

Effect of Aid for Trade on Financial Development

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ABSTRACT

Many studies have considered the macroeconomic effects of Aid for Trade (AfT) flows, that is, the part of official development assistance allocated for the development of the trade sector. The present paper aims to expand this literature by investigating the effect AfT flows on financial development. The empirical analysis draws on an unbalanced panel dataset of 121 countries over the period 2002-2019, and uses primarily the two-step system Generalised Method of Moments estimator. Empirical outcomes show that total AfT flows exert a positive effect on financial development. The magnitude of this positive effect is greater, the lower the share of manufactured exports in total merchandise exports, or the lower the level of economic complexity. The magnitude of this positive effect is also greater, the lower the size of real net foreign direct investment inflows in the AfT beneficiary countries. These findings highlight the key role of AfT flows in promoting financial development in beneficiary countries, and therefore, in fostering economic development in these countries.

JEL Classifications: F14, F35, G20.

Keywords: Aid for Trade; Economic complexity; Foreign direct investment inflows; Manufactured exports.

1. INTRODUCTION

It is now well established² that financial development can play an important role in economic growth and development. At the same time, the literature on the determinants of financial development has paid little attention to the effect of development aid on financial development. One of the very scarce studies on the matter is the work by Maruta (2019) who has examined the effect of development aid in favour of the financial sector on financial development. The author has reported empirical evidence that aid in favour of the financial sector has exerted a positive effect on financial development. The objective of the present paper is to contribute to the literature on the macroeconomic determinants of financial development, by examining the effect of Aid for Trade³ (AfT) (i.e. the part of development aid dedicated to the trade

sector in recipient-countries) on financial development, through the channels of manufactured exports and foreign direct investment (FDI) inflows.

As a matter of fact, developing countries, including the least-developed countries,⁴ experience a low share of manufacturing exports and hence, a relatively low level of integration into the global trading system, compared with developed countries. To address this trade-related disadvantage in developing countries, the international community (in particular the Members of the World Trade Organisation – WTO) launched the AfT Initiative at the 2005 WTO Hong Kong Ministerial Conference. This Initiative aims to “help developing countries, particularly LDCs, to 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” (Paragraph 57 of the Hong Kong Ministerial Declaration, WTO 2005). Since then, the WTO has been making efforts to mobilise financial resources (i.e. AfT flows) in favour of trade sector development in developing countries.

Whether AfT flows have been effective in helping recipient-countries to promote trade, and better integrate into the global trading system – and more generally to affect macroeconomic outcomes – has been the subject of an important theoretical and empirical literature.⁵ According to the OECD/WTO (2022 p 15), total AfT flows of USD 556 billion were disbursed to developing countries from 2006 to 2020, and total AfT flows to developing countries reached USD 48.7 billion in 2020. In 2020, the largest regions beneficiaries of AfT flows disbursements were Africa (38 per cent) and Asia (35 per cent). The distribution of total AfT flows among other regions was America (10 per cent), Europe (6 per cent), Oceania (1 per cent), and unspecified developing countries (10 per cent).

A strand of the literature on AfT effectiveness has shown that AfT flows affect manufactured exports positively in recipient-countries (e.g. Ghimire *et al* 2013; Hühne *et al* 2014; Gnanon 2018). Concurrently, another strand of the literature has shown that manufactured exports can be positively associated with financial development (e.g. Wamboye and Mookerjee 2014a, 2014b). Similarly, AfT flows can affect positively FDI inflows (e.g. Donaubaue *et al* 2016; Lee and Ries 2016; Ly-My and Lee 2019; Gnanon 2022) and, in turn, FDI inflows can promote financial development (e.g. Adam and Tweneboah 2009; Soumaré and Tchana 2015; Otchere *et al* 2016). Against this background, one could question whether AfT flows can affect financial development, including through the manufactured export performance and FDI inflows channels.

The current paper aims to address empirically this issue which, to the best of our knowledge, has not been investigated in the literature. The empirical analysis, based on the two-step system Generalised Method of Moments (GMM), covers a sample of 121 countries over the period from 2002 to 2019. The findings reveal that AfT flows influence financial development positively, including in countries with low levels of manufactured export performance (i.e. low degrees of economic complexity), and low levels of FDI inflows.

The rest of the analysis contains five sections. Section 2 provides a literature review relevant to the subject matter, and builds on it to discuss how AfT flows can affect financial development, notably through the channels of manufactured export performance and FDI inflows. Section 3 discusses the empirical model that allows for an investigation of the issue at hand. Section 4 discusses the econometric approach to perform the empirical exercise. Section 5 interprets empirical outcomes, and Section 6 concludes.

2. LITERATURE REVIEW AND DISCUSSION ON THE EFFECT OF AfT FLOWS ON FINANCIAL DEVELOPMENT

This section lays down the hypotheses to be tested in the empirical analysis. These hypotheses are developed on the basis of a review of several strands of the literature. The hypotheses concerning the effect of AfT flows on financial development through the manufactured export performance channel have been developed on the basis of the literature concerning the manufactured export performance effect of AfT flows, on the one hand, and the financial development effect of manufactured exports, on the other. Likewise, the hypotheses concerning the effect of AfT flows on financial development through the FDI inflows channel has been drawn up on the basis of the literature concerning the manufactured export performance effect of AfT flows on the one hand, and on the literature of the financial development effect of FDI inflows, on the other hand.

2.1. Effect of AfT on financial development through the manufactured export channel

In the relevant literature, few studies⁶ have considered and emphasised the role of manufactured exports in promoting financial development in both developed and developing countries (e.g. Wamboye and Mookerjee 2014a, 2014b). Wamboye and Mookerjee (2014a) have investigated the relationship between financial development and manufactured exports in 29 African countries. They have reported that financial development causes manufactured exports in 11 African countries, while in 7 countries, manufactured exports causes financial development. Similarly, Wamboye and Mookerjee (2014b) have focused on 8 small Caribbean and Central American countries, and found that in 63 per cent of this sample, financial development causes manufactured exports, while in the remaining 37 per cent of countries, manufactured exports causes financial development. Many other studies have, nevertheless, emphasised (without testing empirically) the potential causality effect of manufactured exports to financial development (e.g. Kletzer and Bardhan 1987; Rajan and Zingales 1998; Beck 2002, 2003; Huang and Temple 2005; Matsuyama 2005; Contessi and De Nicola 2013; Cezar 2014; Vaubourg 2016).

In a similar spirit, other studies have stressed that export product upgrading, including export product diversification (at both the extensive and intensive margins), and improvement of export product quality are key drivers of financial

development (e.g. Ramcharan 2006; Do and Levchenko 2007; Contessi and De Nicola 2013; Hattendorff 2014; Cho *et al* 2019; Gnanon 2019a). An important argument put forth in these studies is that the demand for external finance in individual countries – driven by their comparative advantage – influences significantly their financial development depth. For example, Do and Levchenko (2007) has shown theoretically and empirically that countries that specialise in more financially dependent export products (such as manufactured exports) are likely to experience a high demand for external finance (i.e. a rise in the credit demanded by firms involved in exporting financially intensive products) and, as a result, high financial development depth. Similarly, countries' firms that export products that are not financially dependent (such as primary commodities) are likely to experience low demand for credit and would experience low depth of financial development, i.e. an under-developed financial system.

Hattendorff (2014) has built on the work by Hausmann and Rigobon (2003) to explain how export product diversification could affect financial development. In fact, Hausmann and Rigobon (2003) have shown theoretically that resource abundant countries that have not been able to enhance their specialisation on non-resource tradable goods (e.g. manufacturing products) are likely to rely less on movements in the allocation of production inputs so as to address demand shocks. This would affect their real exchange rate (i.e. the relative prices of tradable and non-tradable goods) and induce a rise in their exchange rate volatility. When these countries experience financial frictions such as bankruptcy costs or exchange rate volatility, lenders demand a higher risk premium, which triggers a rise in real interest rates. Hattendorff (2014) has built on this argument to postulate that export product concentration would be associated with higher real interest rates and exchange rate volatility, which consequently discourages investment, reduces the amount of credit allocated, and ultimately results in a lower depth of financial development. The author has provided empirical evidence that export product diversification is associated with greater financial development in both developed and developing countries, although in poor countries it exerts no significant effect on financial development.

Ramcharan (2006) has relied on the argument that risk diversification across a range of imperfectly correlated sectors (including through economic diversification) would promote financial development. Using topographical data, he has provided strong evidence that economic diversification promotes financial development, whereas the concentration of economic activities (as is the case in many developing countries) influences financial development negatively. Gnanon (2019a) has drawn insights from the studies by Do and Levchenko (2007), Hattendorff (2014) and from the literature on the political factors underpinning the relationship between export upgrading and financial development, to demonstrate empirically that export product upgrading is positively associated with financial development.

Overall, on the one hand, manufactured exports can influence financial development positively (e.g. Wamboye and Mookerjee 2014a; 2014b). On the other hand, countries that export financially intensive products (notably manufacturing products) are likely to enjoy greater financial development (e.g. Do and Levchenko 2007), in particular because the expansion of export product baskets away from primary commodities and towards manufacturing goods, could help diversify risks and promote financial development (e.g. Ramcharan 2006; Hattendorff 2014). Against this background, we postulate that manufactured exports would contribute to the promotion of financial development

Studies on the effect of AfT flows on manufactured export performance are scarce, but include Ghimire *et al* (2013), Hühne *et al* (2014) and Gnanon (2018). Ghimire *et al* (2013) have found empirically a positive effect of sectoral AfT on sectoral exports, which signifies, *inter alia*, that AfT allocated to the manufacturing sector has exerted a positive effect on manufactured exports. Hühne *et al* (2014) found that AfT flows have influenced different categories of SITC manufacturing export products positively. Gnanon (2019b) has shown empirically that AfT flows have led to an increase in exports of low-skill and technology-intensive manufactures, relative to primary export products, and exports of manufactured products that are high-skill and technology-intensive manufactures, relative to primary export products. AfT flows have, however, exerted no significant effect on exports of medium-skill and technology-intensive manufactures, relative to primary export products, in recipient countries.

From a theoretical standpoint, the effect of AfT flows on manufactured exports depends on how each of the components of total AfT, as identified by the Organisation for Economic Cooperation and Development (OECD), affects manufactured exports. In fact, the OECD has distinguished three components of total AfT flows: AfT related to economic infrastructure, AfT allocated for building productive capacity, and AfT related to trade policy and regulation. AfT flows for economic infrastructure help to build hard economic infrastructure (e.g. transport and storage, communications, and energy generation and supply) and hence contribute to lowering trade costs in recipient-countries (e.g. Wilson *et al* 2003, 2005; Cali and TeVelde 2011; Busse *et al* 2012; Portugal-Perez and Wilson 2012).

Trade cost reductions, in turn, allow recipient-countries to enhance their export competitiveness, which could lead to higher manufactured export performance. The reduction in trade costs will not generate higher manufactured exports performance if recipient-countries are not capable of producing manufactured goods. This is where AfT flows allocated for the enhancement of productive capacity in recipient-countries play a critical role. Finally, AfT flows for trade policy regulation help to facilitate the cross-border movement of trade flows, through its trade facilitation component, and hence increase border and transport efficiency, notably by streamlining the time, cost, and number of

documents required for export and import procedures. This category of AfT flows contains a trade-related technical assistance part, which allows international organisations such as the WTO, the United Nations Regional entities, and regional development banks (such as the African Development Bank and the Asian Development Bank) to equip developing countries' policymakers with adequate tools for the design of trade policies and strategies to promote trade, while meeting their commitments at the WTO. For example, Gnanngnon (2018) has shown that AfT in favour of trade policy and regulation has contributed to promoting trade liberalisation in recipient-countries.

Incidentally, a few studies have recently considered the effects of development aid allocated to the financial sector (this type of aid is part of total AfT flows) on financial development. Maruta (2019) has shown empirically that aid for the financial sector promotes financial development in recipient-countries. Agapova and Vishwasrao (2020) have found that while foreign aid to the financial sector increases public sector borrowing, it has not generated benefits for financial intermediation in the private sector. While aid to the financial sector may positively influence financial development in recipient-countries, it remains to be determined whether other parts of total AfT flows (that is, non-financial sector aid) exerts a direct positive or negative influence on financial development. As a result, the direction in which total AfT flows could affect financial development, including through the manufactured export performance channel, remains *a priori* undetermined.

Against this background, we can expect that the effect of total AfT flows on financial development will work through the manufactured export channel. In particular, we can argue that total AfT flows will promote financial development in countries that enjoy an increase in manufactured exports (***hypothesis 1***). On the other hand, we can also expect that total AfT flows will enhance financial development in countries that have lower levels of manufactured exports. This means that total AfT flows would promote the development of manufactured exports in countries with low levels of manufactured exports (as a share of total exports) and hence induce a higher level of financial development in these countries. In this specific case, total AfT flows will be associated with greater financial development in countries with low levels of manufactured exports (as a share of total exports) (***hypothesis 2***).

In the same spirit, we can postulate that the effect of total AfT flows on financial development would depend on countries' levels of economic complexity. The concept of economic complexity reflects the level of sophistication of a country's productive structure, notably its export structure. It indicates both the diversity of the country's export products basket (namely the degree of export product diversification at the extensive margins⁷), and the ubiquity of these export products (i.e. the number of countries that also export these products; e.g. Hausmann and Hidalgo 2009; Hausmann *et al* 2014). Hence, a 'complex or sophisticated economy' is the one that exports a high number of products, while concurrently having a low ubiquity for these export products,

i.e. its goods are exported by few other countries. This suggests that the concept of 'economic complexity' is distinct from that of 'manufacturing exports'. A country may export a limited number of 'light' manufactured products, such as textiles and clothing, that dominate its total exports. For this country, an increase in the share of manufactured exports in total export products from one year to the next does not provide a clear indication as to whether the manufactured products exported are sophisticated, and exported by few countries in the world. An economy exporting essentially 'light' manufactured products could not qualify as a complex one, as its degree of complexity is low.

In light of the foregoing, we postulate that total AfT flows will foster financial development in countries that have high degrees of economic complexity (***hypothesis 3***). It is also arguable that total AfT flows will promote financial development in countries with low levels of economic complexity, because it is in these countries that total AfT flows contribute to helping export more complex products, which in turn, spur financial development (***hypothesis 4***).

2.2. Effect of AfT on financial development through the FDI channel

Among the few studies on the effects of AfT flows on FDI, Donaubaauer *et al* (2016) have found that AfT flows exert a positive effect on FDI flows to developing countries, through its strong positive effect on these countries' infrastructure in transportation, communication, energy, and finance. Lee and Ries (2016) and Ly-My and Lee (2019), have found that AfT flows promote greenfield FDI flows. Gnanngnon (2022) finds that AfT flows influence the inward FDI stock positively in countries that experience a high level of export product concentration. This suggests that the effect of AfT flows on financial development through the FDI inflows channel can work implicitly through the export product diversification channel (namely implicitly manufactured exports or eventually economic complexity channel).

On the other hand, FDI inflows could also contribute to deepening financial development. For example, higher FDI inflows can increase the total amount of funds available to the local economy, and induce financial markets and the banking system to enhance firms' involvement with overseas investors (e.g. Henry 2000; Desai *et al* 2006). Soumaré and Tchana (2015) have reported bidirectional causality between FDI and stock market development indicators. According to Adam and Tweneboah (2009) and Otchere *et al* (2016), FDI inflows can also be positively associated with financial development. To the extent that AfT flows can also affect FDI inflows positively, we postulate that higher AfT flows may induce greater financial development in countries that receive higher amounts of FDI inflows (***hypothesis 5***). On the other hand, one may assume that AfT interventions foster financial development in countries that received low levels of FDI inflows, because it is indeed in such countries that AfT flows would drive- FDI inflows (***hypothesis 6***).

3. MODEL SPECIFICATION

There is a huge literature⁸ on the determinants of financial development (e.g. Ang and McKibbin 2007; Baltagi *et al* 2009; Huang 2010; David *et al* 2014; Ho *et al* 2018; Khan *et al* 2020). We build on this literature to discuss the effects of control variables (considered in the present analysis) on financial development.

Patrick (1966) was among the first authors to have developed the ideas of 'supply-leading' and 'demand-following' aspects of financial development. The supply-leading role of financial institutions, supported by Gurley and Shaw (1955), Goldsmith (1969) and Xu (2000), was that financial institutions contribute to the transfer of resources from traditional to modern sectors, by serving as productive inputs in the production process. Along the same lines, the improvement in the development level is associated with greater economies of scale in financial services provision, and this enhances financial development. On the demand side, the expansion of an economy goes hand in hand with the development of the financial sector, as the private sector may increase its demand for new financial instruments, and get better access to external finance (see also Robinson 1952; Kuznets 1955; Al-Yousif 2002; Ang and McKibbin 2007; David *et al* 2014). Summing-up, we expect a rise in the real per capita (a proxy for the development level) to induce greater financial development.

The effect of trade openness on financial development has been the subject of an immense literature. According to Kletzer and Bardhan (1987), countries with a relatively well-developed financial sector have a comparative advantage in industries and sectors that rely on external finance. Thus, trade openness could be associated with higher financial development depth. Feeney and Hillman (2001) have argued that greater trade openness arises from the elimination or reduction (by internationally open financial markets) of the interest in strategic trade policy. Rajan and Zingales (2003) have shown theoretically that the opening up of a country to both trade and financial markets would severely reduce the power of vested interest groups that blocked financial development, and eventually reduce opposition to financial reform by creating sufficient new profits that outweigh the adverse effects of increased competition on vested interest groups. According to Baltagi *et al* (2009), countries would not need to open economies to both trade and capital accounts before enjoying greater financial development, as by opening up one without the other, they could still enjoy the development of the banking sector. Many studies have reported a positive effect of trade openness on financial development (e.g. Baltagi *et al* 2009; Kim *et al* 2010; Hauner *et al* 2013; Zhang *et al* 2015; Ashraf 2018). Thus, we can expect trade openness to be positively associated with financial development.

Many works have noted that higher inflation exerts a deleterious effect on the development of the financial sector, for example through the erosion of the values of financial assets, and greater incentives to diversify away from savings in the financial sector towards investment in the real sector (e.g. Boyd *et al*

2001; Ben and Ghazouani 2008; Bittencourt 2011). We postulate that higher inflation can result in a fall of the financial development depth.

On another note, the improvement of institutional and governance quality is essential for promoting financial development (e.g. La Porta *et al* 1997; Levine 1997; Capasso 2004; Law and Demetriades 2006; Tressel and Detragiache 2008; Huang 2010; Le *et al* 2016; Ho *et al* 2018; Bui and Bui 2019). The positive effect of better institutional and governance quality on financial development could take place, for example, through protections for creditors and investors (e.g. La Porta *et al* 1997), the channelling of resources to productive activities, the minimisation of their waste and misuse (e.g. Capasso 2004), and the political interference in lending decisions, which in countries with fewer constraints on the executive power, may reduce the efficiency of credit allocation (e.g. Tressel and Detragiache 2008).

Countries with a larger population, reflecting scale and networking effects, would likely experience greater efficiency in the supply of financial services than small countries (Allen *et al* 2012). Allen *et al* (2014) and Aluko and Ajayi (2018) have reported a positive effect of population density on financial development in Sub-Saharan African countries. We expect the population density to be positively associated with financial development.

In light of this discussion, we postulate the following baseline model:

$$\begin{aligned} \text{Log(FD)}_{it} = & \alpha_1 \text{Log(FD)}_{it-1} + \alpha_2 \text{Log(AfT)}_{it} + \alpha_3 \text{Log(GDPC)}_{it} + \alpha_4 \text{OPEN}_{it} \\ & + \alpha_5 \text{INFL}_{it} + \alpha_6 \text{INST}_{it} + \alpha_7 \text{Log(POPD)}_{it} + \mu_i + \gamma_t + \omega_{it} \end{aligned} \quad (1)$$

i and t stand respectively for a given country, and a time-period. The panel dataset used in the analysis is chosen on the basis of data availability. It is unbalanced, and includes 121 countries over the period 2002–2019. To smooth out the effect of business cycles on the variables at hand, we adopt the practice in the literature and use non-overlapping sub-periods of 3-year average data. There are six sub-periods: 2002–2004; 2005–2007; 2008–2010; 2011–2013; 2014–2016 and 2017–2019. α_1 to α_7 are parameters to be estimated. μ_i are countries' fixed effects; γ_t are time dummies that stand for global shocks affecting simultaneously all countries' financial development paths. ω_{it} is a well-behaving error term.

All variables contained in model (1), including their definition and source are described in Appendix 1. Standard descriptive statistics on variables are reported in Appendix 2, and the list of the 121 countries is reported in Appendix 3.

The dependent variable "FD" is the measure of financial development depth. It is measured by the financial development index developed by the International Monetary Fund (see Sahay *et al* 2015). This index summarises how developed financial institutions and financial markets are in terms of depth (size and liquidity), access (ability of individuals and companies to access financial services), and efficiency (ability of institutions to provide financial services at low costs and with sustainable revenues, and the level of activity of capital markets). The one period lag of the dependent variable has been included in

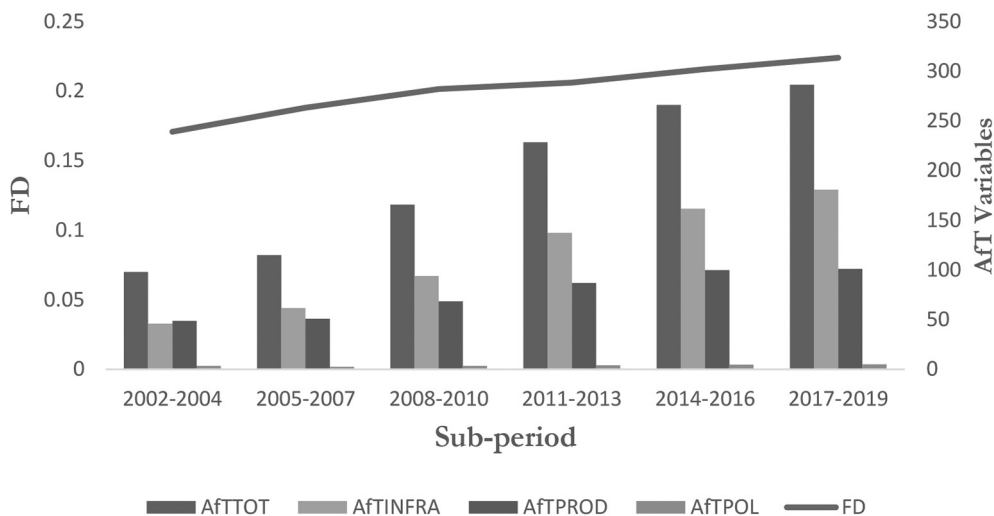
model (1) to account for its partial adjustment to its long-run equilibrium (e.g. Baltagi *et al* 2009).

The key regressor of interest “Aft” is the real gross Aft disbursement that benefits a given country. “Aft” can be the total real gross Aft disbursements (denoted “AFTTOT”) or its components, i.e. Aft for economic infrastructure (“AFTINFRA”), Aft for building productive capacity (“AFTPROD”), and Aft allocated for trade policy and regulation (“AFTPOL”). All Aft variables are expressed in constant 2019 US Dollars.

Using the non-overlapping sub-periods dataset, we provide in Figure 1 the development of financial development and Aft variables over the full sample; and in Figure 2, the correlation pattern (in the form of a scatter plot) between financial development and each Aft variable over the full sample.

Figure 1 shows that the indicator of financial development and all Aft variables (i.e. total Aft flows and all the three components of the latter) increased steadily over the entire period. The index of financial development reached 0.22 in 2017–2019 from 0.17 in 2002–2004. Total Aft flows rose, on average, from US\$ million 97.91 in 2002–2004 to US\$ million 286.45 in 2017–2019. All three components of total Aft flows also exhibited steady upward movement over the period 2002–2019, with Aft for economic infrastructure being the dominant component of total Aft flows, followed by Aft for productive capacity, and Aft for trade policy and regulation. Aft flows for economic infrastructure increased from US\$ million 46.04 in 2002–2004 to US\$ million 180.84 in 2017–2019. Aft

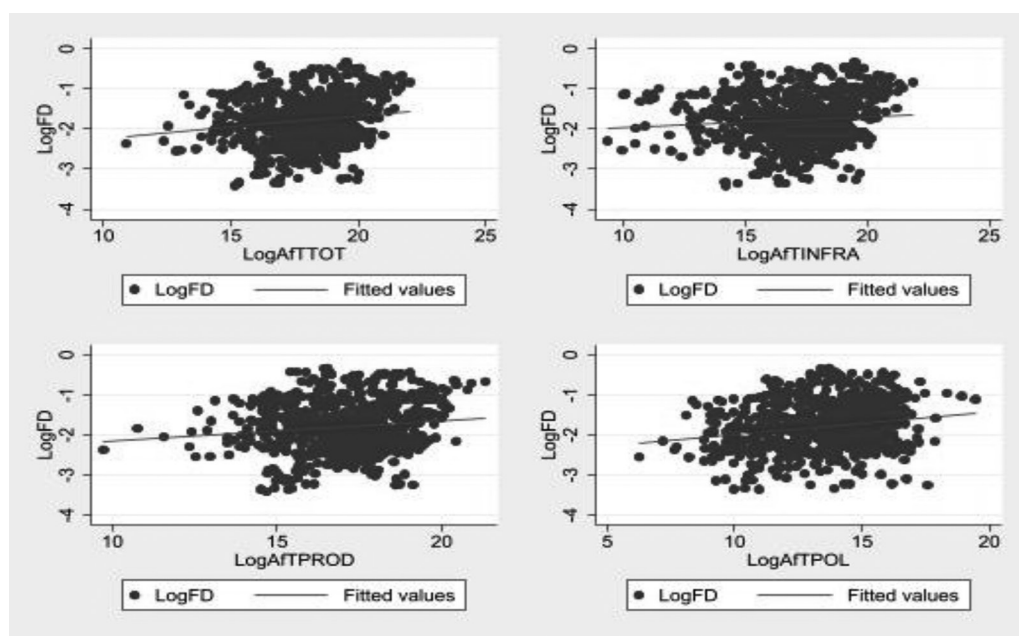
Figure 1: Aft flows and financial development over the full sample



Source: Author

Note: Aft variables are expressed in millions of US dollars (constant 2019prices).

Figure 2: Scatter plot between total Aft flows and financial development over the full sample



Source: Author

Note: Aft variables are expressed in millions of US dollars (constant 2019prices).
“Log” signifies natural logarithms.

flows for productive capacity reached US\$ million 100.93 in 2017–2019 against US\$ million 48.75 in 2002–2004, while Aft flows for trade policy and regulation slightly rose from US\$ million 3.57 in 2002–2004 to US\$ million 4.9 in 2017–2019.

All four graphs in Figure 2 indicate positive correlations between each Aft variable (i.e. total Aft and each of its three components) and financial development over the full sample.

4. ECONOMETRIC APPROACH

We start the empirical analysis by estimating model (1), where the variable “Aft” is measured by total Aft flows, using pooled ordinary least squares (OLS), the within fixed effects estimator (FE) and the feasible generalised least squares (FGLS) estimators. Note that the estimates obtained by means of the OLS and FE estimators have been corrected using the technique suggested by Driscoll and Kraay (1998). This technique takes account of heteroscedasticity, autocorrelation in the error term, and helps to handle very general forms of cross-sectional and temporal dependence (i.e. spatial dependence) among the

cross-sectional units in the panel dataset (Hoechle 2007). The results of these estimations are presented respectively in columns [1] to [3] of Table 1.

However, the use of these estimators may lead to biased estimates for two main reasons. First, the correlation between the lagged dependent variable and time invariant country-specific effects in the error term could generate biased estimates. This bias is referred to as the Nickell bias (Nickell 1981), and is particularly important in panel datasets with a small time-period and large cross-section. Second, all regressors, except for the population density variable, are likely to be endogenous because of the potential bi-directional causality between each of them and the dependent variable (Gnanangnon 2019a).

Taking the AfT variables, reverse causality can arise from the fact that donor-countries could provide lower amounts of AfT flows to recipient countries that experience a higher depth of financial development, because trading firms in those countries might easily obtain credit for their international trade activities. We handle these endogeneity issues by following studies such as Baltagi *et al* (2009) and Gnanangnon (2019a, 2021b), and estimate model (1) using the two-step system Generalised Method of Moments (GMM) estimator suggested by Arellano and Bover (1995) and Blundell and Bond (1998). This involves the estimation of a system of equations that combines 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. The two-step system GMM estimator generates estimates that are more efficient than the ones generated by the difference GMM estimator (of Arellano and Bond 1991) in the presence of persistent series, that is those that display a state-dependence path (as lagged levels of such series are weak instruments for subsequent first difference series – see for example, Bond *et al* 2001). Additionally, the difference GMM estimator magnifies gaps when panel datasets are unbalanced (Roodman 2009). Blundell *et al* (2001) have noted that the system GMM estimator relies on relatively slight restrictions on the initial condition process, and is asymptotically efficient.

The appropriateness of the two-step system GMM estimator is evaluated by using three tests: the Arellano-Bond test of first-order serial correlation in the first-differenced error term (denoted AR(1)), the Arellano-Bond test of no second-order autocorrelation in the first-differenced error term (denoted AR(2)), and the Sargan/Hansen test of over-identifying restrictions (OID), which determines the validity of the instruments used in the regressions. Furthermore, these tests would be powerful if the number of instruments used in regressions was lower than the number of countries (e.g. Roodman 2009). To avoid the proliferation of instruments in the regressions (and hence meet this rule of thumb suggested by Roodman 2009), we have used 3 lags of endogenous variables as instruments in the regressions.

The empirical exercise centred on the two-step system GMM estimator is conducted in the following way. Column [4] of Table 1 contains the outcomes of

Table 1: Effect of total AfT flows on financial development

Estimators: POLS, FE, FGLS (with panel-specific first order autocorrelation) and Two-Step System GMM

	POLS	FE	FGLS	Two-Step System GMM
<i>Variables</i>	<i>Log(FD)</i> (1)	<i>Log(FD)</i> (2)	<i>Log(FD)</i> (3)	<i>Log(FD)</i> (4)
Log(FD) _{t-1}	0.920*** (0.0183)	0.497*** (0.0787)	0.916*** (0.00750)	0.819*** (0.0220)
Log(AfTTOT)	0.0156*** (0.00463)	-0.00371 (0.00428)	0.0189*** (0.00217)	0.0462*** (0.00690)
Log(GDPC)	0.0349*** (0.0112)	0.0872* (0.0472)	0.0441*** (0.00509)	0.112*** (0.0135)
OPEN	0.0239 (0.0172)	0.0439*** (0.00720)	0.0139* (0.00713)	-0.0254 (0.0240)
INFL	0.00279 (0.00361)	-0.0148*** (0.00155)	0.00132 (0.00384)	-0.0190** (0.00808)
INST	0.00822*** (0.00183)	0.0576*** (0.0100)	0.00848*** (0.00249)	0.0225** (0.00954)
Log(POPD)	-0.00384* (0.00230)	0.214*** (0.0165)	-0.00240 (0.00190)	-0.00808 (0.00990)
Constant	-0.644*** (0.202)	-2.291*** (0.484)	-0.737*** (0.0808)	
Observations – Countries	586 – 121	586 – 121	585 – 120	586 – 121
R-squared/Within R-squared	0.965	0.5304		
Pseudo R-squared			0.9830	
Number of Instruments				72
AR1 (P-Value)				0.0000
AR2 (P-Value)				0.3023
AR3 (P-Value)				0.3685
OID (P-Value)				0.1411

Note: *p-value<0.1; **p-value<0.05; ***p-value<0.01. Robust Standard Errors are in parentheses. The Pseudo R2 has been computed for the regressions based on the FGLS estimator as the correlation coefficient between the dependent variable and its predicted values. In the regression based on the two-step system GMM estimator, AfT variables, and the variables “OPEN”, “INFL”, “INST”, “GDPC” and the interaction variables have been treated as endogenous. The variable “POPD” has been treated as exogenous. Time dummies have been included in the regressions.

the estimation of the dynamic model (1) where the variable “Aft” is measured by total Aft flows (i.e. “AftTOT”).

Outcomes in Table 2 help assess the effect of each component of total Aft flows on financial development. These outcomes are obtained by estimating three different variants of model (1) where the variable “Aft” is measured by each of the three components of total Aft flows, respectively.

Table 2: Effect of the components of total Aft flows on financial development

Estimator: Two-Step System GMM

<i>Variables</i>	<i>Log(FD)</i> (1)	<i>Log(FD)</i> (2)	<i>Log(FD)</i> (3)
Log(FD) _{t-1}	0.848*** (0.0207)	0.819*** (0.0227)	0.831*** (0.0212)
Log(AftINFRA)	0.0182*** (0.00473)		
Log(AftTPROD)		0.0390*** (0.00604)	
Log(AftPOL)			0.00187 (0.00458)
Log(GDPC)	0.0826*** (0.0140)	0.0969*** (0.0118)	0.0943*** (0.0131)
OPEN	-0.0560*** (0.0205)	0.0137 (0.0270)	0.00856 (0.0259)
INFL	-0.00607 (0.00797)	-0.00295 (0.00717)	0.00807 (0.00665)
INST	0.0177** (0.00864)	0.0367*** (0.00827)	0.0324*** (0.0121)
Log(POPD)	0.0174* (0.00928)	0.00216 (0.0101)	0.0451*** (0.0116)
Observations – Countries	586 – 121	586 – 121	576 – 121
AR1 (P-Value)	0.0000	0.0000	0.0000
AR2 (P-Value)	0.1622	0.2714	0.2384
AR3 (P-Value)	0.4542	0.4480	0.7483
OID (P-Value)	0.1232	0.1033	0.1538

Note: *p-value<0.1; **p-value<0.05; ***p-value<0.01. Robust Standard Errors are in parentheses. The components of total Aft, and the variables “OPEN”, “INFL”, “INST”, “GDPC” and the interaction variables have been treated as endogenous. The variable “POPD” has been treated as exogenous. Time dummies have been included in the regressions.

Next, we assess how the effect of total AfT flows, as well as the effect of each of its components, on financial development varies across countries in the full sample. To that end, we estimate four different specifications of model (1) in which we interact each AfT variable (introduced once) with real per capita income. The results of these estimations are reported in columns [1] to [4] of Table 3.

Table 3: Effect of total AfT flows on financial development across countries in the full sample

Estimator: Two-Step System GMM				
<i>Variables</i>	<i>Log(FD)</i> (1)	<i>Log(FD)</i> (2)	<i>Log(FD)</i> (3)	<i>Log(FD)</i> (4)
Log(FD) _{t-1}	0.814*** (0.0233)	0.845*** (0.0229)	0.790*** (0.0175)	0.847*** (0.0159)
Log(AfTTOT)	0.193*** (0.0378)			
[Log(AfTTOT)]*[Log(GDPC)]	-0.0176*** (0.00409)			
Log(AfTINFRA)		0.212*** (0.0370)		
[Log(AfTINFRA)]*[Log(GDPC)]		-0.0219*** (0.00421)		
Log(AfTPROD)			0.198*** (0.0222)	
[Log(AfTPROD)]*[Log(GDPC)]			-0.0196*** (0.00254)	
Log(AfTPOL)				0.00603 (0.0188)
[Log(AfTPOL)]*[Log(GDPC)]				-0.000519 (0.00227)
Log(GDPC)	0.393*** (0.0813)	0.467*** (0.0803)	0.419*** (0.0443)	0.0775** (0.0331)
OPEN	-0.0383 (0.0277)	-0.0637** (0.0279)	0.0397** (0.0183)	-0.00754 (0.0186)
INFL	-0.0187* (0.0108)	-0.0122 (0.0101)	0.000747 (0.00611)	0.0104** (0.00519)
INST	0.00767 (0.00955)	0.0154* (0.00849)	0.0379*** (0.00489)	0.0292*** (0.00974)

Log(POPD)	-0.00332 (0.0113)	0.00229 (0.0109)	-0.0105 (0.00809)	0.0348*** (0.00840)
Observations – Countries	586 – 121	586 – 121	586 – 121	576 – 121
Turning point of the real per capita income	US\$ 57867.378 [=exponential (0.193/0.0176)]	US\$ 16000.341 [=exponential (0.212/0.0219)]	US\$ 24392.74 [=exponential (0.193/0.0176)]	n.a.
AR1 (P-Value)	0.0000	0.0000	0.0000	0.0000
AR2 (P-Value)	0.2619	0.1273	0.2932	0.2329
AR3 (P-Value)	0.3674	0.5214	0.4368	0.7081
OID (P-Value)	0.10	0.1564	0.1115	0.3266

Note: *p-value<0.1; **p-value<0.05; ***p-value<0.01. Robust Standard Errors are in parentheses. AfT variables, the variables “OPEN”, “INFL”, “INST”, “GDPC” and the interaction variables have been treated as endogenous. The variable “POPD” has been treated as exogenous. Time dummies have been included in the regressions. “n.a.” means “not available”.

The estimates reported in columns [1] to [4] of Table 4 allow testing our main hypothesis concerning whether the effect of AfT flows on financial development depends on the share of manufactured exports in total exports. These results are obtained by estimating four other variants of model (1), by interacting each AfT variable (i.e. total AfT flows, and each of the three components of the latter) and the variable capturing the share of manufactured exports in total merchandise exports, denoted “SHMAN” (see Appendix 1 for more details on this variable – this variable is not expressed in percentage terms for the sake of analysis). We test the robustness of the findings in column [1] of Table 4 (i.e. whether the effect of total AfT flows on financial development works through the manufactured exports channel) by estimating another specification of model (1) that includes the variable measuring the level of economic complexity indicator, denoted “ECI” (see Appendix 1 for the source of this variable) and its interaction with the variable measuring total AfT flows. The outcomes of the estimation of this new specification of model (1) are provided in column [5] of Table 4.

Finally, we test the hypothesis as to whether the effect of AfT interventions on financial development works through the FDI channel by estimating different other variants of model (1) where each AfT variable (total AfT and each of its components) is interacted with the indicator of the size of real FDI inflows (denoted “FDI”) (see Appendix 1 for the details on the computation of this variable). The results of these estimations are presented in Table 5.

Table 4: Effect of total AFT flows on financial development through the manufacturing export share channel/economic complexity channel

Estimator: Two-Step System GMM					
<i>Variables</i>	<i>Log(FD) (1)</i>	<i>Log(FD) (2)</i>	<i>Log(FD) (3)</i>	<i>Log(FD) (4)</i>	<i>Log(FD) (5)</i>
Log(FD) _{t-1}	0.763*** (0.0223)	0.814*** (0.0216)	0.780*** (0.0202)	0.823*** (0.0207)	0.796*** (0.0230)
Log(AFTTOT)	0.0687*** (0.00947)				0.0242*** (0.00591)
[Log(AFTTOT)]*SHMAN	-0.0417*** (0.0150)				
Log(AFTINFRA)		0.0213*** (0.00718)			
[Log(AFTINFRA)]*SHMAN		-0.0115 (0.0123)			
Log(AFTPROD)			0.0617*** (0.0108)		
[Log(AFTPROD)]*SHMAN			-0.0500*** (0.0152)		
Log(AFTPOL)				0.0164*** (0.00531)	
[Log(AFTPOL)]*SHMAN				-0.000940 (0.0125)	
SHMAN	0.697*** (0.264)	0.233 (0.204)	0.864*** (0.247)	0.0458 (0.168)	

[Log(AFTTOT)]*ECI									-0.0125*** (0.00343)
ECI									0.188*** (0.0663)
Log(GDPC)	0.158*** (0.0160)	0.0956*** (0.0166)	0.128*** (0.0140)	0.0857*** (0.0109)	0.134*** (0.0139)				
OPEN	0.00757 (0.0260)	-0.0429* (0.0231)	0.0162 (0.0276)	0.0264 (0.0240)	-0.00261 (0.0223)				
INFL	-0.0124 (0.00780)	-0.00350 (0.00744)	-0.0109 (0.00783)	0.00707 (0.00818)	-0.0185* (0.0100)				
INST	0.0164* (0.00891)	0.0160** (0.00719)	0.0277*** (0.00706)	0.0302*** (0.00676)	0.0218** (0.00981)				
Log(POPD)	-0.0149* (0.00820)	0.00404 (0.00741)	-0.00524 (0.00620)	0.00559 (0.00709)	0.0429*** (0.0104)				
Observations – Countries	492 – 111	492 – 111	492 – 111	486 – 111	491 – 100				
Turning point of “SHMAN”/”ECI”	1.647 (=0.0687/0.0417)	n.a.	1.234 (=0.0617/0.0500)	n.a.	1.936 (=0.0242/0.0125)				
AR1 (P-Value)	0.0004	0.0003	0.0002	0.0003	0.0000				
AR2 (P-Value)	0.6775	0.3115	0.5200	0.8391	0.2466				
AR3 (P-Value)	0.2810	0.3088	0.3751	0.4487	0.6475				
OID (P-Value)	0.2568	0.1115	0.2260	0.10	0.2117				

Note: *p-value<0.1; **p-value<0.05; ***p-value<0.01. Robust Standard Errors are in parentheses. Aft variables, the variables “SHMAN”, “ECI”, “OPEN”, “INFL”, “INST”, “GDPC” and the interaction variables have been treated as endogenous. The variable “POPD” has been treated as exogenous. Time dummies have been included in the regressions. “n.a.” means not available.

Table 5: Effect of total AfT flows on financial development through the FDI channel

Estimator: Two-Step System GMM				
Variables	Log(FD) (1)	Log(FD) (2)	Log(FD) (3)	Log(FD) (4)
Log(FD) _{t-1}	0.837*** (0.0192)	0.842*** (0.0168)	0.861*** (0.0203)	0.867*** (0.0192)
Log(AfTTOT)	0.0906*** (0.0163)			
[Log(AfTTOT)]*FDI	-0.00237*** (0.000676)			
Log(AfTINFRA)		0.0505*** (0.0118)		
[Log(AfTINFRA)]*FDI		-0.00134*** (0.000515)		
Log(AfTPROD)			0.0895*** (0.0129)	
[Log(AfTPROD)]*FDI			-0.00268*** (0.000587)	
Log(AfTPOL)				0.0721*** (0.0110)
[Log(AfTPOL)]*FDI				-0.00326*** (0.000501)
FDI	0.0406*** (0.0117)	0.0221*** (0.00840)	0.0444*** (0.00972)	0.0452*** (0.00667)
Log(GDPC)	0.104*** (0.0150)	0.0998*** (0.0125)	0.0860*** (0.0114)	0.0699*** (0.0121)
OPEN	1.20e-05 (0.0206)	-0.0370** (0.0184)	0.00990 (0.0283)	0.0134 (0.0311)
INFL	-0.0116 (0.00830)	-0.000902 (0.00833)	-0.00821 (0.00774)	0.00304 (0.00707)
INST	0.0291*** (0.00649)	0.0112* (0.00649)	0.0379*** (0.00469)	0.0299*** (0.00734)
Log(POPD)	-0.0141** (0.00710)	0.00288 (0.00682)	-0.00445 (0.00775)	0.0186** (0.00925)

Observations – Countries	584 – 121	584 – 121	584 – 121	575 – 121
Approximate turning point of “FDI”	US\$ Billion 40010000 [=exponential (0.0906/0.00237)]	US\$ Billion 23280000 [=exponential (0.0505/0.00134)]	US\$ Billion 318800 [=exponential (0.0895/0.00268)]	US\$ Billion 4.028 [=exponential (0.0721/0.00326)]
AR1 (P-Value)	0.0000	0.0000	0.0000	0.0000
AR2 (P-Value)	0.2633	0.1457	0.2379	0.4271
AR3 (P-Value)	0.5427	0.6220	0.4790	0.5170
OID (P-Value)	0.1546	0.1419	0.1318	0.10

Note: *p-value<0.1; **p-value<0.05; ***p-value<0.01. Robust Standard Errors are in parentheses. AfT variables, the variables “FDI”, “OPEN”, “INFL”, “INST”, “GDPC” and the interaction variables have been treated as endogenous. The variable “POPD” has been treated as exogenous. Time dummies have been included in the regressions.

5. INTERPRETATION OF EMPIRICAL RESULTS

Outcomes in Tables 1 to 5 show that the coefficients of the one-period lag of the financial development indicator are positive and significant at the 1 per cent level. These outcomes confirm the argument by Baltagi (2009) that there exists a partial adjustment of the financial development indicator to its long-run equilibrium. They highlight the importance of considering the dynamic specification of model (1) in the analysis.

The results presented at the bottom of column [4] of Table 1 and at the bottom of all columns of Tables 2 to 5 help evaluate the consistency of the two-step system GMM technique. These outcomes suggest that the p-values of the AR(1) test are close to 0, while the p-values of the AR(2) and AR(3) tests are always higher than 0.10 (i.e. the 10 per cent level). Moreover, the OID test generates p-values higher than 0.10, thereby confirming the validity of the instruments used in the regressions. Interestingly, the coefficients of the lagged dependent variable from the results based on the two-step system GMM estimator are lower than the coefficient of the same variable in column [1] of the Table 1 (estimate based on the POLS estimator), but higher than the coefficient of the same variable in column [2] of Table 1 (estimate based on the FE estimator). This is in line with the recommendation by Bond *et al* (2001). All these findings show that the two-step system GMM estimator is appropriate for the empirical exercise.

However, before interpreting the estimation outcomes based on the two-step system GMM approach (our preferred estimator), we consider the outcomes obtained by means of the POLS, FE and FGLS estimators. Estimates reported in columns [1] and [3] show that total AfT flows exert a positive and significant effect (including of equal magnitude) on financial development. For example, building on results in column [1] of the Table, a 1 percentage point rise in total AfT flows induces a rise in the values of the index of financial development by 0.016 percentage points. In contrast, total AfT flows exert no significant effect

on financial development (see results based on the FE estimator in column [2]). As for control variables in columns [1] to [3] of Table 1, we find that the improvement in real per capita income and in institutional and governance quality are associated with greater financial development.

Estimates of the other control variables are not homogeneous across the three columns of Table 1. Greater trade openness tends to be positively associated with financial development (see columns [2] and [3] – although only at the 10 per cent level in column [3]), while higher inflation rates undermine financial development (see column [2]). The estimate associated with the population density is yet significant at the conventional significance levels, but it is alternatively negative and positive respectively in columns [1] and [2], and not significant in column [3] of the Table. As noted above, these outcomes may be biased, but could serve as benchmark outcomes in the analysis.

We now consider the estimates based on the two-step system GMM approach. The estimation outcomes reported in column [1] of Table 1 suggest that total AfT flows exert a positive and significant effect (at the 1 per cent level) on financial development. The coefficient of the variable measuring total AfT flows is higher than the ones reported in columns [1] and [3] of Table 1. A rise in total AfT flows by 100 percentage points (i.e. doubling the amount of total AfT flows) leads to an increase in the value of the index of financial development by 4.62 percentage points. Among control variables, trade openness and the population density do not affect financial development at the conventional significance levels. In the meantime, an increase in real per capita income, lower inflation rates and improvement of institutional and governance quality drive financial development positively, at least at the 5 per cent level. The results of control variables in Tables 2 to 5 are largely consistent with those in column [4] of Table 1.

Results in columns [1] and [2] of Table 2 indicate that AfT interventions for building economic infrastructure and AfT interventions for strengthening productive capacity are positively and significantly associated (at the 1 per cent level) with financial development. The doubling of the amounts of AfT for economic infrastructure induces an increase in the values of the index of financial development by 1.82 percentage points. Likewise, doubling AfT flows for productive capacity results in an increase in the value of the index of financial development by 3.90 percentage points. It, therefore, appears that AfT flows for productive capacity exert a higher positive effect on financial development than AfT flows for economic infrastructure. However, we find no significant effect (at the conventional significance levels) of AfT interventions related to trade policy and regulation on financial development (see results in column [3] of Table 2).

We now examine the results presented in Table 2. We note from column [1] of this table that the estimate of the interaction variable “AfTTOT*GDPC” is negative and significant at the 5 per cent level while, at the same time, the coefficient of the variable “AfTTOT” is positive and significant at the 1 per cent level. Similar patterns of results are obtained for the interaction variable

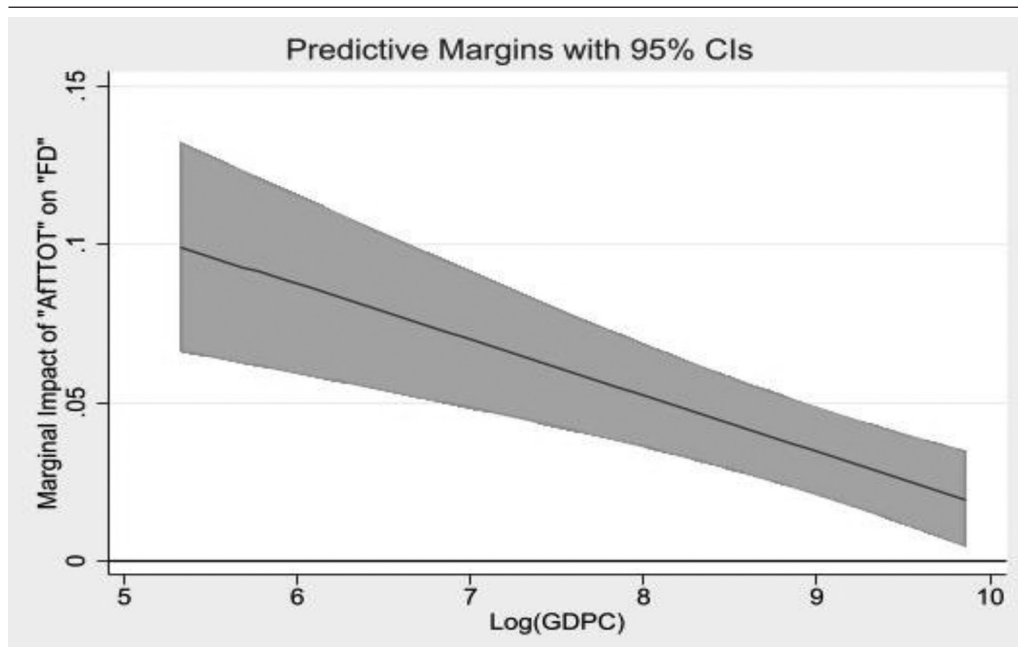
“AftINFRA*GDPC” and the variable “AftINFRA” on the one hand (see column [2] of Table 3), and on the other hand for the interaction variable “AftPROD*GDPC” and the variable “AftPROD” (see column [3] of Table 3). We report at the bottom of columns [1] to [3] the turning point of real per capita income (this acts as a proxy for countries’ development level) beyond which the effect of AfT interventions (whether total AfT flows, AfT for economic infrastructure or AfT for productive capacity) on financial development becomes negative. On average, this turning point of the real per capita income amounts to US\$ 57867.38; US\$ 16000.34; and US\$ 24392.74 when the AfT variable is respectively total AfT flows, AfT for economic infrastructure and AfT for productive capacity.

As the values of real per capita income in the full sample range between US\$ 211 and US\$ 19230 (see Appendix 2), it appears that only the turning point amounting to US\$ 16000.34 falls within this interval. We conclude that, on average, total AfT flows (including AfT for productive capacity) always exert a positive effect on financial development, and the magnitude of this positive effect diminishes as real per capita income rises. In other words, countries with lower per capita income enjoy, on average, a higher positive effect of total AfT flows (including AfT for productive capacity) on financial development than relatively advanced countries.

As for the results in column [2] of Table 3, we conclude that AfT interventions for economic infrastructure promote financial development in countries with a real per capita income lower than US\$ 16000.34. For the other countries in the full sample (i.e. those whose real per capita income range between US\$ 16000.34 and US\$ 19230), AfT flows are negatively associated with financial development. Taken as such, this finding may be difficult to interpret, and may suggest that it would not be each component of total AfT flows (taken in isolation) that could matter for financial development, but rather all components taken together (i.e. the total AfT flows) could affect financial development.

Finally, the estimates in column [4] of Table 3 suggest that neither the coefficient of the variable “AftPOL”, nor the interaction term associated with of the variable (“[Log(AftPOL)]*[Log(GDPC)]”) are significant at the 10 per cent level. These outcomes are consistent with those in column [3] of Table 2, and suggest that AfT flows for trade policy and regulation exert no significant effect on financial development, an effect that does not depend on the level of real per capita income. To get a better view on how the effect of total AfT flows on financial development varies across countries in the full sample, we present in Figure 3, at the 95 per cent confidence interval, the marginal impact of total AfT flows on financial development for varying levels of the real per capita income. We observe that this marginal impact declines as the real per capita income improves, but it is always positive and significant at the 5 per cent level. We deduce that total AfT flows always influence financial development positively, with the magnitude of this effect being higher for low-income countries than for more relatively advanced countries.

Figure 3: Marginal Impact of “AftTOT” on “FD” for varying levels of the real per capita income



Source: Author

Turning to the outcomes presented in columns [1] to [4] of Table 4, we note that the coefficients of each AfT variable (i.e. total AfT and each of its three components) are positive and significant at the 1 per cent level. At the same time, the coefficients of the related interaction variables in each of these columns are not always statistically significant (at the 5 per cent level). The interaction terms are significant, at least at the 5 per cent level, only for results reported in column [1] (concerning total AfT flows) and for those presented in column [3] (concerning AfT for productive capacity). On the basis of these outcomes, we first conclude that the effect of AfT for economic infrastructure and that of AfT for trade policy and regulation on financial development do not depend on countries' manufactured export performance (i.e. the share of their manufactured exports in total merchandise exports – see results in columns [2] and [4]).

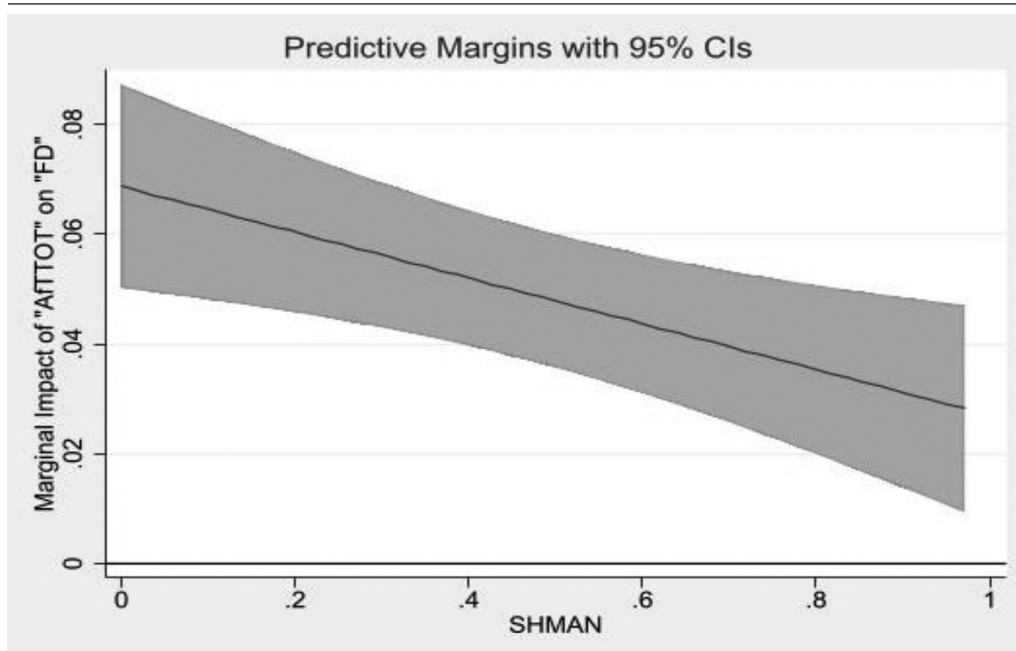
Second, the effects of total AfT flows (including AfT for productive capacity) on financial development do depend on the countries' manufactured export performance. There appears to be a turning point in the share of manufactured exports in total merchandise exports above which these effects become negative; otherwise, they are positive. These turning points in the share of manufactured

exports in total merchandise exports reported at the bottom of columns [1] and [3] are respectively 1.65 (when the AfT variable is total AfT flows) and 1.23 (when the variable “AfT” in model (1) is measured by AfT flows for productive capacity). In the full sample, the values of the indicator of the share of manufactured export in total merchandise exports range between 0.00003 and 0.97 (this indicator is not expressed in percentage terms). Given that the value of 1.65 found above is higher than the maximum value of the indicator of the share of manufactured export in total merchandise exports, we infer that on average, total AfT flows always influence financial development positively and significantly, with the magnitude of this positive effect decreasing as the share of manufactured export in total merchandise exports rises.

Similarly, as the turning point of the variable “SHMAN” (1.23) is also higher than the maximum value of the indicator of the share of manufactured export in total merchandise exports, we also conclude that AfT interventions for productive capacity always exert a positive and significant effect on financial development, and the magnitude of this positive effect decreases (rises) as the share of manufactured export in total merchandise exports increases (falls).

Figure 4 allows for an analysis of the extent to which the effect of total AfT flows on financial development depends on the share of manufactured exports

Figure 4: Marginal Impact of “AfTTOT” on “FD” for varying shares of manufactured exports in total merchandise exports



Source: Author

in total merchandise exports. Figure 4 shows, at the 95 per cent confidence interval, the marginal impact of total AfT flows on financial development for varying shares of manufactured exports in total merchandise exports. We observe that this marginal impact is always positive and significant at the 5 per cent level, but decreases as countries' share of manufactured exports in merchandise exports increases. This finding is consistent with the one observed, on average, over the full sample (see our interpretation of the outcomes above), and supports hypothesis 2 rather than hypothesis 1 set out in Section 2. By implication, total AfT flows foster financial development in countries with lower shares of manufactured exports in total merchandise exports, including to a greater extent than in countries with a relatively higher manufactured export performance.

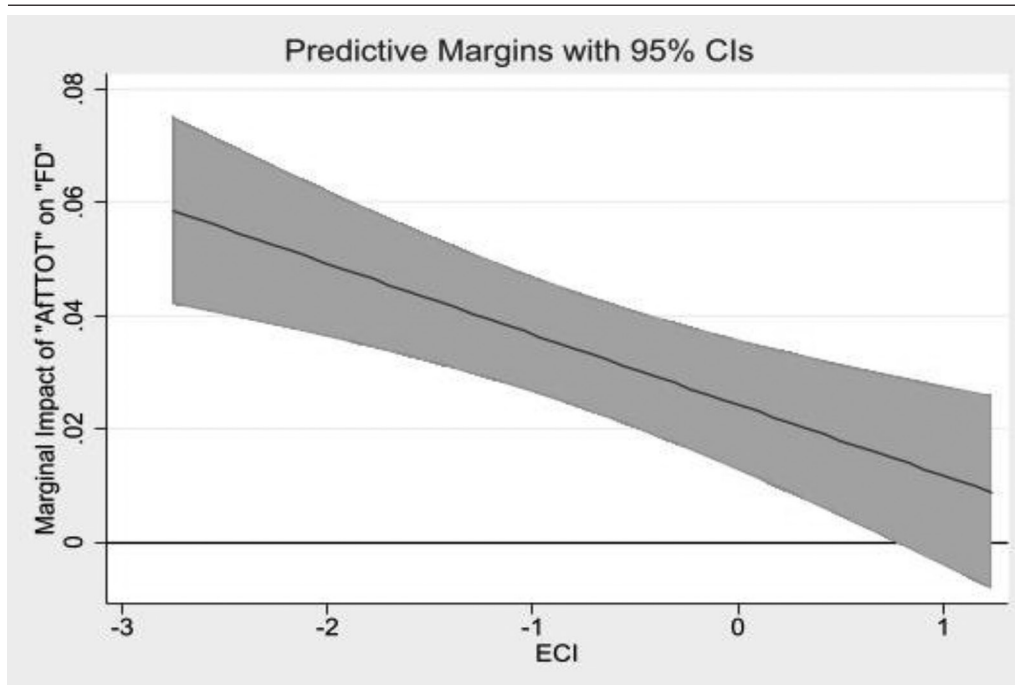
We now consider results in column [5] of Table 4 to examine whether the findings in column [1] of the same table are confirmed when we examine the effect of total AfT flows on financial development for varying levels of economic complexity. We note from column [5] of the table that the interaction term of the variable "AfTTOT*ECI" is negative and significant at the 1 per cent level (as was the interaction variable of "AfTTOT*SHMAN" in column [1] of the same table). Concurrently the coefficient of "AfTTOT" is positive and significant at the 1 per cent level (as was the case in column [1] of the same table). Hence, patterns of outcomes in column [5] of Table 4 are similar to those in column [1] of the same table.

Taking together the outcomes in column [5] of Table 4, we conclude that the effect of total AfT flows on financial development depends on countries' level of economic complexity. In particular, this effect is positive when the level of economic complexity is lower than 1.936, although the magnitude of this positive effect increases as the degree of economic complexity falls. As the values of the index of economic complexity range between -2.76 and 1.32, we conclude that on average, total AfT flows always influence financial development positively, regardless of countries' level of economic complexity, but the magnitude of this positive effect decreases at lower levels of economic complexity becomes lower. These findings align well with those found in column [1] of Table 4, and suggest that by helping to export complex products, total AfT flows contribute to fostering financial development in countries with low degrees of economic complexity.

We present in Figure 5, at the 95 per cent confidence interval, the marginal impact of total AfT flows on financial development for varying levels of economic complexity. It appears from the graph in this Figure that the marginal impact of total AfT on financial development is always positive, and decreases as the level of economic complexity rises. However, it is not always significant. In particular, this marginal impact is significant for levels of economic complexity lower than 0.747 (this number is extracted from Stata software when constructing Figure 5).

Given that the values of the indicator of economic complexity range between -2.76 and 1.32, we deduce that countries whose level of economic complexity

Figure 5: Marginal Impact of “AFTTOT” on “FD” for varying levels of economic complexity



Source: Author

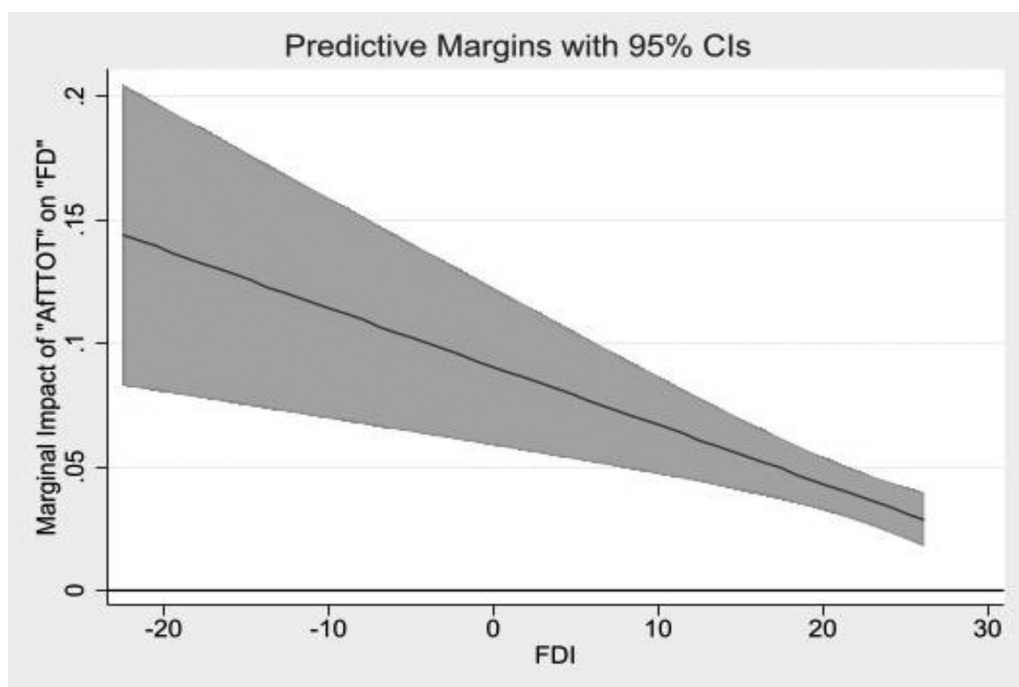
is lower than 0.747 experience a positive effect of total AfT flows on financial development, with the magnitude of this effect increasing as the level of economic complexity falls (i.e. in countries with low levels of economic complexity – e.g. low-income countries). For countries whose level of economic complexity is higher than 0.747 (between 0.747 and 1.32), total AfT flows exert no significant effect on financial development. Overall, the message conveyed by Figure 5 is consistent with the one obtained, on average, over the full sample (see our interpretation above), and supports hypothesis 4 rather than hypothesis 3 set out in Section 2. Total AfT flows foster financial development in countries with low levels of economic complexity.

Considering the outcomes in Table 5, we find that the coefficient of each AfT variable (from columns [1] to [4]) are positive, and the interaction terms of each relevant interaction variable are negative, all coefficients being significant at the 1 per cent level. These outcomes suggest that the effect of total AfT flows (including each component of the latter) on financial development depends on the magnitude of real FDI inflows. We report at the bottom of Table 5 the turning point of the variable “FDI1” above which the effect of each AfT variable on

financial development becomes negative (below this turning point, this effect is positive, and its magnitude increases as the size of FDI inflows declines). This turning point of real FDI inflows amounts to US\$ trillion 40.01, US\$ trillion 23.28, US\$ trillion 0.319 and US\$ billion 4.028 when the relevant AfT variable is respectively total AfT flows, AfT for economic infrastructure, AfT for productive capacity, and AfT for trade policy and regulation.

As per Appendix 2, the values of “FDI1” (i.e. the non-transformed indicator of real net FDI inflows) range between US\$ billion –5.68 and US\$ billion 230. The maximum value of “FDI1” (US\$ billion 230) appears to be far lower than all turning points of “FDI1” reported above, except for the one relating to AfT for trade policy and regulation. We conclude that the effect of total AfT flows (including AfT for economic infrastructure and AfT for productive capacity) on financial development is always positive, and the magnitude of this positive effect increases as the size of FDI inflows declines. This finding supports hypothesis 6, and suggests that by driving- FDI inflows in countries with low existing levels of FDI inflows, total AfT flows (including AfT for economic infrastructure and AfT for productive capacity) exert a higher positive effect on

Figure 6: Marginal Impact of “AFTTOT” on “FD” for varying values of FDI inflows



Source: Author

financial development than in countries with relatively higher levels of FDI inflows.

AfT interventions for trade policy and regulation exert a positive effect on financial development in countries whose size of real net FDI inflows is lower than US\$ billion 4.028 (the magnitude of this positive effect is higher, the lower the size of the real FDI inflows). In contrast, this type of AfT intervention is substitutable to FDI inflows in positively affecting financial development in countries whose size of real net FDI inflows exceeds US\$ billion 4.028.

We illustrate graphically, in Figure 6, the extent to which the effect of total AfT flows on financial development depends on the magnitude of FDI inflows. Figure 6 displays, at the 95 per cent confidence interval, the marginal impact of total AfT flows on financial development for varying magnitudes of real net FDI inflows. The marginal impact of total AfT flows on financial development appears always to be positive and significant at the 5 per cent level, but decreases as the size of the real net FDI inflows rises. Once again, this finding confirms our analysis above, and supports hypothesis 6. Hence, total AfT flows help to attract higher FDI flows in countries with low levels of FDI inflows, and promote financial development in these countries, including more than in countries that enjoy relatively higher levels of FDI inflows.

6. CONCLUSIONS

This paper has examined the effects of AfT flows on financial development through the manufactured export performance and FDI channels. Several findings emerge from the analysis based on a sample of 121 countries over the period 2002–2019. First, total AfT flows, including two of its major components (AfT for economic infrastructure and AfT for productive capacity) exert a positive and significant effect on financial development, with the magnitude of this positive effect being higher in less developed countries (among AfT beneficiaries) than in relatively more advanced countries. In contrast, there is no significant effect of AfT interventions for trade policy and regulation on financial development.

Second, the effects of total AfT flows and its component, AfT for productive capacity, on financial development depend on beneficiary-countries' manufactured export performance. In contrast, the effect of the two other components of total AfT flows on financial development does not depend on countries' manufactured export performance. Total AfT flows (and its component, AfT for productive capacity) always exert a positive effect on financial development, and the magnitude of this effect is higher in countries with low shares of manufactured exports in total merchandise exports than in countries with relatively high shares of manufactured exports in total merchandise exports.

Similar conclusions apply when we examine whether the effect of total AfT flows on financial development depends on countries' level of economic complexity. In particular, this effect is statistically nil for countries that

experience relatively high levels of economic complexity, and is positive for countries with low levels of economic complexity. Finally, the effects of total AfT flows (and its components, AfT for economic infrastructure and AfT for productive capacity) on financial development are always positive, and higher in countries with lower real net FDI inflows, than in countries with relatively higher real net FDI inflows.

From a policy perspective, this analysis has shown that AfT flows matter for financial development, notably through their impact on manufactured exports and FDI inflows. AfT flows can serve as an important lever not only for the development of the manufacturing sector in beneficiary countries, but also to attract FDI flows in these countries. As a result, the scale-up of these foreign capital flows could contribute to fostering financial development, which is essential for economic development in beneficiary countries.

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Appendix 1: Definition and Source of variables

<i>Variables</i>	<i>Definition</i>	<i>Source</i>
FD	This is the financial development index, which summarises how developed financial institutions and financial markets are in terms of their depth (size and liquidity), access (ability of individuals and companies to access financial services), and efficiency (ability of institutions to provide financial services at low costs and with sustainable revenues, and the level of activity of capital markets). The values of this indicator range between 0 and 1.	IMF Financial Development Index Database (see online at: https://data.imf.org/?sk=F8032E80-B36C-43B1-AC26-493C5B1CD33B) – See also Sahay <i>et al</i> (2015).
AfTTOT, AfTINFRA, AfTPROD, AfTPOL	“AfTTOT” is the total real gross disbursement of total Aid for Trade. “AfTINFRA” is the real gross disbursement of Aid for Trade allocated to the building of economic infrastructure. “AfTPROD” is the real gross disbursement of Aid for Trade for building productive capacity. “AfTPOL” is the real gross disbursement of Aid allocated for trade policies and regulation. All four AfT variables are expressed in constant 2019 US Dollars.	Author’s calculation based on data extracted from the OECD statistical database on development, in particular the OECD/DAC-CRS (Organisation for Economic Cooperation and Development/Donor Assistance Committee)-Credit Reporting System (CRS). Aid for Trade data cover the following three main categories (the CRS Codes are in brackets): Aid for Trade for Economic Infrastructure (“AfTINFRA”), which includes transport and storage (210), communications (220), and energy generation and supply (230); Aid for Trade for Building Productive Capacity (“AfTPROD”), which includes banking and financial services (240), business and other services (250), agriculture (311), forestry (312), fishing (313), industry (321), mineral resources and mining (322), and tourism (332); and Aid for Trade policy and regulations (“AfTPOL”), which includes trade policy and regulations and trade-related adjustment (331).

SHMAN	This indicator represents the share of manufactured exports in total merchandise exports (not expressed in percentage terms for the sake of the analysis).	Author's calculation based on data from the World Development Indicators (WDI) of the World Bank.
ECI	This is the economic complexity index, which reflects the diversity and sophistication of a country's export structure, and hence indicates the diversity and ubiquity of that country's export structure. It has been estimated by applying the methodology described in Hausman and Hidalgo (2009). Higher values of this index reflect greater economic complexity.	MIT's Observatory of Economic Complexity (https://oec.world/en/rankings/eci/hs6/hs96)
FDI	The variable "FDI" represents the transformed indicator of net Foreign Direct Investment inflows (constant 2010 US\$ prices). It has been calculated in two steps. We first compute the indicator of net Foreign Direct Investment inflows (constant 2010 US\$ prices) (denoted "FDI1") by multiplying net Foreign Direct Investment inflows (not expressed as a percentage of GDP) by real GDP (constant 2010 US\$) (e.g. Herzer 2011). As the variable "FDI1" contains many zeros and has a skewed distribution, we proceed in a second step to transform it as follows: FDI where refers to the absolute value of "FDI1".	Author's calculation based on data on net Foreign Direct Investment inflows as a share of GDP; and real GDP from the WDI.
GDPC	GDP per capita (constant 2010 US\$)	WDI
OPEN	This is the indicator of trade openness, measured by the ratio of the sum of exports and imports of goods and services to GDP. For the sake of the analysis, this variable has not been expressed in percentage terms.	Authors' calculation based on data from the WDI.
INFL	The variable "INFL" is the transformed measure of the annual inflation rate (%), based on the Consumer Price Index CPI, where missing values have been replaced with values of the GDP Deflator (annual %). The variable "INFL" has been computed using the following formula: INFL where refers to the absolute value of the annual inflation rate (%), denoted "INFLATION".	Authors' calculation based on data from the WDI
POPD	This is the measure of the population density, that is, the number of people per square km of land area.	WDI
INST	This is the variable representing the institutional and governance quality in a given country. It has been computed by extracting the first principal component (based on factor analysis) of the following six indicators of institutional quality and governance: political stability and absence of violence/terrorism; regulatory quality; rule of law index; government effectiveness index; voice and accountability; and corruption. The higher the value of this index, the better the governance and institutional quality.	Author's computation based on data on the six indicator components of institutional quality and governance collected from the World Bank Governance Indicators (WGI) developed by Kaufmann <i>et al</i> (2010) and recently updated (see data online at: https://info.worldbank.org/governance/wgi/)

Appendix 2: Descriptive statistics on variables used in the analysis

<i>Variable</i>	<i>Observations</i>	<i>Mean</i>	<i>Standard deviation</i>	<i>Minimum</i>	<i>Maximum</i>
FD	586	0.210	0.136	0.035	0.719
AfTTOT	586	216,000,000	379,000,000	53334.330	3,670,000,000
AfTINFRA	586	129,000,000	259,000,000	11374	3170,000,000
AfTPROD	586	82,700,000	145,000,000	16850.670	1,840,000,000
AfTPOL	576	3,995,733	9,887,764	2080	165,000,000
SHMAN	492	0.3495	0.281	0.00003	0.9712
ECI	491	-0.433	0.732	-2.756	1.317
FDI1	584	4,780,000,000	19,400,000,000	-5,680,000,000	230,000,000,000
OPEN	586	0.801	0.358	0.002	2.863
GDP	586	4020.590	3650.586	211.006	19230.040
INFLATION	586	6.892	10.161	-13.088	146.285
INST	586	-1.086	1.425	-4.682	2.985
POPD	586	120.568	176.311	1.648	1686.837

Appendix 3: List of the countries used in the full sample

Albania	Gabon	Nicaragua
Algeria	Gambia	Niger
Angola	Georgia	Nigeria
Antigua and Barbuda	Ghana	North Macedonia
Argentina	Grenada	Pakistan
Armenia	Guatemala	Panama
Azerbaijan	Guinea	Paraguay
Bangladesh	Guinea-Bissau	Peru
Belarus	Guyana	Philippines
Belize	Haiti	Rwanda
Benin	Honduras	Samoa
Bhutan	India	Senegal
Bolivia	Indonesia	Serbia
Bosnia and Herzegovina	Iran, Islamic Rep.	Seychelles
Botswana	Jamaica	Sierra Leone
Brazil	Jordan	Solomon Islands
Burkina Faso	Kazakhstan	South Africa
Burundi	Kenya	South Sudan
Cabo Verde	Kiribati	Sri Lanka
Cambodia	Kyrgyz Republic	St. Vincent and the Grenadines
Cameroon	Lao PDR	Sudan
Central African Republic	Lebanon	Suriname
Chad	Lesotho	Tajikistan
Chile	Liberia	Tanzania
China	Libya	Thailand
Colombia	Madagascar	Timor-Leste
Comoros	Malaysia	Togo
Congo, Dem. Rep.	Maldives	Tonga
Congo, Rep.	Mali	Tunisia
Costa Rica	Marshall Islands	Turkey
Cote d'Ivoire	Mauritania	Turkmenistan
Dominica	Mauritius	Uganda

Dominican Republic	Mexico	Ukraine
Ecuador	Micronesia, Fed. Sts.	Uruguay
Egypt, Arab Rep.	Moldova	Uzbekistan
El Salvador	Mongolia	Vanuatu
Equatorial Guinea	Morocco	Venezuela, RB
Eritrea	Mozambique	Vietnam
Eswatini	Myanmar	Zambia
Ethiopia	Namibia	
Fiji	Nepal	

ENDNOTES

1. Economist, World Trade Organisation, Rue de Lausanne 154, CH-1211 Geneva 21, Switzerland. SenaKimm.Gnanon@wto.org
2. There is a voluminous literature on the effect of financial development on economic growth and development. For example, recent studies on the effect of financial development on economic growth include Ang and McKibbin (2007); Zhang *et al* (2012); Arcand *et al* (2015); Samargandi *et al* (2015); Asteriou and Spanos (2019); and Yang (2019).
3. AfT flows include development aid in favour of the financial sector.
4. According to the United Nations, LDCs represent the poorest and most vulnerable countries (i.e. vulnerable to environmental and external shocks) in the world. The list of countries included in the group of LDCs is regularly updated by the United Nations Committee for Development Policy, using a set of criteria that could be found online at: <https://www.un.org/ohrlls/content/least-developed-countries>
5. See Cadot *et al* (2014); OECD/WTO (2017); Gnanon (2021a); and Benziane *et al* (2022) regarding the macroeconomic effects of AfT flows.
6. It is worth noting that most of the studies on the relationship between international trade and financial development have focused on the effect of financial development on international trade (e.g. Kletzer and Bardhan 1987; Beck 2002, 2003; Svaleryd and Valchos 2002; 2005; Matsuyama 2005; Wynne 2005; Amiti and Weinstein 2011; Demir and Dahi 2011; Ju and Wei 2011; Minetti and Zhu 2011; Goksel 2012; Caggese and Cuñat 2013; Manova 2013; Alvarez and López 2014; Cezar 2014; Wamboye and Mookerjee 2014a, 2014b; Fauceglia 2015). Literature surveys on the effect of finance on international trade have been provided by Contessi and De Nicola (2013); Foley and Manova (2015); and Vaubourg (2016).
7. This reflects the number of products exported by a given country.
8. For a literature review on the macroeconomic determinants of financial development see, for example, Huang (2010); Voghouei *et al* (2011); and Aluko and Ajayi (2018).

REFERENCES

- Adam A M and Tweneboah G (2009) 'Foreign direct investment and stock market development: Ghana's evidence', *International Research Journal of Finance and Economics*, 26, 178-185.
- Agapova A and Vishwasrao S (2020) 'Financial sector foreign aid and financial intermediation', *International Review of Financial Analysis*, 72, 101589.

- Allen F, Carletti E, Cull R, Qian J, Senbet L and Valenzuela P (2012) 'Resolving the African Financial Development Gap: Cross-Country Comparisons and a Within-Country Study of Kenya', NBER Working Paper No. 18013, Cambridge MA.
- Allen F, Carletti E, Cull R, Qian J, Senbet L and Valenzuela P (2014) 'The African financial development and financial inclusion gaps', *Journal of African Economies*, 23(5), 614-642.
- Aluko O A and Ajay M A (2018) 'Determinants of banking sector development: Evidence from Sub-Saharan African countries', *Borsa Istanbul Review*, 18(2), 122-139.
- Alvarez R and López R A (2014) 'Access to banking finance and exporting', *Industrial and Corporate Change*, 23, 1523-39.
- Al-Yousif Y K (2002) 'Financial development and economic growth: Another look at the evidence from developing countries', *Review of Financial Economics*, 11(2), 131-150.
- Amiti M and Weinstein D E (2011) 'Exports and Financial Shocks', *The Quarterly Journal of Economics*, 126(4), 1841-1877.
- Ang J B and McKibbin W J (2007) 'Financial liberalization, financial sector development and growth: Evidence from Malaysia', *Journal of Development Economics*, 84(1), 215-233.
- Arcand J L, Berkes E and Panizza U (2015) 'Too much finance?', *Journal of Economic Growth*, 20(2), 105-148.
- Arellano M and Bond S (1991) 'Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations', *Review of Economic Studies*, 58, 277-297.
- Arellano M and Bover O (1995) 'Another look at the instrumental variable estimation of error-components models', *Journal of Econometrics*, 68(1), 29-51.
- Ashraf B N (2018) 'Do trade and financial openness matter for financial development? Bank-level evidence from emerging market economies', *Research in International Business and Finance*, 44, 434-458.
- Asteriou D and Spanos K (2019) 'The relationship between financial development and economic growth during the recent crisis: Evidence from the EU', *Finance Research Letters*, 28, 238-245.
- Baltagi B H, Demetriades P O and Law S H (2009) 'Financial development and openness: Evidence from panel data', *Journal of Development Economics*, 89(2), 285-296.
- Beck T (2002) 'Financial Development and International Trade: Is There a Link?', *Journal of International Economics*, 57, 107-131.
- Beck T (2003) 'Financial dependence and international trade', *Review of International Economics*, 11(2), 296-316.
- Ben N S and Ghazouani S (2008) 'Does stock market liberalization spur financial and economic development in the MENA region?', *Journal of Comparative Economics*, 36(4), 673-693.
- Benziane Y, Law S H, Rosland A and Abd Rahman, M D (2022) 'Aid for trade initiative 16 years on: lessons learnt from the empirical literature and recommendations for future directions', *Journal of International Trade Law and Policy*, 21(2), 79-104.
- Bittencourt M (2011) 'Inflation and financial development: Evidence from Brazil', *Economic Modelling*, 28(1-2), 91-99.

Blundell R and Bond S (1998) 'Initial Conditions and Moment Restrictions in Dynamic Panel Data Models', *Journal of Econometrics*, 87, 115-143.

Blundell R, Bond S and Windmeijer F (2001) 'Estimation in dynamic panel data models: Improving on the performance of the standard GMM estimators' in Baltagi B H, Fomby T B and Hill R. C. (eds) *Nonstationary panels, panel cointegration, and dynamic panels*, Bingley: Emerald, 53-91.

Bond S, Hoeffler A and Temple J R W (2001) 'GMM estimation of empirical growth models', CEPR discussion paper no. 3048, London: Centre for Economic Policy Research.

Boyd J H, Levine R and Smith B D (2001) 'The Impact of Inflation on Financial Sector Performance', *Journal of Monetary Economics*, 47, 221-48.

Bui D T and Bui T M H (2019) 'How does institutional development shape bank risk-taking incentives in the context of financial openness?', *Pacific-Basin Finance Journal*, 58, 101209.

Busse M, Hoekstra R and Königer J (2012) 'The impact of aid for trade facilitation on the costs of trading', *Kyklos*, 65(2), 143-163.

Cadot O, Fernandes A, Gourdon J, Mattoo A and de Melo J (2014) 'Evaluating Aid for Trade: A Survey of Recent Studies'. *The World Economy*, 37(4), 516-529.

Caggese A and Cuñat V (2013) 'Financing constraints, firm dynamics, export decisions, and aggregate productivity', *Review of Economic Dynamics*, 16(1), 177-193.

Calì M and TeVelde D (2011) 'Does Aid for Trade Really Improve Trade Performance?', *World Development*, 39(5), 725-740.

Capasso S (2004) 'Financial Markets, Development and Economic Growth: Tales of Informal Asymmetries', *Journal of Economic Surveys*, 18(3), 267-292.

Cezar R (2014) 'The Heterogeneous Effect of Finance on International Trade', *Applied Economics*, 46(24), 2903-2919.

Cho I, Contessi S, Russ K N and Valderrama D (2019) 'Financial choice and international trade', *Journal of Economic Behavior & Organization*, 157, 297-319.

Contessi S and De Nicola F (2013) 'What do we know about the Relationship between Finance and International Trade', Working Paper 2012-054B, St Louis MO: Federal Reserve Bank of St Louis.

David A C, Mlachila M and Moheeput A (2014) 'Does Openness Matter for Financial Development in Africa?', IMF Working Paper WP/14/94, Washington DC: International Monetary Fund.

Demir F and Dahi O S (2011) 'Asymmetric effects of financial development on South-South and South-North trade: Panel data evidence from emerging markets', *Journal of Development Economics*, 94, 139-149.

Desai M A, Foley C F and Hines Jr J R (2006) 'Capital controls, liberalizations, and foreign direct investment', *Review of Financial Studies*, 19(4), 1433-1464.

Do Q-T and Levchenko A A (2007) 'Comparative advantage, demand for external finance, and financial development', *Journal of Financial Economics*, 86, 796-834.

Donaubauer J, Meyer B and Nunnenkamp P (2016) 'Aid, Infrastructure and FDI: Assessing the Transmission Channel with a New Index of Infrastructure', *World Development*, 78, 230-245.

- Driscoll J C and Kraay A C (1998) 'Consistent Covariance Matrix Estimation with Spatially Dependent Panel Data', *Review of Economics and Statistics*, 80(4), 549-560.
- Fauceglia D (2015) 'Credit constraints, firm exports and financial development: Evidence from developing countries', *The Quarterly Review of Economics and Finance*, 55, 53-66.
- Feeney J and Hillman A L (2001) 'Privatization and the political economy of strategic trade policy', *International Economic Review*, 42, 535-556.
- Foley F C and Manova K (2015) 'International trade, multinational activity, and corporate finance', *Annual Review of Economics*, 7, 119-146.
- Ghimire S, Mukherjee D and Alvi E (2013) 'Sectoral aid for trade and sectoral exports: a seemingly unrelated regression analysis', *Economic Bulletin*, 33(4), 2744-2755.
- Gnangnon S K (2018) 'Aid for trade and trade policy in recipient countries', *International Trade Journal*, 32(5), 439-464.
- Gnangnon S K (2019a) 'Effect of Export Upgrading on Financial Development', *Journal of International Commerce, Economics and Policy*, 10(3), 1-37.
- Gnangnon S K (2019b) 'Aid for Trade and Recipient-Countries' Export Structure: Does Trade Policy Liberalization Matter?' *Arthaniti: Journal of Economic Theory and Practice*, 18(1), 56-85.
- Gnangnon S K (2021a) 'Aid for Trade and Services Export Diversification in Recipient-Countries', *Australian Economic Papers*, 60(2), 189-225.
- Gnangnon S K (2021b) 'Effect of poverty on financial development: Does trade openness matter?', *The Quarterly Review of Economics and Finance*, 82, 97-112.
- Gnangnon S K (2022) 'Aid for Trade, export product diversification, and foreign direct investment', *Review of Development Economics*, 26(1), 534-561.
- Goksel T (2012) 'Financial constraints and international trade patterns', *Economic Modelling*, 29(6), 2222-2225.
- Goldsmith R W (1969) *Financial Structure and Development*, New Haven CT: Yale U P.
- Gurley J G and Shaw E S (1955) 'Financial aspects of economic development', *American Economic Review*, 45(4), 515-538.
- Hattendorff C (2014) 'Natural resources, export concentration and financial development', *Diskussionsbeiträge*, No. 2014/34, Freie Universität Berlin, Fachbereich Wirtschaftswissenschaft.
- Hauner D, Prati A and Bircan C (2013) 'The interest group theory of financial development: evidence from regulation', *Journal of Banking & Finance*, 37, 895-906.
- Hausmann R and Rigobon R (2003) 'An alternative interpretation for the resource curse: theory and policy implications' in Davis J M, Ossowski R and Fedelino A (eds) *Fiscal Policy Formulation and Implementation in Oil Producing Countries*, Washington DC: International Monetary Fund, 13-44.
- Hausmann R and Hidalgo C A (2009) 'The building blocks of economic complexity', *Proceedings of the National Academy of Sciences*, 106(26), 10570-10575.
- Hausmann R, Hidalgo C A, Bustos S, Coscia M, Simoes A and Yildirim M A (2014) *The atlas of economic complexity: mapping paths to prosperity*, Cambridge MA: MIT Press.
- Henry P B (2000) 'Do stock market liberalizations cause investment booms?', *Journal of Financial Economics*, 58(1-2), 301-334.

- Herzer D (2011) 'The Long-run Relationship between Outward Foreign Direct Investment and Total Factor Productivity: Evidence for Developing Countries', *Journal of Development Studies*, 47(5), 767-785.
- Ho C-H, Huang S, Shi H and Wu J (2018) 'Financial deepening and innovation: The role of political institutions', *World Development*, 109, 1-13.
- Hoechle D (2007) 'Robust standard errors for panel regressions with cross-sectional dependence', *The Stata Journal*, 7(3), 281-312.
- Huang Y (2010) 'Political institutions and financial development: an empirical study', *World Development*, 38(2), 1667-1677.
- Huang Y and Temple J (2005) 'Does external trade promote financial development?' CEPR Discussion Paper Series DP5150, London: Centre for Economic Policy Research.
- Hühne P, Meyer B and Nunnenkamp P (2014) 'Aid for trade: Assessing the effects on recipient exports of manufactures and primary commodities to donors and non-donors', Kiel Working Papers, No 1953, Kiel: Kiel Institute for the World Economy.
- Ju J and Wei S-J (2011) 'When is Quality of Financial System a Source of Comparative Advantage?', *Journal of International Economics*, 84, 178-187.
- Kaufmann D, Kraay A and Mastruzzi M (2010) 'The Worldwide Governance Indicators Methodology and Analytical Issues', World Bank Policy Research WPS5430, Washington DC: The World Bank.
- Khan Z, Hussain M, Shahbaz M, Yang S and Jiao Z (2020) 'Natural resource abundance, technological innovation, and human capital nexus with financial development: A case study of China', *Resources Policy*, 65, 101585.
- Kim D-H, Lin S-C and Suen Y-B (2010) 'Dynamic effects of trade openness on financial development', *Economic Modelling*, 27(1), 254-261.
- Kletzer K and Bardhan P (1987) 'Credit Markets and Patterns of International Trade', *Journal of Development Economics*, 27, 57-70.
- Kuznets S (1955) 'International differences in capital formation and financing. Princeton NJ: Princeton U P. Available at: <https://www.nber.org/system/files/chapters/c1303/c1303.pdf>
- La Porta R, Lopez-de-Silanes F, Shleifer A and Vishny R (1997) 'Legal determinants of external finance', *Journal of Finance*, 52, 113-150.
- Law S H and Demetriades P (2006) 'Openness, institutions and financial development', WEF working paper series No. 0012, Birkbeck, University of London.
- Le T, Kim J and Lee M (2016) 'Institutional quality, trade openness, and financial sector development in Asia: An empirical investigation', *Emerging Markets Finance and Trade*, 52(5), 1047-1059.
- Lee H H and Ries J (2016) 'Aid for Trade and Greenfield Investment', *World Development*, 84, 206-218.
- Levine R (1997) 'Financial Development and Economic Growth: Views and Agenda', *Journal of Economic Literature*, 35(2), 688-726.
- Ly-My D and Lee H H (2019) 'Effects of aid for trade on extensive and intensive margins of greenfield FDI', *The World Economy*, 42(7), 2120-2143.

- Manova K (2013) 'Credit Constraints, Heterogeneous Firms and International Trade', *The Review of Economic Studies*, 80, 711-744.
- Maruta A F (2019) 'Can aid for financial sector buy financial development?', *Journal of Macroeconomics*, 62, 103075.
- Matsuyama K (2005) 'Credit Market Imperfections and Patterns of International Trade and Capital Flows', *Journal of the European Economic Association*, 3(2-3), 714-723.
- Minetti R and Zhu S (2011) 'Credit Constraints and Firm Export: Microeconomic Evidence from Italy', *Journal of International Economics*, 83(2), 1695-1725.
- Nickell S (1981) 'Biases in Dynamic Models with Fixed Effects', *Econometrica*, 49(6), 1417-1426.
- OECD/WTO (2017) 'Aid for Trade at a Glance 2017: Promoting trade, inclusiveness and connectivity for sustainable development', Paris: Organisation for Economic Cooperation and Development and Geneva: World Trade Organisation.
- OECD/WTO (2022) Aid for Trade at a Glance 2022: Empowering Connected, Sustainable Trade. Paris: Organisation for Economic Cooperation and Development. Available at: <https://doi.org/10.1787/9ce2b7ba-en>
- Otchere I, Soumaré I and Yourougou P (2016) 'FDI and financial market development in Africa', *The World Economy*, 39(5), 651-678.
- Patrick H T (1966) 'Financial development and economic growth in underdeveloped countries', *Economic Development and Cultural Change*, 14, 174-189.
- Portugal-Perez A and Wilson J S (2012) 'Export Performance and Trade Facilitation Reform: Hard and Soft Infrastructure', *World Development*, 40(7), 1295-1307.
- Rajan R G and Zingales L (1998) 'Financial dependence and growth', *American Economic Review*, 88(3), 559-586.
- Rajan R G and Zingales L (2003) 'The Great Reversals: The Politics of Financial Development in the 20th Century', *Journal of Financial Economics*, 69(1), 5-55.
- Ramcharan R (2006) 'Does Economic Diversification Lead to Financial Development? Evidence From topography', IMF Working Paper WP/06/35, Washington DC: International Monetary Fund.
- Robinson J (1952) *The Rate of Interest and Other Essays*, London: Macmillan.
- Roodman D M (2009) 'A note on the theme of too many instruments', *Oxford Bulletin of Economic and Statistics*, 71(1), 135-158.
- Sahay R, Čihák M, N'Diaye P, Barajas A, Bi R, Ayala D, Gao Y, Kyobe A, Nguyen L, Saborowski C, Svirydzhenka K and Yousefi S R (2015) 'Rethinking Financial Deepening: Stability and Growth in Emerging Markets', IMF Staff Discussion Note, SDN/15/08, Washington DC: International Monetary Fund.
- Samargandi N, Fidrmuc J and Ghosh S (2015) 'Is the Relationship Between Financial Development and Economic Growth Monotonic? Evidence from a Sample of Middle-Income Countries', *World Development*, 68, 66-81.
- Soumaré I and Tchana T F (2015) 'Causality between FDI and financial market development: Evidence from emerging markets', *The World Bank Economic Review*, 29(suppl_1), S205-S216.

Svaleryd H and Vlachos J (2002) Markets for risk and openness to trade: How are they related?, *Journal of International Economics*, 57, 369-395.

Svaleryd H and Vlachos J (2005) 'Financial Markets, the Pattern of Industrial Specialization and Comparative Advantage: Evidence from OECD Countries', *European Economic Review*, 49, 113-144.

Tressel T and Detragiache E (2008) 'Do Financial Sector Reforms Lead to Financial Development? Evidence from a New Dataset', IMF Working Paper 08/265, Washington DC: International Monetary Fund.

Vaubourg A-G (2016) 'Finance and International Trade: A Review of the Literature', *Revue d'économie politique*, 126, 57-87.

Voghouei H, Azali M and Jamali M A (2011) 'A survey of the determinants of financial development', *Asian Pacific Economic Literature*, 25(2), 1-20.

Wamboye E and Mookerjee R (2014a) 'Financial development and manufactured exports: the African experience', *International Journal of Economic Policy in Emerging Economies*, 7(1), 22-34.

Wamboye E and Mookerjee R (2014b) 'The nexus between finance and manufactured exports in selected Caribbean and Central American countries', *International Journal of Trade and Global Markets*, 7(4), 339-359.

Wilson J S, Mann C L and Otsuki T (2003) 'Trade facilitation and economic development: a new approach to quantifying the impact', *World Bank Economic Review*, 17(3), 367-389.

Wilson J S, Mann C L and Otsuki T (2005) 'Assessing the benefits of trade facilitation: a global perspective', *World Economy*, 28(6), 841-871.

WTO (2005) 'Ministerial Declaration on Doha Work Programme. Adopted on 18 December 2005 at the Sixth Session of Trade Ministers Conference (document, WT/MIN(05)/DEC)', Hong Kong, China, December 13-18.

Wynne J (2005) 'Wealth as a Determinant of Comparative Advantage', *American Economic Review*, 95, 226-254.

Xu Z (2000). 'Financial development, investment, and economic growth', *Economic Inquiry*, 38(2), 331-344.

Zhang J, Wang L and Wang S (2012) 'Financial development and economic growth: Recent evidence from China', *Journal of Comparative Economics*, 40(3), 393-412.

Zhang C, Zhu Y and Lu Z (2015) 'Trade openness, financial openness, and financial development in China', *Journal of International Money and Finance*, 59, 287-309.