Gnanon and Priyadarshi (2016) have built on this theoretical hypothesis to demonstrate empirically that export product diversification has influenced positively commercial services exports in Least developed countries (LDCs). Building on the same hypothesis, Gnanon (2020c) has found empirically that manufactured exports are associated with greater services export diversification, and Gnanon (2020e) has uncovered empirically that export product diversification is positively associated with greater services export diversification.

Overall, as multilateral trade liberalization influences positively export product diversification, and as greater export product diversification induces greater services export diversification, we can expect that greater multilateral trade liberalization would likely result in a higher degree of services export diversification.

The empirical exercise has used an unbalanced panel dataset of 133 countries (both developed and developing countries) over the period 1995-2014, and the two-step system Generalized Methods of Moments (GMM) approach. Findings show that greater multilateral trade liberalization promotes services export diversification, including in countries that experience a rise in the share of manufactured exports in total goods exports, and greater export product diversification. In addition, multilateral trade liberalization promotes services export diversification in countries that enjoy higher FDI inflows.

The rest of the paper is organized around three sections. Section 2 presents data on the key variables of interest in the analysis. Section 3 lays down the model specification that is used to perform the empirical analysis, and briefly explains the econometric approach used to estimate the

model and its different variants. Section 4 discusses empirical results. Section 5 deepens the analysis, and Section 6 concludes.

## 2. Data description

This section provides a brief analysis of data concerning the key variables of interest in the analysis, including the variables capturing services export concentration and multilateral trade policy.

The dependent variable used in the analysis is the indicator of services export concentration, denoted "SEC". Following Gngangnon (2020c to 2020f), this variable has been measured using the Herfindahl index of export concentration, denoted "HHI", and the Theil index of services export concentration, denoted "THEIL". The index "HHI" is our main measure of services export concentration, while the indicator "THEIL" is used for robustness check analysis. Appendix 1 provides further details on the computation of these two indicators of services export concentration. Values of each of the two indicators range between 0 and 100, and values closed to 100 indicate greater services export concentration, and values closed to 0 reflect lower level of services export concentration, that is, a greater degree of services export diversification. Data used to compute these indicators of services export concentration are extracted from the database on commercial services exports released by the International Monetary Fund (IMF) (Loungani et al. 2017). This database provides data on commercial services exports concerning 11 major sectors of services (categories of services), including disaggregated data on services exports at the 2-digit level.

The key regressor of interest is the indicator of multilateral trade policy (denoted "MTP"). Following previous studies (e.g., Gngangnon, 2017a,b,c; 2018a,b; 2019a,b,c,d,e,f; 2020a,b; Ratnaike, 2012), the indicator "MTP" has been calculated using a measure of domestic trade policy. This is here the trade freedom score<sup>5</sup> (denoted "DTP") computed by the Heritage Foundation, as the absence of tariff and non-tariff barriers that affect imports and exports of goods and services (see Miller et al. 2019). Thus, for a given country, "MTP" is measured as the average domestic trade policy of the rest of the world, i.e., the average trade freedom score of the rest of the world (excluding the concerned country).

As shown in Appendix 2, values of "HHI" and "THEIL" range between 0 and 100: the average values of "HHI" and "THEIL" are respectively 49.4 and 63.4, while their standard deviation are similar and amount respectively to 29.2 and 24.8. On the other hand, the values of

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<sup>5</sup> Appendix 1 provides a further description on the domestic trade policy "DTP".

"MTP" range between 60.3 and 74.9, with the average and standard deviation amounting respectively to 68.1 and 5.34.

### 3. Empirical strategy

Following the recent works on the macroeconomic determinants of services export diversification (e.g., Gngangnon, 2020c to 2020f), we postulate a baseline model specification, which includes the variable measuring multilateral trade liberalization, and denoted "MTP" as the key variable of interest, along with a number of control variables<sup>6</sup>. The latter include domestic trade policy, denoted "DTP"; the real per capita income, denoted "GDPC", which is a proxy for countries' level of development; the Internet penetration rate, denoted "INTERNET" and measured by the share (in percentage) of individuals using the Internet in the total population; a measure of financial development, denoted "FINDEV"; a proxy for the education level, denoted "EDU"; the size of FDI inflows, denoted "FDI", and measured by the real per capita Foreign Direct Investment (FDI) inflows (constant 2010 US\$ prices); the institutional and governance quality, denoted "INST", and finally the population size, denoted "POP".

The baseline model specification is as follows:

$$SEC_{it} = \alpha_0 + \alpha_1 SEC_{it-1} + \alpha_2 MTP_{it} + \alpha_3 DTP_{it} + \alpha_4 GDPC_{it} + \alpha_5 INTERNET_{it} + \alpha_6 FINDEV_{it} + \alpha_7 EDU_{it} + \alpha_8 FDI_{it} + \alpha_9 INST_{it} + \alpha_{10} POP_{it} + \mu_i + \lambda_t + \omega_{it} \quad (1)$$

The subscripts  $i$  and  $t$  refer respectively to a country, and the time-period. The panel dataset, chosen on the basis of data availability, contains 133 countries (including both developed and developing countries) over the period 1995-2014. Following the standard practice in the macroeconomic empirical literature, and particularly recent studies highlighted above on the determinants of services export diversification, we have used non-overlapping sub-periods data of 3-year average. There are six sub-periods that are 1995-1997, 1998-2000, 2001-2003, 2004-2006, 2007-2010, and 2011-2014<sup>7</sup>. All variables employed in the analysis are described in Appendix 1, and their respective descriptive statistics are provided in Appendix 2. Appendix 3 contains the list of the 133 countries contained in the full sample.  $\alpha_0$  to  $\alpha_{10}$  are coefficients that will be estimated empirically.  $\mu_i$  are countries' fixed effects;  $\varepsilon_{it}$  is a well-behaving error-term.  $\lambda_t$  are time dummies,

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<sup>6</sup> We do not intend to rehearse here the discussion on theoretical effects of control variables on services export diversification, as such a discussion has been well elaborated in Gngangnon (2020c to 2020f).

<sup>7</sup> It is worth noting that the two last sub-periods cover 4 years.

and capture global shocks that affected simultaneously all countries' services export diversification path.

Following Gnanon (2019b, 2020g) as well as Gnanon (2020d), we have standardized all variables contained in the baseline model (1). This involves computing for each variable, the ratio of the difference between the variable and its mean (average) to the standard deviation of the variable. This procedure helps to eliminate measurement problems across different variables in the model, and mainly allows comparing and ranking the estimates, so as to permit us to identify the level of contribution of multilateral trade liberalization (which is our key variable of interest) to the dynamics of services export diversification compared to that of other regressors in the model.

Once again, we draw from Gnanon (2020c to 2020f) to estimate model (1) as well as its different variants described below, by means of the two-step system Generalized Methods of Moments (GMM) estimator developed by Arellano and Bover (1995) and Blundell and Bond (1998). This technique is particularly convenient for dynamic panel datasets with a small-time dimension and a large cross-section. It allows addressing endogeneity concerns, including bi-directional causality between some regressors (notably control variables) and the indicator of services export concentration, the endogeneity problem induced by the correlation between the one-period lag dependent variable and unobserved countries' time invariant specific effects, as well as the endogeneity arising from eventual measurement errors. In the analysis, regressors "INTERNET", "FINDEV", "GDPC", "FDI", "EDU", "DTP", "INST" have been considered as endogenous (due to the reverse causality from the dependent variable to each of these regressors), while the variables "MTP" and "POP" are considered as exogenous. The two-step system GMM estimator performs better than the first-difference estimator proposed by Arellano and Bond (1991) as the latter produces weak instruments (e.g., Bond, 2002; Roodman, 2009). Relying on the two-step system GMM estimator involves estimating a system of equations that includes an equation in differences and an equation in levels, where lagged first differences are used as instruments for the levels equation, and lagged levels are used as instruments for the first-difference equation.

Three tests are used to evaluate the consistency of the estimator. These include the Arellano-Bond test of the presence of first-order serial correlation in the error term (denoted AR(1)), the test of the absence of second-order autocorrelation in the error term (denoted AR(2)); and the Sargan/Hansen test of over-identifying restrictions (OID), which helps to test the joint validity of the instruments used in the regressions. Furthermore, these tests can become powerless if the number of instruments exceeds the number of countries (e.g., Roodman, 2009). To meet these requirements of the two-step system GMM technique, the regressions have used a maximum of 3

lags of the dependent variable as instruments, and a maximum of 3 lags of endogenous variables as instruments.

In the empirical exercise, we start by estimating the baseline model (1) using the "HHI" indicator, which is our primary measure of services export concentration. Results of this estimation are presented in column [1] of Table 1.

Column [2] of Table 1 reports the estimates that allow investigating how multilateral trade liberalization affects services export diversification in High Income Countries ("HICs") versus "NonHICs" (also referred to as "developing countries") as well as in Least developed countries (LDCs). The sub-sample of "HICs" is extracted from the World Bank's classification of countries, while the sub-sample of LDCs refers to poorest and most vulnerable countries<sup>8</sup> (to environmental shocks as well as external shocks) in the world. To obtain the outcomes reported in column [2] of Table 1, we estimate a variant of model (1) (with "HHI" as the measure of "SEC") in which we include the dummy variables "HIC" and "LDC" as well as their interaction with the variable "MTP". "HIC" and "LDC" are respectively dummies capturing High Income Countries, and Least developed countries.

Column [1] of Table 2 contains outcomes arising from the estimation of another variant of model (1), which is the baseline model (1) (still with "HHI" as the measure of "SEC") in which we introduce an index of export product concentration and an interaction variable between the index of export product concentration and the index of multilateral trade policy. For the purpose of the analysis, we have used the Theil index of export product concentration developed by the IMF as our indicator of export product concentration. This index is denoted "EPC" (see Appendix 1 for further details on the computation of this index). Outcomes in column [1] of Table 2 help to test the 'network hypothesis', which applied in the context of the present study, allows us to investigate whether the effect of multilateral trade liberalization on services export diversification translates through the channel of export product diversification. In other words, by interacting "MTP" with "EPC", we seek to examine the extent to which the effect of multilateral trade liberalization on services export concentration depends on the degree of export product concentration. The variable "EPC" has been treated as endogenous in the regression.

We deepen the understanding of outcomes reported in column [1] of Table 2 (i.e., that test the "network hypothesis") by further investigating whether the effect of multilateral trade liberalization on services export diversification depends on countries' reliance on manufacturing exports. To that effect, we estimate a third variant of model (1) (still with "HHI" as the measure

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<sup>8</sup> The group of LDCs is designed by the United Nations. For further information on this group of countries, please see online at: <https://www.un.org/ohrrls/content/least-developed-countries>



of "SEC"), which is the baseline model (1) in which we include a variable measuring the share (in percentage) of total manufacturing exports in total merchandise exports (denoted "SHMAN"), along with the interaction between this variable and the index of multilateral trade policy. The outcomes of the estimation of this variant of model (1) are presented in column [2] of Table 2. The variable "SHMAN" has been treated as endogenous in the regression.

For robustness check analysis, the second and third variants of model (1) are re-estimated using the variable "THEIL" as the indicator of services export concentration. Results of these estimations are provided in columns [1] and [2] of Table 3.

#### **4. Empirical results**

The two columns of Table 1 show a positive and significant coefficient (at the 1% level) of the one-period lag of the dependent variable. These findings show that services export concentration (diversification) in period  $t-1$  is positively associated with services export concentration (diversification) in period  $t$ . On the other hand, in all columns of Table 1, the requirements of the two-step system GMM are all met: the Sargan test shows  $p$ -values higher than 10% (the 10% level of statistical significance), which validates the instruments used in the regressions; the AR(1) test indicates  $p$ -values are always lower than 10%; and the  $p$ -values arising from the AR (2) test exceed 10%. Furthermore, as expected, the number of instruments is always lower than the number of countries. Overall, we can safely interpret the outcomes reported in Table 1. We note from column [1] of this Table that the coefficient of the multilateral trade policy variable is negative and significant at the 1% level. This shows that over the full sample, a higher level of multilateral trade liberalization leads to a greater services export diversification. In terms of magnitude, the outcomes suggest that an increase in the index of multilateral trade policy (i.e., "MTP") by 1-point is associated with a decrease in the index of services export concentration (i.e., "HHI") by 0.277-point. At the 5% level, domestic trade policy liberalization, a greater internet penetration, higher FDI inflows, and a rise in the population size tend to be associated with a greater services export concentration. This can signify that these factors lead countries to rely on services activities in which they have a comparative advantage. On the other hand, a rise in the real per capita income induces a higher level of services export diversification (as the coefficient of the variable "GDPC" is negative and significant at the 5% level). In other words, as countries develop, they tend to expand the range of services export items. Finally, financial development, the education level and the institutional and governance quality do not appear to influence here services export diversification. Interestingly, when we compare the estimate associated with the

index of multilateral trade policy with the estimates of other regressors in column [1] of Table 1, we observe that multilateral trade liberalization exerts the highest effect (in absolute value) on services export diversification, i.e., it is the most important contributor to countries' dynamics of services export diversification path. The other regressors that influence services export diversification (in the descending order in terms of the magnitude of their effects) are the internet penetration rate, the population size, domestic trade policy, the real per capita income, and the size of FDI inflows in constant values.

*[Insert Table 1, here]*

Results in column [2] of Table 1 show a negative and significant coefficient (at the 1% level) of the index of multilateral trade policy. At the same time, the interaction variables "MTP\*LDC" and "MTP\*HIC" hold coefficients that are not significant at the 10% level. Therefore, we conclude that multilateral trade liberalization tends to exert an effect of the same magnitude (i.e., +0.306) on services export diversification in HICs, developing countries, and LDCs. However, as shown by results in columns [1] and [2] of Table 2, the effect of multilateral trade liberalization on services export concentration (diversification) depends on countries' degree of export product concentration (diversification), including their reliance on manufactured exports (in total goods exports).

*[Insert Table 2, here]*

Taking up results in column [1] of Table 2, we observe that the interaction variable between multilateral trade policy and export product concentration holds a positive and significant coefficient at the 1% level, while the coefficient of the multilateral trade policy index is negative and significant at the 1% level. Therefore, we conclude that multilateral trade liberalization influences positively services export concentration when the degree of export product concentration exceeds a certain threshold. The standardized value of this threshold of the index of export product concentration is given by 1.107 ( $= 0.237/0.214$ ), and the equivalent unstandardized value of "EPC" amounts to 4.36 [ $= 3.123 + 1.107*1.118$ ]<sup>9</sup>. To recall, values of "EPC" range between 1.09 and 6.18 (see Appendix 2), and this interval genuinely contains the threshold of 4.36. As a result, for export product concentration higher than 4.36, multilateral trade liberalization influences positively services export concentration in countries that experience a higher level of export product concentration. Moreover, the higher the level of export product concentration, the greater is the magnitude of the positive effect of multilateral trade liberalization on services export concentration. In other words, for "EPC" values higher than 4.36, multilateral

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<sup>9</sup> Note that 3.123 and 1.118 represent respectively the average value of "EPC" and the value of the standard deviation of "EPC" (see Appendix 2).

trade liberalization promotes services export diversification in countries that experience a rising level of export product diversification: the greater the latter, the higher is the magnitude of the positive effect of multilateral trade liberalization on services export diversification. In contrast, for values of "EPC" lower than 4.36, multilateral trade liberalization is associated with greater services export diversification, and the lower the level of "EPC" (i.e., the greater the degree of export product diversification), the higher is the magnitude of the positive effect of multilateral trade liberalization on services export diversification.

Estimates shown in column [2] of Table 2 indicate negative and significant coefficients at the 1% level for both "MTP" variable and the interaction variable ["MTP\*SHMAN"]. Therefore, we conclude that the effect multilateral trade liberalization on services export diversification genuinely depends on countries' shares of manufactured exports in total goods exports: this effect is always negative (regardless of the share of manufactured exports in total goods exports), but its magnitude (in absolute value) consistently increases as the share of manufactured exports in total goods exports rises. Put it differently, multilateral trade liberalization promotes services export diversification in countries that enjoy a higher share of manufactured exports in total export products.

Taking together, findings in columns [1] and [2] of Table 2 suggest that by relying heavily on the export of primary commodities, developing countries and particularly the LDCs among them would likely experience a greater services export concentration (i.e., the export of few services items). This is because these countries experience a high level of export product concentration on primary commodities, and a low share of manufactured exports in total goods exports. These findings are confirmed by the outcomes reported in columns [3] and [4] of Table 2 when we use the indicator "THEIL" rather than "HHI" as the measure of services export concentration. In fact, we note from column [3] of Table 2 that the coefficient of the interaction variable ["MTP\*EPC"] is positive and significant at the 1% level, and the variable "MTP" exhibits a coefficient that is not significant at the 10% level. These findings reveal that multilateral trade liberalization consistently induces greater services export concentration in countries that experience a rising degree of export product concentration. Likewise, outcomes reported in column [4] of Table 2 show that the coefficient of "MTP" is significant only at the 10%, while the coefficient of the interaction variable ["MTP\*SHMAN"] is negative and significant at the 1% level. Therefore, we conclude that at least the 5% level, multilateral trade liberalization consistently promotes services export diversification regardless of the countries' share of manufactured exports in total goods exports, and the magnitude of this positive effect increases with this share.

Finally, it is worth noting that results of control variables across all columns of Table 2 are consistent with those in column [1] of Table 1.

## 5. Further analysis

The literature has underlined that FDI inflows play an essential role in the development of trade in services, and particularly services exports, through several avenues<sup>10</sup>: employment creation, capital accumulation, transfer of technology, greater competition, better access to new and large foreign markets, provision of training for the local workforce and upgrading technical and management skills. At the same time, results presented in the previous section have shown that FDI inflows are associated with a greater services export concentration, that is, FDI inflows tend to induce export of relatively few services items. In the context of the present analysis, one could question whether multilateral trade policy helps explain why higher FDI inflows result in greater services export concentration, i.e., whether the effect of multilateral trade liberalization on services export diversification depends on the size of FDI inflows to countries. This question is particularly relevant because two-thirds of international trade in services occur via Mode 3 of services or commercial presence, notably FDI inflows (e.g., Maurer and Magdeleine, 2008; UNCTAD, 2016). Additionally, in a recent study, Gnangnon (2017b) has demonstrated empirically that multilateral trade liberalisation promotes FDI inflows in host countries, and this positive effect is particularly higher in countries that liberalize their domestic trade policy regimes than in those that adopt restrictive trade policy measures. In light of the foregoing, we expect theoretically that multilateral trade liberalization can result in the expansion of the range of services export activities (i.e., greater services export diversification), in particular if it provides foreign firms with opportunities to invest in host countries on a wide range of services export items.

To test empirically this hypothesis, we estimate another specification of model (1) by including in the baseline model (1), the interaction between the variables "MTP" and "FDI". This specification of model (1) is estimated using alternatively "HHI" and "THEIL" as measures of services export concentration. Results of the estimations are provided in columns [1] and [2] of Table 3, respectively for "HHI" and "THEIL" as the dependent variable.

***[Insert Table 3, here]***

We first note from these two columns of Table 3 that the one-period lag of the dependent variable is positive and significant at the 1% level, and all requirements of the two-step system

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<sup>10</sup> See for example, Golub (2009); Grünfeld and Moxnes (2003); Hung and Viana (1995); Li et al. (2003); Li et al. (2004); Pain and van Welsum (2004); Sandra and Pelin (2012) and Wong et al. (2009).

GMM technique described above, are met. We can therefore move on to the interpretation of estimates displayed in Table 3.

Results in column [1] of Table 3 suggest that the coefficients of "MTP" and the interaction variable ["MTP\*FDI"] are both negative, but the former is significant at the 5% level, while the latter is significant at the 1% level. Based on these two outcomes, we conclude that multilateral trade liberalization always induces greater services export diversification regardless of the size of FDI inflows. Interestingly, the magnitude of this positive effect of multilateral trade liberalization on services export diversification increases as the size of FDI inflows (in real values) rises. This signifies that while FDI inflows (take in isolation) are associated with greater services export concentration, they do induce a higher degree of services export diversification in the context of a greater multilateral trade liberalization. These findings are confirmed by outcomes reported in column [2] of Table 3. These outcomes indicate that the interaction term of the interaction variable ["MTP\*FDI"] is negative and significant at the 1% level, while the coefficient of "MTP" is not significant at the 10% level. Thus, we conclude that multilateral trade liberalization consistently induce a greater degree of services export diversification in countries that enjoy higher FDI inflows, and the higher the size of FDI inflows (in real values), the greater is the magnitude of the positive effect of multilateral trade liberalization on services export diversification.

Finally, results relating to control variables in columns [1] and [2] of Table 3 align with those in the other columns of Table 1.

## 6. Conclusion

This paper has examined the effect of multilateral trade liberalization on services export diversification. It has shown that multilateral trade liberalization induces greater services export diversification in both developed countries and developing countries (including LDCs) alike. Additionally, and interestingly, its positive effect on services export diversification takes place through greater share of manufactured exports in total goods exports and greater export product diversification. Furthermore, multilateral trade liberalization enhances services export diversification in countries that attract FDI flows.

These findings show that domestic trade protectionist measures are likely to undermine progress in multilateral trade negotiations. This would limit the ability of countries, notably developing countries and LDCs (that depend on exports of low value-added products) to expand their range of export products towards manufactured exports. In turn, greater export product diversification towards manufactured exports could help establish a large network in the

international market that could be used to enlarge the basket of services export items. Greater cooperation among WTO Members on trade matters is needed more than ever in the current COVID-19 pandemic times where the economic growth has plummeted in many countries in the world, and the achievement of the sustainable development goals set by the United Nations is being compromised. Greater multilateral trade liberalization could help revive economic growth and bring back developed and developing economies on a sustainable development path by: providing incentives to governments to adopt and implement measures in favour of promoting trade, including export of goods and services, and encouraging domestic trading firms to invest in activities aiming at expanding the range of services items they export. Multilateral trade liberalization can further encourage the expansion of services export items through incentivizing foreign firms to undertake foreign direct investment activities particularly in services sectors of host countries.

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# Tables and Appendices

**Table 1:** Effect of multilateral trade liberalization on services export concentration

*Estimator:* Two-Step System GMM

Variables	HHI (1)	HHI (2)
One-period Lag of the Dependent variable	0.521*** (0.0232)	0.518*** (0.0232)
MTP	-0.277*** (0.0896)	-0.306*** (0.105)
MTP*LDC		0.153 (0.128)
MTP*HIC		0.0998 (0.0948)
LDC		0.302** (0.130)
HIC		-0.0561 (0.0802)
DTP	0.177** (0.0828)	0.0998 (0.0808)
GDPC	-0.156** (0.0691)	-0.136* (0.0719)
INTERNET	0.188** (0.0752)	0.154** (0.0767)
FINDEV	-0.00185 (0.0552)	5.28e-05 (0.0579)
EDU	-0.0532 (0.0709)	0.00674 (0.0670)
FDI	0.0700** (0.0308)	0.0439 (0.0355)
INST	0.0243 (0.0446)	0.0321 (0.0420)
POP	0.171*** (0.0511)	0.136** (0.0544)
Constant	-0.0953*** (0.0233)	-0.102** (0.0518)
Observations - Countries	486 - 133	486 - 133
Number of Instruments	93	95
AR1 (P-Value)	0.0001	0.0000
AR2 (P-Value)	0.4769	0.5429
OID (P-Value)	0.4403	0.4673

*Note:* \*p-value<0.1; \*\*p-value<0.05; \*\*\*p-value<0.01. Robust standard errors are in parenthesis. In the two-step system GMM estimations, the variables "INTERNET", "FINDEV", "GDPC", "FDI", "EDU", "DTP", "INST" and the interaction variables have been treated as endogenous. The variable "MTP" and "POP" have been considered as exogenous. All variables have been standardized.

**Table 2:** Effect of multilateral trade liberalization on services export concentration  
*Estimator:* Two-Step System GMM

Variables	HHI (1)	HHI (2)	THEIL (3)	THEIL (4)
One-period Lag of the Dependent variable	0.555*** (0.0218)	0.547*** (0.0210)	0.551*** (0.0187)	0.535*** (0.0201)
MTP	-0.237*** (0.0842)	-0.216*** (0.0700)	-0.0699 (0.0729)	-0.116* (0.0696)
MTP*EPC	0.214*** (0.0379)		0.161*** (0.0360)	
MTP*SHMAN		-0.207*** (0.0420)		-0.109*** (0.0389)
EPC	-0.228*** (0.0427)		-0.0524 (0.0344)	
SHMAN		0.195*** (0.0539)		0.0911* (0.0506)
DTP	0.241*** (0.0557)	0.207*** (0.0574)	-0.0327 (0.0608)	-0.0298 (0.0523)
GDPC	-0.00253 (0.0598)	-0.0980* (0.0556)	0.0110 (0.0712)	0.0175 (0.0601)
INTERNET	0.0587 (0.0637)	0.122* (0.0649)	0.161*** (0.0521)	0.271*** (0.0492)
FINDEV	-0.0972** (0.0414)	-0.0308 (0.0480)	-0.252*** (0.0377)	-0.217*** (0.0353)
EDU	0.0697 (0.0554)	-0.109* (0.0600)	0.0880 (0.0704)	-0.0300 (0.0682)
FDI	0.0107 (0.0284)	0.0499* (0.0273)	0.105*** (0.0249)	0.0463* (0.0254)
INST	0.0226 (0.0357)	0.0470 (0.0318)	0.0566 (0.0371)	0.0596** (0.0291)
POP	0.111** (0.0460)	0.186*** (0.0502)	0.0805* (0.0433)	0.128*** (0.0412)
Constant	-0.0977*** (0.0237)	-0.125*** (0.0215)	0.145*** (0.0160)	0.138*** (0.0192)
Observations - Countries	485 - 132	485 - 133	485 - 132	485 - 133
Number of Instruments	105	105	105	105
AR1 (P-Value)	0.0000	0.0001	0.0001	0.0001
AR2 (P-Value)	0.8281	0.5672	0.8973	0.6439
OID (P-Value)	0.5410	0.5705	0.5196	0.7273

Note: \*p-value<0.1; \*\*p-value<0.05; \*\*\*p-value<0.01. Robust standard errors are in parenthesis. In the two-step system GMM estimations, the variables "EPC", "SHMAN", "INTERNET", "FINDEV", "GDPC", "FDI", "EDU", "DTP", "INST" and the interaction variables have been treated as endogenous. The variable "MTP" and "POP" have been considered as exogenous. All variables have been standardized.

**Table 3:** Effect of multilateral trade liberalization on services export concentration  
*Estimator:* Two-Step System GMM

Variables	HHI	THEIL
	(1)	(2)
One-period Lag of the Dependent variable	0.524***	0.533***
	(0.0234)	(0.0201)
MTP	-0.217**	-0.00967
	(0.0890)	(0.0956)
MTP*FDI	-0.124***	-0.149***
	(0.0452)	(0.0330)
FDI	0.132***	0.108***
	(0.0440)	(0.0353)
DTP	0.167**	-0.0835
	(0.0836)	(0.0804)
GDPC	-0.186***	-0.0452
	(0.0667)	(0.0758)
INTERNET	0.197***	0.308***
	(0.0730)	(0.0660)
FINDEV	-0.0105	-0.183***
	(0.0536)	(0.0440)
EDU	-0.0549	-0.0721
	(0.0702)	(0.0761)
INST	0.0408	0.107**
	(0.0438)	(0.0425)
POP	0.157***	0.134***
	(0.0497)	(0.0497)
Constant	-0.0803***	0.203***
	(0.0246)	(0.0228)
Observations - Countries	486 - 133	486 - 133
Number of Instruments	94	94
AR1 (P-Value)	0.0001	0.0001
AR2 (P-Value)	0.3495	0.5595
OID (P-Value)	0.3936	0.6867

Note: \*p-value<0.1; \*\*p-value<0.05; \*\*\*p-value<0.01. Robust standard errors are in parenthesis. In the two-step system GMM estimations, the variables "EPC", "SHMAN", "INTERNET", "FINDEV", "GDPC", "FDI", "EDU", "DTP", "INST" and the interaction variables have been treated as endogenous. The variable "MTP" and "POP" have been considered as exogenous. All variables have been standardized.

## Appendix 1: Definition and Source of variables

Variables	Definition	Sources
HHI	<p>This is the Herfindahl index, also referred sometimes to as the Hirschman-Herfindahl index. It has been computed as follows: <math>HHI = \frac{\sum_k s_k^2 - 1/n}{1/n}</math> where <math>s_k = x_k / \sum_{k=1}^n x_k</math> represents the share of services export line k (with amount exported <math>x_k</math>) in total services exports: <math>x_k</math> stands for the amount of services exports associated with the services line "k"; n represents the total number of the services export lines (k) and <math>n = \sum_{k=1}^n k</math>. The calculated indicator has been normalized so that its values range between 0 and 100. Higher values of this index indicate greater services export concentration, while lower values show greater services export diversification.</p>	<p>Author's calculation based on data extracted from the database developed by the International Monetary Fund (IMF) on the international trade in services (see online at: <a href="https://data.imf.org/?sk=07109577-E65D-4CE1-BB21-0CB3098FC504">https://data.imf.org/?sk=07109577-E65D-4CE1-BB21-0CB3098FC504</a>) – See also Loungani et al. (2017). The data used to compute the HHI indicator are sectoral data on services exports at 2-digit level, which is the maximum digit-level of disaggregated data available on services exports. In particular, we have relied on 11 major sectors of services (categories of services) – at the 1-digit level - and used the disaggregated data on services exports for sub-sectors at the 2-digit level. These 11 major services sectors are as follows (the sub-sectors are in brackets):</p> <ol style="list-style-type: none"> <li><b>1. Charges for the use of intellectual property n.i.e.;</b></li> <li><b>2. Construction</b> (Construction abroad; Construction in reporting economy);</li> <li><b>3. Financial services</b> (Financial Explicitly charged and other financial services; Financial intermediation services indirectly measured -FISIM-);</li> <li><b>4. Insurance and pension services</b> (Auxiliary insurance services; Direct insurance; Pension and standardized guaranteed services; Reinsurance);</li> <li><b>5. Maintenance and repair services n.i.e.;</b></li> <li><b>6. Manufacturing services on physical inputs owned by others</b> (Goods for processing abroad; Goods for processing in reporting economy);</li> </ol>

		<p><b>7. Other Business Services</b> (Professional and management consulting services; Research and development services; Technical, trade-related, and other business services);</p> <p><b>8. Personal, cultural, and recreational services</b> (Audiovisual and related services; Other personal, cultural, and recreational services);</p> <p><b>9. Telecommunications, computer, and information services</b> (Computer services; Information services; Telecommunications services);</p> <p><b>10. Transport</b> (Air Transport; Other mode of Transport; Postal and courier services; Sea Transport);</p> <p><b>11. Travel</b> (Business; Personal).</p>
THEIL	<p>This variable represents the Theil index of services export concentration. It has been calculated using the following formula (for example see Agosin et al, 2012; Cadot et al., 2011): <math>THEIL = \frac{1}{n} \sum_{k=1}^n \frac{x_k}{\mu} \ln \left( \frac{x_k}{\mu} \right)</math>,  where <math>\mu = \frac{1}{n} \sum_{k=1}^n x_k</math></p> <p>n represents the total number of the (services) export lines (k) <math>n = \sum_{k=1}^n k</math>;  <math>x_k</math> stands for the amount of services exports associated with the services line "k".</p>	<p>Author's calculation based on the same data (extracted from the IMF database on the international trade in services) used to compute the HHI indicator.</p>
DTP	<p>This is the trade policy index, measured by the score of "Freedom to trade internationally". It represents a major component of the economic freedom index, and is calculated as a composite measure of the absence of tariff and non-tariff barriers that affect imports and exports of goods and services. Its computation is based on two components, namely the trade-weighted average tariff rate and non-tariff barriers (NTBs). The extent of NTBs is obtained using quantitative and qualitative available information. NTBs include quantity restrictions, price restrictions, regulatory restrictions, investment restrictions, customs restrictions, and direct government interventions. The score of this index ranges between 0 and 100, with a rise indicating lower trade barriers, i.e., higher trade liberalization, while a decrease reflects rising trade protectionism.</p>	<p>Heritage Foundation (see Miller et al. 2019)</p>

MTP	Average trade policy of the rest of the world. For a given country, this variable has been calculated as the average trade freedom score of the rest of the world.	Author's calculation based on the "DTP" variable whose data is extracted from the Heritage Foundation.
EPC	This is the index of overall export product concentration. It is calculated using the Theil Index, and following the definitions and methods used in Cadot et al. (2011). The overall Theil index of export product concentration is the sum of the extensive component (increase in the number of new export products or trading partners) and the intensive component (the shares of export volumes across active products or trading partners) of the "PCONC" variable. The computation of the index has been based on a classification of products into "Traditional", "New", or "Non-Traded" products categories. A rise in the values of "PCONC" index signifies an increase in the degree of overall export product concentration, while lower values of this index indicates greater export product diversification.	Details on the calculation of this Index could be found online in the International Monetary Fund's Diversification Toolkit – See data online at: <a href="https://data.imf.org/?sk=3567E911-4282-4427-98F9-2B8A6F83C3B6">https://data.imf.org/?sk=3567E911-4282-4427-98F9-2B8A6F83C3B6</a>
SHMAN	Share (%) of total manufacturing exports in total merchandise exports	Author's calculation based on data extracted from the Database of the United Nations Conference on Trade and Development (UNCTAD) - See online at: <a href="https://unctadstat.unctad.org/EN/">https://unctadstat.unctad.org/EN/</a>
FDI	This variable measures the real per capita Foreign Direct Investment (FDI) inflows (constant 2010 US\$ prices). This variable has been calculated by multiplying the FDI-to-GDP ratio by the real per capita income (constant 2010 US\$) (see for example Herzer (2011) and Nagel et al. (2015) who apply this method to compute real values of FDI inflows).	Author's calculation based on data on FDI inflows (% GDP) from the United Nations Conference on Trade and Development (UNCTAD) database, and data on real per capita income (constant 2010 US\$) from the WDI.
INTERNET	Share (%) of individuals using the Internet in the total population.	World Development Indicators (WDI)
GDP	This is the per capita Gross Domestic Product (constant 2010 US\$)	WDI
EDU	This is the average of the gross primary school enrollment (%), gross secondary school enrollment (%), and gross tertiary school enrollment (%).	Author's calculation based on data collected from the WDI.
FINDEV	This is the indicator of financial development. It is a composite index of four indicators of financial development, which are the liquid liabilities (% GDP); the private credit by deposit money banks and other financial institutions (% GDP); the bank deposits (% GDP); and the financial system deposit (% GDP). The "FINDEV" indicator has been computed by relying on the factor analysis approach, including the Principal Component Analysis that allows extracting a common factor from the above-mentioned four indicators of financial development. Higher values of "FINDEV" reflect a higher depth of financial development, and lower values indicate lower levels of financial development.	Author's calculation based on data on the four indicators from the World Bank's Financial Structure dataset developed by Beck et al. (2000; 2009) and Čihák et al. (2012) and updated in June 2017.
POP	This is the measure of the total Population	WDI



INST	<p>This is the variable measuring the institutional and governance quality in a given country. It has been computed by extracting the first principal components (based on factor analysis) of the following six indicators of institutional and governance quality. These indicators are political stability and absence of violence/terrorism; regulatory quality; rule of law; government effectiveness; voice and accountability; and corruption.</p> <p>Higher values of the synthetic index are associated with better governance and institutional quality, while lower values reflect worse governance and institutional quality.</p>	<p>Data on the components of the variable "INST" has been collected from World Bank Governance Indicators (WGI) developed by Kaufmann, Kraay and Mastruzzi (2010) and regularly updated.</p>
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## Appendix 2: Descriptive statistics on variables used in the model

Variable	Observations	Mean	Standard deviation	Minimum	Maximum
HHI	486	49.353	29.215	0.000	99.342
THEIL	486	63.411	24.839	0.000	100.000
MTP	486	68.100	5.349	60.289	74.856
DTP	486	70.100	12.551	18.933	90.000
EPC	485	3.123	1.118	1.090	6.175
SHMAN	485	15.047	13.354	0.194	77.466
INTERNET	486	22.716	25.078	0.000	94.873
EDU	486	211.284	54.764	46.927	333.873
FINDEV	486	55.655	35.006	0.000	100.000
GDPG	486	12326.200	18354.460	192.174	106862.700
FDI	486	103463.300	514494.700	-396434.700	7018371.000
INST	486	0.076	2.071	-4.219	4.819
POP	486	49,300,000	170,000,000	170989	1,350,000,000

## Appendix 3: List of countries contained in the Full Sample

Full sample			
Albania	Denmark	Lao P.D.R.	Poland
Algeria	Dominican Republic	Latvia	Portugal
Angola	Ecuador	Lebanon	Romania
Argentina	Egypt	Lesotho	Russia
Armenia	El Salvador	Liberia	Rwanda
Austria	Estonia	Lithuania	Saudi Arabia
Bahrain	Ethiopia	Luxembourg	Senegal
Bangladesh	Fiji	Macedonia, FYR	Serbia
Barbados	Finland	Madagascar	Slovak Republic
Belarus	France	Malawi	Slovenia
Belgium	Gabon	Malaysia	Spain
Belize	Gambia, The	Mali	Sri Lanka
Benin	Georgia	Malta	St. Lucia
Bhutan	Germany	Mauritius	Sudan
Botswana	Ghana	Mexico	Swaziland
Brazil	Greece	Moldova	Sweden
Bulgaria	Guatemala	Mongolia	Switzerland
Burkina Faso	Guinea	Morocco	São Tomé and Príncipe
Burundi	Guyana	Mozambique	Tajikistan
Cabo Verde	Honduras	Myanmar	Tanzania
Cambodia	Hungary	Namibia	Thailand
Cameroon	India	Nepal	Timor-Leste
Canada	Indonesia	Netherlands	Togo
Chile	Iran	Nicaragua	Tunisia
China	Ireland	Niger	Turkey
Colombia	Israel	Nigeria	Uganda
Comoros	Italy	Norway	Ukraine
Congo, Democratic Republic of the	Jamaica	Oman	United States
Congo, Republic of	Jordan	Pakistan	Uruguay
Costa Rica	Kazakhstan	Panama	Venezuela
Croatia	Kenya	Papua New Guinea	Yemen
Cyprus	Korea	Paraguay	
Czech Republic	Kuwait	Peru	
Côte d'Ivoire	Kyrgyz Republic	Philippines	

**Appendix 4:** List of countries contained in the sub-Samples

<b>HICs</b>		<b>LDCs</b>	
Austria	Kuwait	Angola	Nepal
Bahrain	Latvia	Bangladesh	Niger
Barbados	Lithuania	Benin	Rwanda
Belgium	Luxembourg	Bhutan	Senegal
Canada	Malta	Burkina Faso	Sudan
Chile	Netherlands	Burundi	São Tomé and Príncipe
Croatia	Norway	Cambodia	Tanzania
Cyprus	Oman	Comoros	Timor-Leste
Czech Republic	Poland	Congo, Democratic Republic of the	Togo
Denmark	Portugal	Ethiopia	Uganda
Estonia	Saudi Arabia	Gambia, The	Yemen
Finland	Slovak Republic	Guinea	
France	Slovenia	Lao P.D.R.	
Germany	Spain	Lesotho	
Greece	Sweden	Liberia	
Hungary	Switzerland	Madagascar	
Ireland	United States	Malawi	
Israel	Uruguay	Mali	
Italy		Mozambique	
Korea		Myanmar	