


Foreign direct investment, anti-money laundering regulations and economic growth

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Abstract

This study seeks to establish the impact of anti-money laundering (AML) regulations on economic growth as well as how AML regulations influence the foreign direct investment (FDI)–growth nexus for 165 economies across the globe. We employ Prais–Winsten and the Hansen (2000) panel threshold regression estimation techniques to test the hypotheses of the study. We use data ranging from 2012 to 2018. We provide evidence that AML regulations generally stimulate growth; however, AML regulations only stimulate growth below the threshold value. Again, although we report that FDI stimulates growth, the growth-enhancing impact of FDI is more pronounced at higher levels of AML regulations.

KEYWORDS

anti-money laundering regulations, economic growth, foreign direct investment, threshold analysis

1 | INTRODUCTION

The role of foreign direct investment (FDI) in promoting growth has been a subject of intense debate in the literature. Although this argument has provided many possible insights into the FDI-growth connection, most of the current theory and empirical evidence provide conflicting predictions about their relationships. Some studies report that through technology transfer and spillover effects, FDI exerts a positive influence on the economic growth of host countries (Alfaro et al., 2004; Barro & Sala-i-Martin, 1995; de Mello, 1997; Paugel, 2007), while others find that FDI is not beneficial to growth (Djankov & Hoekman, 2000; Konings, 2001). Nonetheless, the recent strand of literature indicates that the contribution of FDI to the growth of nations is dependent on the business environment existing in the beneficiary nations. Previous research has shown that the extent of the development of the financial market (Adjasi et al., 2012; Alfaro et al., 2004; Azman-Saini, Law, & Ahmad, 2010), quality of institutions

(Agbloyor et al., 2016; Jude & Leveuge, 2017), human capital quality (Ford et al., 2008), economic freedom (Azman-Saini, Baharumshah, & Law, 2010), regulatory quality in the form of credit and labour markets regulations and regulations in the area of starting and closing down a business, contract enforcement and protection of creditor rights (Adams & Opoku, 2015; Busse & Groizard, 2008; Ketteni & Kottaridi, 2019) and elections (Agbloyor, 2019), among others, determine the extent to which countries benefit from FDI.

This research builds on existing literature in three areas by examining (1) the influence of FDI on growth across different economies around the world, (2) the effect of anti-money laundering (AML) regulations on economic growth and (3) the role of AML regulations in promoting the connection between FDI and growth. We concentrate primarily on the second and third strands in extending the frontiers of knowledge. The threat of money laundering has become a pressing issue over the past few decades. It is seen as a major obstacle to the growth prospects of economies around the world. Extant literature contends that crime has negative outcomes on economic growth (Debnath & Das, 2017). Money laundering affects the growth of countries through its impact on the development and stability of the global financial system (Financial Action Task Force [FATF], 2020; Ofoeda et al., 2020). Furthermore, it undermines legitimate efforts by the private sector as it creates uncompetitive output markets, distorts domestic market operations and has the potential of throwing local economic policies out of control (Fundanga, 2003; McDowell & Novis, 2001). Again, it leads to loss of government revenue for development projects as criminal proceeds are concealed for tax purposes (Hendriyetty & Grewal, 2017). Further, the heightened incidence of money laundering has consequences for the reputation of countries (McDowell & Novis, 2001).

Undoubtedly, it is expected that providing an effective AML regulatory framework should promote the growth of the economies. Adams and Opoku (2015) contend that the legal and regulatory framework of countries plays a critical role in ensuring the competitiveness of output markets which promotes the efficient allocation of resources to sectors of the economy that support growth. Money laundering creates uncompetitive output markets as front companies that are used to launder proceeds of criminal activities can subsidize their products and services far below market rates. This is because these companies are established mainly for laundering funds and not for economic reasons. Therefore, effective AML regimes should provide competitive output markets which result in the reallocation of resources from less productive firms (front companies) to productive ones. According to Melitz (2003), the exposure to trade fosters competition, induces the exit of less efficient firms and reallocates market shares towards the more productive firms and contributes to an aggregate productivity increase. Again, AML regulations open an economy up for international trade and investment, promote financial sector development, promote transparency and reduce information asymmetry. Therefore, we expect AML regulations to impact the growth of countries.

Nonetheless, despite the concerted global efforts in curbing money laundering around the globe through the establishment of the FATF, little empirically is known on the influence of AML regulations on the growth outcomes of nations (see Ouyang et al., 2019; Silberberger & Königer, 2016). Geiger and Wuensch (2007), however, argued that the expected benefits of AML regulations may not be realized as AML regulations could dampen growth as it impedes the wealth creation abilities of citizens by increasing financial and non-financial costs of transactions. Again, according to Mccarthy et al. (2015), AML compliance has become a resource-intensive and expensive business for financial institutions which may erase the gains from regulating money laundering. We, therefore, opine that although AML regulations could promote growth, excessive AML regulations may have undesirable outcomes for the growth of economies. We, therefore, seek to ascertain if there exists a threshold effect for the impact of AML regulations on economic growth.

Further, this study seeks to ascertain the role of AML regulations in promoting the FDI-growth nexus. According to Busse and Groizard (2008), the policy environment, particularly the regulatory architecture of a country, largely determines the impact of capital flows on growth. According to Bende-Nabende et al. (2001), FDI promotes growth through technological transfers, new capital formation, job creation, human resource development, the introduction of improved and efficient production methods. For instance, Hermes and Lensink (2003) argue that technological diffusion from FDI may occur through demonstration and/or imitation, competition, linkages and training. Nonetheless, we argue that countries with a high incidence of money laundering may not get the desired benefit from FDI as

money laundering creates unfair competition in an economy. Again, the expected linkages between multinational enterprises (MNEs) and domestic firms may not occur as MNEs may not want to be associated with domestic firms. This is because such association may be deemed as complicity on the part of these MNEs in money laundering, and therefore, technology spillovers to domestic firms are less likely to occur.

Perez et al. (2012) contend that a significant amount of FDI (i.e. 20%) is motivated by the desire to launder illicit funds, and therefore, such FDIs may not have the intended growth outcomes as such funds may be diverted to unproductive sectors of the economy. Consequently, the success of FDI in promoting economic growth depends on the effectiveness of the AML regulatory framework of the host country. AML regulations should prevent funds divergence to unproductive investment activities. We, therefore, expect that AML regulations should significantly improve the FDI-growth nexus. Although there is a plethora of literature on how intermediating factors influence the FDI-growth relationship (Adams & Opoku, 2015; Adjasi et al., 2012; Agbloyor, 2019; Agbloyor et al., 2016; Alfaro et al., 2004; Azman-Saini, Baharumshah, & Law, 2010; Azman-Saini, Law, & Ahmad, 2010; Busse & Groizard, 2008; Ford et al., 2008; Joshua et al., 2020; Jude & Leveuge, 2017; Ketteni & Kottaridi, 2019; Udemba et al., 2020; Udi et al., 2020), it appears no attempt is made in the literature to establish the impact of AML regulations on FDI-growth connection.

For instance, Adams and Opoku (2015) examined how credit market regulation, labour market regulation and business regulation promote the impact of FDI on growth. Busse and Groizard (2008) investigated how regulations in the area of starting and closing down a business, labour market regulations, contract enforcement regulations, protection of creditor rights and ability to obtain credit impact the FDI-growth relationship. Ketteni and Kottaridi (2019) also investigated the impact of FDI on economic growth under different regimes of regulations (credit and labour market regulatory systems). Agbloyor et al. (2016) examined how institutional quality under different environments promotes the FDI-economic growth nexus. Unlike previous studies, this present study examines the impact of AML regulations on economic growth and how AML regulations influence the FDI-growth connection. Further, we argue that the impact of AML regulations on growth and the impact of AML regulations on the FDI-growth relationship may differ at certain levels of AML regulations.

We employ the Prais-Winsten and Hansen (2000) estimation approaches to estimate the effect of AML regulations on growth and the impact of FDI on economic growth via AML regulations across different economies. We also examine the threshold effect in the AML regulations-economic growth nexus as well as the threshold effect of AML regulations on FDI-growth connection. We find that AML regulations generally spur the economic growth of countries across the globe. However, the effect of AML regulations on growth is up to a threshold value beyond which the impact becomes negligible. Finally, our study finds that FDI stimulates growth. Nonetheless, the growth-enhancing impact of FDI is more prominent for countries in high-regime AML regulations. We structure the rest of the study as follows; in Section 2, we provide a review of relevant literature on AML regulations, FDI and growth. Section 3 discusses the empirical approaches as well as the data used in this study, and we discuss the findings of the study in Section 4. We conclude from the findings of the study and provide some policy recommendations to inform practice.

2 | REVIEW OF LITERATURE

2.1 | AML regulations and economic growth

In recent years, money laundering has become a major canker that governments, regulators and policymakers have to contend with. This is because it has catastrophic consequences for the development and stability of financial systems and the economies of nations around the globe (Aluko & Bagheri, 2012). Again, legitimate efforts by the private sector are undermined through the activities of money laundering. It also destabilizes domestic market operations as it leads to uncompetitive output markets which adversely affect the productivity of licit factors of production. Money laundering also results in loss of control of government domestic economic policies and loss of government revenue

through tax evasion and undermines government institutions by fostering corruption (Fundanga, 2003; Hendriyetty & Grewal, 2017; Loayza et al., 2019; McDowell & Novis, 2001). Further, it can impair the growth of economies by leading to capital flight from such economies meant for development (Bartlett, 2002). It is evident that money laundering has negative consequences for the growth of economies, and therefore, its regulation is a necessity.

Although the impact of money laundering and its regulation on economic growth remain unexplored mainly empirically in literature, theoretical prescriptions suggest a possible effect of money laundering and its regulation on the growth of countries. According to the endogenous growth model, growth depends not only on the parameters of production and utility functions but also on other factors such as improved labour force, better health care and educational system, technological change, international trade, government policy and regulation (Romer, 1994). Further, Maliranta (2011) indicates that productivity increase is not only accounted for by technical change (or productivity growth within plants/firms) but also through the reallocation of inputs to those firms (and plants). Arnold et al. (2008) noted that regulation plays a crucial role in allocating resources towards the most dynamic and efficient firms. Also, Arnold et al. (2011) opine that the opening of markets and increased competition generate reallocation of resources favouring more productive firms. Again, Melitz (2003) indicated that exposure to trade induces the exit of less efficient firms and reallocates market shares towards the more productive firms and contributes to an aggregate productivity increase.

Therefore, effective regulation of money laundering is expected to create competitive output markets, resulting in the reallocation of resources from less productive (front companies) to productive ones aimed at promoting growth. Again, AML regulation opens an economy for international trade and investment as it enhances the reputation of countries. It also encourages a competitive business environment by eliminating front companies (often inefficient) used for laundering proceeds of criminal activities and promotes financial sector development by fostering customer confidence and trust in the financial system through the principle of transparency. According to Bartlett (2002), AML regulations reinforce good governance of financial institutions that are critical for countries' economic growth. A model presented by Araujo and Moreira (2005) posits that the effectiveness of AML regulations should positively affect consumption which has implications for growth. Their study further accentuated that effective AML regulations increase output and consumption due to more productive labour. A study by Cavalcante Veiga and Andrade (2006) showed that AML regulation is related to investment and growth of countries. Issaoui et al. (2016) had shown that AML policies, suspicious transaction reporting and criminalization of terrorist financing have positive growth outcomes for Gulf countries. In a study of 135 countries, Djankov et al. (2006) provide evidence that countries with better business regulations grow faster.

However, AML regulations might come with some unintended consequences such as banks exiting from providing services to firms or clients perceived to come from high-risk segments of the economy or countries (Lowery & Ramachandran, 2015; Naheem, 2018). Again, Mohammad et al. (2016) provided evidence that AML regulations impact banking secrecy, increase service cost, negatively affect the volume of deposits and act as obstacles to attracting capital. Geiger and Wuensch (2007) opine that excessive AML regulations could retard wealth creation and therefore growth. This is because AML regulations increase the transaction costs of both foreign and domestic firms. A survey report by LexisNexis Risk Solutions (2020) estimates that AML compliance costs US financial firms to the tune of \$26.4 billion, \$49.5 billion for the United Kingdom and \$47.5 billion for Germany, while the global AML compliance cost is estimated at \$180 billion. This suggests that excessive AML regulations might have negative outcomes for growth. Therefore, we hypothesize a positive impact of AML regulations on growth below a certain threshold of AML regulations and a negative impact above the threshold.

2.2 | FDI and economic growth

The role of FDI in the growth process of nations cannot be overemphasized. Notwithstanding the strong theoretical prescriptions of a positive influence of FDI on growth, the empirics have largely produced mixed and inconclusive

results (see Aizenman et al., 2013; Ali & Mna, 2019; Asamoah et al., 2019; Yalta, 2013). However, in recent times, empirical works have shown that the characteristics of host countries such as quality of institutions, the extent of financial market development, political environment and quality of human capital development, urbanization, industrialization and pollutant emission, among others, stimulate the effect of FDI on growth. Recent studies provide evidence that urbanization, industrialization and pollutant emission influence the FDI-growth connection (see Joshua et al., 2020; Udemba et al., 2020; Udi et al., 2020). The influence of the financial market on the FDI-growth relationship has also been investigated in extant literature (see Adjasi et al., 2012; Agbloyor et al., 2014; Alfaro et al., 2004, 2010).

Again, using a threshold regression, Azman-Saini, Law, and Ahmad (2010) provide evidence that the positive effect of the development of the financial market on the FDI-growth nexus sets in only after a certain threshold of financial market development is exceeded. Adams and Opoku (2015) in a study of 22 sub-Saharan African (SSA) countries examined whether regulatory regimes in the form of credit and labour market regulations as well as business regulations condition the effect of FDI on growth. They find that effective legal frameworks and quality regulations stimulate the effect of FDI on economic growth. In a related study, Ketteni and Kottaridi (2019) find that labour regulations or liberalizations stimulate the impact of FDI on growth, while the impact of credit regulations on the FDI-growth connection is larger in high credit regulation regimes than in liberalized regimes. Further, Jude and Leveuge (2017) in a study of 93 developing countries provide evidence that the link between FDI and growth is enhanced by the quality of institutions. Finally, Ford et al. (2008) in a threshold analysis of US states find that the impact of human capital on the FDI-per capita output growth connection is more pronounced only when a certain minimum threshold of human capital is attained.

3 | METHODOLOGY

In this section, we describe the sources of data and the estimation approaches that we adopt in the analysis of the data. We test our hypothesized relationships using a panel dataset of 165 countries around the world from 2012 to 2018.

3.1 | Empirical model specification

In line with theoretical prescriptions and previous empirical studies (see Adjasi et al., 2012; Ford et al., 2008; Yang, 2008), we specify the following model:

$$Growth_{it} = \beta_0 + \beta_1 FDI_{it} + \beta_2 AMLR_{it} + \beta_3 (FDI * AMLR)_{it} + \beta_4 Z_{it} + \mu_i + \nu_t + \varepsilon_{it} \quad (1)$$

where $Growth_{it}$ represents economic growth of country i in time t . In line with previous empirical works (see Ajide, 2020; Nirola & Sahu, 2019; Polizzi et al., 2020), we measure economic growth using the growth of real GDP per capita. GDP per capita income represents the distribution of wealth within the economy as compared to the GDP growth rates. Again, FDI_{it} represents foreign direct investment. We measure FDI as the natural logarithm of net FDI inflows. Furthermore, $AMLR_{it}$ represents the index for AML regulations. We proxy AML regulations by the Basel AML Index from the Basel Institute on Governance. The Basel AML Index provides an independent assessment of the effectiveness of the AML systems of countries as well as provides an annual ranking of the money laundering risks of countries across the globe. The areas covered by the index are the effectiveness of the local legal AML frameworks put in place by countries in combating money laundering (65%), the extent of bribery and corruption in a country (10%), financial transparency and standards (15%), the extent of transparency and accountability in the public sector (5%) and the extent of legal and political risk of a country (5%). This index ranges from 0 to 10 where

0 represents the lowest AML risk or the most effective AML regulatory system and 10 represents the highest AML risk or the least effective AML regulatory system. However, we rescale the index following Agoba et al. (2019) and Ofoeda et al. (2020), where the lesser the score, the weaker the AML regulatory framework. We use the formula $-1*(AMLR-10)$, where AMLR is the AML regulations index.

Further, $(FDI*AMLR)_{it}$ denote the interaction term between FDI and AML regulations. However, to obtain the total effect of FDI on growth, we take the partial differential of growth with respect to FDI via Equation 1 following (Baltagi et al., 2009; Mohammed et al., 2020), which is given below:

$$\frac{\partial Growth_{it}}{\partial FDI_{it}} = \beta_1 + \beta_3 * AMLR_{it} \quad (2)$$

Consequently, the impact of FDI on growth largely depends on the sign and magnitude of the coefficients of the other variables and the extent of effectiveness of the AML regulatory framework of a country.

In line with the literature, we include some control variables in our model. We denote the control variables by the vector Z_{it} . We control for institutional quality, trade openness, natural resource endowment, infrastructure, financial development and human capital (see Agbloyor et al., 2016; Aluko & Ibrahim, 2020; Azman-Saini, Law, & Ahmad, 2010; Law et al., 2013). We measure the quality of institutions using the civil liberties score from the freedom house. The index ranges from 1 to 7 where 7 denotes weak institutions while 1 denotes strong institutions. We again rescale the civil liberties score following Agoba et al. (2019) and Ofoeda et al. (2020), where higher scores now denote strong institutions and lower scores denote weak institutions. Quality institutions are expected to exert a larger impact on productivity and therefore expected to have positive outcomes for growth. More opened economies allow for foreign participation which enhances economic growth (Agbloyor et al., 2016). We measure trade openness as a ratio of exports plus imports to GDP.

Natural resource endowment is expected to promote the growth of countries. We measure natural resource endowment as the ratio of natural resource rents to GDP. Quality infrastructure improves the quality of life of citizens, enhances trade and augments capital and labour in the production process, which is expected to promote economic growth (Kodongo & Ojah, 2016). We measure infrastructure by the number of telephone lines plus mobile lines per 100 people. The financial sector influences savings and investment decisions, facilitates trade and ensures the allocation of resources to productive sectors of the economy to promote growth (Aluko & Ibrahim, 2020). We measure financial development using the financial development index developed by the IMF (Svirydzenka, 2016). Finally, the knowledge and skills possessed by individuals influence their productivity. Therefore, human capital development promotes economic growth. We use secondary school enrolment as a percentage of all eligible children to measure human capital development. Except for AML regulation, we collect data for all our variables from the World Development Indicators. We use the Basel AML Index from the Basel Institute on Governance for AML regulations. In Table 1, we present the measurements as well as the sources of data for all variables used in the study.

3.2 | Empirical strategy

3.2.1 | Prais–Winsten estimation

We estimate Equation 1 using the Prais–Winsten panel-corrected standard errors (PCSEs) (Prais & Winsten, 1954). Conventionally, the fixed or random effects estimation techniques are employed in estimating the linear panel models. However, Huang et al. (2018) note that if serial correlation and heteroskedasticity are present in the data, the fixed effects estimations might be biased. Hence, possible alternatives could be the feasible generalized least squares (FGLS) and Prais–Winsten PCSEs. However, according to Beck and Katz (1995), the Prais–Winsten is a preferred alternative as the FGLS produces incorrect standard errors and autoregressive errors and could only be used

TABLE 1 Variable descriptions and data sources

Variable (denotation)	Variable measurement	Data source
Economic Growth (GROWTH)	The growth rate of real GDP per capita $\left(\frac{GDPPC_1 - GDPPC_0}{GDPPC_0}\right)$	World Development Indicators (WDI)
AML regulations index (AMLR)	Basel AML Index	Basel Institute on Governance
Foreign direct investment (FDI)	The natural log of net FDI inflows	WDI
Institutional quality (INSTQ)	Civil liberties scores	Freedom House
Trade openness (TO)	The ratio of exports + imports to GDP	WDI
Natural resource	Natural resource rents as a ratio of GDP	WDI
Infrastructure	Telephone + mobile subscriptions per 100 people	WDI
Financial development (FD)	Financial Development Index	IMF
Human capital (HCD)	Percentage of secondary school enrolment to all eligible children	WDI

in cases where we have very large time dimensions. With the shorter time dimensions (2012–2018) of our data, we use the Prais–Winsten estimation technique. Again, the Prais–Winsten technique automatically corrects heteroskedastic and serially correlated residuals. Further, unlike the Cochrane–Orcutt, Prais–Winsten corrects serial correlation that is closer to 1 and also produces more reliable and efficient results in correcting for heteroskedasticity and serial correlation.

3.2.2 | Panel threshold regression

In this study, we argue that the impact of AML regulations on economic growth may differ across the different levels of AML regulations. Also, the impact of AML regulations on the relationship between FDI and growth may differ based on the extent of AML regulations. We hypothesize that excessive AML regulations may be a disincentive for wealth creation and hence may hurt growth. Also, we posit that stronger AML regulations should promote the impact of FDI on growth. In exploring the non-linear behavior of AML regulations with growth as well as the FDI–growth nexus, we employ the panel threshold regression approach suggested by Hansen (2000). Traditionally, the threshold effect is assessed by introducing a quadratic term in the model (see Aibai et al., 2019; Ibrahim & Alagidede, 2018; Taghizadeh-Hesary et al., 2019). However, this approach is unable to identify the exact point where the relationship changes direction. Also, it may be prone to problems of multicollinearity and may not be able to address structural breaks in the data (Huang et al., 2018). Again, as in previous studies (see Agbloyor et al., 2016; Aibai et al., 2019; Alfaro et al., 2004; Azman-Saini, Baharumshah, & Law, 2010), the interaction model (constructed as the product of two variables) is used in assessing the moderating role of a variable. However, our study departs from previous studies by employing the panel threshold analysis by Hansen (2000) as applied in recent literature (see Aluko & Ibrahim, 2020; Azman-Saini, Law, & Ahmad, 2010; Ouyang et al., 2019). This estimation technique can trace the threshold for policy decisions. The threshold regression model can be described as follows:

$$Growth_{it} = \varphi X_{it} + \begin{cases} \alpha_1 + \beta_1 FDI_{it} + \theta_1 AMLR_{it} + \mu_{it} & AMLR_{it} < \gamma \\ \alpha_1 + \beta_2 FDI_{it} + \theta_2 AMLR_{it} + \mu_{it} & AMLR_{it} \geq \gamma \end{cases} \quad (3)$$

where subscripts i and t refer to country and time, respectively. $Growth_{it}$ represents economic growth, while FDI_{it} denote foreign direct investment. Again, $AMLR_{it}$ denote AML regulations, whereas α_i represents the country-specific fixed effects. Further, μ_{it} is a zero mean, finite variance, i.i.d. disturbance. We denote our control variables hypothesized to affect growth by a vector X_{it} . Again, $AMLR_{it}$ is the regime-switching or threshold variable that is used in splitting our data into two sample groups, while γ is the threshold value. Furthermore, β_1 and θ_1 are the coefficients of FDI and AML regulations below the threshold value γ , whereas β_2 and θ_2 are the coefficients of FDI and AML regulations above the threshold value γ .

Pre-estimation diagnostics

Our study checks for heteroskedasticity, autocorrelation/serial correlation, multicollinearity and endogeneity. This is to ensure consistent, unbiased and efficient coefficients in our estimations. We use the Breusch–Pagan/Cook–Weisberg and the White test to check for the presence of heteroskedasticity in our data (Appendix B) which often plagues panel data. The results show the presence of heteroskedasticity in our dataset. Again, we test for autocorrelation by employing the Wooldridge test (Appendix C). There is evidence of autocorrelation in our data. Further, due to the possibility of endogeneity in growth models, we test for endogeneity using the Du–Wu–Hausman test (Appendix D). However, there is no evidence of endogeneity in our dataset. Consequently, we proceed with the Prais–Winsten estimation technique which corrects for the presence of heteroskedasticity and autocorrelation in our data. Since Prais–Winsten is a fixed effects model, we conduct a Hausman test (Appendix A) which shows the preference for a fixed effects model. The presence of multicollinearity may lead to biased coefficients, and therefore, we test for multicollinearity using the variance inflation factor (Appendix E). We provide evidence that the independent variables are not highly correlated. Again, in examining the non-linear behavior of AML regulations and economic growth as well as the non-linearities of AML regulations on the FDI-growth nexus, we employ Hansen's (2000) threshold regression estimation method. This technique is a fixed effects estimation technique and automatically corrects for the presence of heteroskedasticity in the data. The threshold regression with instrumental variables modeling approach proposed by Caner and Hansen (2004) and the dynamic panel threshold approach proposed by Kremer et al. (2013) are often employed to deal with the problem of endogeneity in panel threshold estimations. However, due to the absence of endogeneity in our data, we proceed with Hansen's (2000) threshold regression estimation approach.

4 | EMPIRICAL RESULTS

In this section, we discuss the empirical findings of our study. First, we present the descriptive statistics, which enable us to explore the appropriateness of the data for the estimations. We again present the formal empirical analysis that tests our hypothesized relationships. The descriptive statistics for our full, developed and developing country samples are presented in Table 2. We use the United Nations' country classifications as the basis for grouping countries into developed and developing countries. Our study reports an average real GDP per capita growth (economic growth) of 1.5%, 2.04% and 1.4% for our full, developed and developing country samples, respectively. However, the average net FDI inflows is US\$1.74bn, US\$5.07bn and US\$7.60bn for full, developed and developing country samples, respectively. Again, the average AML regulations index is 4.26 for our full sample, 5.5 for developed countries and 3.9 for developing countries. The rescaled AML regulations index indicates the highest level of AML regulatory effectiveness for a score of 10 and the lowest level of effectiveness for a score of 0. An average of 4.26 for our full sample, therefore, suggests relatively weak AML regulatory systems globally. Nonetheless, comparatively, developed countries have robust AML regulatory frameworks. Further, for quality of institutions, the study reports an average of 3.8, 5.7 and 3.3 for full, developed and developing country samples, respectively. Given a rescaled civil liberty score of 6 now indicating strong institutions and 0 showing weak institutions, an average of 3.8 for our full

TABLE 2 Descriptive statistics

Variable	Obs.	Mean	Std. dev.	Min	Max
Panel A: Full sample					
GDP per capita growth	959	1.522	9.481	-67.586	47.411
FDI	1069	1.74e + 10	6.76e + 10	-1.60e + 11	5.80e + 11
AML regulations	1014	4.26	1.223	1.39	8.221
Institutional quality	1148	3.802	1.787	0	6
Trade openness	1051	92.916	58.33	19.101	442.62
Natural resource	953	7.221	10.399	0.002	61.975
Infrastructure	971	125.174	46.687	0.227	307.461
Financial development	954	0.347	0.221	0.052	0.958
Human capital	677	86.002	26.718	15.434	163.931
Panel B: Developed countries					
GDP per capita growth	210	2.036	7.978	-23.331	17.794
FDI	249	5.07e + 10	1.26e + 11	-1.60e + 11	5.80e + 11
AML regulations	236	5.504	0.82	3.219	8.221
Institutional quality	238	5.66	1.054	0	6
Trade openness	235	118.164	72.128	26.491	416.389
Natural resource	200	2.326	7.398	0.002	48.731
Infrastructure	201	155.746	34.158	0.227	213.923
Financial development	204	0.609	0.192	0.256	0.958
Human capital	169	109.343	18.265	62.183	163.931
Panel C: Developing countries					
GDP per capita growth	704	1.401	9.649	-67.586	47.411
FDI	765	7.60e + 09	2.69e + 10	-1.00e + 10	2.90e + 11
AML regulations	778	3.883	1.065	1.39	6.669
Institutional quality	910	3.316	1.613	0	6
Trade openness	816	85.645	51.507	19.101	442.62
Natural resource	753	8.521	10.694	0.111	61.975
Infrastructure	770	117.193	46.237	8.343	307.461
Financial development	750	0.276	0.168	0.052	0.873
Human capital	508	78.237	24.48	15.434	126.054

Notes: Economic growth is measured by the growth rate of GDP per capita. The AML regulations index is measured using the Basel AML Index published by the Basel Institute on Governance. Institutional quality is civil liberties scores. We also rescaled the civil liberties scores in line with Agoba et al. (2019). Trade openness is exports plus imports scaled by GDP, while natural resource is measured by the ratio of natural resource rents to GDP. Infrastructure is measured by the number of telephone lines plus mobile lines per 100 people. Financial development is measured by the Financial Development Index proposed by IMF. Human capital is the percentage of secondary school enrolment.

sample indicates relatively strong institutions. However, comparatively, developed country institutions are stronger than developing country institutions.

Again, the data suggest that countries in our sample are highly open to international trade. We report an average of 92.9%, 118.2% and 85.6% for trade openness for our full, developed and developing country samples, respectively. The study reports an average of 7.2% for the full sample, 2.3% for developed countries and 8.5% for

developing countries for natural resource rents. The study suggests that globally natural resource rents contribute marginally to GDP. Infrastructure (number of telephone and mobile lines per 100 people) shows an average of 125.2 for the full sample, 155.7 for developed countries and 117.2 for developing countries. Generally, the level of infrastructure is high. We report a mean of 0.35 for the full sample, 0.61 for developed countries and 0.28 for developing countries. The findings of our study suggest a less developed financial sector globally. However, developed countries have more advanced financial systems as compared to developing countries. Finally, we report an overall average of 86% for secondary school enrolment, a developed country average of 109.3% and a developing country average of 78.2%. This indicates a more developed human capital globally.

Further, this study examines the impact of AML regulations on growth outcomes across different economies of the world. We again examine the non-linearity in the AML regulations–economic growth connection and the non-linear behavior of AML regulations in the FDI–economic growth nexus. We present the Prais–Winsten regression results for the full sample, developed and developing country samples in Table 3. In Models 1, 2 and 3, we present the empirical results for our full, developed and developing country samples, respectively. From Models 1 and 3, the study reports that AML regulations positively impact growth for our full and developing country samples. AML regulations ensure efficient allocation of resources to sectors of the economy that support growth and promote a competitive output market which has implications for growth. Again, AML regulations reinforce good governance of financial institutions and promote the development of the financial sector, which is critical for growth. Our finding is consistent with the findings of Djankov et al. (2006) who found that countries with better business regulations grow faster.

On the other hand, our study shows that AML regulations somewhat dampen the growth of developed countries. This may be due to the extensive AML regulatory burden on financial institutions and also the cost of AML

TABLE 3 Prais–Winsten regression results on foreign direct investment and economic growth: the role of AML regulations

	Full sample 1	Developed countries 2	Developing countries 3
AML regulations	0.218*** (0.054)	−0.259* (0.141)	0.177*** (0.056)
FDI	0.124*** (0.019)	−0.07 (0.09)	0.113*** (0.017)
FDI*AMLR	0.017*** (0.005)	0.019 (0.017)	−0.017** (0.007)
Institutional quality	0.159*** (0.032)	0.116*** (0.018)	0.073 (0.047)
Trade openness	0.006*** (0.001)	0.0003 (0.001)	0.007*** (0.001)
Natural resource	−0.026*** (0.006)	−0.193*** (0.064)	−0.014*** (0.005)
Infrastructure	0.007*** (0.003)	0.016*** (0.005)	0.008*** (0.003)
Financial development	2.174*** (0.349)	2.379*** (0.553)	2.057*** (0.235)
Human capital	0.002** (0.001)	0.005* (0.003)	0.002** (0.001)
Constant	4.549*** (0.432)	6.324*** (1.326)	4.897*** (0.325)
Total effects ($\beta_1 + \beta_3 * AMLR_{it}$)	0.052*** (0.014)	0.0357 (0.154)	0.048*** (0.018)
Observations	1025	212	823
R-squared	0.933	0.941	0.932
Country effects	Yes	Yes	Yes
Time effects	Yes	Yes	Yes

Note: The panels corrected standard errors are in parenthesis.

*10% significance level.

**5% significance level.

***1% significance level.

compliance in developed countries. For instance, according to LexisNexis Risk Solutions (2020), the AML compliance cost for only the United States, the United Kingdom and Germany is estimated at \$123.4 billion. The global AML compliance cost is estimated at \$180 billion. Undoubtedly, the burden of AML compliance in developed countries is highly significant and may account for the negative impact of AML regulations on economic growth. Also, from Models 1 and 3, we observe a positive and significant effect of FDI on economic growth for our full sample and developing country samples. However, in our developed country sample, we find a negative but insignificant impact of FDI on economic growth. FDI promotes the growth of countries through the transfer of technology, spillover effects and employment creation, among others. The existing body of literature confirms our result (see Aizenman et al., 2013; Alfaro et al., 2004; Ali & Mna, 2019; Bird & Choi, 2020; Paugel, 2007).

Further, we interact FDI with AML regulations and observe from Models 1 and 3 that the interactive variable is positive and significant for our full sample and developing country sample. This means that a more robust AML regulatory framework enhances the effect of FDI on growth. Quality AML regulatory architecture of a country promotes FDI flows as well as determines how FDI impacts growth. This is because stronger AML regulations ensure the allocation of resources to productive sectors of the economy for growth. Furthermore, transparent and competitive output markets which are critical outcomes of an effective AML regulatory regime are crucial for how FDI impacts growth. Nonetheless, in weak AML regimes, FDIs may be used as means to launder funds, and therefore, such FDIs may not have their intended impact on growth. This means that such economies may just be used as destinations for laundered funds which are often not channelled into growth-enhancing activities. Besides, technology spillovers to domestic firms are less likely to occur as foreign firms may be unwilling to partner with domestic firms out of fear of being linked to money laundering scandals. Therefore, a strong AML regulatory regime is essential in promoting the impact of FDI on growth.

4.1 | Panel threshold regression analysis

Given that this study also aims to establish the nonlinear behaviour of AML regulations–growth connection and the non-linearities in how AML regulations affect the FDI–growth nexus, as a first step, we determine whether the relationships are monotonic by employing the bootstrap method. We hypothesize that there is a non-linear relationship between AML regulations and growth. That is, the impact of AML regulations on growth differs across the different levels of AML regulations. Again, we posit a threshold in the effect of AML regulations on the FDI–growth connection. Accordingly, we test the null hypothesis of linearity where $\theta_1 = \theta_2$ against the alternative hypothesis of a threshold model, that is, $\theta_1 \neq \theta_2$. We use 2000 bootstrap replications and a 15% trimming percentage to ascertain our hypothesized relationships. We test for the existence of threshold effect for our full, developed and developing country samples. Having established the threshold effect in our hypothesized relationships, we then split our sample based on the unique threshold value of our threshold value and proceed with the panel threshold regression. We present the results of the test for the existence of threshold effect in Tables 4 and 5.

As shown in Tables 4 and 5, the bootstrap *P*-values for the test of the existence of threshold effect for the relationship between AML regulations and growth and the impact of AML regulations on the FDI–growth connection for our full, developed and developing country samples indicate a non-acceptance of the test of no threshold effect. This is because the *P*-values are far less than 0.01, and the LM test statistic is also quite large. We, therefore, conclude the existence of threshold effect in the AML regulations–growth connection as well as the presence of threshold effect in the influence of AML regulations on the FDI–growth relationship. Our findings, therefore, suggest that the impact of AML regulations on economic growth is determined by the level of AML regulations of the country. Likewise, the influence of AML regulations on the FDI–growth connection depends on the country's level of AML regulations. Consequently, we divide the sample into two regimes where one regime is above the threshold value and the other regime is below the threshold value.

TABLE 4 Hansen threshold test ... AML regulations and economic growth

	Full sample	Developed countries	Developing countries
LM test for no threshold	48.796***	29.652***	68.025***
Bootstrap <i>P</i> -value	0.000	0.000	0.000
No. of bootstrap replications	2000	2000	2000
Trimming percentage	0.15	0.15	0.15

Notes: Null: There is no threshold effect of AML regulations on economic growth. Two thousand (2000) bootstrap replications are employed with 15 percentage trimming for the threshold tests.

***denote significance at 1%

TABLE 5 Hansen threshold test ... FDI and economic growth-the role of AML regulations

	Full sample	Developed countries	Developing countries
LM-test for no threshold	63.785***	28.1565***	58.657***
Bootstrap <i>P</i> -value	0.000	0.001	0.000
No. of bootstrap replications	2000	2000	2000
Trimming percentage	0.15	0.15	0.15

Notes: Null: There is no threshold effect of AML regulations on the FDI-economic growth connection. Two thousand (2000) bootstrap replications are employed with 15 percentage trimming for the threshold tests.

***denote significance at 1%

Having established the existence of threshold effect in the impact of AML regulations on growth and the impact of AML regulations on the FDI-growth nexus, we proceed with the panel threshold regression. In Table 6, we present the effects of AML regulations on economic growth for our full, developed and developing country samples in Models 4–12. Again, in Table 7, we present the results on the role of AML regulations on the FDI-growth connection for our full, developed and developing country samples in Models 13–21. For each of our samples, we present the global ordinary least squares regression (OLS), regime below the threshold value (low) and the regime above the threshold value (high). In examining the AML-growth link when the level of AML regulations serves as the regime-switching trigger, we find threshold values of 5.6755, 5.6359 and 4.8232 for our full, developed and developing country samples, respectively.

The study further finds that AML regulations positively affect economic growth irrespective of the level of AML regulations for our full sample. However, the impact is only significant for countries below the threshold value. We report a positive significant coefficient (0.1014) below the threshold and an insignificant negative coefficient (−0.1955) above the threshold. Above the threshold of 5.6755 of AML regulations for our full sample, growth is no longer impacted. This suggests that the positive impact of AML regulations on growth disappears when AML regulations go beyond the threshold. This implies that excessive/rigorous AML regulations might have harmful outcomes for growth.

Our findings relate to studies by Mohammad et al. (2016) who indicated that AML regulations impact banking secrecy, increase service or transaction cost and negatively affect the volume of deposits. Generally, our findings show that AML regulations positively impact growth, but the benefit associated with AML regulations wanes away when AML regulations go beyond the threshold.

The study provides evidence that countries in the high regime of AML regulations do not benefit from AML regulations. Money laundering affects government revenue, undermines legitimate private-sector efforts, serves as a threat to a well-functioning financial system and fosters corruption. Therefore, any attempt by a country to regulate money laundering is expected to generate positive outcomes and therefore influence growth. However, the

TABLE 7 Hansen threshold regression examining the effect of AML regulations on FDI-growth relationship

Variables	Full Sample			Developed Countries			Developing Countries		
	13	14	15	16	17	18	19	20	21
	Global OLS	Low (< 5.6755)	High (> 5.9808)	Global OLS	Low (< 5.6359)	High (> 5.6359)	Global OLS	Low (< 4.8232)	High (> 4.8232)
FDI	0.1111*** (0.0258)	0.0732*** (0.0265)	0.1602*** (0.0592)	0.0452*** (0.0101)	-0.0134 (0.0131)	0.0445** (0.0201)	0.1033*** (0.0328)	0.0361 (0.0316)	0.4404*** (0.09776)
Institutional quality	0.2197*** (0.0324)	0.1866*** (0.0351)	0.6504** (0.2928)	0.1793*** (0.0389)	0.1088*** (0.0277)	0.3031*** (0.1121)	0.1080*** (0.0423)	0.1523*** (0.0447)	0.0409 (0.1190)
Trade openness	0.0064*** (0.0009)	0.0075*** (0.0009)	-0.0039 (0.0029)	0.0002 (0.0008)	0.0024*** (0.0005)	-0.0041*** (0.0014)	0.0072*** (0.0011)	0.0061*** (0.0013)	0.0079*** (0.0018)
Natural resource	-0.0793** (0.0169)	-0.0328** (0.0068)	-0.2891*** (0.0428)	-0.3646*** (0.0957)	0.0089 (0.0073)	-0.4552*** (0.0414)	-0.0309*** (0.0070)	-0.0325*** (0.0069)	-0.0443*** (0.0194)
Infrastructure	0.0051*** (0.0015)	0.0027** (0.0011)	0.0069*** (0.0038)	0.0011 (0.0028)	-0.0051*** (0.0013)	-0.0005 (0.0024)	0.0054*** (0.0014)	0.0048** (0.0015)	0.0023 (0.0025)
Financial development	1.5030*** (0.3840)	2.4277*** (0.2470)	0.1519 (1.0429)	-1.7175*** (0.4858)	2.0727*** (0.2138)	1.5166*** (0.6016)	1.4111*** (0.4185)	2.1169*** (0.4196)	-0.3788 (0.6735)
Human capital	0.0007 (0.0009)	0.0013 (0.0009)	0.0002 (0.0021)	-0.0019 (0.0012)	-0.0029*** (0.0009)	-0.0006 (0.0014)	0.0017* (0.0011)	0.0005 (0.0012)	0.0052* (0.0031)
Constant	5.3290*** (0.2769)	5.5374*** (0.2909)	4.5586** (2.0806)	8.3833*** (0.5010)	9.4648*** (0.2395)	8.0115*** (0.9157)	5.4335*** (0.3473)	5.8553*** (0.3613)	3.6834*** (1.0888)
Observations	1025	891	134	212	99	113	823	685	147
R-squared	0.39	0.41	0.61	0.58	0.57	0.79	0.33	0.32	0.53
Country effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Threshold value	5.6755			5.6359			4.8232		
Confidence interval	[4.8987, 5.6755]			[5.0599, 5.6755]			[4.7205, 4.8400]		

implementation of AML regulations is a resource-intensive exercise that may erode the gains expected to be made from the AML regulations. Thus, according to our findings, the impact of AML regulations on growth is eroded when AML regulations become excessive. Again, a critical study of our data shows that most of the countries above the AML regulations threshold are developed countries as reported in Appendix F. It is worth noting that developed countries already have robust systems and structures in place. These countries might have reached a saturation point of growth, and therefore, AML regulations are not expected to have any significant impact on their growth. We find similar results for our developing country sample. However, we find no significant influence of AML regulations on growth neither below nor above the threshold value for developed countries.

Further, we also assess the effect of AML regulations on the FDI-growth link. We use AML regulations in a country as the regime-switching trigger for our full, developed and developing country samples. We find threshold values of 5.6755, 5.6359 and 4.8232 for our full, developed and developing country samples, respectively. The study reports that FDI has a significant positive impact on economic growth across all AML regulations for our full, developed and developing country samples. Our findings generally suggest that FDI spurs the growth of countries globally. This is consistent with several empirical studies (see Aizenman et al., 2013; Ali & Mna, 2019). However, we find a positive significant coefficient of 0.0732 below the threshold value and 0.1602 above the threshold for our full sample. This implies that the impact of FDI on growth is stronger in high-regime AML regulations. Again, we report positive significant coefficients of 0.0445 and 0.4404 above the threshold value for our developed and developing country samples, respectively. However, there is an insignificant impact of AML regulations on the FDI-growth connection below the threshold for both developed and developing country samples. This means that the positive impact of FDI on growth only sets in after a certain threshold of AML regulations is attained for both developed and developing countries.

As noted by Perez et al. (2012), some level of FDI to host countries is motivated by the desire to launder illicit funds. Therefore, the effectiveness of the host country's AML regulations would determine its attractiveness to money laundering motivated FDIs. FDIs motivated by the desire to launder illicit funds are often invested in sectors of the economy that do not support growth. Again, multinationals located in countries with weak AML systems may have difficulties integrating with the domestic economy for fear of being linked to money laundering scandals which may affect the likelihood of horizontal or vertical spillovers. Therefore, countries with weak or non-existent AML regimes may have FDI not impacting growth as expected.

Further, stronger AML regulations limit money laundering and ensure efficient allocation of resources in the domestic economy as well as competitive and efficient output markets. Hence, countries in high-regime AML regulations should benefit more from FDI flows than low-regime countries. Turning to the controls, our findings show that institutional quality, trade openness, natural resource, infrastructure and financial development also matter for growth.

5 | CONCLUSION AND POLICY RECOMMENDATIONS

Extant studies have highlighted the importance of FDI in stimulating the growth of countries. However, the recent strand of literature projects the roles of intermediating factors in the FDI-growth nexus. Undoubtedly, empirical efforts have not been rigorous in establishing the role of AML regulations on the FDI-growth connection. Again, regardless of the devastating impact of money laundering on nations' economies as espoused in literature and the daunting efforts made in curbing it, there has not been any attempt to empirically establish the impact of AML regulations on the economic growth of nations. An effective AML regulation is expected to promote the growth of economies and enhance the impact of FDI on economic growth. This is because it ensures competitive output markets and efficient allocation of resources to productive sectors of the economy. In this study, we examine the effect of AML regulations on growth as well as the role of AML regulations in the FDI-growth relationship. We again analyse the nonlinear behaviour in the AML regulations-growth connection and the non-linearities in how AML regulations

affect the FDI–growth nexus. The study relied on data from 165 countries across different economies over the period 2012–2018. We employ the Prais–Winsten and Hansen (2000) sample splitting approaches in estimating the data.

We provide evidence that AML regulations generally spur economic growth. However, we find that AML regulations somewhat dampen the growth of developed countries. Again, we report a positive and significant coefficient for the interaction term between AML regulations and FDI for our full and developing country samples. This suggests that a stronger AML regulatory framework enhances the effect of FDI on growth. This is because stronger AML regulations ensure the efficient allocation of resources to productive sectors of the economy and promote transparent and competitive output markets which are crucial for growth. Further, we find that the influence of AML regulations on growth is threshold-specific for our full, developed and developing country samples. Specifically, AML regulations promote growth to the threshold value, beyond which the impact becomes negligible. This is because the implementation and compliance of AML regulations are resource intensive, and therefore, excessive AML regulations may somewhat dampen growth. However, for developed countries, the relationships above or below the threshold values are not significant. Again, our study finds that FDI stimulates growth across all levels of AML regulations for our full, developed and developing country samples. Nonetheless, the growth-enhancing impact of FDI is more prominent for countries in high-regime AML regulations. Technology transfers and spillovers effects are not likely to occur as the likelihood of linkages between multinationals and domestic firms is minimal. Also, effective AML regulations deter FDIs that are motivated by the desire to launder proceeds of criminal activities which are often invested in unproductive sectors of the economy. Thus, more effective AML regulations should promote the impact of FDI on growth.

The findings of the study impose some policy implications. First, domestic market conditions and the institutional environment of countries must be critically studied in the design of FDI policies. This is because the local institutional context plays a significant role in how MNEs form their strategies. Our evidence suggests the fact that AML regulations somewhat determine how FDI becomes beneficial to host nations. Second, policymakers and regulators should strengthen AML regulatory frameworks by implementing policies that improve financial transparency and standards, enhance public sector transparency and accountability, reduce legal and political risk and fight bribery and corruption. Third, our study provides evidence that the impact of AML regulations on growth is non-linear and therefore threshold specific. Consequently, policymakers should be aware of potential threshold effects to be able to reap the maximum benefits from AML regulations. Regulators should develop methodologies for the integration of AML oversight into their existing supervisory regimes to make AML implementation and compliance efficient.

Lastly, limitations to this study may offer opportunities for further research. We used the composite Basel AML Index. While this keeps the analysis simple, future studies may use the various components of AML regulations as developed by the Basel Institute on Governance. This will help examine the impact of the various components of the Basel AML Index on economic growth and how they also affect the FDI–growth nexus. Again, we do recognize that countries may have unique AML frameworks. Therefore, the ability of AML regulations in promoting growth may be country specific. Future research may focus on how individual country AML regulatory frameworks influence their growth and also how AML regulations influence the FDI–growth relationship of such countries.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are openly available in World Development Indicators at <http://datatopics.worldbank.org/world-development-indicators/> and the Basel Institute of Governance at <https://www.baselgovernance.org/basel-aml-index/public-ranking>.

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How to cite this article: Ofoeda, I., Agbloyor, E. K., Abor, J. Y., & Achampong, K. O. (2022). Foreign direct investment, anti-money laundering regulations and economic growth. *Journal of International Development*, 34(3), 670–692. <https://doi.org/10.1002/jid.3582>

APPENDIX A: FIXED EFFECTS AND RANDOM EFFECTS ESTIMATIONS

Hausman test

b = consistent under H_0 and H_a ; obtained from xtreg

B = inconsistent under H_a , efficient under H_0 ; obtained from xtreg

Test: H_0 : difference in coefficients not systematic

$$\text{chi2 (12)} = (b-B)'[(V_b-V_B)^{-1}](b-B)$$

$$= 582.43$$

$$\text{Prob} > \text{chi2} = 0.0000$$

(V_b-V_B is not positive definite)

	FE	RE
AML regulations	0.028 (0.023)	0.057** (0.023)
FDI	0.022** (0.009)	0.040*** (0.010)
Institutional quality	-0.003 (0.083)	0.181*** (0.048)
Trade openness	0.008*** (0.001)	0.009*** (0.001)
Natural resource	0.009* (0.005)	0.012*** (0.005)
Infrastructure	-0.001 (0.001)	0.002* (0.001)
Financial development	0.505* (0.281)	1.061*** (0.269)
Human resource	0.000 (0.001)	0.001 (0.001)
_cons	7.248*** (0.378)	5.734*** (0.261)
Obs.	1155	1155
R-squared	0.23	0.26

Notes: Standard errors are in parenthesis. Asterisks denoted by *, ** and *** indicate statistical significance at $P < 0.1$, $P < 0.05$ and $P < 0.01$, respectively.

APPENDIX B: HETEROSKEDASTICITY TEST BREUSCH-PAGAN/COOK-WEISBERG AND WHITE TEST

Breusch-Pagan/Cook-Weisberg test for heteroskedasticity

H_0 : Constant variance

Variables: fitted values of *fdindex*

$$\text{chi2 (1)} = 454.36$$

$$\text{Prob} > \text{chi2} = 0.0000$$

. estat imtest, white

White's test for H_0 : homoskedasticity

against H_a : unrestricted heteroskedasticity

$$\text{chi2(27)} = 718.02$$

$$\text{Prob} > \text{chi2} = 0.0000$$

APPENDIX C: AUTOCORRELATION TEST WOOLDRIDGE

Wooldridge test for autocorrelation in panel data

H0: no first-order autocorrelation

$$F(1, 164) = 22.668$$

$$\text{Prob} > F = 0.0000$$

APPENDIX D: DU-WU-HAUSMAN TEST OF ENDOGENIETY

. estat endog

Tests of endogeneity

Ho: variables are exogenous

Robust score chi2(1) = .680278 (p = 0.4095)

Robust regression F(1,982) = .663727 (p = 0.4154)

APPENDIX E: VARIANCE INFLATION FACTOR

	VIF	1/VIF
Infrastructure	2.360	0.424
Financial development	2.220	0.451
Human capital	1.570	0.635
Institutional quality	1.420	0.703
AML regulations	1.420	0.704
FDI	1.280	0.784
Trade openness	1.140	0.877
Natural resource	1.110	0.901
	1.560	

**APPENDIX F: LIST OF COUNTRIES WITH AML REGULATIONS ABOVE AND BELOW THE THRESHOLD
(THRESHOLD VALUE = 5.9808)**

Full sample					
Country	AMLR	Country	AMLR	Country	AMLR
Developed countries—above threshold					
Finland	7.176	New Zealand	6.352	Malta	5.978
Estonia	6.811	Norway	6.184	Denmark	5.932
Slovenia	6.564	Sweden	6.181		
Lithuania	6.36	Bulgaria	6.118		
Developed countries—below threshold					
Iceland	5.776	Romania	5.392	Italy	4.754
Portugal	5.757	Slovakia	5.348	Germany	4.754
Hungary	5.707	Latvia	5.311	Switzerland	4.538
Belgium	5.626	Spain	5.138	Japan	4.3504
Ireland	5.584	Netherlands	5.103	Greece	4.339
France	5.568	Cyprus	5.095	Luxembourg	4.2234
Czech Republic	5.559	Canada	4.966	Russia	4.0407
Australia	5.456	United States	4.923	Nicaragua	3.9178
Croatia	5.439	Qatar	4.897		
United Kingdom	5.4	Austria	4.791		
Developing countries—above threshold					
Chile	5.766	Uruguay	5.081	Belarus	4.584
Poland	5.74	Jamaica	5.03	Hong Kong Sar, China	4.551
Montenegro	5.473	Taiwan, China	4.98	Serbia	4.549
Colombia	5.442	Korea, South	4.97	Uzbekistan	4.539
Israel	5.403	Georgia	4.947	Albania	4.531
Peru	5.356	El Salvador	4.945	Djibouti	4.516
Macedonia	5.296	Jordan	4.908	Mauritius	4.502
Oman	5.295	Egypt	4.884	Azerbaijan	4.478
South Africa	5.275	Saudi Arabia	4.883	Grenada	4.846
Dominica	5.249	Barbados	4.856	St. Lucia	4.745
Singapore	5.205	Kosovo	4.854	St. Vincent and The Grenadines	4.733
Tunisia	5.182	Malaysia	4.622	Moldova	4.677
Armenia	5.133	Mexico	4.59		
Developing countries—below threshold					
Bahrain	4.44	Samoa	4.164	Ecuador	3.955
India	4.389	Kuwait	4.101	Honduras	3.945
Bosnia-Herzegovina	4.37	Brunei	4.093	Timor-Leste (East Timor)	3.91
Senegal	4.335	Morocco	4.081	Trinidad and Tobago	3.909

(Continues)

Full sample					
Country	AMLR	Country	AMLR	Country	AMLR
Brazil	4.327	Kazakhstan	4.07	China	3.852
Belize	4.325	Syria	4.033	Turkey	3.846
Guatemala	4.307	Ghana	4.029	Bahamas	3.807
Botswana	4.277	United Arab Emirates	3.969	Guyana	3.805
Malawi	4.261	Costa Rica	3.963	Indonesia	3.801
Bangladesh	3.798	Rwanda	3.206	Paraguay	2.573
Cote D'Ivoire	3.78	Mauritania	3.187	Guinea	2.509
Mongolia	3.763	Argentina	3.143	Maldives	2.498
Seychelles	3.756	Benin	3.134	Haiti	2.414
Vanuatu	3.755	Vietnam	3.072	Nepal	2.388
Philippines	3.755	Cape Verde	3.058	Myanmar	2.317
Kyrgyzstan	3.734	Zimbabwe	3.02	Laos	2.24
Suriname	3.727	Comoros	3.013	Kenya	2.21
Papua New Guinea	3.707	Nigeria	2.976	Sudan	2.207
Algeria	3.638	Yemen	2.967	Uganda	2.187
Marshall Islands	3.602	Niger	2.953	Swaziland	2.109
Gambia	3.594	Togo	2.95	Mozambique	2.006
Venezuela	3.579	Ethiopia	2.911	Cambodia	1.941
Ukraine	3.531	Bolivia	2.902	Guinea-Bissau	1.825
Thailand	3.501	Tanzania	2.88	Iraq	1.797
Angola	3.488	Sierra Leone	2.875	Tajikistan	1.748
Sri Lanka	3.441	Lesotho	2.82	Afghanistan	1.549
Pakistan	3.427	Mali	2.788	Iran	1.437
Dominican Republic	3.401	Sao Tome and Principe	2.673		
Panama	3.399	Liberia	2.619		
Lebanon	3.379	Zambia	2.614		
Namibia	3.298	Burkina Faso	2.61		