Multilateral Trade Liberalization and Economic Growth

Sèna Kimm Gnangnon
World Trade Organization, Geneva, Switzerland

Abstract

Over the last years, the world has experienced a backlash against trade. It could translate into a strong appeal to trade protectionism, lowering multilateral cooperation and delaying further trade liberalization at both domestic and international level. Against this background, this paper assesses the impact of multilateral trade liberalization on the economic growth rate by using an unbalanced panel dataset comprising 150 countries over the period 1995~2015. Results suggest a strong positive impact of multilateral trade liberalization on economic growth in both entire sample and sub-samples alike.

I. Introduction

One of the most debated topics in the area of development economics is the relationship between international trade and economic development, particularly economic growth (Singh 2010, Salvatore 2011). Researchers have largely explored the theoretical and empirical links between international trade and economic growth. However, the impact of domestic trade liberalization on economic growth has received much less attention even though the theoretical aspects of this relationship have been well established. Surprisingly, little attention has been paid to the effect of multilateral trade liberalization (reduction for a given country of world trade barriers) on countries' economic growth.

From a theoretical perspective, trade liberalization could allow the reallocation of resources from the areas of comparative disadvantages (where resources may be redundant) into the areas of comparative advantage, thereby facilitating the movement of the income toward its steady -state level. Thus, even if in the short-term trade liberalization could negatively affects economic growth, in the medium-to the long-term, its impact could become positive. These static gains could be enhanced by reductions in rent seeking, corruption, and smuggling. Other gains entail greater economies of scale and scope, including in export industries, reduction of market power in protected markets, knowledge and technology spillovers, increased variety and quality of imported goods available to domestic producers and consumers, stimulation of export-platform Foreign Direct Investment (FDI) inflows (Lee, 1995, Falvey *et al.*, 2012).

On the empirical front, studies on the impact of trade liberalization on economic growth have used various econometric approaches, and reached mixed. Papageorgiou *et al.* (1991) have reported that trade liberalization results in a more rapid growth of exports and Gross Domestic Product (GDP), without significant transitional costs in terms of unemployment. Greenaway *et al.*

(1997) have used a smooth transition model to examine whether there exists a transition in the level and trend of real GDP per capita for 13 countries, and whether these are related to trade liberalization. They concluded that in the majority of countries, transition in level or trend was negative, and where it was positive, it was not affected by trade liberalization. Based on case studies, Greenway (1998) concluded that the impact of trade liberalization on economic growth can be positive or negative, although the cases for positive impact tend to dominate those over the negative impact. Using a dynamic panel model, Greenaway *et al*. (1998, 2002) obtained that there exist in the short-term and long-term, a J-curve effect, whereby economic growth declines in the first instances, and then increases after liberalization. Wacziard and Welch (2008) have used panel data regression which include fixed effects and time effects and have found that a liberalized and a non-liberalized country experience a difference in growth of 1.53%. In the same vein, Salinas and Aksoy (2006) have provided evidence that trade liberalization promotes growth by between 1% and 4%. Falvey *et al*. (2012) have used threshold regression techniques, including a single threshold (i.e., a two-regime model) to investigate whether economic crisis is a good time for countries to undertake trade reforms. In particular, they examined whether there is differential growth effects in the crisis and non-crisis regimes. Their findings have suggested that while trade liberalization has raised subsequent economic growth in both crisis and non-crisis periods, it appeared that internal crisis generated a lower acceleration of economic growth, whereas an external crisis induces a higher acceleration related to non-crisis. Chang *et al.* (2009) have used the system Generalized Methods of Moments (GMM) estimator to examine the role of policy complementarities in enhancing the positive effect of trade openness on economic growth. They concluded that the growth effect of trade openness may be significantly improved if certain complementary reforms are undertaken. Christiansen *et al*. (2013) have used the GMM approach and reported that economic growth benefits from trade liberalization. More recently, Naito (2017) has formulated an asymmetric two-country Melitz model of trade and endogenous growth, and demonstrated that

unilateral trade liberalization increases growth of all countries for all periods.

In parallel to the impact of trade liberalization, another discussion has recently re-surfaced in light of recent years' backlash against international trade. This trade backlash has manifested in a strong appeal for the adoption of restrictive domestic trade measures amid world economic slowdown (United Nations 2017, WTO 2017). In this context, concerns could arise as to whether the rise in restrictive domestic trade measures would not undermine multilateral cooperation on trade. This is because WTO Members had delivered substantive multilateral outcomes at two consecutive WTO Ministerial Conferences[1] for example, the 2013 Bali Ministerial Conference and the 2015 Nairobi Ministerial Conference, which were genuinely the two historically successful Ministerial meetings since the creation of the WTO in 1995. The implementation of the outcomes, which are currently underway, could induce greater multilateral trade liberalization.

Among studies that have used macroeconomic data[2] to examine the macroeconomic impact of multilateral trade liberalization (Egger *et al*. 2004, Collie 2011, Ratnaike 2012, Gnangnon 2017a 2017b 2017c 2017d 2017e and 2017f), only two papers (Egger *et al*. 2004, Gnangnon 2017b) are closely related to the topic addressed in the current paper. Egger *et al.* (2004) have used numerical simulation models to examine the effect of multilateral and bilateral trade and investment liberalization on countries' welfare and convergence in per capita Gross Domestic Product (GDP). Overall, they have obtained that pure multilateral trade liberalization could be welfare enhancing. Moreover, their findings have suggest that both pure multilateral trade liberalization, and bilateral trade and investment liberalization are less likely to promote most effectively the convergence in per capita GDP than multilateral trade and investment liberalization, or pure multilateral investment liberalization. Gnangnon(2017b) has used a quantile regressions

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[1] The outcome of the 2013 Bali Ministerial Conference is online at: https://www.wto.org/english/thewto_e/minist_e/mc9_e/balipackage_e.htm The outcome of the 2015 Nairobi Ministerial Conference is online at: https://www.wto.org/english/thewto_e/minist_e/mc10_e/nairobipackage_e.htm

[2] Hertel et al. (2003), Hertel et al. (2004), Bamou and Tchanou (2006) and Casabianca (2016) are examples of studies that have used microeconomic or sectoral data to investigate the distributional impact of multilateral trade liberalization.

approach and a macroeconomic indicator of multilateral trade liberalization (Ratnaike 2012, Gnangnon 2017a 2017c 2017d 2017e and 2017f who have used the same indicator in their analyses**)** to investigate the impact of multilateral trade liberalization on countries' development level, as proxied by their real per capita GDP. This study has provided evidence of strong support for the view that multilateral trade liberalization promotes countries' economic development.

The objective of the current study is to contribute to this strand of literature by examining the impact of multilateral trade liberalization (and not domestic trade policy liberalization) on economic growth. In that respect, it departs from previous studies that have focused on the impact of (domestic) trade liberalization (or trade openness) on economic growth, by investigating how countries' access to the world trade market (thanks to multilateral trade liberalization) influences their economic growth rate. Furthermore, this article draws on the standard growth literature, and in line with few of the afore-mentioned studies (Chang et *al*. 2009 and Christiansen et *al*. 2013) uses the GMM approach to address the issue at hand. The analysis is conducted on an unbalanced panel dataset containing 150 countries over the period 1995~2015 using non-overlapping sub-periods of 3 year averages. The salient message of this analysis is that multilateral trade liberalization strongly promotes economic growth although the magnitude of this positive impact varies across sub-samples of countries. In particular, upper-middle-income countries and high-income countries appear to be the main beneficiaries of the growth effect of multilateral trade liberalization. It is because these countries have a greater trading capacity than low-income or lower-middle-income countries. This allows them to take better advantage of the opportunities offered by multilateral trade liberalization to promote their economic growth than the other categories of countries. The rest of the paper is organized as follows. Section II provides a theoretical discussion on the avenues through which multilateral trade liberalization can influence economic growth. Section III presents the model underlying the empirical assessment for the impact of

multilateral trade liberalization on economic growth. Section IV interprets empirical results and Section V concludes.

II. Conceptual Framework

A. Definition and measurement

We follow a number of recent studies (Ratnaike 2012, Gnangnon 2017a, 2017b, 2017c, 2017d, 2017e, 2017f) and define "*multilateral trade policy liberalization*" as all trade-related decisions—including those adopted under the auspices of the WTO—that ultimately contribute to reducing tariff and non-tariff barriers to trade for all countries, or at least for the overwhelming majority of them. For example, decisions or agreements adopted by WTO trade ministers (such as the Trade Facilitation Agreement[3] adopted in 2013 and the Export Competition Decision[4] adopted in 2015) at WTO Ministerial Conferences apply to all WTO Members and contribute directly to the liberalization of trade at the multilateral level. Similarly, the reduction of tariff and non-tariff barriers among members of a trading group involving many WTO Members would certainly lead to multilateral trade liberalization if extended to countries that are not members of the group.

Computing an indicator of multilateral trade liberalization is not an easy task. In light of the aforementioned definition of multilateral trade liberalization, the computation of multilateral trade liberalization requires

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[3]The TFA is the first multilateral deal concluded in the 21-year history of the World Trade Organization (see further information online: https://www.wto.org/english/news_e/news17_e/fac_31jan17_e.htm). It aims at simplifying, modernizing, and harmonizing export and import processes. It contains provisions for expediting the movement, release, and clearance of goods, including goods in transit. It also sets out measures for effective cooperation between customs and other appropriate authorities on trade facilitation and customs compliance issues. It further contains provisions for technical assistance and capacity building in this area (see further information online at: https://www.wto.org/english/tratop_e/tradfa_e/tradfa_e.htm). According to a 2015 study carried out by WTO economists (see online at: https://www.wto.org/english/res_e/publications_e/wtr15_e.htm), the full implementation of the TFA would reduce members' trade costs by an average of 14.3 percent, with developing countries having the most to gain. Furthermore, it is expected to reduce the time needed to import goods by over a day and a half and to export goods by almost two days, representing a reduction of 47 percent and 91 percent, respectively, over the current average.

[4]The multilateral (WTO) Export Competition Decision contains some provisions that oblige all WTO Members, including developed and developing countries, to reduce their agricultural subsidies that cause distortions in the international trade markets.

finding an appropriate indicator of domestic trade policy liberalization. Following Ratnaike (2012) and Gnangnon (2017a, 2017b, 2017c, 2017d, 2017e, 2017f), we use two criteria to choose the appropriate indicator of domestic trade policy that would help us calculate the index of multilateral trade policy. First, the indicator of domestic trade policy should reflect the multiple facets of trade policy, including both tariff and non-tariff measures. Second, it should allow computing the indicator of multilateral trade policy liberalization according to the definition of multilateral trade liberalization provided above. The absence of consensus in the international trade literature on a unique indicator of trade policy further complicates the task of computing a multilateral trade liberalization indicator. In this study, the only one indicator that appears to fulfill these two conditions is the "freedom to trade internationally." This indicator, developed by the Heritage Foundation[5] (Miller *et al*. 2017), represents an important component of the Economic Freedom Index (EFW) and is employed in the empirical macroeconomic literature. Therefore, we calculate the index of multilateral trade liberalization by relying on the ""freedom to trade internationally" index proposed by the Heritage Foundation, as a measure of the domestic trade policy. It is worth noting that the "freedom to trade internationally" index developed by the Fraser Institute[6] would have been used to compute the indicator of multilateral trade liberalization. However, this indicator has a lower annual data coverage compared with the indicator developed by the Heritage Foundation. Against this background, the indicator of multilateral trade liberalization is computed as follows: for a given country, multilateral trade policy liberalization is the average of the domestic trade policy liberalization (i.e., the trade policy liberalization score of a given country) of the rest of the world, i.e., of all the other countries (except for the concerned country). This allows us to obtain over the panel dataset a time-varying variable of multilateral trade

liberalization that indicates the extent of multilateral trade liberalization that a given country faces.

To provide insight into the relationship between multilateral trade policy liberalization and growth, Figure 1 illustrates the correlation pattern between the index of multilateral trade liberalization (*MTP*) and the real per capita income growth rates (*GROWTH*). The correlation pattern between these two variables displayed in Figure 1 is not clear-cut. It particularly appears that one country, notably Equatorial Guinea is an outlier in this Figure. Statistics show that Equatorial Guinea had experienced very high values of real per capita

Figure 1. Correlation pattern
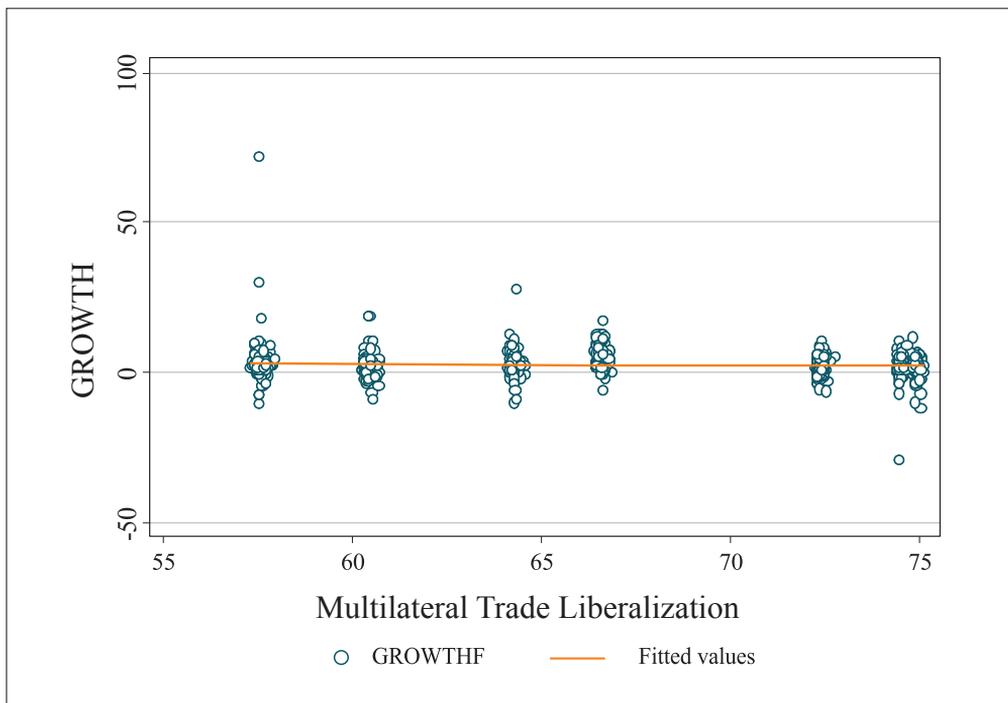
(Note) *MTP* denotes the index of multilateral trade liberalization and *Growth* denotes the real per capita income growth rates.

(Source) Author's own creation

income growth rate during the period 1995~2015. For example, in 1996, 1997, and 2001, the growth rate was, respectively, 61%, 141.6%, and 58%. Accordingly, we address the presence of this outlier in the empirical analysis.

B. Discussion on the expected impact

There are several channels through which multilateral trade liberalization can promote economic growth.

First, by improving welfare (e.g., Hertel *et al*. 2003, Egger *et al*. 2004, Hertel *et al*. 2004, Casabianca 2016), multilateral trade liberalization would surely contribute to promoting economic growth.

Second, by promoting FDI inflows (Collie 2011, Gnangnon 2017a), multilateral trade liberalization could induce higher economic growth in light of the possible positive impact of FDI inflows on economic growth. Indeed, from a theoretical perspective, FDI inflows could promote economic growth, including long-term growth through several channels, including the incorporation of new technologies in the production function of the host economy (Borensztein *et al.* 1998), the rise in the existing stock of knowledge in the host economy through labor training and skill acquisition (Hanson and Slaughter 2003), the introduction of alternative management practices and organizational arrangements (De Mello and Jr Luiz 1999), and capital accumulation and knowledge spillover (Niles 2003). Several studies have provided empirical support for a positive impact of FDI inflows on economic growth (Borensztein *et al.* 1998, Lee 1998, Bengoa and Sanchez-Robles 2003, Li and Liu 2005, Hertel 2008, and Gomes and Veiga 2013).

Third, by helping reduce trade costs, multilateral trade liberalization (such as the Trade Facilitation Agreement and the Export Competition Decision) could promote export diversification (Beverelli *et al.,* 2015). Such export diversification would be further enhanced if multilateral trade liberalization helps address the tariff peaks and escalations faced by developing countries when they try to export higher value added products to developed countries'

markets. Export diversification could, in turn, promote economic growth (Hesse 2008, Aditya and Acharyya 2013).

Fourth, greater cooperation at the multilateral level on trade matters among WTO Members could facilitate multilateral cooperation on other issues, such as global financial and monetary as well as climate change issues, and international security matters such as international terrorism. These would help reduce the frequency of occurrence of external shocks, which particularly hurt economic growth in developing countries and poor countries that lack the financial resources to cope with the adverse consequences of these shocks. In this context, multilateral trade liberalization can be conducive to economic growth (Guillaumont and Wagner 2012, Dabla-Norris and Gündüz 2014, Shabnam 2014).

Fifth, by helping dampen terms of trade fluctuations and in the international trade market, multilateral trade liberalization, such as the Export Competition Decision adopted by WTO Members at the Nairobi Ministerial Conference, could provide traders in countries, including developing and the poorest ones, with stable incom e. This could, in turn, lead to higher domestic consumption and/or imports, which would ultimately promote economic growth.

Sixth, as multilateral trade liberalization could generate higher public revenue (Gnangnon 2017d), it could help governments provide the basic infrastructure as well as physical infrastructure needed to spur economic growth. As a result, it would lead to higher economic growth.

III. Model specification

The estimation of the impact of multilateral trade liberalization on economic growth is carried out by drawing on the standard growth literature[7]. In particular, we consider a model that includes control variables affecting

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[7]There is a voluminous literature that has explored various microeconomic and macroeconomic factors that could affect countries' economic growth or per capita income. A survey of this literature could be found in a survey on this literature is provided by Chirwa and Odhiambo (2016).

the influence of multilateral trade liberalization on economic growth. These controls include domestic trade policy, financial openness, financial development, human capital accumulation (proxied by the gross enrolment ratio in secondary schools), government expenditure over GDP, inflation rate, the initial real per capita income to capture convergence, gross fixed capital formation as a share of GDP as a measure of the level of domestic investment, total population, and a measure of institutional and governance quality.

Therefore, we postulate the following baseline dynamic model:

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\begin{aligned}
GROWTH_{it} = {} & \alpha_0 + \alpha_1 GROWTH_{it-1} + \alpha_2 MTP_{it} + \alpha_3 DUM + \alpha_4 DUM * MTP_{it} + \alpha_5 Log(IGDPC) \\
& + \alpha_6 DTP_{it} + \alpha_7 FINOPEN + \alpha_8 FINDEV + \alpha_9 EDU + \alpha_{10} GOVCONS_{it} + \alpha_{11} GFCF_{it} \\
& + \alpha_{12} INF_{it1} + \alpha_{13} Log(POP)_{it} + \alpha_{14} INST_{it} + \mu_i + \kappa_t + \varepsilon_{it}
\end{aligned}
\tag{1}
$$

where i represents the country's index and t denotes the time period. The panel dataset used is unbalanced and contains 150 countries (developed and developing), with data spanning over seven non-overlapping sub-periods of three years covering the period 1995~2015. The sub-periods considered are respectively 1995~1997, 1998~2000, 2001~2003, 2004~2006, 2007~2009, 2010~2012, and 2013~2015. The choice of the dataset is dictated by data availability. The sources of these variables as well as their definition are provided in Appendix 1. α_0 to α_{14} are parameters to be estimated. μ_i are countries' fixed effects. κ_t are time dummies capturing shocks that could have affected together all countries' economic growth patterns. ε_{it} is a well-behaving error term.

The dependent variable *GROWTH* is real per capita income growth rate, which we henceforth refer to as "growth."

MTP is our index of multilateral trade policy liberalization, whose expected theoretical impact has been discussed in Section II.

The variable *DUM* stands for a dummy variable taking the value 1 for the country Equatorial Guinea and 0 otherwise. Indeed, in light of the observation

in Figure 1 that Equatorial Guinea is an outlier in the relationship between multilateral trade liberalization and economic growth over the entire sample, we control in Model (1) for this outlier effect so as to avoid biased estimates, notably of the estimate of the variable *MTP*. This involves the inclusion in Model (1) of this dummy variable along with its interaction with the *MTP* variable.

The variables *DTP* (domestic trade policy index), *IGDPC* (initial real GDP per capita income), *FINOPEN* (financial openness index), *FINDEV* (indicator of the depth of financial development), *EDU* (gross enrolment secondary school rate), *GOVCONS* (government consumption, in % GDP), *GFCF* (gross fixed capital formation, in % GDP), *INF* (inflation rate, expressed in terms of percentage), *POP* (size of the population), and *INST* (institutional and governance quality) are described along with their sources in Appendix 1. The standard descriptive statistics are reported in Appendix 2 and pairwise correlations among variables are presented in Appendix 3.

As described in Appendix 1, we have computed our indicator of institutional and governance quality by following the empirical literature on this field (Globerman and Shapiro 2002, Buchanan *et al.* 2012), i.e., by relying on the factor analysis and using the first principal components of five indicators of governance, namely, a measure of political stability and absence of violence/terrorism, regulatory quality index, rules of law index, government effectiveness index, and index of corruption.

The use of factor analysis to compute the index of institutional and governance quality severely mitigates the possible endogeneity of this variable. Notwithstanding, a number of other endogeneity issues need to be addressed in the estimation of Model (1). These include the presence of the one-year lag of the dependent variable as a regressor, which could potentially generate the Nickell's (1981) bias, given the nature of our panel dataset (short time period and large cross-section). Additionally, there is a potential endogeneity of the variables *DTP, IGDPC, FINOPEN, FINDEV,*

EDU, GOVCONS, GFCF, and *INF* due to the possible reverse causality from the dependent variable to each of these variables. In this context, we need an appropriate estimator to obtain efficient estimates from the estimation of Model (1).

Dynamic panel estimators, such as the difference and the system GMM, have become popular to address the abovementioned endogeneity issues in panel data like ours, i.e., with a short time-period and large cross-section. The difference GMM estimator involves the transformation of regressors through differencing. This estimator uses lags of the regressors as instruments for the first-differenced estimators. However, when variables such as economic growth follow a random walk, lagged levels can be poor instruments for first differences. Additionally, Roodman (2009) has suggested avoiding using the difference GMM estimator when the panel dataset is unbalanced, as this estimator has a weakness of magnifying gaps. To address the weaknesses of the difference GMM, the system GMM estimator has been developed by Arellano and Bover (1995) and Blundell and Bond (1998). This involves the estimation of a system of equation where an equation in levels is added to the difference equation. In this system, the equation in levels uses lagged differences of the regressors as instruments, whereas the equation in differences uses lagged levels of regressors as instruments. Hence, the proposed system GMM relies upon the assumption that the differenced variables used as instruments are uncorrelated with country fixed effects. Furthermore, it allows for efficiency gain through the use of additional instruments. The system GMM has two variants: the one-step system GMM and the two-step system GMM. Between these two types of system GMM estimators, the two-step system GMM estimator performs better than the one-step GMM estimator, in the presence of heteroscedasticity and serial correlation, as the former uses a consistent estimate of the weighting matrix taking the residuals from the one-step estimate (Davidson and MacKinnon, 2004). In this paper, we use the system GMM approach, in particular the two-

step system GMM estimator. We check the appropriateness of this estimator by performing the following diagnostic tests: the Arellano–Bond test of first-order serial correlation (AR(1)) in the residuals and no second-order autocorrelation (AR(2)) in the error term as well as the standard Sargan test of over-identifying restrictions (OID), which determines the validity of the instruments used in the estimations. We also present results of the third-order serial correlation (AR(3)) in the error term. The number of instruments used in the regressions is also reported because researchers like Roodman (2009) have shown that the abovementioned diagnostic tests may lose power if the number of instruments is higher than the number of countries.

Overall, we estimate Model (1) over the entire sample by means of the two-step system GMM estimator. In addition, we carry out the estimations of several variants of this model, which allows us to examine the differentiated impact of multilateral trade liberalization on economic growth over several sub-samples. These sub-samples include Low-Income Countries (LICs), Lower-Middle-Income Countries (LMICs), Upper-Middle-Income Countries (UMICs), and High-Income Countries (HICs), as per the World Bank's classification of countries in the world. The lists of countries contained in the entire sample as well as in each of these sub-samples are presented in Appendices 4 and 5. To examine these differentiated impacts, we create four dummies, namely, LIC (which takes the value 1 when a country is classified as belonging to the category of LICs and 0 otherwise), LMIC (which takes the value 1 when a country is classified as belonging to the category of LMICs and 0 otherwise), UMIC (which takes the value 1 when a country is classified as belonging to the category of UMICs and 0 otherwise), HIC (which takes the value 1 when a country is classified as belonging to the category of HICs and 0 otherwise). Each of these dummies is interacted with the *MTP* variable and both the dummy and its interaction with the *MTP* variable are included once in Model (1).

In the estimations of all these specifications of Model (1), the variables *DTP, IGDPC, FINOPEN, FINDEV, EDU, GOVCONS, GFCF,* and *INF* are

considered as endogenous. Moreover, in all regressions, we use a maximum of two lags of dependent variable as instruments and two lags of endogenous variables as instruments.

IV. Empirical results

Table 1 reports the outcome of the estimation of Model (1). In particular, column 1 of this table provides the estimates of the Model (1) specification and do not include the MTP variable or the variable *DUM* and its interaction with the *MTP* variable. Column 2 provides the estimates of Model (1) specification, which includes only t e *MTP* variable, but not variable *DUM* and its interaction with the *MTP* variable (which aims to address the outlier effect on the estimates). Finally column 3 displays the results of Model (1) as it stands, i.e., including all variables.

Table 1. Effect of multilateral trade policy liberalization

(Two-Step System GMM Estimator)

VARIABLES	GROWTH	GROWTH	GROWTH
	(1)	(2)	(3)
Real per capita income growth rate (*GROWTH$_{t-1}$*)	0.0612***	0.0721***	0.0578**
	(0.0140)	(0.0150)	(0.0235)
Multilateral trade policy liberalization(*MTP*)		48.13***	29.59***
		(9.091)	(8.881)
Dummy variable (*DUM*)			-69.47***
			(17.30)
Dummy variable* Multilateral trade policy liberalization (*DUM*MTP*)			1.254***
			(0.254)
Initial real GDP per capita income (*Log(IGDPC)*)	-0.133*	-0.134*	-0.144**
	(0.0738)	(0.0754)	(0.0675)
Domestic trade policy index (*DTP*)	0.0128	0.312***	0.194***
	(0.0124)	(0.0572)	(0.0562)
Financial openness index *(FINOPEN)*	-0.0197***	-0.0230***	-0.0213***
	(0.00434)	(0.00400)	(0.00407)
Indicator of the depth of financial development *(FINDEV)*	-0.0228***	-0.0261***	-0.0285***
	(0.00410)	(0.00407)	(0.00393)
Gross enrolment secondary school rate *(EDU)*	0.0309***	0.0321***	0.0361***
	(0.00765)	(0.00641)	(0.00678)
Government consumption *(GOVCONS)*	-0.105***	-0.0887**	-0.0412

(continued)

VARIABLES	GROWTH	GROWTH	GROWTH
	(1)	(2)	(3)
Gross fixed capital formation (*GFCF*)	(0.0330)	(0.0349)	(0.0352)
	0.111***	0.111***	0.0965***
	(0.00605)	(0.00631)	(0.0142)
Inflation rate *(INFL)*	-0.0465***	-0.0389***	-0.0537***
	(0.0118)	(0.0110)	(0.0141)
Size of the population *(Log(POP))*	-0.284**	-0.273***	-0.0174
	(0.117)	(0.104)	(0.113)
Institutional and governance quality *(INST)*	-0.0546	0.0264	0.0875
	(0.140)	(0.142)	(0.124)
Constant	5.392**	-2.921***	-1.798***
	(2.355)	(553.1)	(540.2)
Observations-Countries	667–150	667–150	667–150
Number of instruments	102	103	104
AR1 (*p*-value)	0.0000	0.0000	0.0000
AR2 (*p*-value)	0.9616	0.7990	0.9296
AR3 (*p*-value)	0.2758	0.2444	0.3271

(Note)*p-value < 0.1; **p-value < 0.05; ***p-value < 0.01. Robust Standard Errors are in parenthesis. The variable *DUM* is a dummy variable taking the value 1 for the country Equatorial Guinea and 0 otherwise. This dummy variable is introduced along with its interaction with the *MTP* variable in the regressions because this country appears to be an outlier in Figure 1. Indeed, Equatorial Guinea had experienced very high values of real per capita income growth rate during the period 1995~2015. For example, in 1996, 1997, and 2001, the growth rate was, respectively, 61%, 141.6%, and 58%. Thus, the inclusion of this dummy along with its interaction with the *MTP* variable allows controlling for the specificity associated with this country. In the two-step system GMM estimations, the variables *FINOPEN, DTP, FINDEV, GFCF, INFL, GOVCONS, IGDPC*, and *EDU* have been considered as endogenous. The other variables have been considered as exogenous. Time dummies have been included in the regressions

Table 2. Differentiated impact of multilateral trade policy liberalization

VARIABLES	GROWTH	GROWTH	GROWTH	GROWTH
	(1)	**(2)**	**(3)**	**(4)**
Real per capita income growth rate ($GROWTH_{t-1}$)	0.0611**	0.0675***	0.0520**	0.0773***
	(0.0244)	(0.0250)	(0.0231)	(0.0236)
Multilateral trade policy liberalization (MTP)	28.63***	26.45***	38.37***	31.75***
	(9.046)	(8.792)	(10.30)	(8.985)
Low-Income Countries* Multilateral trade policy liberalization ($LIC*MTP$)	-0.0374			
	(0.0422)			
Lower-Middle-Income Countries * Multilateral trade policy liberalization ($LMIC*MTP$)		0.0149		
		(0.0308)		
Upper-Middle-Income Countries* Multilateral trade policy liberalization ($UMIC*MTP$)			0.112***	
			(0.0304)	
High-Income Countries * Multilateral trade policy liberalization ($HIC*MTP$)				-0.0980***
				(0.0345)

(continued)

VARIABLES	GROWTH	GROWTH	GROWTH	GROWTH
	(1)	**(2)**	**(3)**	**(4)**
Dummy variable (*DUM*)	-94.27***	-75.28***	-59.81***	-50.72**
	(22.77)	(18.38)	(19.12)	(22.09)
Dummy variable* Multilateral trade policy liberalization (*DUM*MTP*)	1.621***	1.351***	1.115***	0.977***
	(0.334)	(0.270)	(0.282)	(0.325)
Low-Income Countries (*LIC*)	1.981			
	(2.898)			
Lower-Middle-Income Countries (*LMIC*)		-0.117		
		(2.073)		
Upper-Middle-Income Countries (*UMIC*)			-8.474***	
			(2.041)	
High-Income Countries (*HIC*)				6.314***
				(2.298)
Initial real GDP per capita income (*Log(IGDPC)*)	-0.103	-0.145**	-0.199***	-0.0396
	(0.0705)	(0.0680)	(0.0685)	(0.0654)
Domestic trade policy index (*DTP*)	0.189***	0.176***	0.246***	0.201***

(continued)

VARIABLES	GROWTH	GROWTH	GROWTH	GROWTH
	(1)	**(2)**	**(3)**	**(4)**
Financial openness index (*FINOPEN*)	(0.0571)	(0.0558)	(0.0646)	(0.0555)
	-0.0237***	-0.0208***	-0.0231***	-0.0194***
	(0.00411)	(0.00411)	(0.00416)	(0.00431)
Indicator of the depth of financial development (*FINDEV*)	-0.0314***	-0.0275***	-0.0281***	-0.0295***
	(0.00373)	(0.00380)	(0.00441)	(0.00392)
Gross enrolment secondary school rate (*EDU*)	0.0323***	0.0380***	0.0429***	0.0292***
	(0.00804)	(0.00740)	(0.00820)	(0.00791)
Government consumption (*GOVCONS*)	-0.0234	-0.0395	-0.0334	-0.0501
	(0.0375)	(0.0364)	(0.0387)	(0.0401)
Gross fixed capital formation (*GFCF*)	0.112***	0.0983***	0.0938***	0.0759***
	(0.0178)	(0.0145)	(0.0153)	(0.0176)
Inflation rate (*INFL*)	-0.0492***	-0.0513***	-0.0532***	-0.0508***
	(0.0125)	(0.0152)	(0.0132)	(0.0142)
Size of the population (*Log(POP)*)	0.0454	0.00686	-0.0822	-0.0708
	(0.119)	(0.112)	(0.117)	(0.127)

(continued)

VARIABLES	GROWTH	GROWTH	GROWTH	GROWTH
	(1)	**(2)**	**(3)**	**(4)**
Institutional and governance quality *(INST)*	0.181	0.117	-0.0380	0.290
	(0.122)	(0.122)	(0.161)	(0.179)
Constant	-1.741***	-1.608***	-2.331***	-1.929***
	(550.2)	(534.8)	(626.7)	(546.6)
Observations-Countries	667–150	667–150	667–150	667–150
Number of instruments	105	105	105	105
AR1 (*p*-value)	0.0000	0.0000	0.0000	0.0000
AR2 (*p*-value)	0.9610	0.9657	0.9225	0.8602
AR3 (*p*-value)	0.3118	0.3354	0.3505	0.3380
OID (*p*-value)	0.2750	0.3414	0.3887	0.4267

In Table 2, we present the results of the estimations of different specifications of Model (1) in which we include once the dummy capturing each sub-sample mentioned above along with its interaction with the variable *MTP* so as to capture the impact of *MTP* on this specific sub-sample of countries.

Across all columns of the two tables, we note that the coefficient of the one-year lag of the dependent variable is positive and statistically significant at the 1% level. This signifies that there is a state dependence in economic growth rate. At the bottom of all these columns, we also report the outcome of the diagnostic tests that help check the validity of the two-step system GMM. It appears that the *p*-values associated with the AR(1) are 0 across all columns, whereas the *p*-values relating to AR (2) and AR(3) are higher than 0.10. Moreover, the *p*-values associated with the Sargan test (OID) are higher than 0.10. Taken together, these results confirm the validity of the two-step system GMM to perform the empirical analysis.

Let us now start with the results provided in Table 1.It appears from the comparison of the results in columns 1 and 2 that the introduction of the variable *MTP* in the model specification does not change substantially the sign, the magnitude, or the statistical significance of coefficients relating to control variables (i.e., variables in column 1). Results in column 2 suggest that multilateral trade liberalization exerts a positive and significant impact on the economic growth rate. A one-point increase in the index of multilateral trade liberalization is associated with a 48.1 percentage point increase in the economic growth rate. However, this outcome does not take into account the presence of an outlier in Figure 1. Results in column 3 address this issue and show that multilateral trade liberalization still exerts a positive and significant impact on the economic growth rate. Specifically, over the entire sample (when the variable *DUM* takes the value 0), the net impact of multilateral trade liberalization on economic growth rate is given by 29.6, which means that a 1-point increase in the index of multilateral trade liberalization is associated with a 29.6 percentage point increase in the economic growth rate. Specifically, for Equatorial Guinea (when the variable *DUM* takes the value 1), the net impact of multilateral trade liberalization on economic growth rate is given by 30.844 (= 29.59 + 1.254), which means that a 1-point increase in

the index of multilateral trade liberalization is associated in Equatorial Guinea with a 30.84 percentage point increase in the economic growth rate.

Turning to results on control variables in column 3, we obtain that economic growth is positively and statistically driven by lower initial real per capita income, therefore confirming the convergence hypothesis, domestic trade policy liberalization, higher education level, higher investment, and lower inflation. While government consumption, population size, and institutional and governance quality do not significantly influence economic growth, although their impact may vary across countries in the entire sample, we do obtain that financial openness and financial development exert a negative and statistically significant impact on the economic growth rate. It is worth noting here that Christiansen *et al.* (2013) also obtained a negative impact of capital account openness on growth. Notwithstanding, the negative impacts of financial development and financial openness over the entire sample likely reflect different impacts across countries. As this study does not focus on the impact of these two variables on the economic growth rate, we do not go into further detail on the analysis of the impact of these two variables. Nevertheless, results on the differentiated impacts of each of these two variables across the entire sample are available upon request. For example, we obtain that financial development and financial openness exert a net positive impact on economic growth rate in low-income countries and different results are also obtained on other sub-samples considered. It is worth mentioning that Christiansen *et al.* (2013) reported a negative impact of capital account openness on economic growth.

Let us now take up results reported in Table 2. Results over control variables in column 1 to column 4 of this table are broadly in line in terms of sign, statistical significance, and magnitude of coefficients relating to these variables with those reported in Table 1.

As for our variable of interest, we obtain that there is no statistically significant difference between the impact of multilateral trade liberalization on economic growth rate in LICs versus non-LICs (countries not classified as LICs) and in LMICs versus non-LMICs (countries not classified as LMICs).

This is because the coefficients associated with the interaction between the *MTP* variable and each of the dummies, LIC and LMIC, are not statistically significant at the 10% level. Thus, the net impact of multilateral trade liberalization on economic growth in LICs and LMICs (as Equatorial Guinea is considered as an upper-middle-income country in the World Bank's classification, we consider here the variable *DUM* equal to 0) is given, respectively, by 28.63 and 26.45. This signifies that a 1-point increase in the index of multilateral trade liberalization promotes the economic growth rate in LICs by 28.63 percentage points and in LMICs by 26.45 percentage points. Concerning UMICs, we find that multilateral trade liberalization exerts a higher positive and significant impact on economic growth in UMICs than in non-UMICs (countries not classified as UMICs in the sample). As Equatorial Guinea is classified as an UMIC (we consider here that the variable *DUM* takes the value 1), the net impact of multilateral trade liberalization on the economic growth rate in UMICs is given by 39.6 (= 38.37 + 0.112 + 1.115). This suggests that a 1-point increase in the index of multilateral trade liberalization induces a 39.6 percentage point increase in UMICs' economic growth rate. Finally, HICs experience a lower impact of multilateral trade liberalization on economic growth rate than non-HICs (countries not classified as HICs in the sample). The net impact of multilateral trade liberalization on the economic growth rate in HICs (here, we consider that the variable *DUM* takes the value 0) is given by 31.65 (= 31.75 − 0.0980). Hence, a 1-point increase in the index of multilateral trade liberalization leads to a 31.65 percentage point increase in the economic growth rate in HICs.

Overall, while all four country categories appear to benefit significantly from multilateral trade liberalization, UMICs appear to be, on average, the main beneficiaries of multilateral trade liberalization in terms of economic growth rate. This group is followed by HICs, LICs, and LMICs. This could be explained by the fact that many countries in the categories of UMICs and HICs have a greater capacity to trade than the two other country groups. This places UMICs and HICs in a better position to reap the benefits of further liberalization of trade at the multilateral level.

V. Conclusion

This paper assesses the impact of multilateral trade liberalization on the economic growth rate. The analysis relies on an unbalanced panel dataset comprising 150 developed and developing countries over the period of 1995~2015.

Over the entire sample, the results suggest a very strong impact of multilateral trade liberalization on countries' economic growth rate. This result is confirmed upon examination of the net impact of multilateral trade liberalization on sub-samples of low-income, lower-middle-income, upper-middle–income, and high-income countries. Notwithstanding, upper-middle-income countries appear to be, on average, the main beneficiaries of multilateral trade liberalization in terms of economic growth rate. This group is followed by High-Income Countries (HICs), Low-Income Countries (LICs), and Lower-Middle-Income Countries (LMICs). This outcome is not surprising and could be explained by the fact that many countries in the categories of Upper-Middle-Income Countries (UMICs) and High-Income Countries (HICs) have a greater capacity to trade than the two other country groups; hence, these countries are in a better position to benefit from further multilateral trade liberalization.

The policy implication is that the adoption of trade protection measures would likely trigger a trade war, which would undermine the possibility of greater cooperation among WTO Members to make further progress on multilateral trade liberalization. As a result, countries' economic growth and development prospects would be adversely affected.

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Appendix

Appendix 1 : Definitions and sources

Variable	Definition	Source
Real per capita income growth rate(*GROWTH*)	GDP per capita Growth Rate (constant 2010 US dollars), in percentage	World Development Indicators (WDI) 2017 (World Bank 2017)
Domestic trade policy index (*DTP*)	Trade policy of the domestic economy = Trade Freedom Score. This is a component of the Heritage Foundation's Index of Economic Freedom. It is 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: trade-weighted average tariff range and Non-Tariff Barriers (NTBs), the extent of latter having been determined on the basis of quantitative and qualitative available information. NTBs include quantity restrictions, price restrictions, regulatory restrictions, investment restrictions, customs restrictions, and direct government interventions. This score is graded on a scale of 0–100, with a rise indicating lower trade barriers, i.e.,., higher trade liberalization, whereas a decrease reflects rising trade protectionism.	Heritage Foundation http://www.heritage.org/issues/economic-freedom see Miller *et al.*, (2017)

(continued)

Variable	Definition	Source
Index of multilateral trade policy liberalization(*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 (for countries for which data exist).	Author's calculation based on Heritage Foundation data
Initial real GDP per capita income (*IGDPC*)	Initial GDP per capita (constant 2010 US dollars)	Author's calculation based on data on GDPC extracted from WDI, 2017
Gross fixed capital formation(*GFCF*)	Gross fixed capital formation (% of GDP)	WDI, 2017
Gross enrolment secondary school rate (*EDU*)	Gross secondary school enrolment (in %)	WDI, 2017
Financial openness index (*FINOPEN*)	The measure of *de jure* financial openness.	This index has been computed by Chinn and Ito (2006) and updated in July 2017. Its value ranges between 0 and 1. We have multiplied by 100 so as to ensure coherence with the trade policy variable defined below (which is also a measure of a *de jure* trade policy and whose value range between 0 and 100) See: http://web. pdx.edu/~ito/Chinn-Ito_website.htm
Indicator of the depth of financial development(*FINDEV*)	Represents the measure of the depth of financial development. It is measured by domestic credit to the private sector as a percentage of GDP.	Author's calculation based on data from WDI, 2017

(continued)

Variable	Definition	Source
Government consumption(*GOVCONS*)	General government final consumption expenditure (% of GDP)	WDI, 2017
Size of the population (*POP*)	Total population	WDI, 2017
Institutional and governance quality(*INST*)	This is the variable capturing institutional quality in a given country. It has been computed by extracting the first principal component (based on factor analysis) of the following six indicators of governance. These indicators are, respectively, denoted "PolStab," "RegQual," "Ruleslaw," "GovEff," "VoiceAcc," and "Cor."PolStab is the measure of political stability and absence of violence/terrorism. RegQual stands for regulatory quality index. Ruleslaw represents the Rules of Law index. GovEff is the government effectiveness index. VoiceAcc is the index of voice and accountability. Cor is the index of corruption. It is worth noting that higher values of the index INST are associated with better governance and institutional quality, whereas lower values reflect worse governance and institutional quality.	Data on the components of INST variables are extracted from World Bank Governance Indicators developed by Kaufmann, Kraay and Mastruzzi (2010) and recently updated.

Appendix 2 : Descriptive statistics

Variable	Observations	Mean	Standard deviation	Minimum	Maximum
GROWTH	1,046	2.491	4.113	-29.074	72.057
MTP	1,050	67.228	6.419	57.290	75.135
DTP	1,007	67.792	15.383	9.067	95
FINOPEN	1,049	52.569	36.6	0	100
FINDEV	1,029	48.149	44.996	0.001	250.609
IGDPC	969	9927.017	14991.530	157.565	73747.840
GFCF	1,030	22.503	10.059	2.234	175.290
INFL	1,030	35.990	764.382	-6.934	24411.030
GOVCONS	1,032	15.593	5.403	4.005	44.375
EDU	901	75.903	30.791	5.391	163.956
POP	1050	4.11e+07	1.44e+08	76346.67	1.36e+09
INST	1,046	-0.054	2.219	-5.139	4.801

(Note)*p-value < 0.1

Appendix 3 : Pairwise correlation

	Real per capita income growth rate(GROWTH)	Index of multilateral trade policy liberalization (MTP)	Domestic trade policy index (DTP)	Financial openness index (FINOPEN)	Indicator of the depth of financial development (FINDEV)	Initial real GDP per capita income (IGDPC)	Gross fixed capital formation (GFCF)
Real per capita income growth rate(GROWTH)	1.0000						
Index of multilateral trade policy liberalization(MTP)	-0.0996*	1.0000					
Domestic trade policy index (DTP)	-0.0371	0.4004*	1.0000				
Financial openness index (FINOPEN)	-0.0477	0.0703*	0.5459*	1.0000			
Indicator of the depth of financial development(FINDEV)	-0.1125*	0.1780*	0.4604*	0.4359*	1.0000		
Initial real GDP per capita income (IGDPC)	0.0096	-0.0301	-0.0149	-0.0642*	0.0368	1.0000	
Gross fixed capital formation(GFCF)	0.5348*	0.0815*	0.0573*	-0.0091	0.0740*	0.0244	1.0000
Inflation rate (INFL)	-0.0715*	0.0138	-0.0449	-0.0506	-0.0938*	-0.0219	-0.0518*

(continued)

	Real per capita income growth rate (GROWTH)	Index of multilateral trade policy liberalization (MTP)	Domestic trade policy index (DTP)	Financial openness index (FINOPEN)	Indicator of the depth of financial development (FINDEV)	Initial real GDP per capita income (IGDPC)	Gross fixed capital formation (GFCF)
Government consumption (GOVCONS)	-0.1003*	0.0082	0.2063*	0.1992*	0.2231*	0.0170	0.0450
Gross enrolment secondary school rate (EDU)	-0.0478	0.1369*	0.5443*	0.5166*	0.5578*	0.0007	0.0527
Size of the population (POP)	0.1192*	0.0227	-0.1443*	-0.1087*	0.1289*	-0.0547*	0.1146*
Institutional and governance quality (INST)	-0.0422	-0.0094	0.5053*	0.5758*	0.7166*	0.0207	0.0864*

(Note)*p-value < 0.1

(continued)

	Inflation rate *(INFL)*	Government consumption *(GOVCONS)*	Gross enrolment secondary school rate *(EDU)*	Size of the population *(POP)*	Institutional and governance quality*(INST)*
Inflation rate *(INFL)*	1.0000				
Government consumption *(GOVCONS)*	-0.0471	1.0000			
Gross enrolment secondary school rate *(EDU)*	-0.1098*	0.3766*	1.0000		
Size of the population *(POP)*	-0.0071	-0.1111*	-0.0352	1.0000	
Institutional and governance quality *(INST)*	-0.0678*	0.3987*	0.7090*	-0.0531*	1.0000

(Note)*p-value < 0.1

Appendix 4: List of countries in the entire sample

Entire Sample				
Albania	Colombia	Guinea-Bissau	Malaysia	Senegal
Algeria	Comoros	Guyana	Mali	Seychelles
Angola	Congo, Dem. Rep.	Honduras	Malta	Sierra Leone
Argentina	Congo, Rep.	Hong Kong SAR, China	Mauritania	Slovak Republic
Armenia	Costa Rica	Hungary	Mauritius	Slovenia
Australia	Cote d'Ivoire	Iceland	Mexico	South Africa
Austria	Croatia	India	Moldova	Spain
Bahamas, The	Cyprus	Indonesia	Mongolia	Sri Lanka
Bahrain	Czech Republic	Iran, Islamic Rep.	Morocco	St. Lucia
Bangladesh	Denmark	Ireland	Mozambique	St. Vincent and the Grenadines
Barbados	Djibouti	Israel	Namibia	Suriname
Belarus	Dominica	Italy	Nepal	Swaziland
Belgium	Dominican Republic	Jamaica	Netherlands	Sweden
Belize	Ecuador	Japan	New Zealand	Switzerland
Benin	Egypt, Arab Rep.	Jordan	Nicaragua	Tajikistan
Bhutan	El Salvador	Kazakhstan	Niger	Tanzania
Bolivia	Equatorial Guinea	Kenya	Nigeria	Thailand

Entire Sample				
Botswana	Eritrea	Korea, Rep.	Norway	Togo
Brazil	Estonia	Kuwait	Oman	Tonga
Bulgaria	Fiji	Kyrgyz Republic	Pakistan	Trinidad and Tobago
Burkina Faso	Finland	Lao PDR	Panama	Tunisia
Burundi	France	Latvia	Paraguay	Turkey
Cabo Verde	Gabon	Lebanon	Peru	Uganda
Cambodia	Gambia, The	Lesotho	Philippines	Ukraine
Cameroon	Georgia	Liberia	Poland	United Kingdom
Canada	Germany	Libya	Portugal	United States
Central African Republic	Ghana	Lithuania	Romania	Uruguay
Chad	Greece	Macedonia, FYR	Russian Federation	Venezuela, RB
Chile	Guatemala	Madagascar	Rwanda	Yemen, Rep.
China	Guinea	Malawi	Saudi Arabia	Zimbabwe

Appendix 5: List of countries in the sub-sample analyses

Low-Income Countries	Lower-Middle-Income Countries	Upper-Middle-Income Countries	High-Income Countries
Benin	Armenia	Albania	Australia
Burkina Faso	Bangladesh	Algeria	Austria
Burundi	Bhutan	Angola	Bahamas, The
Central African Republic	Bolivia	Argentina	Bahrain
Chad	Cabo Verde	Belarus	Barbados
Comoros	Cambodia	Belize	Belgium
Congo, Dem. Rep.	Cameroon	Botswana	Canada
Eritrea	Congo, Rep.	Brazil	Chile
Gambia, The	Cote d'Ivoire	Bulgaria	Croatia
Guinea	Djibouti	China	Cyprus
Guinea-Bissau	Egypt, Arab Rep.	Colombia	Czech Republic
Liberia	El Salvador	Costa Rica	Denmark
Madagascar	Ghana	Dominica	Estonia
Malawi	Guatemala	Dominican Republic	Finland
Mali	Honduras	Ecuador	France
Mozambique	India	Equatorial Guinea	Germany
Nepal	Indonesia	Fiji	Greece
Niger	Kenya	Gabon	Hong Kong SAR, China
Rwanda	Kyrgyz Republic	Georgia	Hungary
Senegal	Lao PDR	Guyana	Iceland
Sierra Leone	Lesotho	Iran, Islamic Rep.	Ireland
Tanzania	Mauritania	Jamaica	Israel

(continued)

Low-Income Countries	Lower-Middle-Income Countries	Upper-Middle-Income Countries	High-Income Countries
Togo	Moldova	Jordan	Italy
Uganda	Mongolia	Kazakhstan	Japan
Zimbabwe	Morocco	Lebanon	Korea, Rep.
	Nicaragua	Libya	Kuwait
	Nigeria	Macedonia, FYR	Latvia
	Pakistan	Malaysia	Lithuania
	Philippines	Mauritius	Malta
	Sri Lanka	Mexico	Netherlands
	Swaziland	Namibia	New Zealand
	Tajikistan	Panama	Norway
	Tonga	Paraguay	Oman
	Tunisia	Peru	Poland
	Ukraine	Romania	Portugal
	Yemen, Rep.	Russian Federation	Saudi Arabia
		South Africa	Seychelles
		St. Lucia	Slovak Republic
		St. Vincent and the Grenadines	Slovenia
		Suriname	Spain
		Thailand	Sweden
		Turkey	Switzerland
		Venezuela, RB	Trinidad and Tobago
			United Kingdom
			United States
			Uruguay