Is the Impact of Trade Policy on Developing and Developed Countries' Export Performance Sustainable?

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Abstract

This article examines anew the implications of trade policy liberalisation for export performance in both developed and developing countries. The current empirical analysis departs from existing research in that it uses the 'Adstock' approach to investigate whether there exists a cumulative (i.e. sustainable) impact of trade policy liberalisation on countries' export performance. Using a panel dataset comprising 168 countries (both developed and developing) over the period 1998–2014, the analysis provides strong evidence on how the impact of trade policy liberalisation on export performance is sustainable, i.e. whether it is persistent over time. Specifically, more advanced countries appear to benefit from a higher sustainability of the impact of trade policy liberalisation on their export performance than relatively less advanced economies. Moreover, in low-income countries there is no sustainability of this impact. The latter result could be explained by the structural weaknesses that prevent low-income countries from deriving the most benefit from their integration into the global trading system. Overall, the rise in anti-trade sentiment and the subsequent increase in trade protectionist measures are likely to hurt countries' export performance. In addition, it would particularly be desirable that the international community enhance its effort towards helping low-income countries address the structural trade-relating constraints that prevent them from fully benefitting from their integration into the global trading system.

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1. Introduction

The various gains associated with the opening up of an economy to international trade have been well recognised by economists. These include for example, improvement in the allocation of resources, increasing countries' import capacity, higher trade flows, enhancement of

competition within the economy for the benefits of consumers and producers, higher foreign direct investment inflows, transfer of technology from the rest of the world to the domestic economy, relaxing balance of payments constraints, a higher productivity growth rate and economic growth rate. All these benefits are inter-linked and can reinforce each other.

There is also historical evidence that the liberalisation of trade regimes has been key for successful growth strategies. However, trade is not an end in itself, but a means – an opportunity – to achieve an end, that is, development objectives. Hence, while trade liberalisation represents a great opportunity for a country to achieve its development objectives (e.g., greater integration into the global trading system, ensuring sustained economic growth and poverty reduction – and ultimately ensuring sustainable development), there is no guarantee that trade liberalisation reforms would lead to the intended objectives. For this opportunity to be translated into genuine benefits for the country concerned, its reforms of the trade regime should be accompanied by a set of domestic policies, including sound macroeconomic policies, economy-wide hard trade-related infrastructure, adequate institutional reforms as well as investment in human capital, and social safety nets to insure traders as well as the rest of the population against the external economic and financial risks associated with trade liberalisation.

Recent years have witnessed a backlash against trade and globalisation, reflecting a rising anti-globalisation and anti-trade sentiment. This is manifesting particularly in a growing anti-trade rhetoric and in a rise in protectionist measures in many countries. These trade-restricting measures have certainly contributed to the recent trade growth slowdown, amidst a lacklustre performance of the global economy. At the same time, empirical studies that have examined the impact of trade policy liberalisation on export performance (e.g., Agosin 1991; and Clarke and Kirkpatrick 1992; Santos-Paulino 2002; Santos-Paulino and Thirlwall 2004; Ju *et al* 2010; and Ratnaike 2012) remains inconclusive.

The thrust of the current study is to contribute to this strand of the literature by examining anew the impact of trade policy liberalisation on export performance in both developed and developing countries. In particular, the paper investigates whether the impact of trade policy liberalisation on export performance is sustainable, i.e., persistent over time. To carry out the analysis, we draw on the Adstock methodology developed by Broadbent (1979) and which has also been utilised in studies such as Broadbent and Fry (1995), Fry *et al* (2000) and Feeny and Fry (2014). This technique allows us to circumvent the use of the instrumental variables techniques (which are very hard to be found), including the Generalised Method of Moments (GMM) in dynamic panel analyses. In principle, the GMM approach helps address the endogeneity issue relating to the bi-directional causality between our trade policy variable and the export performance variable. This technique is widely used in the empirical literature, but has been criticised on several grounds:because the results that

it generates are very sensitive to the set of instruments used, notably when internal instruments (lagged levels and lagged differences) are used (see Gomanee *et al* 2005; Rajan and Subramanian 2008; and Kraay 2015, for the use of GMM approach in the context of assessments of the impact of aid on economic growth); the fact that the researcher has considerable freedom to specify the instruments and the number of their lags; and because 'differencing' reduces the sample size as well as the variation and co-variation in the data. In addition, Bazzi and Clemens (2013) note that only *ad hoc* methods of testing for weak instruments are currently available when using the GMM system estimator. Furthermore, as well highlighted by Feeny and Fry (2014 p 1071), one major criticism of dynamic panel estimators, like the GMM approach in the context of the current analysis, is that they assume that lagged levels of our measure of trade policy liberalisation do not have an independent effect on the outcome variable, i.e. on export performance (see also Arndt *et al* 2010 for this criticism in a different context). In this study, we argue that there would be a cumulative effect, over years, of trade policy liberalisation on export performance through several channels, including (but not limited to) lower costs for imported inputs, transfer of technology, innovation, as well as other positive externalities such as improvements in the market allocation of resources.

The empirical analysis is conducted using a set of 168 countries over the period 1998–2014. Strong evidence is found that over the sample as a whole, the impact of trade policy liberalisation on export performance is highly sustainable, i.e., it is persistent over time. In particular, we find that the higher the countries' level of development, measured by their real per capita income, the higher the magnitude of the impact of domestic trade policy liberalisation on export performance. However, for low-income countries, that is, those with real per capita income lower than $US 863.76, results indicate the statistical insignificance of the sustainability of trade policy liberalisation on export performance. This particular outcome may well reflect the difficulties (trade-related capacity constraints and other trade-related challenges) that these countries face in improving their export performance and better-integrating into the multilateral trading system. This result particularly calls for the international community to further enhance its effort towards helping these countries address structural weaknesses that prevent them from benefitting from international trade, despite their effort to further opening up their trade regimes.

The rest of the paper is organised as follows. Section 2 presents a literature review on the impact of trade policy liberalisation on export performance. Section 3 briefly describes the Adstock technique used to perform the analysis. Section 4 presents the model specification and discusses the estimation strategy. Section 5 analyses the empirical results and Section 6 concludes.

2. Literature Review: The Impact of Trade Liberalisation on Export Performance

There are myriad theoretical and empirical studies on the macroeconomic impact of trade liberalisation, including on economic growth, poverty reduction,

trade performance (export share to GDP, import share to GDP, export growth, import growth, trade balance share to GDP, trade balance growth, export upgrading, import diversification), employment, and foreign direct investment inflows and outflows. However, the strand of this literature that has examined the export performance effect of trade liberalisation is not voluminous.

The theoretical literature on the impact of trade policy liberalisation on export performance has emphasised several channels through which such an impact could occur. On the top of the theoretical arguments in favour of trade policy liberalisation is its role in reducing anti-export bias. The latter has been defined as the incentive effect of protection on production for export vis-à-vis production for the domestic market (e.g., Balassa and Associates 1982; Jenkins 1996). Firms will be less willing to invest in production for exports in the context of the existence of large profits to be made in protected import-substituting industries. In addition, protection can negatively influence a country's export competitiveness, in relation to the production of other countries. This negative influence would manifest itself, in particular, through the rise in the cost of inputs as compared to world market prices. Hence, protection would see exporters at a competitive disadvantage in international markets. As a result, local exporters will likely suffer from a cost penalty unless they are granted exemptions from duties on imported inputs and are free to substitute imports to domestically-produced inputs.

By encouraging the availability of imported inputs at low costs, trade liberalisation could contribute to enhancing the export competitiveness of domestic firms. Morrison (1976) has argued that protectionist policies not only discourage exports directly through their effects on the costs and availability of imported inputs, but also indirectly through their impact on the exchange rate. Similarly, Jenkins (1996) has emphasised that trade protectionism reduces the demand for foreign exchange below the level that would exist under free trade, whichleads to a higher exchange rate compared to the situation in the of absence of protectionist measures. The resulting currency overvaluation would be a disincentive to exporters. Trade liberalisation can facilitate the diffusion of knowledge and technology from the direct import of high-technology goods (Barro and Sala-i-Martin 1997; Baldwin *et al* 2005). This could in turn enhance countries' export performance. Grossman and Helpman (1991) have also shown that trade liberalisation improves the transfer of new technologies, which in turn facilitate technological progress and productivity improvement.

Empirically, existing studies, including cross-country, time-series and panel data analyses, have found positive, negative and no significant impact of trade policy liberalisation on export performance.

Let us start with studies that have uncovered a positive impact of trade policy liberalisation on export performance. The work on the impact of trade liberalisation dates back to the 1980s and 1990s, with cross-country studies of Harrigan and Mosley (1991), on the one hand, and Papageorgiou *et al* (1991) showing that trade liberalisation influences exports positively. However, some

of these cross-country studies, including their methodological aspects, have been criticised by authors such as Srinivasan and Bhagwati (1999) and Rodríguez and Rodrik (2001). These authors have argued that the cross-country methodology was not appropriate to capture the relationship between trade policy and export growth.

Time-series analyses of the export performance impact of trade policy liberalisation have been carried out by, *inter alia*, Ahmed (2000), Pacheco-López (2005), Santos-Paulino (2006), and Zakaria (2014). Using a cointegration analysis over the period 1974–1995, Ahmed (2000) reported that trade policy liberalisation (measured by a dummy variable) exerted a significant impact on export expansion in Bangladesh. Relying on an autoregressive distributed lag and error correction models, Pacheco-López (2005) has shown, *inter alia*, that the trade liberalisation that took place in the mid-1980 in Mexico exerted a significant impact on Mexico's exports, although thanks to this liberalisation, imports grew faster than exports. Santos-Paulino (2006) used cointegration analysis and error correction models to demonstrate empirically that over the period 1960–2000, the Dominican Republic experienced a positive and significant effect of trade liberalisation on export growth. The author has used as a measure of trade liberalisation the years during which such liberalisation has taken place. Zakaria (2014) used quarterly time series data for Pakistan over the period 1981/1982–2007/2008 and particularly relied on trade liberalisation indicator developed by Sachs and Warner (1995) and Wacziarg and Welch (2003) (a dummy liberalisation variable taking 1 during the period of trade liberalisation and 0, otherwise) to provide empirical evidence that trade liberalisation stimulated both exports and imports in Pakistan.

Turning to panel data analyses, Dollar (1992) examined the impact of outward orientation on export growth. His analysis used a panel dataset of 95 developing countries over the period 1976-1985. The author measured outward orientation of a given country through international comparisons of price levels for 121 countries taken from the Summer and Heston dataset. Dollar (1992) uses pooled Ordinary Least Squares (OLS) and concludes that open economies tend to grow faster over long periods of time, thanks to the potential externalities associated with exporting.

Bleaney (1999) investigated the impact of trade reforms on economic performance using a panel dataset of 10 Latin American countries over 1979-1995. He classified each country as 'reformed' or 'unreformed' in a given year, and showed evidence that both manufactured and total exports generated higher income elasticities after reform.

Santos-Paulino (2002) and Santos-Paulino and Thirlwall (2004) examined the impact of trade liberalisation on export performance over a sample of 22 developing countries (with data spanning 1972–1997) in which trade policies were liberalised in the mid-1970s. The authors used several measures of trade liberalisation: reduction in export duties, dummy for the year(s) of significant trade liberalisation, and two slope dummy variables, to capture the effect of

free trade on price and income elasticities. Across all their estimations, which employed various econometric methodologies (fixed effects and GMM), they found that trade liberalisation led to export growth (and import growth). However, the magnitude of this impact varies with the econometric methodology used. For example, they found that a decrease in export duties led to 0.05 to 0.09 percentage point increase in export growth.

Ju *et al* (2010) employed two measures of trade liberalisation, the first being a dummy capturing trade liberalisation dates, the second being the trade liberalisation dummy from Wacziarg and Welch (2003). Their analysis covers a panel dataset comprising 77 developing countries over the period 1970–2004. The authors used fixed effects and GMM techniques (one-step and two step GMM system approaches) and found, *inter alia*, that trade liberalisation exerted a significant positive impact on export performance, measured by the share of exports to GDP. The magnitudes of the estimates associated with the impact of the trade liberalisation variables, using these two econometric techniques, varied from 0.037 to 0.082.

Ratnaike (2012) examined empirically the relationship between trade liberalisation and export performance for 27 Members of the Organisation of Economic Cooperation and Development (OECD) over the period 1980–2010. He used tariffs and the index of freedom to trade internationally calculated by the Fraser Institute (this index is a component of the economic freedom index), as measures of trade policy. Employing both fixed effects and GMM, Ratnaike (2012) found evidence that domestic trade policy did not significantly influence export performance in the OECD countries.

It is worth noting here that Subasat (2008) also carried out an analysis on the trade impact of trade liberalisation, using 120 countries over 6 years. However, his study measured trade flows by the sum of exports and impots and hence, did not make the distinction between the trade liberalisation impacts separately on export and import flows.

Other studies such as Agosin (1991), Clarke and Kirkpatrick (1992), Greenaway and Sapsford (1994), Shafaeddin (1994) and Jenkins (1996) nevertheless reported either mixed evidence or lack of significant impact of trade liberalisation on export performance. Agosin (1991) and Clarke and Kirkpatrick (1992) found no significant evidence of a positive relationship between free trade and export growth in developing countries. Greenaway and Sapsford (1994) explored the impact of trade liberalisation on exports in the sample of 12 countries used in Papageorgiou *et al* (1991). They found that trade liberalisation did not exert a significant impact on exports in 8 out of the 12 countries examined. However, in 3 countries (Turkey, Columbia, and Spain), they reported a positive and significant impact. For 1 country (New Zealand), results suggested a significant negative impact of trade liberalisation on exports.

Shafaeddin (1994) also found no significant impact of trade liberalisation on exports in least-developed African countries. The author explained this outcome by failure in the design of trade policy reforms in these countries.

Jenkins (1996) reported that the export performance of Bolivia increased mainly due to more stable real exchange rate after 1985, rather than by trade liberalisation policies.

3. Presentation of the Adstock Approach

Let us consider the following distributed-lag model:

$$y_t = \alpha + \beta_0 x_t + \beta_1 \lambda x_{t-1} + \beta_2 \lambda x_{i-2} + ... + \mu_t = \alpha + \sum_{j=0}^{n} \beta_j \lambda^j x_{t-j} + \mu_t \quad (1)$$

where y and x stand respectively for the dependent and the explanatory variable; t denotes the time-period, $t = 1,.....T,$; the index j represents the lag of the variable x; α and β are parameters to be estimated; λ is the estimated rate of change of the distributed-lag model. μ_t is an error term which is independently and identically distributed.

Model (1) captures the response of the variable y to the variable x and could be estimated in several ways (see Broadbent 1979; Gujarati 1995), of which, the Adstock approach is the one adopted here. This was formulated by Broadbent (1979) to examine the impact of advertising. Since then, this technique has been used, for example, by Broadbent and Fry (1995) and Fry *et al* (2000). More recently, Feeny and Fry (2014) have used it to examine the sustainability of development aid flows with respect to economic growth.

To illustrate this model, let us start with the formulation of Koyck (1954) who assumes that $\beta_j = \beta_0 \lambda^j$ (2), with $j = 0,1,.....,n$, and λ, such that $0 < \lambda < 1$, is known as the rate of decline, or the decay of the distributed; $1 - \lambda$ is termed the speed of adjustment. By so doing, Koyck (1954) gives less weight to the distant β's than more recent ones. Hence, the Koyck model is in the form

$$\alpha + \beta_0 \sum_{j=0}^{n} \lambda^j x_{t-j} + \mu_t \quad (3)$$

The Adstock model is formally equivalent to the Koyck model described in equation (3). According to the Adstock model, the impact of x on y depends upon the prevailing stock of x in the current period. Hence, the Adstocks are calculated using the following formula:

$$XStock_t = \sum_{j=0}^{n} (1 - \lambda) \lambda^j x_{t-j} \quad (4)$$

where x is the value of the explanatory variable for which the stock is calculated and λ stands for its decay rate (see above). Broadbent (1979) suggests that the *XStock* variables be defined by a list of half-lives or median lag, denoted η. The half-life is defined as the time required for the first half, or 50 per cent, of the total change in y following a unit sustained change in x. In other words, the half-life represents the period by which half of the total impact of x is felt. As Adstock models are formally equivalent to the Koyck model, the half-lives are those of the Koyck model, defined as follows:

$$\eta = \frac{\log 0.5}{\log \lambda} \quad (5)$$

In other words, the half-lives in the Adstock models depend on the decay λ. Hence, the Adstock method suggests that the researcher calculate the Xstock variables by selecting a range of half-lives η and, for each value, finding the corresponding value of the decay λ. According to the Adstock approach, the long-run cumulative impact of x is given by $(\frac{\beta_0}{1-\lambda})$ and the short-run effect of x is β_0. Put it differently, the short-run effect represents $(1-\lambda)*100$ (percentage) of the long-run cumulative impact of x on y.

From an econometric perspective, the coefficient associated with the Xstock variable is the long-run average effect of the variable X on the variable Y. Indeed, Phillips and Moon (1999) have made a distinction between the long-run average (LRA) coefficient and the average long-run (ALR) coefficient obtained in a panel data regression. To illustrate this, let us consider the following model: $y_{it} = \alpha_{0i} + \alpha_i x_{it} + \upsilon_{it}$ where y_{it} and x_{it} are not cointegrated but are related and where υ_{it} is integrated of order 1, that is, I(1). The index i represents the individual and t stands for the time-period. Averaging over i the coefficient α_i will attenuate the noise in the relationship between y_{it} and x_{it} and, the pooled fixed effects estimator $\hat{\alpha}$ will consistently estimate that relationship. Phillips and Moon (1999) called $\hat{\alpha}$ the long-run average (LRA) regression coefficient. The LRA coefficient is in general different from the average long-run (henceforth denoted ALR) regression coefficient, which represents the average behaviour of individuals in the sample.

We follow here Feeny and Fry (2014) and consider that the impact of the trade policy variable on export performance is measured by the effect of the prevailing stock of the trade policy in the current year. In other words, this impact reflects the cumulative effect of our measure of trade policy (from previous years up to the current year) on export performance. If we denote TP our trade policy variable of a country in a given year, the variable qualified as Stock of TP (denoted *TPSTOCK*) is therefore constructed as follows:

$$TPSTOCK_t = \sum_{j=0}^{\infty}(1-\lambda)\lambda^j TP_{t-j} \quad (6)$$

where t is the time subscript. λ represents the decay rate or the rate of decline. In this way, the Adstock methodology renders *TPSTOCK* variables definitely predetermined with respect to the dependent variable (the export performance variable).

As noted above, the *TPSTOCK* variables are defined on the basis of a range of half-lives or median lag values (η), and equivalently (λ) values through the formula of η defined in equation (3). The half-life here is defined as the period by which half of the total impact of trade policy liberalisation is felt (Gujarati 1995 p 595). We use TP data over an extended period that covers several years before the first data point (the earliest year being in our database 1998 and may vary from one country to another, depending on data availability) for the model estimation. We calibrate the stocks of trade policy liberalisation from a range of half-lives (and equivalently λ values), by creating fifteen (15) *TPSTOCK*

variables, i.e., with different half-lives (for η = 1 to 15). This (indirect) estimation is essentially a grid research over half-life η or equivalently the decay rate λ in equation (6) (see also Feeny and Fry 2014 p 1070).

4. Model Specification and Estimation Strategy

To examine whether the impact of trade policy liberalisation on countries' export performance is sustainable, we draw on the literature described above. While the set of variables considered in these studies varies from one to another, we consider in the current study those control variables (in addition to our domestic trade policy variable) that would potentially influence the sustainability of the impact (if any at all) of trade policy on countries' export performance in the model specification. These variables include real per capita income, world demand, real exchange rate, terms of trade, institutional and governance quality, and foreign direct investment inflows. In the current study, we replace the world demand faced by a country – which is difficult to measure – by the extent of multilateral trade liberalisation. The latter is expected to generate greater trade opportunities and, hence, higher world demand for a given country.

Against this background, we postulate the following parsimonious model:

$$EXP_{it} = \alpha_0 + \alpha_1 TPSTOCK_{it} + \alpha_2 Log(GDPC)_{it} + \alpha_3 MTP_{it} + \alpha_4 REER_{it-1} + \alpha_5 FDI_{it-1} + \alpha_6 TERMS_{it} + \alpha_7 INST_{it} + \mu_i + \varepsilon_{it} \quad (7)$$

where subscript *i* stands for a given country; *t* represents the time-period. The dependent variable *EXP* represents the export performance of a given country (total exports of goods and services, in per cent of GDP).

TPSTOCK represents the Stock variables relating to trade policy that we described above. Each of the 15 *TPSTOCK* variables are introduced once in the estimation of a specification of model (7). Note that our trade policy measure is the indicator of freedom to trade internationally, is one component of the Economic Freedom Index developed by the Heritage Foundation and used in the empirical macroeconomic literature. As far as studies on the impact of trade policy on export performance are concerned, Ratnaike (2012) has measured trade policy by the score of freedom to trade internationally computed by the Fraser Institute.[2] This indicator is highly correlated with our trade policy indicator (which is computed by the Heritage Foundation[3]). The Heritage Foundation's indicator of freedom to trade internationally has a major advantage over the Fraser Institute's indicator of freedom to trade internationally: the former is available annually from 1995 onwards, while the latter is available annually only from 2000 onwards and every five years between 1970 and 2000. As a result, for a study like ours where we need annual data over as long a period as possible, the trade policy indicator measured by the score of freedom to trade internationally computed by the Heritage Foundation is more appropriate. This indicator encompasses measures of trade taxes, tariff rates, trade barriers and capital market controls. As noted above, it has the advantage

of providing an annual (starting from 1995) 'absolute' measure of the degree of trade policy liberalisation for many countries. This indicator has two components: trade-weighted average tariff barriers and non-tariff barriers, the extent of the latter having been determined on the basis of available quantitative and qualitative information (see Appendix 1). The score on this indicator is graded on a scale of 0 to 100, with an increase indicating lower trade barriers (higher trade liberalisation) and a decrease indicating higher trade protection. It is worth noting that other indicators such as the degree of trade openness, measured by the sum of a country's export and imports of goods and services, as a share of this country's GDP are not appropriate for our analysis. Likewise, the dummy indicator proposed by Sachs and Warner (1995) as a measure of trade liberalisation is also not appropriate for our analysis.

It would be difficult to anticipate the expected impact of the variables *TPSTOCK* on countries' export performance but, based on existing studies, we would expect a positive impact of these variables on export performance, although the sustainability of this impact remains an empirical matter.

GDPC is real per capita income of a given country. It is a proxy for its level of economic development. We expect an increase in a country's level of economic development to be associated with higher ability of this country to increase its export share(s), notably the share of their manufacturing export products in total exports.

MTP represents the level of multilateral trade liberalisation. Using the index of freedom to trade internationally, it has been computed as follows: for a given country, it is the average trade freedom score (*TP*) of the rest of the world, i.e., of all the other countries for which data exist (except for the concerned country; see for example, Ratnaike 2012; Gnangnon 2017a, 2017b, 2018). This allows us to obtain over the panel dataset a time-varying estimate of multilateral trade liberalisation which reflects, for a given country, the extent of multilateral trade liberalisation that it could enjoy. Multilateral trade liberalisation contributes to dampening international prices fluctuations in international trade and, hence, to reducing existing trade distortions. It could therefore increase the world demand for products (as well as services) for a given country and hence improve its export performance. Accordingly, we expect multilateral trade policy liberalisation to be positively associated with an improvement in countries' export performance.

REER is the real effective exchange rate of a given country *i*; it indicates the price competitiveness of domestic goods relative to foreign goods. We expect an improvement in domestic price competitiveness (that is, a depreciation of the real effective exchange rate) to be associated with improved export performance.

TERMS stands for the terms of trade of country *i*; an improvement in a country's terms of trade would be associated with improved export performance.

FDI stands for FDI inflows in a given country; it is expected that FDI inflows, in particular in countries where a substantial part of them are oriented towards international trade activities, to be associated with improved export performance.

INST is our measure of institutional and governance quality in a given country. This variable has been computed by applying factor analysis to five indicators of governance and institutional quality computed by the World Bank (see Appendix 1 for details). We expect better institutional quality to influence positively countries' trade flows, including export performance (e.g. Jansen and Nordås 2004; Li and Samsell 2009; and Wu *et al* 2012).

In model (7), we have introduced the variables *GDPC* (in logs), *REER*, and *FDI* with a one-year lag, with a view to mitigating any endogeneity concern, particularly in terms of reverse causality from the dependent variable to each of these variables. Incidentally, the use of factor analysis to compute the institutional and governance indicator helps mitigate considerably the endogeneity (reverse causality) issue relating to *INST*. This is why we do not introduce this variable with a one-year lag in model (7).

α_0 to α_7 are parameters to be estimated. μ_i are country-fixed effects. The disturbance term ε_{it} is assumed to be independently and identically distributed (i.i.d.; 0, σ_ε^2).

One might expect a spurious relationship between *TPSTOCK* and *EXP*, but such a risk is very low here for two reasons: first, the time dimension is relatively short (17 years); second, as noted in section 2, the use of a pooled Fixed Effects estimator will consistently estimate model (7) over the panel dataset and will attenuate the noise in the relationship between the regressors and the dependent variable, in particular the relationship between *TPSTOCK* variables and *EXP*.

We perform the empirical analysis by means of the Adstock technique over an unbalanced panel dataset comprising 168 countries spanning the period 1998–2014. It is important to note that, given the relatively short time-span of our panel dataset, we would not consider as optimal the result associated with the half-life time analysis (depending on which model specification with the *TPSTOCK* variable would display the lowest Akaike Information Criterion (AIC) or Bayesian Information Criterion (BIC). Hence, we refrain from considering the result associated with the *TPSTOCK* variable in the best fitting model (based on AIC/BIC criteria) as the optimal time (period) over which half of the total impact of trade policy liberalisation on export performance occurs. Nothwithstanding this, the advantage of the current study is to provide *prima facie* evidence on whether the impact of trade policy liberalisation on export performance is sustainable across countries, including both developed and developing countries.

We estimate the different specifications of model (7) (i.e., model (7) with each *TPSTOCK* variable) by means of the within fixed effects estimator. This estimator takes into account the possible cross-sectional dependence along with the eventual heteroscedasticity and serial correlation in residuals. Standard errors are corrected by means of the Driscoll-Kraay (1998) technique, which Hoechle (2007) adapted in Stata for unbalanced panels. Henceforth, we refer to this estimator to as FE-DK. As there are several model specifications with different *TPSTOCK* variables, the best fitting half-life (the most preferred model

specification) is selected by relying on the AIC/BIC and choosing the lowest value of one of these criteria.

For the empirical analysis, we proceed as follows:

– first, we examine the impact of the current level of (domestic) trade policy on countries' export performance over the full sample. This involves the estimation of a specification of model (7) where we replace the *TPSTOCK* variable with *TP*. In so doing, we are well aware of the potential endogeneity of the *TP* variable in the estimation of this model specification. This endogeneity could arise, in particular, from the reverse causality from *EXP* to *TP*.

– second, given the high heterogeneity of the full sample, we start with the regression of model (7) specifications over both the full sample to determine, based on AIC/BIC criteria, the preferred model specification. We subsequently interpret the results associated with the estimation of this model. In a second instance, we examine whether the results obtained from the estimation of the preferred model specification are valid across all countries contained in the full sample. To do so, we avoid the use of subjective sub-samples and introduce in the preferred model specification a variable which captures the interaction between *TPSTOCK* (from the preferred model specification) and real per capita income. This allows us to check how the impact of the retained *TPSTOCK* variable (among the fifteen *TPSTOCK* variables) on countries' export performance varies across countries in the full sample.

Appendix 1 provides the definition of each variable used in the analysis and the source of this variable. Appendix 2 reports the list of countries used in the full sample, while Appendix 3 presents descriptive statistics on these variables. Appendix 4 reports pairwise correlations between these variables.

5. Analysis of Estimation Results

Column [1] of Table 1 reports the outcome of the estimation of model (7) specification where we replace the *TPSTOCK* variable by the current level of trade policy (current level of *TP*). Column [2] of this Table presents the estimation results of the specification of model (7) in which we include the interaction variable $TP^{*}Log(GDPC)_{t-1}$, which represents the interaction between *TP* and $Log(GDPC)_{t-1}$.

Table 2 displays the results of the estimation of different specifications of model (7) (with different *TPSTOCK* variables (from *TPSTOCK1* TO *TPSTOCK15*) in order to choose the best-fitting model and interpret the associated results.

Table 3 reports the results of the best-fitting model specification in which we include a variable capturing the interaction between *TPSTOCK* (of this best fitting model) and $Log(GDPC)_{t-1}$.

Analysis of Estimation Results Reported in Table 1

Column [1] of Table 1 indicates that over the full sample, there is no significant impact of (domestic) trade policy liberalisation on countries' export performance. As noted above, this result is likely due to the potential endogeneity of TP.

Table 1: Effect of Trade Policy on Export Performance – Entire sample

Estimator: *Fixed Effects with Driscoll-Kraay Standard Errors*

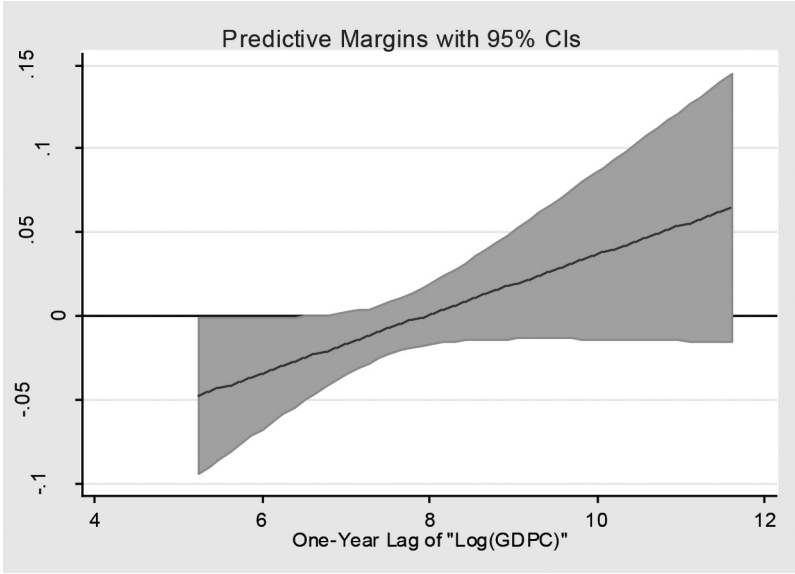
	EXP	EXP
	(1)	(2)
TP	-0.00306	-0.140*
	(0.00910)	(0.0743)
$Log(GDPC)_{t-1}$	-4.163**	-5.686***
	(1.671)	(2.109)
$TP*[Log(GDPC)_{t-1}]$		0.0176*
		(0.00981)
MTP	0.474***	0.470***
	(0.0640)	(0.0655)
$REER_{t-1}$	-0.0417**	-0.0411**
	(0.0171)	(0.0167)
FDI_{t-1}	0.101	0.102
	(0.0646)	(0.0637)
TERMS	-0.00842	-0.00666
	(0.0186)	(0.0186)
INST	-0.00362	0.0840
	(0.619)	(0.590)
Constant	50.28***	62.14***
	(15.86)	(19.36)
Observations	2,174	2,174
Number of Countries	168	168
Within R-Square	0.0748	0.0766

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

Regarding control variables we find that, on average, greater multilateral trade policy liberalisation induces greater export performance. At the same time, a depreciation of the real effective exchange rate influences negatively and significantly countries' export performance. The other control variables do not exert a statistically significant influence on countries' export performance.

Turning to column [2], we are interested in whether the impact (if any at all) of domestic trade policy on export performance varies across countries of the full sample. To do so, we look in particular at the coefficient of TP – which is negative and statistically significant only at the 10 per cent level – and the coefficient of the interaction variable $TP*Log(GDPC)_{t-1}$, which is statistically significant only at the 10 per cent level. Given the level of statistical significance of the interaction term, it is tempting to conclude that, on average, there is no significant impact of trade policy liberalisation on countries' export performance in the full sample. To get a better picture on the impact of domestic trade policy on countries' export performance, we present in Figure 1, at the 95 per cent confidence intervals, the pattern of the marginal effect of the current level of domestic trade policy TP on countries' export performance EXP, for various countries' levels of economic development (proxied by real per capita income).

Figure 1: Marginal Impact of TP on EXP,
for various countries' development levels



For the interpretation of this graph, we use the following rule: the statistically significant effects at the 95 per cent confidence intervals are those encompassing only the upper and lower bounds of the confidence interval that are either above (or below) the zero line. This figure suggests strongly that irrespective of the countries' level of development, the marginal impact of the current level of domestic trade policy on countries' export performance is always statistically insignificant. This result is probably due to the endogeneity of the variable capturing the current level of domestic trade policy. This endogeneity problem could, in particular, stem from the reverse causality from the dependent variable EXP to TP.

Analysis of Estimation Results Reported in Table 2

We note that across columns [1] to [15], the impact of *TPSTOCK* on export performance is positive and statistically significant at the 1 per cent level (except for TPSTOCK1, for which the associated coefficient is statistically significant at the 10 per cent level). In addition, the magnitude of this impact increases as the value of the half-life (η) increases (from 1 to 15 – i.e., from TPSTOCK1 to TPSTOCK15). The best fitting model specification is the one with the variable TPSTOCK15, as the model specification that contains this variable exhibits the minimum value of both the AIC and BIC selection criteria. Therefore, this result indicates that over our period of study, half of the total impact of

Table 2: Impact of TPSTOCK variables on Export Performance – Entire Sample

Estimator: *Fixed Effects with Driscoll-Kraay Standard Errors*

	EXP (1)	**EXP (2)**	**EXP (3)**	**EXP (4)**	**EXP (5)**	**EXP (6)**	**EXP (7)**	**EXP (8)**	**EXP (9)**	**EXP (10)**	**EXP (11)**	**EXP (12)**	**EXP (13)**	**EXP (14)**	**EXP (15)**
$Log(GDPC)_{t-1}$	-5.081**	-5.487**	-5.913**	-6.168**	-6.329***	-6.403***	-6.428***	-6.428***	-6.415***	-6.398***	-6.379***	-6.360***	-6.342***	-6.325***	-6.309***
	(2.152)	(2.258)	(2.371)	(2.394)	(2.418)	(2.421)	(2.414)	(2.405)	(2.395)	(2.386)	(2.378)	(2.371)	(2.365)	(2.360)	(2.355)
MTP	0.433***	0.326***	0.177	0.0314	-0.0704	-0.134	-0.172	-0.193	-0.204	-0.210	-0.212	-0.212	-0.211	-0.210	-0.207
	(0.0789)	(0.0953)	(0.111)	(0.112)	(0.126)	(0.140)	(0.151)	(0.161)	(0.168)	(0.173)	(0.177)	(0.180)	(0.182)	(0.183)	(0.185)
$REER_{t-1}$	-0.0391**	-0.0387***	-0.0385***	-0.0392***	-0.0399***	-0.0405***	-0.0410***	-0.0414***	-0.0417***	-0.0419***	-0.0421***	-0.0423***	-0.0424***	-0.0426***	-0.0427***
	(0.0150)	(0.0147)	(0.0144)	(0.0145)	(0.0147)	(0.0149)	(0.0151)	(0.0152)	(0.0153)	(0.0154)	(0.0154)	(0.0155)	(0.0155)	(0.0156)	(0.0156)
FDI_{t-1}	0.103*	0.104*	0.104*	0.104*	0.103*	0.103*	0.102*	0.102*	0.102*	0.102*	0.101*	0.101*	0.101*	0.101	0.101
	(0.0621)	(0.0619)	(0.0618)	(0.0616)	(0.0614)	(0.0613)	(0.0613)	(0.0612)	(0.0612)	(0.0612)	(0.0612)	(0.0612)	(0.0611)	(0.0611)	(0.0611)
TERMS	-0.00461	-0.00328	-0.00184	-0.000403	0.000472	0.000980	0.00125	0.00138	0.00143	0.00144	0.00142	0.00139	0.00136	0.00132	0.00128
	(0.0186)	(0.0186)	(0.0185)	(0.0182)	(0.0180)	(0.0178)	(0.0177)	(0.0176)	(0.0175)	(0.0175)	(0.0175)	(0.0175)	(0.0174)	(0.0174)	(0.0174)
INST	0.585	0.630	0.683	0.718	0.735	0.739	0.737	0.733	0.728	0.722	0.717	0.713	0.709	0.705	0.701
	(0.665)	(0.657)	(0.639)	(0.628)	(0.621)	(0.617)	(0.614)	(0.613)	(0.613)	(0.612)	(0.612)	(0.613)	(0.613)	(0.613)	(0.613)
TPSTOCK1	0.0387*														
	(0.0201)														
TPSTOCK2		0.0822***													
		(0.0241)													
TPSTOCK3			0.135***												
			(0.0329)												
TPSTOCK4				0.178***											
				(0.0368)											
TPSTOCK5					0.214***										
					(0.0436)										
TPSTOCK6						0.242***									
						(0.0503)									
TPSTOCK7							0.264***								
							(0.0566)								
TPSTOCK8								0.282***							
								(0.0626)							

TPSTOCK9									0.299*** (0.0683)						
TPSTOCK10										0.315*** (0.0738)					
TPSTOCK11											0.330*** (0.0790)				
TPSTOCK12												0.345*** (0.0841)			
TPSTOCK13													0.359*** (0.0891)		
TPSTOCK14														0.374*** (0.0939)	
TPSTOCK15															0.388*** (0.0987)
Constant	57.47*** (19.30)	65.68*** (20.42)	77.05*** (21.64)	87.76*** (21.72)	95.35*** (22.12)	100.1*** (22.34)	103.0*** (22.44)	104.6*** (22.50)	105.5*** (22.53)	106.0*** (22.56)	106.2*** (22.57)	106.2*** (22.58)	106.2*** (22.59)	106.1*** (22.59)	105.9*** (22.60)
Observations	2,084	2,084	2,084	2,084	2,084	2,084	2,084	2,084	2,084	2,084	2,084	2,084	2,084	2,084	2,084
No. of Countries	168	168	168	168	168	168	168	168	168	168	168	168	168	168	168
Within R-squared	0.0786	0.0815	0.0863	0.0900	0.0932	0.0953	0.0966	0.0975	0.0980	0.0983	0.0985	0.0986	0.0987	0.0987	0.0987
AIC	14086.56	14080.02	14069.15	14060.64	14053.39	14048.53	14045.44	14043.52	14042.33	14041.59	14041.14	14040.87	14040.72	14040.64	14040.62
BIC	14131.69	14125.15	14114.29	14105.78	14098.52	14093.66	14090.58	14088.66	14087.46	14086.73	14086.28	14086.01	14085.85	14085.78	14085.76

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

trade policy liberalisation on export performance (over the entire sample) appears to be felt within fifteen years of the implementation of trade policy liberalisation. This clearly suggests that over the full sample of countries under analysis, the impact of trade policy liberalisation on export performance is, on average, highly sustainable, i.e. persistent over time. The magnitude of the coefficient relating to the variable TPSTOCK15 implies that a 1 percentage-point increase in the trade policy index is associated with an increase of export performance in long-run by 0.388 percentage points, with half of this impact occurring within 15 years.

As $\eta = 15$, here, we infer from equation (5) that $\lambda = exponential\left(\frac{\log 0.5}{\eta}\right) = exponential\left(\frac{\log 0.5}{15}\right) = 0.9548$. Hence, the short-run effect of trade policy liberalisation on export performance amounts to $(1 - \lambda)*100 = 4.5$ per cent of the long-run cumulative impact of trade policy liberalisation on export performance. As the coefficient of the long-run cumulative impact is given by 0.388, we therefore conclude that the magnitude of the short-run effect of trade policy liberalisation on export performance is 0.0175.

Overall, for the entire sample, the long-run cumulative impact of trade policy liberalisation on export performance is given by the coefficient 0.388 (with half of this impact occurring within 15 years), and the short-run effect amounts to 0.0175.

Results for control variables indicate a negative and significant effect of real exchange rate appreciation and countries' real per capita income on export performance. The impact of multilateral trade liberalisation on export performance is only statistically significant in the first two columns of Table 2. In these two columns, it is positive. Across columns [1] to [13], the impact of FDI inflows on export performance is positive but statistically significant only at the 10 per cent level. However, in columns [14] and [15], we find no significant impact of FDI on export performance. Across all columns of this Table, there is no significant impact of terms of trade and institutional quality on export performance.

Analysis of Estimation Results Reported in Table 3

As noted above, in this Table we are particularly interested in how the impact of TPSTOCK15 on countries' export performance varies across countries in the full sample. It could be noted in this table that the coefficient of the variable TPSTOCK15 is not statistically sugnificant, whereas the interaction term relating to [TPSTOCK15]*[Log(GDPC)$_{t-1}$] is positive and statistically significant at the 1 per cent level. Therefore, we might conclude that, on average, the magnitude of the impact of TPSTOCK15 on countries' export performance is always positive and increases with countries' level of development (measured by their real per capita income). However, this average impact may hide different impacts (in terms of magnitude and statistically significance) across countries in the full sample. We provide a better picture on this impact by displaying in

Table 3: Does the Impact of TPSTOCK15 on Export Performance depend on countries' level of development (proxied by their real per capita income)

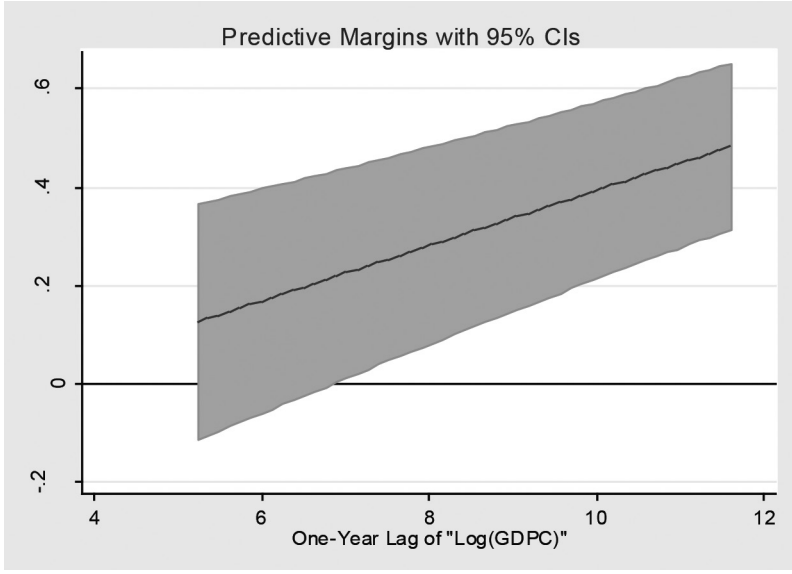
Estimator: *Fixed Effects with Driscoll-Kraay Standard Errors*

	EXP
	(1)
TPSTOCK15	-0.168
	(0.169)
$Log(GDPC)_{t-1}$	-5.471**
	(2.532)
$[TPSTOCK15]*[Log(GDPC)_{t-1}]$	0.0561***
	(0.0109)
MTP	-0.124
	(0.179)
$REER_{t-1}$	-0.0429***
	(0.0149)
FDI_{t-1}	0.103*
	(0.0613)
TERMS	0.00141
	(0.0182)
INST	0.674
	(0.613)
Constant	94.56***
	(25.93)
Observations	2,084
Number of Countries	168
Within R-Square	0.1080

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

Figure 2, at 95 per cent confidence intervals, the pattern of the marginal impact of TPSTOCK15 on countries' export performance, for various countries' levels of economic development. It can be observed in this Figure that the marginal impact of TPSTOCK15 on export performance takes both negative and positive values and increases as countries develop, that is, as they enjoy higher real per capita income. However, this marginal impact is not statistically significant for all countries' development levels. Indeed, this marginal impact appears to be statistically significant only for countries whose real per capita income is higher than $US 863.76 [= exponential (6.761293)]. For these countries, the marginal impact of TPSTOCK15 on EXP is positive, and the higher the real per capita income, the higher the magnitude of this positive marginal impact on their export performance. For countries with real per capita income below or equal to $US 863.76 (low-income countries), the marginal impact of TPSTOCK15 on export performance is statistically insignificant. On the basis of this analysis, we can conclude that more advanced countries tend to enjoy a more sustainable impact of domestic trade policy liberalisation on export performance than less advanced economies. In particular, low-income countries do not experience

Figure 2: Marginal Impact of TPSTOCK15 on EXP,
for various countries' development levels



any significant sustainable positive impact of domestic trade policy liberalisation on export performance.

6. Conclusions and Policy Implications

Recent years have witnessed a backlash against international liberalisation in many countries. This has certainly contributed to the recent global trade slowdown. The current paper examines anew, from an empirical perspective, the implications of trade policy liberalisation for export performance in both developed and developing countries. Indeed, while the theoretical positive effects of trade policy liberalisation on export performance has been well established in the literature, the empirical testing of this relationship has received scant attention, in particular as far as developed countries are concerned. The current empirical analysis departs from the existing studies on the export performance impact of trade liberalisation, as it uses the Adstock approach to investigate whether there exists a cumulative (i.e. sustainable) impact of trade policy liberalisation on countries' export performance, the latter measured by the ratio of countries' exports of goods and services to their Gross Domestic Product. Using a panel dataset comprising 168 countries (which includes both developed and developing countries) over the period 1998–2014, the analysis provides strong empirical evidence that the impact of trade policy liberalisation on export performance is highly sustainable, i.e., persistent over time. Moreover, over the

full sample of countries, half of the impact of trade policy liberalisation on export performance occurs within 15 years of trade policy liberalisation. However, while this result holds for countries with real per capita income higher than $US 863.76, it is not statistically significant for countries with real per capita income below that figure (essentially, low-income countries). Likely reasons for this in these countries not having the requisite trade capacity, including supply side capacity and trade-related infrastructure to take full advantage – in terms of higher export performance - from trade policy liberalisation.

The take-home message of this analysis is two-fold: first, the rising anti-trade sentiment and the subsequent rise in protectionist measures are likely to hurt countries' export performance. Second, it is desirable that the international community enhance its efforts towards helping low-income countries to address the structural trade-related constraints that prevent them from deriving the full benefits from international trade, despite their effort to liberalise their trade regimes. The trade-related structural constraints include, *inter alia*, the lack of hard infrastructure (for example, roads and electricity power), the lack of appropriate institutional capacity that would be conducive to export expansion in these countries, and the lack of appropriate skills needed for export promotion in these countries.

One limitation of this study is the relatively short-span of the time series dimension of the panel dataset. It prevents us from considering as optimal the half-life time obtained in the analysis over the entire sample as well as different sub-samples. Therefore, the half-life period obtained applies to our period of study, 1998–2014. Nothwithstanding this, the advantage of the current study is to provide a first empirical insight into whether the impact of trade policy liberalisation on export performance in developed and developing countries is sustainable. An avenue for future research would be to examine again this topic once reliable trade policy variables exist over a very long period.

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APPENDIX 1

Definitions and sources of variables used in the analysis

Variable	**Definition**	**Source**
EXP	Exports of goods and services (% of GDP)	World Development Indicators (WDI) of the World Bank
TP	Trade Policy of the domestic economy = Trade Freedom Score; This is a component of the Economic Freedom Index. It is 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	Heritage Foundation http://www.heritage.org/issues/economic-freedom

	components: trade-weighted average tariff rate and non-tariff barriers (NTBs), the extent of the latter determined on the basis of available quantitative and qualitative 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 to 100, with a rise indicating lower trade barriers, i.e., higher trade liberalisation, while a decrease reflects rising trade protectionism.	
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 (i.e., for all other countries, except the one for which the variable is being calculated).	Author's calculation based on Heritage Foundation data.
GDP	Real GDP (constant 2010 prices)	WDI
REER	Real effective exchange rate (CPI based), Index Base 2005. A rise in this variable indicates an appreciation of the real effective exchange rate, whilst a decline is interpreted as a depreciation of the real effective exchange rate.	UNCTAD Database
FDI	Inward, in % GDP	UNCTAD Database
TERMS	Net barter terms of trade index	WDI
POP	Total Population	WDI
INST	This variable captures institutional quality in a given country. It has been computed by extracting the first principal component (based on factor analysis) of the following five indicators of governance: 'PolStab', 'RegQual', 'Ruleslaw', 'GovEff' and 'Cor'. 'PolStab' is the measure of political stability and absence of violence/terrorism. It reflects perceptions of the likelihood that the government will be destabilised or overthrown by unconstitutional or violent means, including politically motivated violence and terrorism. 'RegQual' stands for Regulatory Quality. This index reflects perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development. 'Ruleslaw' represents the Rules of Law index and reflects perceptions of the extent to which agents have confidence in and abide by the rules of society; in particular the quality of contract	Data on the components of 'INST' variables has been extracted from World Bank Governance Indicators developed by Kaufmann *et al* (2010) and recently updated.

enforcement, property rights, the police, the courts and the likelihood of crime and violence.

'GovEff' is the Government Effectiveness index and reflects perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies.

'Cor' is the index of corruption. It reflects perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as 'capture' of the state by elites and private interests.

It is worth noting that the values of each of these indicators range from – 2.5 to 2.5, with the lower values indicating 'worse' governance and institutional quality.

Appendix 2

List of countries included in the analysis – Entire Sample

Albania	Gambia, The	Niger
Algeria	Georgia	Nigeria
Angola	Germany	Norway
Argentina	Ghana	Oman
Armenia	Greece	Pakistan
Australia	Guatemala	Panama
Austria	Guinea	Papua New Guinea
Azerbaijan	Guinea-Bissau	Paraguay
Bahamas, The	Guyana	Peru
Bahrain	Haiti	Philippines
Bangladesh	Honduras	Poland
Barbados	Hong Kong SAR, China	Portugal
Belarus	Hungary	Qatar
Belgium	Iceland	Romania
Belize	India	Russian Federation
Benin	Indonesia	Rwanda
Bhutan	Iran, Islamic Rep.	Samoa
Bolivia	Ireland	Saudi Arabia
Bosnia and Herzegovina	Israel	Senegal
Botswana	Italy	Serbia
Brazil	Jamaica	Seychelles
Bulgaria	Japan	Sierra Leone
Burkina Faso	Jordan	Singapore
Burundi	Kazakhstan	Slovak Republic
Cabo Verde	Kenya	Slovenia
Cambodia	Korea, Rep.	Solomon Islands

Cameroon	Kuwait	South Africa
Canada	Kyrgyz Republic	Spain
Central African Republic	Lao PDR	Sri Lanka
Chad	Latvia	St. Lucia
Chile	Lebanon	St. Vincent and the Grenadines
China	Liberia	Sudan
Colombia	Libya	Suriname
Comoros	Lithuania	Swaziland
Congo, Dem. Rep.	Luxembourg	Sweden
Congo, Rep.	Macao SAR, China	Switzerland
Costa Rica	Macedonia, FYR	Tajikistan
Cote d'Ivoire	Madagascar	Tanzania
Croatia	Malawi	Thailand
Cyprus	Malaysia	Togo
Czech Republic	Maldives	Tonga
Denmark	Mali	Trinidad and Tobago
Djibouti	Malta	Tunisia
Dominica	Mauritania	Turkey
Dominican Republic	Mauritius	Uganda
Ecuador	Mexico	Ukraine
Egypt, Arab Rep.	Moldova	United Arab Emirates
El Salvador	Mongolia	United Kingdom
Equatorial Guinea	Morocco	United States
Eritrea	Mozambique	Uruguay
Estonia	Myanmar	Uzbekistan
Ethiopia	Namibia	Vanuatu
Fiji	Nepal	Venezuela, RB
Finland	Netherlands	Vietnam
France	New Zealand	Yemen, Rep.
Gabon	Nicaragua	Zambia

Appendix 3

Standard Descriptive Statistics

Variable	Observations	Mean	Standard Deviation	Minimum	Maximum
EXP	2,810	42.381	29.380	0.099	230.269
TP	2,856	64.303	23.003	0	95
MTP	2,856	68.452	5.418	59.686	75.062
GDPC	2,844	12483.510	17987.22	186.919	110001.1
REER	2,639	107.392	33.144	22.226	1013.695
FDI	2,856	4.956	8.779	-101.375	161.833
TERMS	2,666	110.113	33.196	21.397	290.904
INST	2,517	-0.074	2.198	-5.409	4.886

Appendix 4

Pairwise correlation among variables

	EXP	TP	MTP	GDPC	REER	FDI	TERMS	INST
EXP	1.0000							
TP	0.1648*	1.0000						
MTP	0.0740*	0.3310*	1.0000					
GDPC	0.3713*	0.3721*	0.0524*	1.0000				
REER	-0.0803*	0.0031	0.0694*	-0.1005*	1.0000			
FDI	0.3550*	-0.0213	0.0727*	0.0729*	-0.0410*	1.0000		
TERMS	0.0116	0.0607*	0.2605*	-0.0042	0.0966*	-0.0204	1.0000	
INST	0.3437*	0.3745*	-0.0054	0.7600*	-0.1767*	0.0906*	-0.1887*	1.0000

Notes: **p-value<0.1;*

Endnotes

1. World Trade Organisation**,** Rue de Lausanne 154, CH-1211 Geneva 21, Switzerland. E-mail: SenaKimm.Gnangnon@wto.org
This article represents the personal opinions of individual staff members of the WTO and is not meant to represent the position or opinions of the WTO or its Members, nor the official position of any staff members. The author would like to express his gratitude to Professors Simon Feeny and Tim Fry for their helpful comments on an earlier version of the paper. Any errors or omissions are the fault of the author.

2. The Freedom to Trade Internationally index is one of the component of the Economic Freedom Index computed by the Fraser Institute (for further details see online at: https://www.fraserinstitute.org/)

3. The Freedom to Trade Internationally index is one of the component of the Economic Freedom Index computed by the Heritage Foundation (for further details see online at: http://www.heritage.org/index/)

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