Aid for Trade, Export Product Diversification and Foreign Direct Investment

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Abstract

The few existing studies on the relationship between Aid for Trade (AfT) flows and Foreign Direct Investment (FDI) inflows tend to report a positive effect of total AfT flows, in particular of Aid flows for building economic infrastructure, on FDI inflows. The present article aims to complement these works by investigating whether the effect of AfT flows on inward FDI stock depends on recipient-countries' level of export product concentration. The empirical analysis has shown that AfT flows exert a strong positive effect on inward FDI stock in countries that experience a high level of export product concentration. These findings are relevant for developing countries in light of the concentration of their export products on primary commodities, and given the strong role of FDI flows for employment generation, economic growth and development in these countries.

1. Introduction

Since the launch of the Aid for Trade (AfT) Initiative at the 2005 Hong Kong Ministerial Conference of the World Trade Organization (WTO), a growing number of studies have looked at the effectiveness of the AfT inflows that accrue to developing countries. For example, several studies have examined the impact of AfT on recipient-countries' trade performance, in particular export performance (see for example a literature review in OECD-WTO, 2017). The objective of this Initiative is "to help developing countries, particularly LDCs build the supply-side capacity and trade-related infrastructure that they need to assist them to implement and benefit from WTO Agreements and more broadly to expand their trade" (see Paragraph 57 of the Hong Kong Ministerial Declaration, see WTO, 2005). According to the OECD (Organization of Economic Cooperation and Development), AfT could be classified into three major categories: AfT allocated for economic infrastructure (it encompasses aid for transport and storage, communications, and energy generation and supply); AfT related to productive capacity building (which includes banking and financial services, business and other services, agriculture, fishing, industry, mineral resources and mining, and tourism); and AfT allocated for trade policy and regulations (which mainly includes trade policy and regulations and trade-related adjustment interventions).

The trade effect of AfT flows has been the subject of many studies, but few studies (e.g., Lee and Ries, 2016; Donaubauer et al. 2016 and Ly-My and Lee, 2019) have considered the FDI effect of AfT flows. Lee and Ries (2016) have looked at the effect of AfT flows on FDI flows. At the same time, many studies have recommended that developing countries should diversify their export products basket away from primary commodities, in light of the positive effect of export product diversification on economic growth (e.g., Aditya and Acharyya, 2013; Can and Gozgor, 2017; De Pineres and Ferrantino, 1997; Mania and Rieber, 2019; Naudé et al. 2010; Herzer and Nowak-Lehmann, 2006), its dampening effect on export revenue instability (e.g., Athukorola, 2000; Kramarz et al. 2020; Osakwe, 2007; Prebisch, 1950; Singer, 1950; Stanley and Bunnag, 2001; Vannoorenberghe et al. 2016), or its negative effect on income inequality (e.g., Gnangnon, 2019a; Le et al. 2020). At the same time, Gnangnon (2019b) and Kim (2019) have obtained that AfT flows can be associated with greater export product diversification in recipient-countries. On the other hand, Gnangnon (2019c) has shown that countries that diversify their export product basket are likely to attract greater FDI inflows. Against this background, one can question whether AfT flows promote inward FDI in countries that diversify their export products basket or whether it is the other way around. The current paper tries to address this question, including by examining how AfT flows influence inward FDI for varying levels of export product diversification (or concentration). The empirical analysis uses a country/year framework in an unbalanced panel dataset comprising 126 countries over the period 2002–2017. It employs the two-step Generalized Methods of Moment (GMM) approach. The findings indicate that AfT interventions promote inward FDI in recipient-countries that have a higher degree of export product concentration.

The remainder of the article is organized around four sections. Section 2 discusses the theoretical impact of AfT on Inward FDI. Section 3 presents the empirical model and discusses the econometric methodology. Section 4 interprets the results, and Section 5 concludes.

2. Discussion On The Theoretical Impact Of Aid For Trade On Inward Fdi

2.1 Brief literature review on the FDI effect of development aid

An increasing number of studies have been devoted to the trade impact of AfT, but the literature on AfT effectiveness has paid little attention to the impact of AfT flows on foreign direct investment (FDI) inflows, although some studies have looked at the impact of

development aid (official development aid flows - ODA) in general or some of its components on inward FDI. For example, Kimura and Todo (2010) have developed the concept of “vanguard effect” of ODA in relation to FDI. They have argued that multinational firms from countries that provide development aid tend to engage in FDI in specific host countries, recipients of this ODA. This is because development aid also carries an ‘information effect’ for host countries, and helps foreign investors to get access to private information relating to aid recipient countries. In that respect, aid programmes could help donor-countries’ investors to collect data and devise business strategies in the recipient countries. Karakaplan et al. (2005) have found evidence that while development aid influences negatively inward FDI, its impact becomes positive when host countries improve their governance and experience developed financial systems. Blaise (2005) has obtained evidence that aid allocated for infrastructure projects influences positively Inward FDI. Beladi and Oladi (2006) have reported that development aid oriented towards public goods can crowd out FDI in the recipient country under a factor-intensity condition. Harms and Lutz (2006) have argued that when targeted in an appropriate way, aid could induce an ‘infrastructure effect’ and result in higher inward FDI. They have reported that development aid flows are complementary to inward FDI, specifically in countries where private agents face a substantial regulatory burden. According to Kosack and Tobin (2006), when aid is invested to support human capital, it does not affect inward FDI because in essence, FDIs are private flows and are expected to support physical capital. The role of development in mitigating FDI expropriation risk in sub-Saharan Africa and other low-income countries has been highlighted by Asiedu et al. (2009). At the same time, Bhavan et al. (2011) have found for South Asian countries that development aid exerts a positive impact on inward FDI to these countries, while Arazmuradov (2015) has obtained that development aid has exerted a moderate complementary effect on inward FDI in Central Asian economies. Selaya and Sunesen (2012) have demonstrated that aid invested in complementary inputs such as public infrastructure development (e.g., aid allocated for the construction of roads, electricity, …etc) and human capital investments raises the marginal productivity of capital, and induces higher inward FDI. However development aid in the form of physical capital transfers, i.e. directed towards productive sectors (such as agriculture, manufacturing, banking,…., etc) crowds out productive private investment. The authors, have therefore, concluded that for development aid to attract FDI flows without inducing capital flight, it should target complementary inputs so as to increase absorptive capacity in recipient-countries.

As it could be observed from this brief literature review on the impact of ODA on inward FDI in ODA-recipient countries, none of these studies have specifically focused on the impact of AfT on FDI, though many of them have examined the impact of some components of AfT such as development aid allocated to physical infrastructure on FDI.

2.2. Discussion on the effect of AfT flows on FDI, including through the export product diversification channel

As noted above, few studies (e.g., Lee and Ries, 2016; Donaubauer et al. 2016 and Ly-My and Lee, 2019). Lee and Ries (2016) have focused - not on the aggregate inward FDI - but rather on greenfield cross-border investment, to investigate in a bilateral donor-recipient framework (25 donors and 125 recipients over the period 2003–2013) the impact of AfT on greenfield investment. Their findings indicate that total AfT flows exert a positive and significant impact on greenfield investment, with this positive impact being mainly driven by AfT for trade-related infrastructure and AfT for building productive capacity. Interestingly, these positive impacts are mainly driven by the big 5 donor-countries - namely Japan, the United States, France, Germany, and Great Britain - which account for 80% of total AfT allocated to recipient-countries. The study further shows that the previously highlighted positive impacts of AfT on greenfield investment apply particularly to AfT recipients that are non-LDCs (countries that are not classified as Least developed countries), but not to LDCs. Donaubauer et al. (2016) have obtained empirically that by enhancing recipient-countries’ endowments with infrastructure in transportation, communication, energy, and finance, aid allocated to economic infrastructure is positively associated with FDI inflows into developing countries. The authors have concluded that only target aid promotes indirectly inward FDI through the infrastructure channel (other aid has appeared to be non effective in improving infrastructure). Ly-My and Lee (2019) have investigated the effects of AfT on greenfield FDI flows in recipient-countries. They have shown that AfT interventions are associated with an increase in the dollar value of FDI flows to the recipient countries, and helped diversify the greenfield projects and source countries of these FDI inflows. Interestingly, AfT interventions have been positively associated with greenfield FDI flowing from donor (developed) countries than those coming from non-donor (developing) countries. Concerning total AfT components, the authors have found a positive effect of AfT for economic infrastructure and AfT for trade policy and regulation on greenfield FDI. Additionally, this effect is higher for FDI sourced from developed countries than FDI sourced from developing ones. In

contrast, AfT for productive capacity building has affected positively greenfield FDI from donor countries, although they have negatively influenced greenfield FDI flows from non-donor countries.

At the outset, we argue that as donors take into account recipient-countries' characteristics when deciding the amount of AfT to allocate to recipient-countries, it is possible that they reduce AfT flows to developing countries that experience higher inward FDI. This is because donors may believe that developing countries that experience higher inward FDI are now receiving higher foreign capital flows that could substitute to AfT in promoting their trade performance. Additionally, when aid recipient-countries experience reversals of FDI flows, AfT could increase in order to fill the gap left by FDI flows reversals. Taken these arguments together, we can expect that AfT would substitute to FDI flows to developing countries, i.e., higher AfT flows would be associated with lower FDI flows.

We also postulate that the net impact of AfT on inward FDI would depend on the category of AfT considered as found by the few existing studies cited above, i.e., whether the AfT considered is AfT allocated for economic infrastructure, AfT for productive capacity building or AfT for trade policies and regulations. Additionally, as the analysis is focusing on the aggregate inward FDI, the impact of total AfT on inward FDI could also depend on the influence of each of the three categories of AfT flows on different types of inward FDI: the latter can be horizontal FDI, vertical FDI, export-platform FDI and complex-vertical FDI (for example, see Fugazza and Trentini, 2014 for details on these types of FDI flows). As the current analysis is being conducted on the aggregate inward FDI and given that we do not have data on the different types of FDI mentioned above, it would be difficult to evaluate empirically how the net impact of total AfT on aggregate inward FDI could be explained by the impact of AfT categories on the different types of FDIs.

Let us now consider how each AfT component influences the aggregate FDI flows.

Foreign private investors can not directly finance the development of economic infrastructure (unless this takes place through public-private partnerships) in recipient-countries, nor could they finance the objectives intended by the AfT interventions for trade policies and regulations. In this context, AfT for economic infrastructure and AfT for trade policies and regulations could attract inward FDI and, therefore, be complementary with FDI. In the same vein, Lee and Ries (2016) have noted that AfT dedicated to economic infrastructure would help reduce the costs of selling to host-country consumers and establishing export platforms or other links in the global production chain (see also Calì and TeVelde, 2011 and Vijil and Wagner, 2012). This would, in turn, attract multinational firms (such as export platform FDIs and complex vertical FDIs) that aim to invest in the international trade activities of the host-country, and even those capital inflows (such as horizontal FDIs) that intend to serve the host-country's domestic market. Indeed, by helping enhance production and export facilities, AfT for economic infrastructure would contribute to reducing trade costs, and generate higher inward FDI. In this regard, a number of studies have reported that trade costs reduction induces higher inward FDI. For example, Duval and Utoktham (2014) have used bilateral data for both OECD and developing countries in Asia and the Pacific and shown evidence that while host-countries' quality of business regulatory environment generally matters most to attract Inward FDI, lower international trade costs (excluding tariffs) also positively influence inward FDI. Similarly, Haque et al. (2017) have shown that a lower trade cost on the intermediate goods (with or without trade costs reduction on the final goods) increases the incentives for FDI in the final goods market.

With respect to AfT for productive capacity building, Lee and Ries (2016) have argued that it could help attract both multinational enterprises that intend to engage in FDI geared towards international trade activities. This is for example the case for aid for agricultural research which could encourage investment in downstream food processing (e.g., Lee and Ries, 2016). However, Selaya and Sunesen (2012) have demonstrated that aid invested in physical capital, i.e. directed towards productive sectors (such as agriculture, manufacturing, banking..etc) crowds out FDI. This is because by enhancing investment in physical capital in recipient-countries, which could have been financed by private investors including foreign investors, AfT programmes for productive capacity building would induce lower inward FDI. As a result, higher AfT for productive capacity building would be associated with lower inward FDI.

Let us now turn to AfT allocated for trade policies and regulations. These AfT interventions help to mitigate trade costs associated with inefficient trade procedures, notably by reducing administrative costs and regulatory bottlenecks to trade (e.g., Calì and TeVelde, 2011; Busse, Hoekstra, and Königer, 2012). Inefficient trade procedures, which increase the transaction costs of both domestic firms' exports of own goods and their import of necessary intermediates, and hence decrease the likelihood that a multinational will locate

in this country (see Persson, 2012: page 18). In particular, one component of AfT allocated to trade policies and regulations, which is AfT for trade facilitation helps reduce trade costs and thus enhances the competitiveness of domestic firms in the international trade market. In that respect, Beverelli et al. (2017) have shown that trade facilitation is conducive to export diversification; and Hoekman and Nicita (2009)have concluded that a relatively small reduction in trade costs will generate larger trade impacts than what could emerge even from a relatively ambitious market access outcome from the Doha Development negotiations Round in the World Trade Organization. The authors have then recommended that additional aid for trade should help assist countries in covering the costs of improving trade-related procedures and processes. Taken all these arguments together, we expect thatAfT related to trade policies and regulations would exert a positive impact on Inward FDI oriented towards the international trade activities in the host-country. One another note, AfT interventions also aim to enhance the capacity of policymakers in developing countries to devise appropriate trade policies that would match with their commitments at the WTO and their trade development strategies (for example Gnangnon, 2018a who has shown that AfT allocated to trade policies and regulations is conducive to trade policy liberalization in recipient-countries). By complying with their commitments at the WTO, as well as with WTO agreements, beneficiaries of AfT allocated to trade policies and regulations would send the signals to foreign investors (including multinationals aiming to engage in FDIs) that their recipients' trade policies are predictable and transparent. This would in turn attract FDIs that aim to set up plants in the host-country and export to the host-country's trading partners. Overall, the direction of the impact of AfT flows on inward FDI is uncertain and remains an empirical matter.

On the other hand, the few existing studies on the export product diversification of AfT interventions have revealed relatively mixed evidence. Gnangnon (2019b) has shown that AfT interventions are associated with greater export product diversification. Kim (2019) has obtained that total aid for trade has reduced export product concentration in the short term, with this negative effect on export product concentration being solely driven by AfT related to productive capacity building. However, in the long term, there is no significant effect of AfT on export product diversification. In connection to these findings, Hühne et al. (2014) have obtained empirically that while AfT flows have been associated with greater exports of manufactures in recipient-countries, these capital inflows have exerted no significant effect on recipient-countries' exports of primary commodities. In the same vein, Gnangnon (2018b) has examined empirically the effect of AfT flows on recipient-countries' export structure, and reported that AfT interventions have positively influenced exports of low-skill and technology-intensive manufactures, and high-skill and technology-intensive manufactures, but have exerted no significant effect on medium-skill and technology-intensive manufactures. At the same time, Gnangnon (2019c) has shown that countries that diversify their export product basket are likely to attract greater FDI inflows. Taking together these findings, one may be tempted to argue that AfT flows could promote inward FDI into countries that enjoy a greater level of export product diversification. However, as the effect of AfT flows on export product diversification including towards manufacturing export products is unclear, one might also obtain that AfT flows would promote inward FDI in countries that experience a greater export product concentration. In other words, multinational enterprises would setup plants in countries that experience a high degree of export product concentration (including on primary commodities) with a view to taking advantage of AfT interventions in terms of reducing trade costs, enhancing productive capacity and production and export of goods and services. Summing-up, the extent to which the effect of AfT flows on FDI inflows depends on recipient-countries' level of export product concentration is an empirical issue.

3. Model And Empirical Strategy

The analysis primarily utilizes the two-step system Generalized Methods of Moments (GMM) estimator developed by Arellano and Bover (1995) and Blundell and Bond (1998) for dynamic panels with a small-time dimension and large cross-section. This estimator captures the impact of the lagged Inward FDI on current inward FDI, and helps deal with the endogeneity bias arising from the correlation between the unobserved country-specific effects and the lagged dependent variable. The two-step system GMM has also the advantage of addressing endogeneity concerns relating to the bi-directional causality between regressors and the dependent variable in the dynamic panel models. It involves the combination of the estimation of an equation in differences with an equation in levels where lagged first differences are used as instruments for the levels equation and lagged levels are used as instruments for the first-difference equation. Incidentally, this estimator has many advantages over the difference-GMM estimator developed by Arellano and Bond (1991). Indeed, Arellano and Bover (1995) and Blundell and Bond (1998) have pointed out that in the context where the explanatory variables are persistent over time, instrumenting in the difference GMM approach the endogenous variables by the lagged values of the first difference of these variables generates weak instruments. The two-step system GMM estimator uses additional moment conditions and therefore helps reduce the potential biases and imprecision associated with the difference

estimator. Roodman (2009) has additionally noted that in the context of unbalanced panel dataset, the difference GMM estimator has a weakness of magnifying gaps. The appropriateness of the two-step system GMM estimator is assessed by using the following diagnostic tests. The first test is the Arellano-Bond test of first-order serial correlation in the error term (denoted AR(1)) and no second-order autocorrelation in the error term (denoted AR(2)). The second test is the Sargan test of over-identifying restrictions (OID), which determines the validity of the instruments used in the estimations. As the use of too many instruments (in particular if the number of instruments is higher than the number of countries) reduces the power of the afore-mentioned tests, including the Sargan test (e.g., Ziliak, 1997; Bowsher, 2002; Roodman, 2009), we also report the number of instruments used in the analysis.

Drawing from the empirical literature on the macroeconomic determinants of inward FDI, we postulate the following baseline model:

$$FDI_{it} = \alpha_0 + \alpha_1 FDI_{it-1} + \alpha_2 AfT_{it} + \alpha_3 [AfT_{it} * EXCONC_{it}] + \alpha_4 EXCONC_{it} + \alpha_5 NonAfTTOT_{it} + \alpha_6 GDPC_{it} + \alpha_7 GROWTH_{it} + \alpha_8 EDU_{it} + \alpha_9 TP_{it} + \alpha_{10} INFL_{it} + \alpha_{11} INST_{it} + \alpha_{12} POP_{it} + \mu_i + \omega_{it} \quad \textbf{(1)}$$

where i represents the country's index; t denotes the time-period. α0 to α12 are parameters to be estimated. μi are countries' fixed effects; ωit is a well-behaving error term. The analysis uses an unbalanced panel dataset comprising 123 countries over the period 2002–2017. The choice of this set of countries and the period is dictated by data availability. In order to mitigate short term fluctuations and capture medium term effects of variables under analysis (in particular the variable of interest), the analysis uses non-overlapping sub-periods of 3-year average, which include 2002–2004; 2005–2007; 2008–2010; 2011–2013; and 2014–2017.

The dependent variable "FDI" is the measure of the inward foreign direct investment in stock. It can be the real values of inward FDI (constant 2010 US$ prices), computed by multiplying the inward Foreign Direct Investment stock (% of GDP) by the real GDP (constant 2010 US$) (e.g., Nagel et al., 2015 and Herzer, 2011). This variable is denoted "FDICST". For robustness check, the variable "FDI" is also measured by "FDIGDP", which is the inward FDI stock, expressed as a percentage of the recipient-country's GDP.

"AfT" is the real gross AfT disbursement that accrues to a country. It can be either the total real gross AfT disbursements - denoted "AFTTOT" - or its components. The latter include AfT for economic infrastructure, denoted "AfTINFRA", AfT for building productive capacity, denoted "AfTPROD", and AfT allocated for trade policies and regulations, denoted "AfTPOL". All AfT variables have been expressed in constant prices 2016, US Dollar.

"EXCONC" is the index of export product concentration. The latter is primarily measured by the Herfindahl-Hirschmann Index of export product concentration computed by the United Nations Conference on Trade and Development (UNCTAD). Its values range between 0 and 1, with higher values reflecting a higher export concentration on a few products. In contrast, values of this index closer to 0 reflect a homogenous distribution of exports among a series of products. For robustness check analysis, we use the index of export product diversification computed as the absolute deviation of a country's export structure from world's export structure, based on the modified Finger-Kreinin (1979) measure of similarity in trade. This indicator, denoted "FKIEDI", takes values between 0 and 1, with values closer to 1 reflecting a greater divergence of a country's export structure from the world's export structure. Values of the indicator closer to 0 indicate a greater convergence of a country's export structure towards the world's exports structure.

All variables contained in model (1) have been standardized so as to avoid measurement problems of variables, and make comparable the related estimates (arising from the estimations). The standardized procedure involves, for each variable, the computation of the ratio of the difference between the variable and its mean (average) to the standard deviation of this variable. This procedure leads to the removal of time dummies from model (1) as their standardized values amount to zero.

Control variables are drawn from the literature of the macroeconomic determinants of inward FDI and consist mainly of those determinants that are likely to influence the impact of AfT on inward FDI. These variables include: the host-countries' market size proxied by the host-countries' real their capita income (which simultaneously acts as a proxy for the country's development level, denoted "GDPC"), the host-country's economic growth rate (denoted "GDPGR") and the host-country's size of their population (denoted "POP"). Other control variables include the level of human capital accumulated, proxied by the education level, i.e., the

secondary school enrolment rate; trade policy (denoted “TP”), and the institutional and governance quality (denoted “INST”). Indeed, many studies (e.g., Chakrabarti, 2001; Asiedu, 2002; Busse and Hefeker, 2007; Vo and Daly, 2007 and Boateng et al. 2015) have underlined that domestic market size of a host-country influences inward FDI to this country. Likewise, many studies (recent ones include for example, Asiedu, 2006, Trevino et al. 2008; and Okafor et al. (2015) have shown that human capital accumulation influences positively Inward FDI. The impact of trade policy liberalization/or trade openness (which is an outcome of several policies, including trade policy liberalization) on inward FDI has been largely investigated in the literature. This impact depends on the types of inward FDI that enter a country. For example, according to the tariff-jumping hypothesis, higher tariffs (or higher trade restrictive measures) would attract horizontal type Inward FDI, which aim to be protected from import competition in the host-country (e.g., Markusen, 1984; Markusen and Venables, 1995). At the same time, vertical Inward FDI are likely driven by trade policy liberalization (e.g., Helpman and Krugman, 1985). Similarly, export platform FDI and complex-vertical Inward FDI increase in the context of trade policy liberalization (e.g., Fugazza and Trentini, 2014). Many empirical analyses (e.g., Mina, 2007; Trevino et al. 2008, Asiedu and Lien, 2011; Boateng et al. 2015; Gnangnon, 2017; Gnangnon and Iyer, 2017) have uncovered a positive impact of trade liberalization (or trade openness) on Inward FDI. Overall, while a positive impact of trade policy liberalization on inward FDI could be expected in the current analysis, it is worth emphasizing that a negative or a statistical nil impact could also be obtained, because the observed impact might reflect the impact of trade policy on the different types of Inward FDI.

Let us turn to the expected effect of NonAfT flows on inward FDI. As noted above, Selaya and Sunesen (2012) have found that development aid allocated for the enhancement of human capital is associated with higher inward FDI. As this type of aid is included in the category on NonAfT flows, one can expect a rise in NonAfT flows to be associated with a rise in inward FDI. As NonAfT flows are primarily invested in the non-tradable sector, they might affect inward FDI through their effect on the real exchange rate. On the one hand, development aid flows (including flows invested in the non-tradable sector) can be associated with the appreciation of the real exchange rate (e.g., Addison and Baliamoune-Lutz, 2017; Adu and Denkyirah, 2018; Elbadawi, 1999; Ouattara and Strobl, 2008). As an appreciation of the real exchange rate can lead to lower FDI inflows (e.g., Caves, 1989; Blonigen, 1997; Froot and Stein, 1991; and Vijayakumar et al. 2010), one can expect NonAfT flows to be associated with lower FDI inflows.

With respect to the inward FDI effect of institutional and governance quality, there is a large consensus in the literature that good institutional and governance quality promotes inward FDI (e.g., Busse and Hefeker, 2007; Bevan et al. 2004; Ali et al., 2010; Buchanan et al., 2012).

In all regressions performed with the two-step system GMM estimator, variables measuring “AfT” and the variables “TP”, “INST” are considered as endogenous, whereas the variables “EDU” and GDPGR” have been considered as predetermined. The other variables have been considered as exogenous.

We provide an insight into the relationship between “AfTTOT” and “FDICST” variables (unstandardized variables), by using non-overlapping sub-periods of 3-year average data for the period 2002–2017 over the full sample. Thus, we present in Figure 1 the developments of “AfTTOT” and “FDICST”. Figure 2 shows the correlation pattern (in the form of cross-plot) between total AfT flows and the real inward FDI stock. It can be noted from Figure 1 that total AfT flows and real inward FDI have moved in the same direction. Total AfT flows increased, on average over the full sample, from US$ 93.8 million in 2002–2004 to US$ 272 million in 2014–2017. At the same time, real FDI moved from US$ 2060 billion in 2002–2004 to US$ 4910 billion in 2014–2017. Both the left-hand side graph (based on unstandardized variables) and the right-hand side graph (based on standardized variables) of Figure 2 show a positive correlation between total AfT flows and real inward FDI stock. However, the outliers present on the left-hand side graph do not appear on the right-hand side graph.

Overall, the empirical analysis proceeds as follows. First, we estimate variants of model (1) without the variable “ECI” and its interaction with the variable “AfT”. The variants of model (1), therefore, include total AfT flows as well as its components. These variants of model (1) merely aim to examine the effect of AfT flows variables on real inward FDI stock. The results of these estimations are presented in Table 1. Second, we estimate model (1) as it stands, including with both total AfT as well as its components (this leads to the estimation of several specifications of model (1)). The results of these different model specifications with the variable “ECI” (as measure of “EXCONC”) are reported in Table 2, whereas results of these model specifications with “FKEDI” as measure of “EXCONC” are provided in Table 3. Finally, we use “FDIGDP” as the measure of “FDI” and estimate different other specifications of model (1), including with total AfT flows and the components of the latter. The outcomes of these different specifications of model (1) are displayed in Table 4.

Appendix 1 provides the description and source of all variables used in the analysis, while Appendix 2 presents the list of the 123 AfT recipient-countries. Appendix 3 reports descriptive statistics on unstandardized variables.

4. Analysis Of Estimations' Results

Before interpreting the outcomes of estimations reported in Tables 1 to 4, it is important to discuss the results of the diagnostic tests that allow assessing the validity of the two-step system GMM approach. First, we note that the coefficients of the one-period lag of the dependent variable is always positive and statistically significant at the 1% level, thereby confirming the persistence of inward FDI stock over time. Second, it could be observed at the bottom of all columns of these Tables that the p-values associated with the AR(1) test are always lower than 0.05 (the 5% level of statistical significance), while the p-values relating to AR (2) test are higher than 0.10, i.e, the 10% level of statistical significance. Incidentally, the p-values relating to the Sargan test are always higher than 0.10, and the number of countries is always higher than the number of instruments. Based on these different results, we conclude that the two-step system GMM estimator is well suitable for the empirical analysis.

Let us now start with the interpretation of results reported in Table 1. Estimates in column [2] of this Table suggest that total AfT exerts a positive and significant (at the 1% level) effect on inward FDI stock. In particular, a 1 standard deviation increase in total AfT flows leads to a 0.09 standard deviation rise in inward FDI stock. However, this positive effect is essentially driven by the positive effect (and of the same magnitude) of AfT flows allocated to the build-up of economic infrastructure on inward FDI stock. In fact, we obtain no significant effect (at the conventional levels) of AfT flows for productive capacity building and AfT flows for trade policy and regulation on inward FDI stock. These outcomes are perfectly in line with studies of Selaya and Sunesen (2012) and Donaubauer et al. (2016). Across the four columns of Table 1, NonAfT flows appear to exert no significant effect on inward FDI stock. At the same time, trade policy liberalization is negatively associated with inward FDI stock, and this reflects the fact that FDI move to countries that raise trade barriers. This outcome may hide different impacts on various types of FDIs, so that the net impact on the aggregate inward FDI is negative. However, we do push forward this analysis of trade policy liberalization on inward FDI, as it is not the main subject of the current study. Similarly, economic growth rate influences negatively inward FDI stock. This is in line with the findings by authors such as Buchanan et al. (2012) and Jensen (2003). One explanation of this finding is that a lower economic growth rate can be associated with greater opportunities for future profits and promote inward FDI, notably in countries that are relatively capital poor, but endowed with relatively abundant supply of cheap (underemployed or unemployed) labor and natural resources. Among other control variables, higher real per capita income, a rise in the education level, lower inflation rates, and a rise in the population size affect positively and significantly inward FDI stock. The quality of institutions and governance does not affect inward FDI stock, at the conventional levels. Focusing on results in column [1], we note that among all variables, total AfT flows contribute the least to the stock of inward FDI. This is because the estimate associated with this variable holds the lowest absolute value compared to the estimates related to other variables (except those estimates that are not statistically significant). However, this rank of total AfT flows may change when interacted with export product concentration variables.

We now consider results in Table 2. Results in column [1] of this Table show positive and significant (at the 1% level) coefficients of both “AfTTOT”, and the interaction variable “AfTTOT*ECI”. The combination of these two outcomes indicates that total AfT flows consistently induce higher inward FDI stock in countries that experience a higher level of export product concentration, and the higher the level of export product concentration, the greater is the magnitude of the positive effect of total AfT flows on inward FDI stock. The same findings apply to AfT for economic infrastructure (see column [2], which displays the same patterns of results as those presented in column [1] of Table 2. This signifies that AfT for economic infrastructure promotes inward FDI stock in countries that experience a higher level of export product concentration. For results related to AfT for productive capacity (see column [3] of Table 2) and outcomes associated with AfT for trade policy and regulation (see column [4] of Table 2), we find that the coefficients of the variables “AfTPROD” and “AfTPOL” are not significant at the conventional levels, whereas the interaction of each of these two variables with the variable “ECI” shows a positive and significant coefficient at the 1% level. We conclude that both AfT flows for productive capacity, and AfT flows for trade policy and regulation induce greater inward FDI stock in countries that have a high degree of export product concentration: the higher the level of export product concentration, the greater is the magnitude of the positive effect of AfT flows for productive capacity, and AfT flows for trade policy and regulation on inward FDI stock.

The findings in columns [1] to [3] of Table 3 align well with those in columns [1] to [3] of Table 2, as the coefficients of AfT variables are positive and significant at the 1% level in the first two columns of the Table, but not significant in column [3] of the Table.

Meanwhile, the interaction term associated with the interaction variable between the relevant AfT variable and the indicator “FKEDI” are all positive and significant at the 1% level in columns [1] to [3]. Overall, we conclude that total AfT flows, as well as AfT flows for economic infrastructure and AfT flows for productive capacity exert a positive effect on inward FDI stock in countries whose export product structure diverges from the world’s export structure: the greater the level of the divergence between countries’ export product structure and the world’s export product structure, the higher is the magnitude of the positive effect of these AfT flows on inward FDI stock. Finally, we observe from column [4] of Table 3 that neither the variable “AfTPOL” nor its interaction with the variable “FKEDI” show significant coefficients at the conventional levels. We deduce that AfT flows related to trade policy and regulation exert no influence on inward FDI stock, and additionally, there is no significant effect of AfT related to trade policy and regulation on inward FDI for varying countries’ levels of export product concentration.

Taking up the results in Table 4, we note from columns [1] to [3] and columns [5] to [7] that the interaction terms associated with the interaction between the relevant AfT variable and the variable “ECI” or “FKEDI” are all positive and significant at the 1% level. These, therefore, suggest that the effect of total AfT flows, as well as AfT flows for economic infrastructure and AfT flows for productive capacity on inward FDI stock (% GDP) is positive, and its magnitude increases as countries experience a rise in their level of export product concentration, or as their export product structure diverges from the world’s export product structure. However, there is no significant effect of AfT related to trade policy and regulation on inward FDI stock (% GDP) for varying countries’ levels of “ECI” or “FKEDI” variables.

Results concerning the control variables in Tables 2 to 4 are broadly in line with those displayed in Table 1. In particular, we note that improvement in institutional and governance quality is sometimes positively and significantly associated with inward FDI stock, finding which was not observed in Table 1.

5. Conclusion

This article examines whether the effect of AfT flows on inward FDI stock in recipient-countries depends on the latter’s level of export product concentration. Using a sample of 123 countries over the period 2002–2017, the analysis has shown that total AfT flows exert a positive effect on inward FDI stock in countries that experience a high level of export product concentration (or countries whose export products structure diverges from the world’s export products structure), and the higher the degree of export product concentration (or the degree of divergence of export product structure from the world’s export product structure), the greater is the magnitude of total AfT flows on inward FDI stock. These results apply also to two components of total AfT flows, namely AfT flows for economic infrastructure and AfT flows for productive capacity. However, the effect of AfT related to trade policy and regulation on inward FDI stock does not depend on recipient-countries ' level of export product concentration or its degree of export structure divergence from the world’ export product structure.

Overall, these outcomes show that AfT flows, in particular AfT interventions for economic infrastructure and AfT interventions for productive capacity building, are very useful in attracting FDI flows into recipient-countries (that are developing countries) insofar as these countries experience a high degree of export product concentration. This is particularly important for developing countries, as the majority of the latter are known to rely on export of products with low-value addition, including primary commodities. This is likely explained by the fact multinational enterprises engage in FDI in host-countries (beneficiaries of AfT flows) with a view to taking full advantage of these capital flows, in terms of building economic infrastructure (so as to reduce trade costs) and enhancing productive capacity. These findings should encourage donor-countries to substantially increase AfT flows to developing countries, in particular many of these countries experience a high degree of export product concentration on primary products, and given that inward FDI plays an essential role in employment generation, and eventually economic growth and economic development in host countries.

Declarations

Disclaimer

This is a working paper, which represents the personal opinions of individual staff members and is not meant to represent the position or opinions of the WTO or its Members, nor the official position of any staff members. Any errors or omissions are the fault of the author.

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Tables

Table 1: Impact of the AfT on real FDI stock
Estimator: Two-Step System GMM

Variables	FDICST	FDICST	FDICST	FDICST
	(1)	(2)	(3)	(4)
$FDICST_{t-1}$	0.506***	0.516***	0.506***	0.463***
	(0.0343)	(0.0353)	(0.0314)	(0.0310)
AfTTOT	0.0895***			
	(0.0324)			
AfTINFRA		0.0890***		
		(0.0263)		
AfTPROD			0.00886	
			(0.0230)	
AfTPOL				0.0261
				(0.0302)
NonAfTTOT	0.0119	0.00917	0.0203	0.0532
	(0.0325)	(0.0343)	(0.0292)	(0.0338)
GDPC	0.274***	0.311***	0.325***	0.298***
	(0.0425)	(0.0398)	(0.0419)	(0.0374)
GROWTH	-0.185***	-0.177***	-0.201***	-0.223***
	(0.0272)	(0.0282)	(0.0241)	(0.0269)
EDU	0.0452	0.0949***	0.0599**	0.0688***
	(0.0290)	(0.0254)	(0.0298)	(0.0255)
TP	-0.232***	-0.253***	-0.198***	-0.183***
	(0.0326)	(0.0341)	(0.0360)	(0.0344)
INFL	-0.185***	-0.152***	-0.186***	-0.234***
	(0.0311)	(0.0323)	(0.0313)	(0.0308)
INST	0.0349	0.0395	0.0308	0.0400*
	(0.0262)	(0.0257)	(0.0251)	(0.0240)
POP	0.289***	0.256***	0.274***	0.277***
	(0.0300)	(0.0322)	(0.0286)	(0.0338)
Constant	0.269***	0.266***	0.267***	0.259***
	(0.0175)	(0.0182)	(0.0178)	(0.0176)
Observations - Countries	430 - 123	429 - 123	430 - 123	429 - 123
Number of Instruments	87	87	87	87
AR1 (P-Value)	0.0090	0.0086	0.0102	0.0068
AR2 (P-Value)	0.2298	0.3458	0.2279	0.2724
OID (P-Value)	0.3539	0.3118	0.3078	0.4577

*Note: *p-value<0.1; **p-value<0.05; ***p-value<0.01. Robust Standard Errors are in parenthesis. In the two-step system GMM estimations, AfT variables, as well as the variables "NonAfTTOT, EDU, GROWTH, INFL, T,P INST" have been considered as endogenous. The variable "POP" has been considered as exogenous. All variables have been standardized.*

Table 2: Impact of the AfT on real FDI stock for varying levels of export product concentration ("ECI")
Estimator: Two-Step System GMM

Variables	FDICST	FDICST	FDICST	FDICST
	(1)	(2)	(3)	(4)
$FDICST_{t-1}$	0.459***	0.467***	0.477***	0.445***
	(0.0251)	(0.0231)	(0.0228)	(0.0217)
AfTTOT	0.143***			
	(0.0220)			
AfTTOT*ECI	0.194***			
	(0.0238)			
AfTINFRA		0.0971***		
		(0.0214)		
AfTINFRA*ECI		0.232***		
		(0.0252)		
AfTPROD			-0.00204	
			(0.0166)	
AfTPROD*ECI			0.142***	
			(0.0241)	
AfTPOL				0.00870
				(0.0191)
AfTPOL*ECI				0.101***
				(0.0239)
ECI	-0.0542***	-0.0955***	-0.0534***	-0.0770***
	(0.0178)	(0.0191)	(0.0189)	(0.0236)
NonAfTTOT	-0.0351	-0.0212	0.0159	0.0466**
	(0.0232)	(0.0231)	(0.0210)	(0.0215)
GDPC	0.256***	0.345***	0.326***	0.275***
	(0.0245)	(0.0273)	(0.0240)	(0.0227)
GROWTH	-0.141***	-0.133***	-0.186***	-0.227***
	(0.0209)	(0.0204)	(0.0186)	(0.0156)
EDU	0.0747***	0.0839***	0.0776***	0.0838***
	(0.0208)	(0.0268)	(0.0243)	(0.0194)
TP	-0.209***	-0.210***	-0.162***	-0.191***
	(0.0282)	(0.0265)	(0.0241)	(0.0203)
INFL	-0.172***	-0.179***	-0.183***	-0.252***
	(0.0234)	(0.0236)	(0.0226)	(0.0204)
INST	0.0530***	0.0299*	0.0562***	0.0830***
	(0.0151)	(0.0179)	(0.0213)	(0.0186)
POP	0.272***	0.235***	0.269***	0.276***
	(0.0250)	(0.0261)	(0.0241)	(0.0215)
Constant	0.258***	0.256***	0.253***	0.226***
	(0.0131)	(0.0136)	(0.0135)	(0.0120)
Observations - Countries	430 - 123	429 - 123	430 - 123	429 - 123
Number of Instruments	105	105	105	105
AR1 (P-Value)	0.0046	0.0058	0.0071	0.0037
AR2 (P-Value)	0.2036	0.1776	0.2216	0.2806
OID (P-Value)	0.5242	0.7010	0.3908	0.1737

*Note: *p-value<0.1; **p-value<0.05; ***p-value<0.01. Robust Standard Errors are in parenthesis. In the two-step system GMM estimations, AfT variables, the variables "ECI, NonAfTTOT, EDU, GROWTH, INFL, TP, INST" as well as interaction variables have been considered as endogenous. The variable "POP" has been considered as exogenous. All variables have been standardized. The regressions have used a maximum of 3 lags of the dependent variable as instruments, and a maximum of 4 lags of endogenous variables as instruments.*

Table 3: Impact of the AfT on real FDI stock for varying levels of export product concentration ("FKEDI")
Estimator: Two-Step System GMM

Variables	FDICST	FDICST	FDICST	FDICST
	(1)	(2)	(3)	(4)
$FDICST_{t-1}$	0.477***	0.483***	0.526***	0.442***
	(0.0249)	(0.0250)	(0.0260)	(0.0225)
AfTTOT	0.200***			
	(0.0220)			
AfTTOT*FKEDI	0.154***			
	(0.0201)			
AfTINFRA		0.136***		
		(0.0245)		
AfTINFRA*FKEDI		0.0862***		
		(0.0228)		
AfTPROD			0.0161	
			(0.0141)	
AfTPROD*FKEDI			0.0802***	
			(0.0175)	
AfTPOL				0.0302
				(0.0225)
AfTPOL*FKEDI				-0.0128
				(0.0229)
FKEDI	-0.00507	0.0151	0.00834	-0.0106
	(0.0175)	(0.0183)	(0.0157)	(0.0188)
NonAfTTOT	-0.0603**	-0.0463**	-0.0331	0.0527***
	(0.0290)	(0.0221)	(0.0201)	(0.0175)
GDPC	0.203***	0.300***	0.295***	0.285***
	(0.0265)	(0.0329)	(0.0211)	(0.0236)
GROWTH	-0.184***	-0.196***	-0.188***	-0.219***
	(0.0179)	(0.0215)	(0.0179)	(0.0195)
EDU	0.0950***	0.126***	0.156***	0.105***
	(0.0197)	(0.0226)	(0.0179)	(0.0174)
TP	-0.261***	-0.267***	-0.244***	-0.157***
	(0.0272)	(0.0239)	(0.0198)	(0.0213)
INFL	-0.163***	-0.162***	-0.136***	-0.256***
	(0.0237)	(0.0245)	(0.0228)	(0.0218)
INST	0.0768***	0.0424*	0.0689***	0.0519***
	(0.0251)	(0.0237)	(0.0230)	(0.0173)
POP	0.280***	0.247***	0.282***	0.242***
	(0.0295)	(0.0304)	(0.0205)	(0.0200)
Constant	0.255***	0.248***	0.274***	0.233***
	(0.0124)	(0.0115)	(0.0128)	(0.0122)
Observations - Countries	430 - 123	429 - 123	430 - 123	429 - 123
Number of Instruments	105	105	105	105
AR1 (P-Value)	0.0015	0.0026	0.0032	0.0046
AR2 (P-Value)	0.4392	0.4960	0.3011	0.3898
OID (P-Value)	0.4787	0.3211	0.4190	0.2659

*Note: *p-value<0.1; **p-value<0.05; ***p-value<0.01. Robust Standard Errors are in parenthesis. In the two-step system GMM estimations, AfT variables, the variables "FKEDI, NonAfTTOT, EDU, GROWTH, INFL, TP, INST" as well as interaction variables have been considered as endogenous. The variable "POP" has been considered as exogenous. All variables have been standardized. The regressions have used a maximum of 3 lags of the dependent variable as instruments, and a maximum of 4 lags of endogenous variables as instruments.*

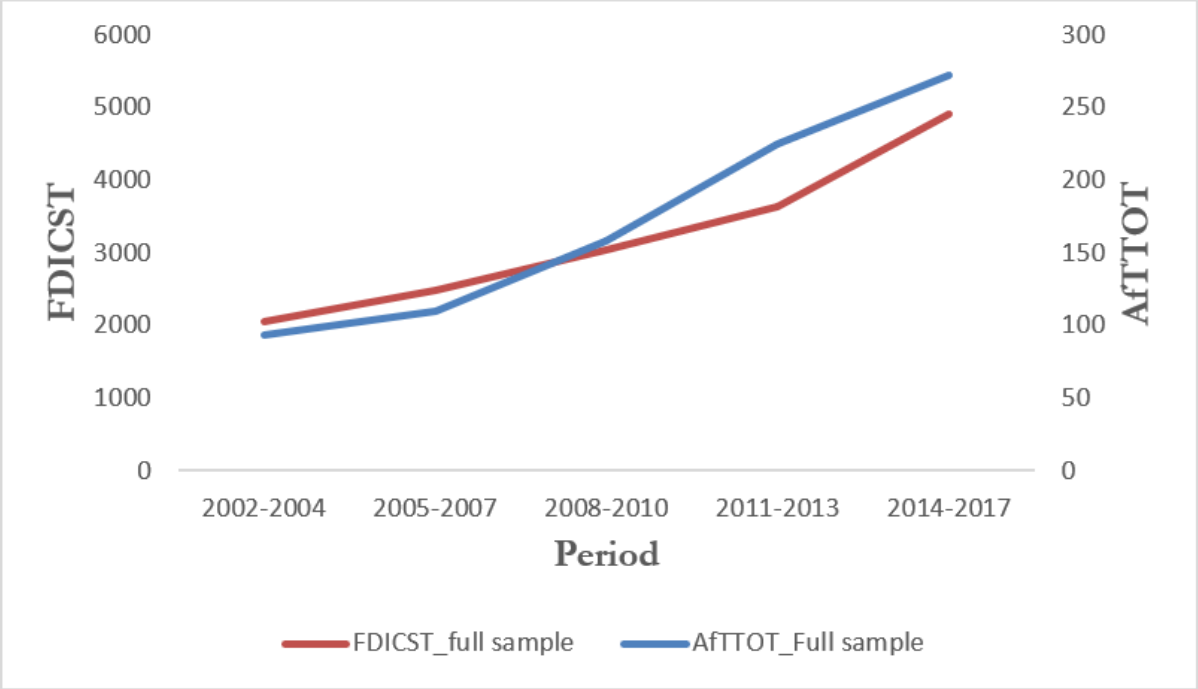
Table 4: Impact of the AfT on FDI stock (% GDP) for varying levels of export product concentration ("ECI"/"FKEDI")

Estimator: Two-Step System GMM

	Regressions with "ECI"				*Regressions with "FKEDI"*			
Variables	FDIGDP	FDIGDP	FDIGDP	FDIGDP	FDIGDP	FDIGDP	FDIGDP	FDIGDP
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$FDIGDP_{t-1}$	0.468***	0.514***	0.496***	0.478***	0.495***	0.501***	0.509***	0.476***
	(0.0261)	(0.0188)	(0.0201)	(0.0202)	(0.0201)	(0.0192)	(0.0197)	(0.0154)
AfTTOT*ECI	0.195***							
	(0.0357)							
AfTINFRA*ECI		0.245***						
		(0.0368)						
AfTPROD*ECI			0.162***					
			(0.0266)					
AfTPOL*ECI				0.00967				
				(0.0391)				
AfTTOT*FKEDI					0.228***			
					(0.0231)			
AfTINFRA*FKEDI						0.0662**		
						(0.0266)		
AfTPROD*FKEDI							0.195***	
							(0.0276)	
AfTPOL*FKEDI								0.00637
								(0.0264)
ECI	-0.129***	-0.137***	-0.0834***	-0.0681**				
	(0.0205)	(0.0262)	(0.0191)	(0.0280)				
FKEDI					-0.0405	0.00711	-0.0303	-0.0238
					(0.0300)	(0.0224)	(0.0250)	(0.0217)
AfTTOT	0.116***				0.178***			
	(0.0321)				(0.0312)			
AfTINFRA		0.119***				0.0927***		
		(0.0271)				(0.0313)		
AfTPROD			0.00862				0.0383	
			(0.0236)				(0.0253)	
AfTPOL				-0.0137				0.0194
				(0.0279)				(0.0300)
NonAfTTOT	-0.123***	-0.125***	-0.0866***	-0.0702***	-0.182***	-0.124***	-0.0975***	-0.0286
	(0.0251)	(0.0231)	(0.0188)	(0.0215)	(0.0325)	(0.0284)	(0.0246)	(0.0283)
GDPC	0.0906***	0.160***	0.156***	0.0871***	0.0233	0.145***	0.0924***	0.112***
	(0.0262)	(0.0342)	(0.0341)	(0.0262)	(0.0372)	(0.0362)	(0.0319)	(0.0279)
GROWTH	-0.139***	-0.162***	-0.170***	-0.185***	-0.155***	-0.180***	-0.187***	-0.212***
	(0.0244)	(0.0222)	(0.0120)	(0.0221)	(0.0290)	(0.0244)	(0.0309)	(0.0246)
EDU	0.160***	0.106***	0.137***	0.161***	0.153***	0.189***	0.217***	0.214***
	(0.0268)	(0.0301)	(0.0328)	(0.0302)	(0.0295)	(0.0296)	(0.0314)	(0.0276)
TP	-0.109***	-0.175***	-0.111***	-0.0848***	-0.188***	-0.195***	-0.190***	-0.113***
	(0.0371)	(0.0365)	(0.0363)	(0.0317)	(0.0390)	(0.0409)	(0.0326)	(0.0260)
INFL	-0.131***	-0.160***	-0.103***	-0.219***	-0.157***	-0.191***	-0.106***	-0.218***
	(0.0211)	(0.0216)	(0.0205)	(0.0253)	(0.0265)	(0.0235)	(0.0260)	(0.0210)
INST	0.0304	0.0158	0.0505*	0.0215	0.0193	-0.0155	0.0502*	-0.000723
	(0.0296)	(0.0264)	(0.0276)	(0.0245)	(0.0298)	(0.0275)	(0.0275)	(0.0284)
POP	0.256***	0.207***	0.261***	0.222***	0.245***	0.163***	0.305***	0.210***
	(0.0262)	(0.0330)	(0.0256)	(0.0229)	(0.0344)	(0.0353)	(0.0290)	(0.0237)
Constant	0.193***	0.220***	0.191***	0.204***	0.225***	0.209***	0.195***	0.201***
	(0.0171)	(0.0182)	(0.0169)	(0.0163)	(0.0191)	(0.0187)	(0.0168)	(0.0145)
Observations - Countries	430 - 123	429 - 123	430 - 123	429 - 123	430 - 123	429 - 123	430 - 123	429 - 123
Number of Instruments	105	105	105	105	105	105	105	105
AR1 (P-Value)	0.0006	0.0005	0.0005	0.0006	0.0001	0.0002	0.0001	0.0004
AR2 (P-Value)	0.2534	0.1712	0.2374	0.3468	0.7943	0.7376	0.3360	0.5309
OID (P-Value)	0.7263	0.6354	0.3217	0.5480	0.7557	0.4624	0.4884	0.5535

*Note: *p-value<0.1; **p-value<0.05; ***p-value<0.01. Robust Standard Errors are in parenthesis. In the two-step system GMM estimations, AfT variables, the variables "ECI, FKEDI, NonAfTTOT, EDU, GROWTH, INFL, TP, INST" as well as interaction variables have been considered as endogenous. The variable "POP" has been considered as exogenous. All variables have been standardized. The regressions have used a maximum of 3 lags of the dependent variable as instruments, and a maximum of 4 lags of endogenous variables as instruments.*

Figures

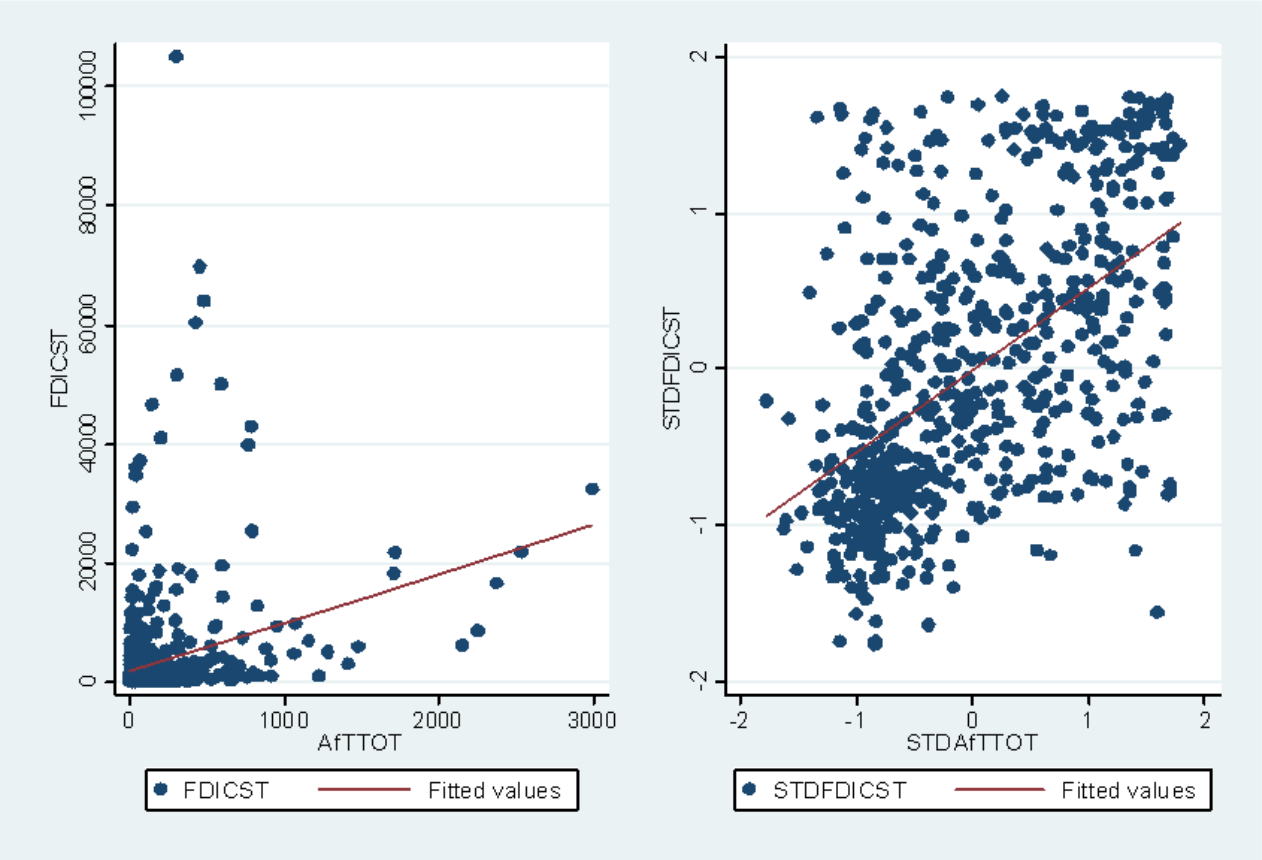


Source: Author

Note: The variable "AfTTOT" is expressed in millions US$, while the variable "FDICST" is expressed in Billion US$.

Figure 1

Evolution of the AfT and FDI stock_Over the Full Sample



Source: Author

Notes: The variables "AfTTOT" and "FDICST" are expressed respectively in millions US$, and billions US$. The variables "STDFDICST" and "STDAfTTOT" represent the standardized variables "FDICST" and "AfTTOT".

Figure 2

Scatter Plot between AfTTOT and FDI stock_Over the Full Sample

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- Appendix1.docx