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Bridging Africa's income inequality gap: How relevant is China's outward FDI to Africa?

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Research Department

Bridging Africa's Income Inequality Gap: How Relevant Is China's Outward FDI to Africa?

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Abstract

In line with the SDG 10 and Aspiration 1 of Africa's Agenda 2063, this study examines whether: (i) the remarkable inflow of Chinese FDI to Africa matters for bridging the continent's marked income inequality gap, (ii) Africa's institutional fabric is effective in propelling Chinese FDI towards the equalisation of incomes in Africa, and (iii) there exist relevant threshold levels required for the various governance dynamics to cause Chinese FDI to equalise incomes in Africa. Our results, which are based on the dynamic GMM estimator for the period 1996 – 2020, reveal that though: (1) Chinese FDI contributes to equitable income distribution in Africa, the effect is weak, and (2) Africa's institutional fabric matters for propelling Chinese FDI towards the equalisation of incomes across the continent, governance mechanisms for ensuring political stability, low corruption, and voice and accountability are keys. Finally, critical masses required for these three key governance dynamics to propel Chinese FDI to reduce income inequality are 0.8, 0.5 and 0.1, respectively. These critical masses are thresholds at which governance is a necessary but no longer a sufficient condition to complement Chinese FDI in order to mitigate income inequality. Hence, at the attendant thresholds, complementary policies are worthwhile. Policy recommendations are provided in the end.

Keywords: Africa, Agenda 2063, China, Corruption, Governance, FDI, Income Inequality,
***JEL Codes**: F6; F15; O43; O55; R58*

1. Introduction

Income inequality remains a pressing issue in both developed and developing countries despite concerted efforts aimed at addressing the concern (World Bank, 2020; Shi *et al.*, 2020; Xu *et al.,* 2021). Relative to other continents, Africa remains the most unequal and marginalised despite giant gains chalked in the past two decades in the fight against poverty (World Bank 2020; Bergstrom *et al.* 2020; Kunawotor *et al*., 2020; Shimeles & Nabassaga, 2018). This is a major concern considering efforts made by African countries and their development partners in addressing the continents hydra-headed problems concerning poverty, unemployment and income inequality since the turn of the Millennium (Ofori *et al*. 2021a; Ofori & Asongu, 2021a; Tchamyou, 2021; Asongu & Odhiambo, 2019).

The outlook concerning income inequality in Africa is also not encouraging following the emergence of the coronavirus pandemic, which is projected to push about 23 million people back into extreme poverty bracket in 2021 (World Bank, 2020; ILO, 2020a, 2020b). In particular, income inequality is expected to rise following the dip in economic growth and the floundering of informal activities due to the coronavirus pandemic (IMF 2020a, 2020b; Ofori *et al*., 2021a; Ofori & Asongu, 2021a). This is also a major concern for African leaders who look forward to making giant headways towards the achievement of SDG 10 and the Africa Agenda 2063. It is in this regard that empirical contributions such as this present study are imperative for guiding policy actions on how African leaders can address income inequality, which can go a long way to foster social cohesion, human resource development, and the quality of life (Ujunwa *et al.,* 2021; Ofori, 2021)

In this study, we identify two key channels in line with Africa's Agenda 2063 and United Nation's Agenda 2030 on how developing countries such as those of Africa can spur industrialisation and shared opportunities. The first is the momentous rise in foreign direct investment (FDI), which as UNCTAD (2021) and Cornia and Martorano (2012) point out is key for promoting sustainable income growth and distribution. Additional optimism regarding FDI in equalising incomes in Africa is that: (1) it is projected to rebound in 2022 despite taking a dip [1] in 2019 and 2020 following the implementation of the Africa Continental Free Trade Area (AfCFTA), and (2) compared to other continents, Africa ranks high as a major FDI destination (UNCTAD 2021; 2019; Cornia & Martorano, 2012). Particularly on the latter, information gleaned from UNCTAD (2021, 2020, 2019) shows that

[1] FDI inflow to Africa reduced by 10% to US$ 45 billion in 2019 following tepid global and regional output growth and demand for primary commodities. In 2020, FDI inflow to Africa declined by 40% following the emergence of the coronavirus pandemic, (UNCTAD, 2021)

in 2018, for instance, FDI inflow to Africa amounted to US$ 46 billion. As Xu *et al.* (2021) and Opoku *et al.* (2019) report, this remarkable inflow of resources can contribute to reducing income equality in marginalised settings such as Africa through industrialisation, enhanced global value participation, jobs creation, and enhanced government revenue mobilisation. Information gleaned from Atitianti and Dai (2021), UNCTAD (2019) and Cornia and Martorano (2012) indicates that, among the major foreign investors in Africa, Chinese investors (hereafter *China FDI*) stands out[2]. In particular, Atitianti and Dai (2021) report that the stock of China FDI to Africa increased from US$ 0.5 billion in 2003 to at least US$35 billion in 2020. In particular, Cornia and Martorano (2012) report that China FDI in sectors such as the hydrocarbons, precious metals, education, telecommunication, and manufacturing has risen remarkably in the past two decades, citing it as a key contributor to the strong growth trajectories of Africa since the year 2000.

Second, taking cues from Kaufmann *et al.* (2010) and Acemoglu and Robinson (2012), we reckon that Africa's institutional fabric will also play a key role for attracting and sharing the gains from FDI. Our main argument is that, though FDI could contribute to the Africa's quest for equitable income growth and distribution as the Bhagwati (1973) hypothesis and modernization theory (Bernstein, 1971) suggest, governance remains a crucial mechanism and the lubricant to turn the turbines on. For instance, strong economic governance is required for reducing investment risk while strong legal frameworks are needed for safeguarding and guaranteeing investment returns (Acemoglu & Robinson, 2008). Particularly, Acemoglu *et al.* (2004), Acemoglu and Robinson (2008) and Ofori and Asongu (2021b) argue that good governance is crucial for the promotion of shared income growth, social welfare, and equitable income distribution. Political stability is also imperative for attracting, integrating and sustaining FDI into recipient economies (Huynh, 2021; Ivanyna & Salerno, 2021; Ofori & Asongu, 2021b; Zhuang *et al.*, 2010). Further, for the income inequality-inducing effect of FDI to be realised, governance effectiveness can be crucial not only for building friendly climate for sustaining foreign investors but also for fostering social inclusion and redistribution (Acemoglu & Robinson, 2012; Acemoglu *et al*., 2004).

Despite these developments, rigorous empirical contributions informing policymakers interested in Africa's equitable income distribution agenda as to whether China FDI contribute to reducing/exacerbating income inequality in Africa is(are) hard to find. Additionally, a key lacuna in the literature is that whether Africa's institutional fabric (i.e.,

[2] Other notable key investors are the EU countries, United States of America, and India

governance quality) matters for forming relevant synergies with China FDI for the equalisation of incomes in Africa remains unexplored. This study, therefore, extends the income inequality literature on Africa by testing two hypotheses. First, this study tests whether unconditionally, both China FDI and governance quality reduce income inequality in Africa. Second, we test whether governance quality moderates China FDI towards the equalisation of incomes in Africa. Finally, we examine threshold levels required for our governance dynamics to propel China FDI to towards the equalisation of incomes in Africa. The main contributions of this study are twofold. First, it could help African leaders map out appropriate governance strategies in line with FDI for achieving income equality by 2063 as envisaged in the comprehensive continental framework dubbed, *The Africa We Want*. Second, the study could also inform African leaders and their development partners on which governance dynamics need much attention and resources if the growing political and social unrest[3], and human resource wastage of Africa triggered partly by the marked income disparity across the continent is to be addressed head-on.

The rest of the study is structured as follows: Section 2 presents a review of the literature on FDI-income inequality nexus and governance quality-income inequality relation. Section 3 details the methods underpinning the empirical analysis. We present our results and discussion in Section 4 and the conclusion and policy recommendations in Section 5.

2. Literature review

2.1 Theoretical linkages between FDI, governance and income inequality

The theoretical foundation of this paper rests on the modernization theory, the Bhagwati hypothesis, and exogenous growth theory. To begin with, the modernization theory indicates that, FDI, which remains a significant component of globalisation, could contribute to improving socio-economic development through job creation, technological transfer, global value chain participation and foreign exchange (Bernstein, 1971). The modernization theory takes its roots from the standard Ohlin (1933) proposition that, by specialising in low skill-intensive labour production, developing countries can use trade to equalise incomes. In settings like this, FDI can play a key role in spurring industrialisation and the generation of durable economic opportunities, providing concrete means of leapfrogging the Kuznets (1955) hypothesis in the process. Second, the exogenous growth theory, which leans itself to innovation and technological transfer, suggests that FDI can be a significant medium for

[3] Coup d' teats in Africa since January 2020 is 6.

boosting industrial sector revival, economic growth, poverty alleviation, and the creation of opportunities in host countries (see, Bhagwati & Srinivasan, 2002; Grossman & Helpman, 1991).

However, as UNDP (2017), OECD (2016) and World Bank (2013) reckon, governance is the fulcrum on which everything else in the economy evolves. This aligns to the argument by Stiglitz (2002) that robust economic, political and institutional frameworks/structures are crucial for attracting and sharing the gains from FDI. Further, quality governance can be instrumental for building trust and cooperation, which are essential elements in disadvantageous settings like Africa for (i) encouraging cross-border investment and (ii) deterring rent-seeking behaviour characteristic FDI. The relevance of quality governance for levelling the playing field for all and providing an enabling environment for FDI to contribute to equitable income distribution is seen in Acemoglu *et al*. (2012, 2010). It is in this regard that the authors point out that bad governance, which is conspicuous of the developing world, contributes to the routine economic stagnation, social unrest and weak investor climate, sapping the masses from equal opportunities and a fair delivery of the public good. Accordingly, boosting effective governance in small open economies like those of Africa as Kaufmann *et al*. (2010) and Tosun and Timothy (2001) argue is thus essential for addressing corruption, enhancing economic freedom, and propelling to benefit all.

2.3. Empirical literature survey on the link between FDI and income inequality

The literature on the link between the FDI and income inequality is vast and still growing amid controversies and inconclusive findings. This study therefore focuses on the FDI-income inequality relationship in the developing world.

For instance, in interrogating the subject matter in sixteen African economies, Kaulihowa and Adjasi (2018) find that though FDI contributes to income growth, it is not potent enough to bridge the continent's marked income disparity gap, citing skill-set bias as the underlying factor. In a similar vein, Khan and Nawaz (2019) applied the dynamic system GMM to examine the FDI-income inequality nexus in the case of Commonwealth of Independent States (CIS). The authors provide strong evidence to suggest that FDI heightens income inequality. Characteristic of cross-border trade and its discontent as Stiglitz (2002) argue, Khan and Nawaz (2019) and Batuo and Asongu (2015) conclude that unless FDI is complemented with structural adjustments/policies, and investment in social infrastructure, it can deepen income inequality. A similar conclusion was reached by Song *et al*. (2021) and Anyanwu *et al*. (2016) who explored the FDI and income inequality relationship in 20 major

remittance-receiving countries, and 17 West African countries, respectively. The conclusions reached by these authors are empirical support for the claim by Cornia and Martorano (2012) that FDI inflow to the low- and middle-income countries has been concentrated in sectors such as the hydrocarbon, precious metals, and telecommunications, which generate fewer jobs for the masses who are generally unskilled.

Contrary to the aforementioned undesirable effects of FDI which are in line the evils of globalisation as Bourguignon (2016) and Stiglitz (2002) warn, some studies also conclude that FDI lessens income inequality in developing countries. For example, Ofori and Asongu (2021b) find in the case of sub-Saharan Africa that FDI induces equitable income distribution both conditionally and unconditionally through good governance. This is a finding that has been re-echoed by Xu *et al*. (2021) examined the effect of FDI on income inequality in 38 sub-Saharan African economies over the period 2000 – 2015. In a comprehensive study by Batuo and Asongu (2015), though the authors report that FDI is directly deleterious to the quest on the part of policymakers to equalise income in Africa, countervailing social policies are worthwhile for mitigating such adverse effects. Sharma and Abekah (2017) also draw data on 71 developing countries from Africa and Latin American for the period 1970 – 2014 to investigate the FDI-income distribution relationship and fail to provide empirical support for both the skill premium and labour aristocracy hypotheses. The authors argue that the marginal gains in income distribution in both South America and Africa could be attributed to the (i) remarkable contribution of FDI to technological spill over and domestic productivity, export and employment and (ii) the fact that FDI has not raised the skill premium in the host countries significantly.

2.4 Brief empirical review on the link between governance and income inequality

A survey of the extant literature on the relationship between governance quality and income inequality shows mixed and inconclusive results. For instance, in a recent study conducted by Xu *et al*. (2021), robust evidence from the GMM estimator suggest that the governance dynamics— political stability, corruption, and rule of law deepens income inequality in Africa. The authors conclude that the weak institutional fabric of Africa explains such unlikely results. In a more comprehensive study which is also executed based on the system-GMM estimator, Canh *et al*. (2020) provide strong empirical evidence to show that weak institutional quality heightens income inequality in low- and middle-income countries. The authors then provide evidence based on the Kuznets (1955) hypothesis, that in the long-run quality governance contributes immensely to the equalisation of incomes.

In a regional and sub-regional contribution to the governance-income inequality literature on sub-Saharan Africa, Kunawotor *et al.* (2020) provide convincing evidence from the autoregressive distributed lag estimation technique to report that institutional governance (i.e., control of corruption) is crucial for reducing income inequality. An interesting contribution from the Kunawotor *et al.* (2020) study is that committing to prudent economic, political and institutional governance in marginalised and unequal settings like sub-Saharan Africa, yields significant short-term and long-term income inequality dividends. Focussing on all disaggregated components of governance quality— control of corruption, political stability, rule of law, governance effectiveness, regulatory quality, and voice and accountability across, Nguyen (2021) find that these governance dynamics contribute to the equalisation of incomes across developing and developed countries though the effects are pronounced in the case of the latter compared to the former. In a similar study by Adams and Akobeng (2021) in the context of Africa, the authors interrogate whether the governance measures of democratic rule, regulatory quality, rule of law and political stability form relevant synergies with digital infrastructure towards the equalisation of incomes in Africa. The authors provide strong empirical evidence from the dynamic system GMM estimator to affirm this hypothesis, with the effects of political stability and rule of law being the most remarkable.

The empirical literature survey, thus far, shows that researchers have not explored whether China FDI deepens or reduces income inequality in Africa. Also, despite giant gains made by countries such as South Africa, Botswana, Mauritius, Caper Verde and Lesotho in various facets of governance as apparent in Figure A.1 in the Appendices section, whether these developments matter for moderating the effect of Chinese FDI on income inequality in Africa is missing in the literature. And indeed, our empirical evidence, which we provide in Section 4 reveals that our governance dynamics, particularly, rule of law, political stability and voice and accountability are crucial for moderating the effect of China FDI in equalising incomes in Africa.

3. Data and methods

3.1 Data

This study uses a panel dataset on 48 African economies[4] over the period 1996-2020 for the empirical analysis. For our main income inequality variable, we opt for the Palma ratio since it captures the tails in the distribution of incomes across a given population (Asongu and Odhiambo, 2017; Lahoti *et al*. 2016). We draw the Palma ratio series from the Global Consumption and Income Project (Lahoti *et al.* 2016). To evaluate the robustness of our estimates on the Palma ratio we use the net Gini index as an alternative measure of income inequality. The Gini index is sourced from the Standardized World Income Inequality Database (Solt, 2020). Our variable of interest is China FDI, proxied by Chinese FDI inflow to African Countries and is also obtained from the database of China's Ministry of Commerce. Our focus on China FDI is that, its inflow to African countries has been a major component of overall FDI. Additionally, with the implementation of the AfCFTA and the finalisation of Africa's investment protocol, grounds are fertile for market-seeking, efficiency-seeking, strategic asset-seeking, and resource-seeking foreign investors, key of which are Chinese investors. Further, we consider 6 governance indictors— *rule of law, control of corruption, regulatory quality, governance effectiveness, political stability, and voice and accountability* from the World Governance Indicators (Kaufmann *et al*., 2010) to capture the implications of systems and structures in incentivising, sustaining, propelling and sharing the gains from FDI.

Also, we control for covariates such as urbanisation, human capital, economic growth, and trade openness. The relevance of these variables in the conditioning information set is captured in what follows. First, we consider human capital considering its relevance in bridging the income inequality gap in marginalised societies is seen in (Tchamyou, 2021; Sarkodie & Adams, 2020) who emphasise that investment in human capital could contribute to bridging the skillset and productivity gaps among richer and poorer households. This can in turn spur economic growth innovation and high production, creating room for more employment opportunities. Second, we keep tabs on trade openness (economic integration) following the unanimous agreement by African leaders to use trade to revive the continent's agricultural and industrial sectors, which could go a long way to boost forward- and

[4] **The countries are**: Algeria, Angola, Benin, Botswana, Burkina Faso, Burundi, Cabo-Verde, Cameroon, Central African Republic, Chad Comoros, Congo Dem. Rep, Congo Rep, Cote d'Ivoire, Djibouti, Egypt, Arab Rep, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mauritius, Morocco, Mozambique, Niger, Nigeria, Rwanda, Senegal, Seychelles, Sierra Leone, South Africa, Sudan, Tanzania, Togo, Tunisia, Uganda, Zambia, Zimbabwe.

backward-linkages, global value chain participation, foreign exchange, and the creation of durable socioeconomic opportunities (Obeng *et al.*, 2021; *Xu et al.*, 2021; Anyanwu *et al*., 2016). Finally, we consider urbanization against the backdrop that it can fuel income inequality in the developing world as low-skill rural migrants settle for low-wage or precarious jobs for subsistence in urban centres (Adams & Klobodu, 2019; Sulemana *et al.*, 2019). The description and sources of the variables are provided in Table 1.

Table 1: Description of variables and data sources

Variables	Descriptions	Sources
Outcome variables		
Palma ratio	Ratio of the share of incomes held by the richest 10% of the population to that of the poorest 40% of the population.	GCIP
Gini index (net)	The distribution of incomes among individuals in a population (0 = perfect equality; 1 = perfect inequality)	SWIID
Variables of interest		
China FDI	China outward FDI to Africa (US$)	MOFCOM
Control of corruption	Captures perceptions of the public on the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests. (estimate)	WGI
Government effectiveness	Perception on the effectiveness of governments in managing and introducing policies aimed at economic growth and development (estimate)	WGI
Political stability	measures perceptions of the likelihood of political instability and/or politically-motivated violence, including terrorism.	WGI
Voice and accountability	Captures perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media.	WGI
Rule of law	captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence	WGI
Regulatory quality	captures perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development.	WGI
Control variables		
Economic growth	Real GDP per capita (US$' 2017 PPP)	WDI
Economic growth square	Square of Real GDP per capita (US$' 2017 PPP)	WDI
Human capital	Years of schooling and returns to education	PWT
Financial access	Financial institutions access index	Findex

Note: WDI is World Development Indicators; SWIID is Standardized World Income Inequality Database; WGI is World Government Indicator; PWT is Penn World tables; and MOFCOM is China's Ministry of Commerce

3.2 Estimation strategy

The study rests on the conventional intuition from the modernization theory (Bernstein, 1971), the Ohlin (1933) model and the Bhagwati (1973) hypothesis that FDI can contribute to shared income growth and distribution. Additionally, we take cues from the argument that good governance is essential for level the playing field and propelling the masses to gain from economic integration (UNDP, 2017; OECD, 2016; World Bank, 2013; Acemoglu & Robinson, 2012; Kaufmann *et al.*, 2010). We then turn attention to the empirical models by following prior contributions such as Anyanwu *et al*. (2016) and Kunawotor *et al.*(2020) where we first specify a baseline model to examine the relationship between income inequality and our control variables (see equation 1).

$$ineq_{it} = \alpha_0 + \beta_1 urban_{it} + \beta_2 trade_{it} + \beta_3 hci_{it} + \beta_4 gpc_{it} + +\eta_i + \mu_t + \mu_{it} \quad (1)$$

Where: $\boldsymbol{ineq}$ denotes income inequality (net) Gini index in country $\boldsymbol{i}$ at time $\boldsymbol{t}$; $\boldsymbol{urban}$ represents urbanization; $\boldsymbol{trade}$ is trade openness; $\boldsymbol{hci}$ is human capital index; $\boldsymbol{gpc}$ is real GDP per capita (US$). Furthermore, to capture the Kuznets effect considering the level of development of the economies under consideration, we modify Equation (1) to obtain:

$$ineq_{it} = \alpha_0 + \delta_1 ineq_{it-1} + \beta_1 urban_{it} + \beta_2 trade_{it} + \beta_3 hci_{it} + \beta_4 gpc_{it} + \beta_5 gpc_{it}^2 + \eta_i + \text{灬}_t + \mu_{it} \quad (2)$$

To test the effect of China's outward FDI and governance quality on income inequality, we modify the Equation 2 as follow:

$$ineq_{it} = \alpha_0 + \delta_1 ineq_{it-1} + \beta_1 urban_{it} + \beta_2 trade_{it} + \beta_3 hci_{it} + \beta_4 gpc_{it} + \beta_5 gpc_{it}^2 + \beta_6 gov_{it} + \beta_7 cfdi_{it} + \eta_i + \mu_t + \mu_{it} \quad (3)$$

Where: $\boldsymbol{cfdi}$ is China's outward FDI; $\boldsymbol{gov}$ is governance quality, which is captured by voice accountability, regulatory quality, control of corruption, rule of law, governance effectiveness, and political stability. Moreover, following the hypothesised moderating role of governance quality on the effect of China FDI on income inequality, we add an interaction term for China FDI and governance quality to Equation 3 to obtain:

$$ineq_{it} = \alpha_0 + \delta_1 ineq_{it-1} + \beta_1 urban_{it} + \beta_2 trade_{it} + \beta_3 hci_{it} + \beta_4 gpc_{it} + \beta_5 gpc_{it}^2 + \beta_6 gov_{it} + \beta_7 cfdi_{it} + \beta_8 (gov_{it} \times cfdi_{it}) + \eta_i + \mu_t + \mu_{仿t} \quad (4)$$

In accordance with Nguyen *et al*. (2020), Equation 4 is modified by log-transforming all the variables with the exception of the governance indicators to obtain Equation (5).

$$ln(ineq_{it}) = \alpha_0 + \beta_1 ln(urban_{it}) + \beta_2 ln(trade_{it}) + \beta_3 \ln(hci_{it}) + \beta_4 ln(gpc_{it}) + \beta_5 ln(gpc_{it}^2) + \beta_6 gov_{捲t} + \beta_7 \ln(cfdi_{it}) + \beta_8 (gov_{it} \times \ln(cfdi_{it})) + \eta_i + \mu_t + \mu_{it} \quad (5)$$

where: $\boldsymbol{\eta_i}$ is the unobserved country-specific effect, $\boldsymbol{\mu_{it}}$ represents the independent and identically distributed error term, $\boldsymbol{i}$ is country, $\boldsymbol{t}$ is time. Though in this case, the dynamic ordinary least squares, for instance, can be applied to test our hypotheses as Stock and Watson (1993) argue, we opt for the dynamic system GMM of Rodman (2009) on grounds of endogeneity. The endogeneity concern arises since: (i) past values of income inequality could have a strong relationship with present income inequality values (Ofori *et al.*, 2021b; Ofori, 2021), and (ii) there could be a possible simultaneity between income inequality and economic growth (Aghion *et al*., 1999). Regarding the former, the authors (ibid) argue that the endogeneity problem stem from the conventional econometric wisdom that $\boldsymbol{ineq_{it-1}}$ depends on $\boldsymbol{\mu_{it-1}}$, which also depends on the country-specific effect $\boldsymbol{\eta_i}$. Additional caveats for employing the system GMM are that: (1) our panel contains greater cross section (N=48) and a time span of 19 years (i.e., T=19), and (2) our dataset also shows cross-country variation which is accounted for in the estimation (Ofori *et al.,* 2021b; Asongu & Nwawchukwu, 2018; Tchamyou, 2020). Against the backdrop that N>T and time-effects are accounted for in the estimation (Ofori *et al.* 2021c; Asongu & Odhiambo, 2020), any concern regarding cross-sectional dependence is eliminated.

Accordingly, we transform Equation (5) into Equations (6) and (7) to capture the level and first difference specifications, which encapsulate the dynamic system GMM estimation:

$$ineq_{it} = \lambda_0 + \delta_1 ineq_{it-1} + \beta_1 cfdi_{it} + \beta_2 gov_{it} + \sum_1^5 \theta_k V_{kit-\tau} + \mathcal{I}_i + \mu_t + \varepsilon_{it} \quad (6)$$

$$ineq_{it} - ineq_{it-\tau} = \delta_1 (ineq_{it-\tau} - ineq_{it-2\tau}) + \beta_1 (cfdi_{it} - cfdi_{it-\tau}) + \beta_2 \left(gov_{it} - gov_{i捲-\tau} \right) + \beta_3 \left(cfdi \times gov_{it} - cfdi \times goc_{it it-\tau} \right) + \sum_1^5 \theta_k (V_{kit-\tau} + V_{kit-2\tau}) + (\mu_t - \mu_{it-\tau}) + (\varepsilon_{it} - \varepsilon_{it-\tau}) \quad (7)$$

Where $\boldsymbol{V_k}$ is a vector of all the control variables as earlier defined. In estimating the system GMM model, the instruments used are the lags of the regressors for the difference equation and the first difference of the regressors for the level equation. It is worth noting that, the

potency of the GMM estimator in yielding robust estimates depends on a number of post estimation tests. Following Alagidede and Ibrahim (2017), we evaluate the validity of the instrument using the Hansen's test of over–identification. The Hansen test is premised on the null hypothesis that the set of identified instruments and the residuals are uncorrelated. Hence, the appropriateness of the instruments and thus the robustness of our estimates depend on the failure to reject the null hypothesis. On the other hand, if the null hypothesis is rejected, then the instruments are not robust because the restrictions imposed by relying on the instruments are invalid. Finally, we evaluate the reliability of our estimates based on the post estimation tests of: (i) whether there is evidence of second-order serial correlation in the residuals or not, (ii) the significance of the interaction terms, and (iii) the Wald test for the overall model significance. From equation 5, the net effect of China's outward FDI on income inequality can be calculated as follows:

$$\frac{\partial(ineq_{it})}{\partial(cfdi_{it})} = \beta_1 + \beta_3\overline{gov_{it}} \quad (6)$$

Where: $\overline{gov}$ is the average value of governance quality.

4. Presentation and discussion of results

4.1. Descriptive statistics and correlation analysis

We begin the presentation of our results by reporting the summary statistics (see Table 2) and the correlations among the variables (see Table A1 in the Appendices section). As apparent in Table 2, the average income inequality scores measured across the net Gini index (%) and Palma ratio are 43.612 and 6.376, respectively.

Table 2. Summary statistics, 1996 – 2020

Variable	Obs	Mean	Std. Dev.	Minimum	Maximum
Dependent variables					
Gini (net)	724	48.216	6.668	30.4	62.9
Palma ratio	917	6.376	1.768	2.483	21.78
Variables of interest					
China Outward FDI	813	51.264	205.09	-814.91	4807.8
Governance effectiveness	817	-0.680	0.591	-1.848	1.056
Control of corruption	817	-0.583	0.589	-1.562	1.2167
Political stability	817	-0.516	0.862	-2.699	1.200
Regulatory quality	817	-0.625	0.552	-2.236	1.127
Rule of law	817	-0.625	0.601	-1.852	1.077
Voice and accountability	817	-0.522	0.670	-1.841	0.997
Control variables					
Urbanization	1200	41.254	17.193	7.412	90.092
Trade openness	1112	72.583	42.471	9.955	347.99

Human capital	961	1.7653	0.4292	1.053	2.9388
GDP per capita (US$)	1191	1784.312	2363.9	102.598	16390.82

Note: Obs is Observation, and Std. Dev. is Standard Deviation

Also, the averages of all the governance variables are negative, denoting the weak institutional fabric of Africa. The data shows that over the study period, African countries are better in terms of political stability (-0.516) and voice and accountability (-0.522) compared to regulatory quality (-0.625) and governance effectiveness (-0.680). For our variable of interest, China's outward FDI, we find a mean value of US$ 51.264 million, which indicates that Chinese investment in Africa has been significant over the study period. A further scrutiny of the data as presented in Figure A.2 shows that Algeria, Angola, Congo DR., Ethiopia, Ghana, Kenya, Nigeria, South Africa, Zambia and Zimbabwe are the highest Chinese FDI-receiving countries. On the contrary, countries such as Burkina Faso, Cabo Verde, Comoros, and Malawi record the low Chinese direct investments.

As our empirical results suggest, improving governance quality in Africa can be an incentive not only for attracting Chinese FDI to boost income growth into Africa but a module for safeguarding investments, providing durable jobs and addressing the marked income inequality in African countries as apparent in Figure 1.

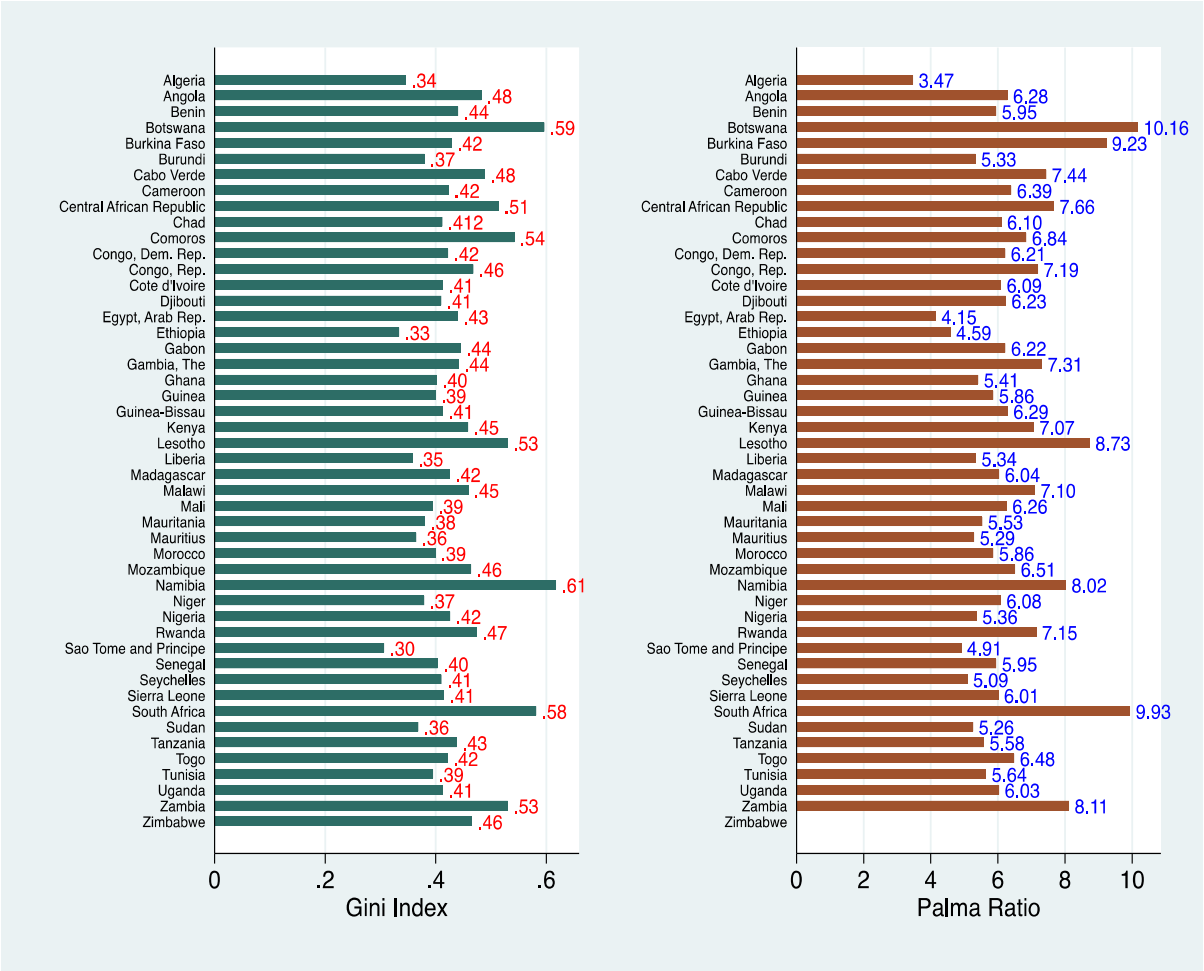

Figure 1. Average In-Country China Outward FDI and Income inequality in Africa, 1996–2020.

4.2 Main results on the China's outward FDI and governance quality on income inequality (Palma Ratio) in Africa

In this section, our GMM estimates based on equations 1 – 5 are presented. We precede the presentation of our main results by examining the effects of the control variables on income inequality. From the baseline results in Column 1 of Table 3, we find that the lag of Palma ratio is positive and statistically significant, which suggests that inequality persists in Africa. Similar results were found by Kunawotor *et al.* (2020) who also used the GMM estimator to examine the determinants of income inequality in Africa. We also find a positive and significant effect of urbanization, signifying that urbanization exacerbates income inequality in Africa. This result could be explained by the marked disparities in socioeconomic opportunities and social services, namely education, road, airports, hospital across the rural and urban divide in Africa. And against backdrop that it is mostly the unskilled individuals who migrate from rural areas to urban centres in search of economic opportunities, the result is not far-fetched. Our findings concurs that of Sulemana *et al*. (2019) who find that urbanization contributes to exacerbating income inequality in Africa.

Similarly, the effect of economic integration proxied by trade openness on income inequality is positive and statistically significant. This evidence suggests that economic integration pacts such the current AfCFTA are not an end in itself in achieving equitable income distribution. The result, therefore, signifies that if the envisaged impact of the AfCFTA, which is lifting 30 million people out of extreme poverty and equalise incomes is to be achieved, then other key factors such as governance need attention. This corroborates the findings of Xu *et al*. (2021) and Anyanwu *et al*. (2016) who argue that trade openness disequalises incomes in the developing world due to skillset mismatch and low economic freedom.

Table 3. GMM results on the joint effect of China's outward FDI and governance quality on income inequality in Africa (Depend variable: Palma ratio)

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Urbanisation	0.0052***	-0.0039***	-0.0067***	-0.0058***	-0.0051***	-0.0050***	-0.0045***	-0.0052***	-0.0052***	-0.0042***	-0.0046***	-0.0043***	-0.0025*	-0.0040***
	(0.0012)	(0.0006)	(0.0016)	(0.0009)	(0.0009)	(0.0009)	(0.0010)	(0.0007)	(0.0019)	(0.0010)	(0.0012)	(0.0009)	(0.0013)	(0.0008)
Trade openness	0.0017***	-0.0001	0.0007***	0.0003	-0.0003***	0.0004	0.0002	0.0003	0.0001	-0.0003*	-0.0001	-0.0002	-0.0007**	0.0000
	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0001)	(0.0002)	(0.0003)	(0.0002)	(0.0004)	(0.0002)	(0.0002)	(0.0003)	(0.0003)	(0.0001)
Human capital	0.0001***	-0.0001	-0.0001***	-0.0001***	-0.0001**	-0.0001***	-0.0001***	-0.0001***	-0.0001***	-0.0001***	-0.0001***	-0.0001***	-0.0001***	-0.0001
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Economic growth	-0.0001***	0.0001	0.0001***	-0.0001***	0.0001	-0.0001	0.0001***	-0.0001	0.0001***	-0.0001	0.0001**	0.0001***	0.0001***	-0.0001**
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Economic growth square	-0.0240***	-0.0313***	-0.0004	0.0075	-0.0176***	-0.0059	-0.0476***	-0.0055	-0.0266**	-0.0065	-0.0168*	-0.0191**	-0.0279***	-0.0048**
	(0.0037)	(0.0068)	(0.0115)	(0.0072)	(0.0028)	(0.0058)	(0.0048)	(0.0075)	(0.0123)	(0.0070)	(0.0087)	(0.0091)	(0.0037)	(0.0023)
China FDI		-0.0004***							-0.0004***	-0.0004***	-0.0002***	-0.0002***	-0.0005***	-0.0001***
		(0.0000)							(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Control of corruption			-0.2615***						-0.4159***					
			(0.0402)						(0.0384)					
Rule of law				-0.0223**						-0.0627***				
				(0.0103)						(0.0181)				
Government effectiveness					-0.0037						-0.1314***			
					(0.0090)						(0.0289)			
Regulatory quality						-0.0810***						-0.1371***		
						(0.0197)						(0.0325)		
Political stability							-0.1703***						-0.1992***	
							(0.0248)						(0.0274)	
Voice and accountability								-0.0593***						-0.0391**
								(0.0128)						(0.0145)
Control of corruption × China FDI									0.0005***					
									(0.0001)					
Rule of law × China FDI										0.0010***				
										(0.0000)				
Government effectiveness × China FDI											0.0005***			
											(0.0000)			
Regulatory quality × China FDI												0.0005***		
												(0.0000)		
Political stability × China FDI													0.0010***	
													(0.0001)	
Voice and accountability× China FDI														0.0007***
														(0.0000)
Palma ratio (–1)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Constant	0.8812***	0.2989***	-0.6589***	-0.3457***	0.0000	-0.2946***	0.0000	-0.2541**	-0.2739	0.0395	0.0247	0.0437	0.0001	0.0001
	(0.0797)	(0.0909)	(0.1216)	(0.0942)	(0.0000)	(0.0814)	(0.0000)	(0.0956)	(0.1753)	(0.0926)	(0.1068)	(0.1241)	(0.0000)	(0.0000)
Time Effect	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Thresholds	na	na	na	na	na	na	na	na	0.8	0.4	0.4	0.4	0.5	0.1
Net Effect	na	na	na	na	na	na	na	na	-0.0007	-0.001	-0.0005	-0.0005	-0.001	-0.0005
Observations	713	491	529	529	529	529	529	529	491	491	491	491	491	491
Joint Significance Test Statistic	na	na	na	na	na	na	na	na	25.570	632.77	374.36	588.83	181.05	272.44
Joint Significance P-Value	na	na	na	na	na	na	na	na	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Countries	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Instruments	40	39	40	40	40	40	40	40	39	39	39	39	39	39
Wald Statistic	3.900e+10	1.380e+11	168271	1.670e+11	3.480e+11	1.700e+11	128286	979461	5.990e+10	244958	1.100e+10	1.850e+10	104881	5.250e+10
Wald P-value	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Hansen P-Value	0.452	0.445	0.620	0.346	1.05e-09	0.411	0.501	0.381	0.255	0.448	0.382	0.365	0.715	0.292
AR(1)	0.033	0.078	0.104	0.102	0.102	0.102	0.103	0.102	0.0780	0.0697	0.076	0.074	0.056	0.068
AR(2)	0.097	0.311	0.184	0.221	0.220	0.223	0.205	0.223	0.276	0.331	0.320	0.325	0.323	0.340

*Standard errors in parentheses l *** p<0.01, ** p<0.05, * p<0.1*

Albeit modest effect, we find strong empirical evidence that human capital drives income inequality upward in Africa. The magnitude of the coefficient implies that a 1 percent increase in human capital development contributes to the worsening of income inequality by a modest 0.0001 per cent. This evidence is plausible considering the fact that low-paying informal jobs are widespread across Africa, thereby deepening the income growth gap between the skilled/educated and the unskilled. Our finding is consistent with Xu *et al.* (2021) who found a positive relationship between education and income inequality in 38 sub-Saharan African countries over the period 2000-2015.

Finally, and interestingly, both economic development and its square report significant suppressing effects on income inequality. This result is at variance with the Kuznets (1955) hypothesis, signifying that with appropriate systems and structures, African countries can leapfrog the theorized unequal growth trajectories peculiar of countries in their stages of development. This result could be attributed to the fact that many stakeholders have implemented many policies that are able to incentivise inclusive growth. This is more so considering efforts by African countries in enhancing access to physical and digital infrastructure (Mutiiria *et al.,* 2020; Lufumpa *et al*. 2017) and broadening the coverage of fiscal and social redistributions (see, Lustig *et al*. 2019)

In line with the first objectives of this paper, we turn attention to the unconditional effects of China FDI and governance quality on income inequality in Africa (see Columns 2 and Columns 9 – 14). The results show that China's FDI inflow to Africa has a negative and significant effect on income inequality. This result is an empirical evidence to World Bank (2013) report that China's outward FDI has been a major contributor to Africa's export diversification drive. In particular, Chinese investors have taken advantage of the African Growth Opportunities Act (AGOA) by investing massively in the manufacturing sectors of Africa, chief of which are seen in Ethiopia, Lesotho and South Africa (Kaplinsky & Morris, 2016). These investments, which are channelled mainly into the textile, shoemaking, and the food and beverage subsectors, absorb/create durable economic opportunities for the mases including the unskilled.

Also, we find evidence that all our governance dynamics matter for bridging the income gap in Africa. The results indicate that regulatory quality (-0.08), control of corruption (-0.26) and political stability (-0.17) are key for spurring and sustaining shared income distribution in Africa. The essence of effective governance for the control of corruption and ensuring political stability centres on the argument that corruption saps African countries resources that could have otherwise been used for mounting social equity

programmes and building systems for easing socioeconomic hardships (Kunawotor *et al.*, 2020; Adams & Klobodu, 2016). Additionally, addressing the continents ever-lingering challenges of socio-political unrest could be a giant step for ensuring sustainability in income growth and distribution. This is more so considering the rise in successful and failed coup d'états attempts in Africa to 6 in 2021 alone.

We turn attention to objective 2 of the study by examining the joint effects of China's outward FDI and governance quality on income inequality (Column 9 – 14). The uniqueness of our paper is that we find strong empirical evidence to show that all the 6 governance dynamics matter for moderating the effect of China FDI towards the equalisation of income in Africa. For instance, following equation (6), we calculate the net effect of China's outward FDI and control of corruption as:

$$\frac{\partial(ineq_{it})}{\partial(cfdi_{it})} = \beta_7 + \beta_7\overline{gov_{it}} = \ (-0.0004) + [(\ 0.0005) \times (-0.583)] = -0.0007$$

Where: -0.583 is the mean value of control of corruption; -0.0004 is unconditional coefficient of China's outward FDI; 0.0005 is conditional coefficient of China's outward FDI. Likewise, we calculate a net effect of -0.001 for the political stability and China FDI interaction. This is calculated as:

$$\frac{\partial(ineq_{it})}{\partial(cfdi_{it})} = \beta_7 + \beta_7\overline{gov_{it}} = \ (-0.0005) + [(\ 0.001) \times (-0.516)] = -0.001$$, taking into

account the average political stability score of -0.516 and the direct (-0.0005) and indirect (0.001) effects of China FDI. Following similar computations, we report a partial effect of -0.001 as well for the rule of law pathways. The remaining governance pathways— regulatory quality, governance effectiveness, voice and accountability also reveal similar partial effects (i.e., -0.0005). As captured succinctly in UNCTAD (2019), the improvement in democratic practices and national security does not only sustain FDI but builds investor confidence, which could attract new investors. This is more so considering the fact that foreign investors substituted the North Africa and West Africa for Southern Africa following the Arab spring and the rise in Jihadists groups in Northern Nigeria, Niger, Burkina Faso and Mali since 2011. In the same vein, government effectiveness and regulatory quality, which are key components of economic freedom, could contribute to reducing income inequality by creating an enabling environment for the masses to benefit from FDI. This could be through the creation of forward and backward linkages that could drive the revival of the continent's agricultural and

industrial sectors, creating demand for both the skilled and unskilled labour. Finally, effective mechanism for voice and accountability is also imperative for putting checks and balances towards the sharing of FDI- and FDI-related gains. This is also relevant for shaping public interests in terms of ensuring that environment-friendly production practices, which are crucial for sustaining income growth and distribution in agriculture predominant settings like Africa are adhered to by foreign investors.

4.2 Robustness checks

In this section, we evaluate the robustness our estimates on the Palma ratio in Table 4 using the net Gini index as an alternative measure of income inequality. Concerning our control variables as reported in Colum 1 of Table 4, the results are quite similar with the Palma ratio results. For instance, while trade openness heightens income inequality in Africa (0.016%), human capital and economic growth report marginal effects of -0.0001 per cent and -0.0002 percent, respectively. We shift focus to the premier objective of this study where we find that China's FDI inflow to Africa contributes to the bridging of the continent's marked income inequality gap. Like we find in the Palma ratio results in Table 3, the effect of China FDI in equalising incomes in Africa is modest (-0.0002), suggesting that greater income equality dividends could be chalked with if incentives for the attraction of investors such as better governance are enhanced.

Regarding the effect of our governance indicators on income inequality, we find that governance effectiveness, rule of law and the control of corruption are keys. The results make sense in that these governance modules are crucial for building systems and structure that attract foreign investors, safeguard investments and the accruing dividends, and the sharing of FDI and FDI-related gains. We then turn attention to objective two of the study where we find that only the governance modules of political stability, and voice and accountability are relevant for forming synergies with China FDI for equitable income distribution in Africa. This result can be explained as follows. First, it might be attributed to the insufficiency of Gini index to capture the tails income distribution in a given population. The computation of the net effects of the political stability-China FDI, and voice and accountability and China FDI interaction terns in what follows.

Table 4. GMM results on the joint effect of China's outward FDI and governance quality on income inequality in Africa (Depend variable: Net Gini index)

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Urbanisation	-0.0308***	-0.0135***	0.0360***	0.0207***	-0.0385***	-0.0365***	-0.0115**	0.0032	-0.0055	-0.0176***	-0.0202***	-0.0130***	-0.0094**	-0.0140***
	(0.0035)	(0.0033)	(0.0029)	(0.0023)	(0.0046)	(0.0048)	(0.0052)	(0.0021)	(0.0051)	(0.0042)	(0.0036)	(0.0043)	(0.0040)	(0.0043)
Trade openness	0.0016***	0.0018***	0.0040***	0.0059***	0.0041***	0.0046***	0.0084***	0.0076***	0.0007	0.0009*	0.0019***	0.0027***	0.0003	0.0008*
	(0.0005)	(0.0004)	(0.0003)	(0.0003)	(0.0004)	(0.0005)	(0.0008)	(0.0004)	(0.0005)	(0.0005)	(0.0005)	(0.0005)	(0.0006)	(0.0004)
Human capital	-0.0001***	0.0001	0.0001***	0.0001***	-0.0001***	-0.0001***	0.0001	0.0001***	-0.0001	-0.0001**	-0.0001	0.0001**	0.0001	-0.0001*
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Economic growth	-0.0002***	0.0001***	0.0001***	0.0001***	-0.0001***	-0.0003***	-0.0001***	0.0001***	0.0001**	0.0001	-0.0001	-0.0001	0.0001	0.0001**
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Economic growth square	0.2920***	-0.0092	-0.2358***	-0.2165***	0.2940***	0.3713***	0.0070	-0.1454***	-0.0191	0.0229	0.0564**	0.0195	0.0010	0.0071
	(0.0185)	(0.0174)	(0.0140)	(0.0123)	(0.0330)	(0.0550)	(0.0094)	(0.0114)	(0.0283)	(0.0238)	(0.0231)	(0.0257)	(0.0214)	(0.0228)
China FDI		-0.0002***							-0.0001***	-0.0001***	-0.0002*	0.0001	-0.0001***	-0.0003***
		(0.0000)							(0.0000)	(0.0000)	(0.0001)	(0.0001)	(0.0000)	(0.0001)
Control of corruption			-0.2911***						-0.2048***					
			(0.0382)						(0.0535)					
Rule of law				-0.0078						-0.0512				
				(0.0146)						(0.0443)				
Government effectiveness					-0.3188***						0.0851*			
					(0.0374)						(0.0439)			
Regulatory quality						0.3880***						0.1374*		
						(0.0431)						(0.0753)		
Political stability							0.3389***						-0.0429	
							(0.0666)						(0.0382)	
Voice and accountability								0.0739*						-0.1025**
								(0.0371)						(0.0487)
Control of corruption × China FDI									0.0001					
									(0.0003)					
Rule of law × China FDI										0.0003				
										(0.0002)				
Government effectiveness × China FDI											0.0001			
											(0.0002)			
Regulatory quality × China FDI												-0.0006***		
												(0.0002)		
Political stability × China FDI													0.0006***	
													(0.0001)	
Voice and accountability× China FDI														0.0004**
														(0.0002)
Net Gini index (-1)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Constant	-4.1129***	0.0000	0.0000	0.0000	-4.6369***	-3.9093***	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	(0.1309)	(0.0000)	(0.0000)	(0.0000)	(0.2847)	(0.4339)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Time Effect	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Net Effect	na	na	na	na	na	na	na	na	–	–	–	–	-0.0004	-0.0005
Observations	566	386	416	416	416	416	416	416	386	386	386	386	386	386
Joint Significance Test Statistic	na	na	na	na	na	na	na	na	–	–	–	–	17.440	5.730
Joint Significance P-Value	na	na	na	na	na	na	na	na	–	–	–	–	0.0002	0.0216
Countries	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Instruments	40	38	39	39	39	39	39	39	38	38	38	38	38	38
Wald Statistic	2.340e+12	2.030e+12	6.140e+12	4.470e+12	2.230e+12	1.320e+12	2.330e+12	5.500e+12	1.920e+12	1.170e+12	9.760e+11	1.020e+12	2.040e+12	1.480e+12
Wald P-value	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Hansen P-Value	0.949	0.903	0.979	0.980	0.982	0.979	0.980	0.978	0.863	0.853	0.847	0.868	0.864	0.856
AR(1)	0.019	0.031	0.032	0.031	0.031	0.031	0.031	0.032	0.032	0.032	0.032	0.032	0.032	0.032
AR(2)	0.198	0.634	0.339	0.357	0.545	0.149	0.211	0.302	0.513	0.448	0.621	0.190	0.370	0.475

*Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1*

First, given the mean political stability score of -0.516; an unconditional effect of China outward FDI of -0.0001; and 0.0006 as the conditional effect of China's outward FDI; the net effect of the former is -0.0004 and is computed from equation (6) as:

$$\frac{\partial(ineq_{it})}{\partial(cfd偏_{it})} = \beta_7 + \beta_7\overline{gov_{it}} = (-0.0001) + [(\,0.0006) \times (-0.516)] = -0.0004$$

Similarly, for the accountability and China FDI interaction, we find a partial effect of -0.0005 taking into account the average voice and accountability score of -0.522; the direct effect of China's outward FDI (-0.0001) and 0.0007 as the indirect effect of China's outward FDI to Africa.

$$\frac{\partial(ineq_{it})}{\partial(cfdi_{it})} = \beta_7 + \beta_7\overline{gov_{it}} = (-0.0003) + [(\,0.0004) \times (-0.522)] = -0.0005$$

Overall, there is convincing evidence that though China is effective in reducing income inequality in Africa, the effect is not remarkable. Second, efforts aimed at stabilising African countries and ensuring that resources count for all could be momentous for bridging that Africa's ever-pressing challenge of income inequality.

4.3 Further discussion of results and policy implications through threshold estimation

So far, two key findings stand out regarding our first two objectives. Regarding the first objective, there is strong evidence that though China FDI matters for the equalisation of incomes in Africa, the effect is weak. This evidence confirms the highly technical sectors such as the telecommunication industry, the extractive industry, and transportation industry that China FDI have been flowing into (Cornia & Martorano, 2012; UNCTAD 2016). In settings where exogenous developments such as the inflow of FDI does not automatically translate in shared opportunities as the endogenous growth theory suggests, the systems, structures and frameworks of the receiving economies have two key roles to play. The first is the direct role which is captured in our first hypothesis where we find that all our governance dynamics— economic, political and institutional are crucial for propelling African countries towards equitable income distribution path. This results ushers us into the indirect role of institutions in reducing income inequality as show in the second hypothesis where through effective governance, China FDI reports a greater income inequality-reducing effect.

Our results suggests that in marginalised and politically fragile settings like Africa, for good governance to form relevant synergies with China FDI towards bridging the

continent's marked income disparity gap, democratic regimes, which are essential for addressing Africa's geopolitical fragility and the protection and safeguarding investors will prove crucial. Additionally, institutional frameworks for protecting the public purse, sharing the gains from FDI, providing the public good, and deepening of the voices of the masses in governance will be key.

While our evidence on objectives 1 and 2 can trigger relevant policy actions concerning the call for FDI into Africa following the implementation of the AfCFTA, we provide further evidence by computing thresholds at which improving various governance dynamics are become a necessary and but not a sufficient condition to engender relevant positive complementarities with China FDI towards reducing income inequality in Africa. Considering the fact that the Palma ratio is our headline income inequality indicator, we calculate our thresholds based on the estimates in Table 3. In the light of the aforementioned, we proceed by computing the critical mass for the corruption-control in the penultimate column of Table 3. With a joint effect of corruption-control and China FDI on income inequality being 0.0005 (Column 9) and that of the unconditional effect of China FDI being 0.0004 (absolute), a threshold score of 0.8 is obtained. This is calculated as:
Threshold corruption-control (Column 9) = 0.0004/0.0005 = 0.8 (score)

Our result suggests that above the threshold of 0.8, corruption-control should be complemented with other favourable income inequality-reducing modules to reduce income inequality in Africa. Following the same strategy, governance thresholds for political stability, regulatory quality, rule of law, governance effectiveness, and voice and accountability are computed. These attendant critical masses are report in what follows:

Threshold for Rule of law (Column 10) = 0.0004/0.001 = 0.4 (score)
Threshold for Government effectiveness (Column 11) = 0.0002/0.0005 = 0.4 (score)
Threshold for Regulatory quality (Column 12) = 0.0002/0.0005 = 0.4 (score)
Threshold for Political stability (Column 13) = 0.0005/0.001 = 0.5 (score)
Threshold for Voice and accountability (Column 14) = 0.0001/0.0007 = 0.1 (score)

Overall, we find that for African countries to channel the remarkable inflow of resources such as China FDI towards the equalisation of incomes across, more effort is need in the developing the continent's frameworks for fighting corruption, ensuring accountability while deepening the 'voice' of the ordinary, media, and civil society groups in decision-making.

Interestingly, though vis-à-vis the other critical masses, those for corruption-control, political stability, and voice and accountability require greater resource allocation and attention/effort, they connote the greatest China FDI-moderating effects per our findings in objective 2. The optimism with these findings, however, is that, from both economic- and resource-sense, these computed thresholds are achievable since they fall within the minimum and maximum values as reported in Table 2. In other words, the computed governance thresholds have economic meaning and policy relevance because they are situated within their respective statistical ranges disclosed in the summary statistics.

5.0 Conclusion and policy recommendations

This study contributes to the debate on the need for African leaders to foster equitable income distribution as enshrined in the United Nation's SDG 10, and Aspiration 1 of Africa's Agenda 2063. The study is premised on three key objectives. First, the study investigates whether the remarkable inflow of Chinese FDI to Africa matters for bridging the continent's marked income inequality gap. Second, the study examines whether Africa's institutional fabric forms relevant synergies with China's FDI towards the equalisation of income in Africa. Third, we compute threshold levels necessary and sufficient for the various governance indicators to propel China FDI to equalise incomes in Africa. To this end, we draw annual data for the period 1996 – 2020 on 48 African countries for the analysis. We provide evidence from the two-step system GMM estimator to affirm our hypotheses. In particular, though China FDI reduces income inequality in Africa, there is robust evidence that its effect is modest. Additionally, the results reveal that institutional mechanism for ensuring political stability, low corruption, and voice and accountability are remarkable for amplifying the income inequality-reducing effect of China FDI. Finally, we find that of all the governance modules, more effort is required in the fight against corruption and political stability considering their respective critical masses of 0.8 and 0.5. These critical masses are thresholds at which governance is a necessary but no longer a sufficient condition to complement Chinese FDI in order to mitigate income inequality. Hence, at the attendant thresholds, complementary policies are worthwhile.

The attendant recommendations are in what follows. First, for African leaders to take advantage of the AfCFTA and expected inflow of FDI to Africa from 2022 to equalise incomes, we recommend that concerted efforts are made in supporting the foreign investors and continent's private sector build capacity to deepen indigenous upstream and downstream linkages, which are essential for improving the continent's global value chain participation

and opportunity creation. Also, in line with the relevance of regulatory quality and governance effectiveness for moderating the effect of China FDI on inequality in Africa, we recommend that policymakers invest massively in building systems and structures that support industrialisation and incentivise foreign investors into continent. This could be achieved if attention is paid to improving the continent's infrastructure, particularly, transport and energy, which are essential for supporting effective private sector growth/profitability and employment creation. This could also be enhanced if Africa's development partners such as the World Bank and the Africa Development Bank provide logistical and financial support to the course. Finally, African leaders should adhere to democratic practices including the respect for constitutional arrangements and public interest while enhancing efforts aimed at improving the fight against corruption. This could go a long way to build public confidence and self-esteem, which are essential for addressing public discontent and social unrest or political turmoil.

A drawback to this study is that we do not consider all the countries in Africa in this study on grounds of data limitation, which is marked in countries such as South Sudan. Somalia, and Zimbabwe. Additionally, we do not investigate whether the FDI and governance interactions matter for reducing poverty as well. We leave this for future studies.

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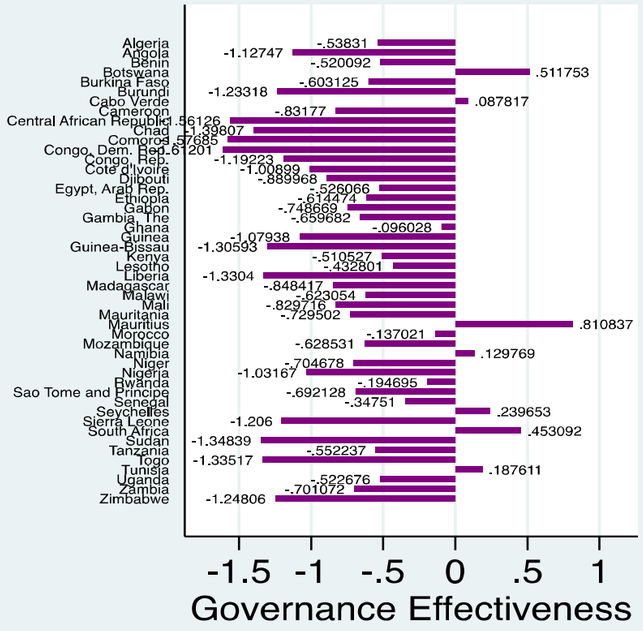

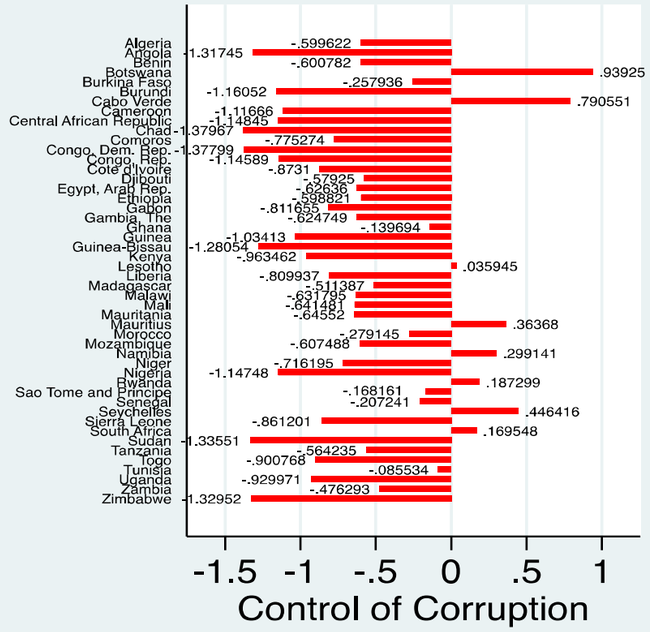

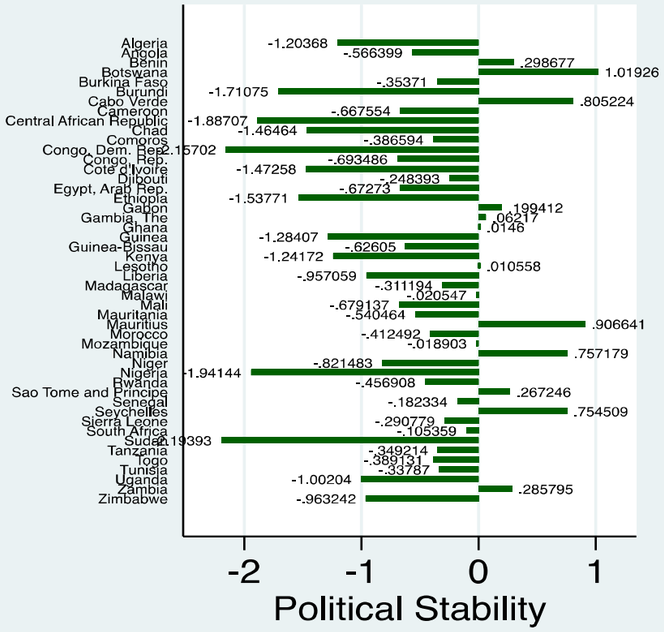

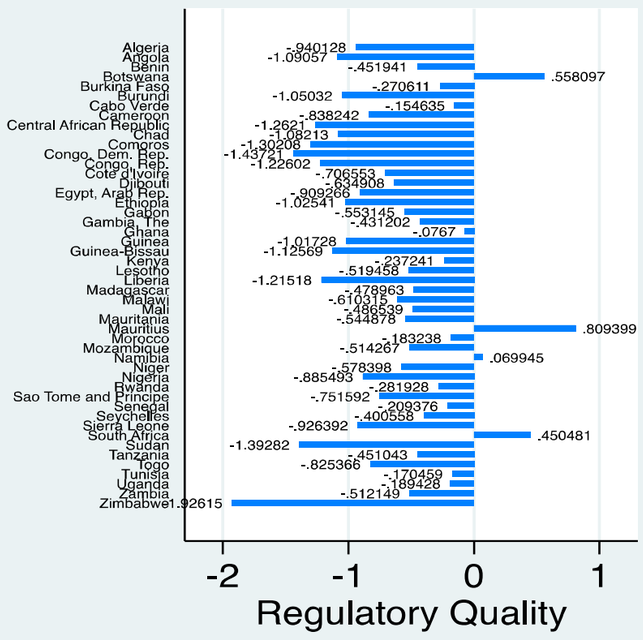

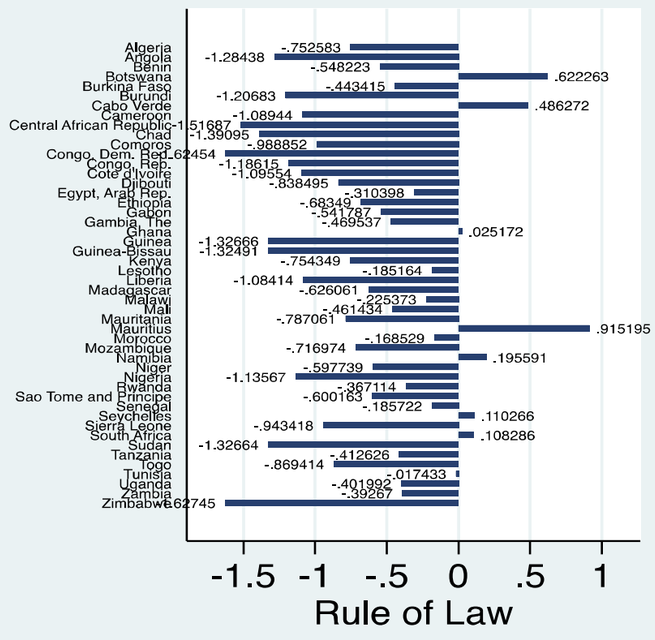

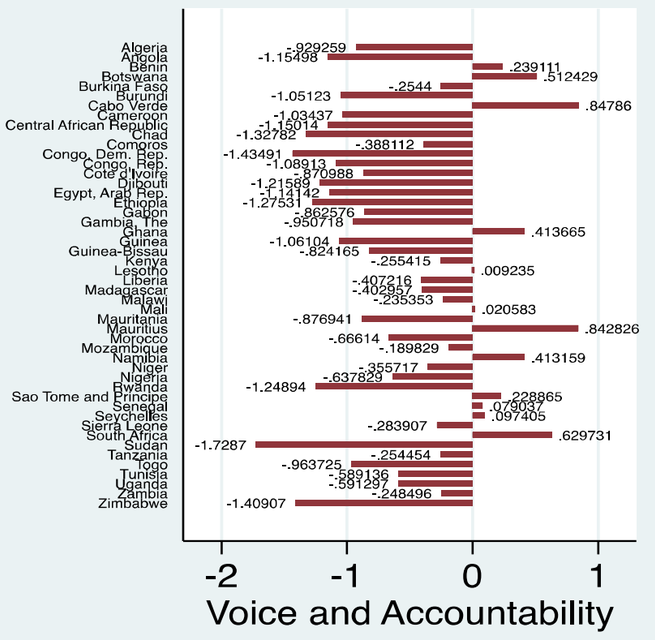

Figure A1. Income inequality–governance nexus in Africa, 1996 – 2020

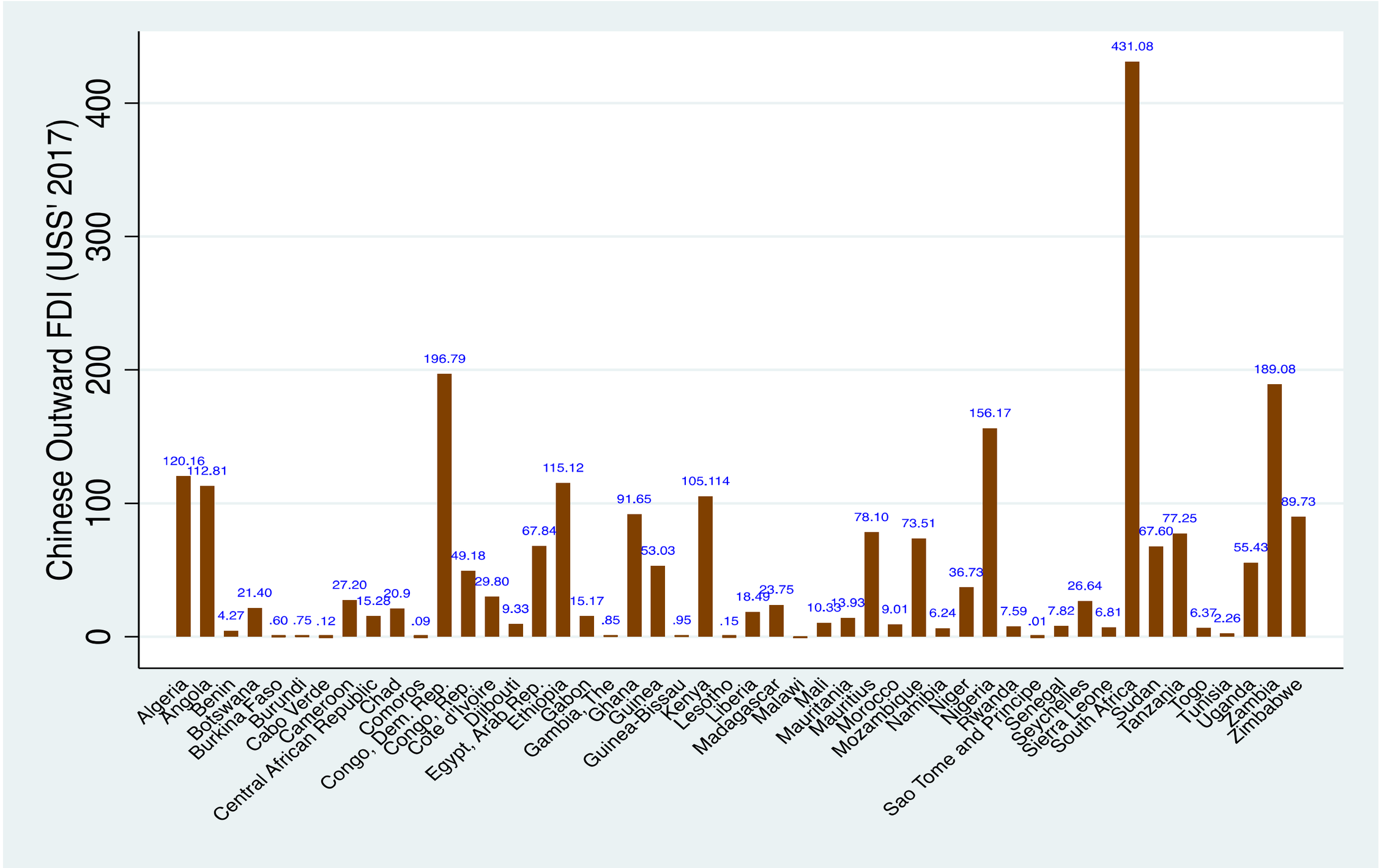

Figure A.2: Inflow of Chinese FDI to Africa, 1996 – 2020

Table A1. Correlation matrix

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
(1) Gini (net)	1													
(2) Palma ratio	0.717***	1												
(3) Urbanization	0.116*	0.0180	1											
(4) Trade openness	0.0938	0.113	0.335***	1										
(5) Industrialization	0.236***	0.0203	0.483***	0.134*	1									
(6) Human capital	0.0159	0.0430	-0.113	0.122*	-0.184**	1								
(7) GDP per capita	0.312***	0.0941	0.654***	0.302***	0.564***	0.0537	1							
(8) China Outward FDI	-0.0261	-0.114	0.105	-0.0784	0.143*	-0.0290	0.209***	1						
(9) Governance effectiveness	0.315***	0.213***	0.149*	0.0656	0.138*	-0.142*	0.592***	-0.0478	1					
(10) Control of corruption	0.426***	0.306***	0.150*	0.181**	0.0525	-0.144*	0.519***	-0.0192	0.887***	1				
(11) Political stability	0.471***	0.309***	0.190**	0.265***	0.0207	-0.163**	0.382***	-0.137*	0.663***	0.727***	1			
(12) Regulatory quality	0.332***	0.329***	0.0920	0.0824	0.0280	-0.0938	0.489***	-0.0846	0.893***	0.833***	0.663***	1		
(13) Rule of law	0.288***	0.165**	0.0926	0.159**	0.0647	-0.155**	0.508***	-0.0348	0.918***	0.890***	0.768***	0.867***	1	
(14) Voice accountability	0.345***	0.294***	0.117*	0.185**	-0.118*	-0.149*	0.337***	-0.0346	0.693***	0.704***	0.742***	0.764***	0.763***	1

*$p < 0.05$, ** $p < 0.01$, *** $p < 0.001$