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Does FDI from China matter for Growth in African Economies?

A statistical analysis of the impact of Chinese investment on African countries from 2001 to 2017

by

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Abstract

The outcomes of FDI have been examined in several studies throughout recent years. Most examinations acknowledge that FDI is a usual positive for the host country. FDI can create direct effects such as wealth flow to the acquiring country, job production, and technology transfer as well as a show impacts in the form of improved productivity, innovation and education. Adverse effects emerge when the foreign corporation goes to join to the host country and/or eliminate the advantages from the host country. Several examples of FDI serve to influence on the host country adversely. This study was accompanied by regression analysis with data from different sources, the period of the analysis is between 2001 and 2012. However, we could not draw any conclusions due to insignificant results, our regression suggests that FDI from China is positively related but the effect is not significant. We believe the result is affected by the fact that total FDI combines a broader range of FDI types and suggest further inquiry on the matter. In recent year FDI from China has increased in African economies and is expected to increase in light of China's one belt one road initiative. In this paper, we explore the impact of Chinese FDI on growth in African economies in a cross-country growth regression framework. There is no evidence that FDI from China affects growth in African Economies

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Table of Contents

1 Introduction	1
1.1 Literature review	1
2 Data	4
3 Methodology	5
3 Results and Analysis	8
4 Conclusion	14
References	16
Appendix	18

1 Introduction

“I sympathize with those who would minimize, rather than with those who would maximize, economic entanglement among nations. Ideas, knowledge, science, hospitality, travel—these are the things which should of their nature be international. But let goods be homespun whenever it is reasonably and conveniently possible. . . and, above all, let finance be primarily national”, Keynes (1930). Keynes scepticism about international finance has been one of the most debated issues in development finance. Underdeveloped countries have smaller capital and hence the marginal product of capital in these countries should be large. This implies that capital should flow from rich to poor countries but what we observe is mostly opposite of that, Lucas (1990). In a well-cited extensive study, Prasad et al. (2007) propose that non-industrial countries that possess extra on foreign investment have not developed quicker in the long-run. By contradiction, growth and the size of foreign investment are absolutely correlated in manufacturing countries. They claim that the purpose of this variation may extend in the poor capacity of non-industrial countries to assimilate foreign capital. Prasad et al. (2007) considered total foreign flows as they took current account balance as a major of foreign flows. We are interested in a specific component of foreign flow i.e. foreign direct investment from China to African countries and it impact on growth of African countries.

1.1 Literature review

One of the main arguments about the positive effect of foreign direct investment (FDI) on the host counties is the technology spillover effect as many researchers have pointed to. Johanson (2006) argues that the host countries of the FDI are going to have positive effect on growth through the technological spillovers especially the developing countries as they lack these technologies. Johanson could not find clear evidence of FDI effect on growth on the developed host countries. Therefore, he concluded that developing countries are more beneficial from hosting FDI than other developed countries.

A serious weakness with this argument, however, is that the Johanson did not take into account that there is some FDI make it so hard for the domestic market to learn from their existing in the host country as argued by Adams (2009). Yet Adams agrees with Johanson that hosting FDI in the developing countries could enhance capital inflows in the host countries besides the creation of the new jobs, technology “know-how”, and create great competitions in the local market in the long-run. Adams focus more on the developing countries and put the light on the sub-Saharan case, which Johanson’s paper lacked. Adams (2009) claims that hosting FDI in weak countries

such as Sub-Saharan could create a foreign control, as well as a monopoly from these FDI since they will not be allowing weak domestic enterprises to exist easily in the country, considering most of the FDI in Africa continent is a natural resource seeker. Adams disagrees with Johanson of the importance of FDI in the case of the developed countries such as South Korea, and Taiwan whom have indeed been beneficial. China has likewise benefited from FDI while it is a developing country but not Sub-Saharan. On the basis of this Adams (2009) concludes that benefit of FDI depends more on the initial condition in each country.

Alfaro, Chanda, Kalemli-Ozcan and Sayek (2006) claim that indeed technology transfer do promote growth, but there are some conditions to support the growth such as the investment in the human capital in the host countries. In addition, the advantages in the developed countries such as education maximize the effect of FDI in the host countries more significant than being in the developing countries. Their empirical evidence failed to confirm positive effect of FDI on the developing host countries these beliefs. In a similar manner, De Mello (1997) agrees with Adams, Alfaro, Chanda, Kalemli-Ozcan, and Sayek of the lies that comes from marketing FDI which includes technology and knowledge transfer to the domestic hosted countries with lies of FDI impact on economic growth. De Mello (1997) advises the policy-makers especially the developing countries do not fall in these lies and to understand the limitation that FDI effects. De Mello criticize the benefits of FDI and believing that change should come from the government to ensure a better environment for the domestic investment rather than foreign investment which could play a better role in economic growth.

In a recent paper Donou-Adonsou and Lim (2018) finds the positive effects of Chinese FDI in to Africa. They use a production function approach to analyze the effect of Chinese FDI in Africa. In this work we use the growth centered approach which is basically based on the idea of conditional convergence. We bring the FDI from China in our conditional convergence regression to see whether it has effect on growth of African countries. We control for factors which can affect the growth rate in these countries.

The investigation and analysis of China's engagement in Africa differ from a country to another, directed on resource extraction in some countries. While Chinese finance in Africa has earned significant and mostly negative consideration from bureaucrats and the media, we instantly turn to the theoretical literature to examine whether our judgments are reflected. We pay consideration to both the content of the evidence presented and the data sources others draw in. The articles we critique are summed our literature section. The literature on Chinese finance in Africa demands a more determined and should be based on facts, yet plenty of articles disappoint to look behind traditional and accessible mythology. Remarkable of the traditional stories that perform in the kinds of literature are a parochial focus on China's financing in the extraction of the natural resource, its finances in unstable and weak countries in Africa, and its treatment of Chinese workers and supplies in building and infrastructure projects. Several of these articles disappoint to employ sufficiently accurate empirical methods, either trying regressions using minuscule sample measurements or utilizing data that does not exactly match the situation on the spot. There is more empirical material in the literature on the impacts of trade with China on African construction, which presents a slightly more precise understanding.

A comprehensive number of studies clearly asks what the impulses and determinants of Chinese finance in Africa imply. such as Kolstad and Wiig (2011) have used UNCTAD data cover a cross-country regression including 29 observations and clarify that the relationship of the natural resource exports of Chinese FDI besides weak political stability in some of the African countries, indicates that Chinese activities, can be extremely damaging to the growth chances of African countries.

Ross (2015) doing a panel of UNCTAD statistics for eight different main African receivers of Chinese FDI across a short-term period. determines that investment is associated with natural resource benefits, besides infrastructure. Other inquiries run slightly more advanced analyses on the taking into consideration the Chinese investments in Africa continent. Cheung et al (2012), performing data from MOFCOM outward foreign direct investment (OFDI) flow, observe that natural resource benefits are one of the various determinants explaining Chinese investment beside by GDP, trade and real GDP growth links with China investment. Chen et al (2016) performing the MOFCOM OFDI outline data execute a comparable point of the quantity not the value of Chinese investments, albeit utilizing the database of MOFCOM, which does not perform to pursue a real investment very thoroughly. They learn that the large part of projects is in cooperation and manufacturing alternatively with mining and manufacture and that Chinese finance supports standard profit-maximizing incentives in that it focuses on skill-intensive areas. Associate, they do not observe that the percentage of Chinese financing is greater in poor governance countries. Sindzingre (2016) identifies that models of Chinese financial existence with Africa, including investment trade, financing, and investment, have overall been uniting with these in Western countries likewise. Seyoum and Lin (2015), utilizing a World Bank review of Chinese investors at the country level, beside the World Bank study data of Chinese investors, determine that the quantity and position of Chinese FDI in Ethiopia for example, is represented mainly by particular advantages and services such as all-embracing technology and reduce costs corresponded to competitors, along with the market access. Yet, as Abebe et al (2017), several international investors in Ethiopia possess limited power over the places they would end up financing considering location is usually selected by the government.

Although some libraries perform better study to identify Chinese financing as profit-intensive, some of them examine much extra research into the characteristics, and influences of those investments. There are many perspectives should be determined in this case study for further work on.

2 Data

The period of analysis is between 2001 to 2012. The bilateral FDI flow is available only for this period. In 2001 China Joined world trade organisation. The data has been taken from multiple data sources: UNCTAD, Polity IV project and Major Episodes of Political Violence (MEPV) and conflict regions, V-Dem, QoG standard dataset and World Bank. The variables have been included based on the review of previous research. We further elaborate on these variables.

Foreign direct investment (FDI) data collected from the United Nations Conference (UNC) on Trade and Development (UNC-TAD) FDI/TNC database. Gross domestic product and human capital data comes World Bank. Trade openness (% of GDP, investment (% of GDP), private credit (% of GDP), total natural resources rents (% of GDP come from the World Development Indicators. Political and Public Corruption index index has been taken from V-Dem. Colonial origin and legal origin comes from QoG standard dataset. Violence indicators such as forcibly displacement population comes from Major Episodes of Political Violence (MEPV) and conflict regions database provided by systemic peace. We believe that controlling for violence is important as Africa has been at the centre of political violence for long.

3 Methodology

The methodology is based on the cross-country regression similar to Barro (1992). These cross-country regressions are based on the idea of convergence emerging from Solow (1957). We briefly explain the idea of convergence. Let's start with a production function.

$$Y_t = (A_t L_t)^\alpha K_t^{1-\alpha}$$

Where Y is output, L is labour and K is capital. A is exogenously given technology parameter. We can write the above equation in per effective labour by dividing both sides with $A_t L_t$.

$$y_t = A k_t^\alpha$$

Where small letters denote the variables in per effective labour. Capital accumulation process is given by

$$K_t = K_{t-1} + (1 - \delta)I_t$$

Assuming that $I_t = S_t$ one can write the above equation as

$$K_{t+1} = (1 - \delta)K_t + S_t$$

$$K_{t+1} = (1 - \delta)K_t + sY_t$$

Dividing both sides by $A_t L_t$ and using $k_{t+1} = \frac{K_{t+1}}{A_{t+1} L_{t+1}}$

$$k_{t+1}(1+n)(1+g) = k_t(1-\delta) + sy_t$$

Where $\frac{\dot{L}_t}{L_t} = n$ and $\frac{\dot{A}_t}{A_t} = g$. In steady state $k_{t+1} = k_t = k$

$$k(1+n)(1+g) = k(1-\delta) + sy$$

$$\frac{k}{y} = \frac{s}{(1+n)(1+g)-(1-\delta)}$$

One can write the above as:

$$\frac{k}{y} = \frac{s}{n+g+\delta}$$

Using $y = k^\alpha$ we have $k = y^{1/\alpha}$ and therefore $\frac{k}{y} = y^{\frac{1-\alpha}{\alpha}}$

$$y^{\frac{1-\alpha}{\alpha}} = \left(\frac{s}{n+g+\delta} \right)$$

$$y = \left(\frac{s}{n+g+\delta} \right)^{\frac{\alpha}{1-\alpha}}$$

One can see from the above expression for the y that if saving rate (s), population growth rate (n), depreciation rate (δ) and technological growth rate (g) are assumed to be same in all countries then all countries will converge to the same per capita income in the long run. This is called unconditional convergence. The implication for this is that poorer country will grow at faster rate in comparison to the richer country and therefore in a cross section of country the growth rate should be negatively related to the present per capita income. If saving rate (s), population growth rate (n), depreciation rate (δ) and technological growth rate (g) are not same in all countries then countries will have their own steady state per capita income to which they will converge in the long run. The unconditional convergence will not hold as it is quite possible that a poor country has a lower steady state per capita income and a rich country has quite higher per capita income in comparison to its current steady state and thus the poor country will not grow at higher rate than the richer country. But one we control for these variables then effectively we are controlling for the long run and then in the regression the negative relationship between the per capita income and subsequent growth rate should come up. This is called conditional convergence. In later cross-country regressions researchers controlled for all possible factors which they expect based on economic logic to affect long run per capita income based on the theory of unconditional convergence. Our cross-country regression of African economies is based on the conditional convergence regression. We control for factors that can possibly determine the long run per capita income based on the existing literature and then bring the foreign direct investment from China in the regression to explore the effect of Chinese FDI on growth on African economies. The baseline model is given by

$$AG_i = \log \beta_1 \log (GDP_{2001}) + \beta_2 (FDI_{China,i}) + \alpha' z_i + u_i \quad (EQ.1)$$

Where AG_i is average annual growth between 2001 and 2017. We control for the level of GDP in 2001. This is based on the idea of convergence which says that poor countries can grow at a faster rate. FDI is the sum of all FDI flows between 2001 and 2017 The z_i contains all control variables. We include 2001 values for these countries as control variable in the above regression.

We run another model which is a panel estimation and is given by:

$$Growth_{i,t} = \log \beta_1 \log (GDP_{i,t-1}) + \beta_2 (FDI_{China,i,t}) + \alpha' z_{i,t} + \theta_i + u_{i,t} \quad (EQ.1)$$

Where θ_i is country fixed effects. We estimate another model in which we control for time fixed effects and is given by

$$Growth_{i,t} = \log \beta_1 \log (GDP_{i,t-1}) + \beta_2 (FDI_{China,i,t}) + \alpha' z_{i,t} + \theta_i + \varphi_t + u_{i,t}$$

The set of control variables investment to gross domestic product ratio as investment is key to growth in most of the growth model as explained above. Financial development is important for recipient countries to utilise the inflows of FDI and therefore we include private credit (% of GDP) as control for financial development. We include human capital as it is important to capture the role of education and skills in determining the long-term growth of an economy (Barro, 2001). per person, which is related the average years of schooling and the return to education.

The long-term growth of a country also depends on how resource abundant it is, the example of middle eastern countries come to the mind, hence it is quite widely debated that resource richness impacts the economic growth and development process (Wagner et al. (2011)). This model also brings in this point through the idea of natural resource rent. Based on the Wagner et al. (2011) research on implications of natural resource rent on the growth potential of a country, we have included the variable that accounts for that proportion of rent in GDP.

We also control for corruption prevalent in a country, keeping in mind the discussion and the evidence on the significant impact of corruption of growth potential of an economy (Mauro 1995, Ehrlich and Francis 1999). This variable is a measure of the extent to which public sector employees grant favours in return for kickbacks or bribes and also, how often do they misappropriate the state resources for personal use. The index considered takes values ranging from low corruption to high corruption. This index is aggregated by taking the average of point estimates from Bayesian factor analysis model of the indicator for public sector misappropriation or bribery. The inclusion of this variable is based on the discussion and the evidence on the significant impact of corruption of growth potential of an economy (Mauro 1995, Ehrlich and Francis 1999).

The openness of the economy, is proxied by its import and export of goods and services expressed as percentage of GDP. We also control for colonial origin, legal origin and type of government i.e. institutional characteristic of the country (democracy or not). The instability in a country can act detrimental to its growth prospects. This is clearly the case with numerous countries like Afghanistan, Nigeria, Congo etc. This factor has been controlled for through the variables that measures the magnitude score of episodes of both international and civil violence and warfare. The scale is from 0 to 1, that is, from lowest violence to highest violence.

3 Results and Analysis

In this section we present results and analyze them. First of all, we provide summary statistics of our main variables in Table 1. There are instances of very high and very low growth rate in our sample and therefore there are evidences of outlier in our sample.

Table: 1 Summary Statistics

Variable	Observation	Mean	Std.Dev.	Max	Min
Growth	373	2.41	8.40	-97.35	80.19
TR	387	78.59	40.89	20.96	311.35
TNRR	403	14.03	13.88	0.00	68.78
GCF	391	22.48	8.93	0.00	60.16
FDI	492	35.66	312.47	-814.91	4807.86
DC	396	23.03	27.87	1.60	160.12
Average Education	360	5.17	2.27	1.06	10.41
Public Sector Corruption	420	0.69	0.22	0.16	0.97

The regression output from the average growth rate is given in table 2 in appendix. We were expecting the growth rate to be negatively related to the level of per capita gross domestic product at purchasing power parity in 2001 based on the idea of conditional convergence. But we did not find much evidence of the same. Colonial origin plays significant role in explaining the variation in average growth rate among African economies as we can see the R^2 increases significantly the moment we add colonial origin. Public sector corruption decreases growth rate but the effect is not significant. Domestic credit as percentage of gross domestic product controls for the initial level of financial development in the country and we do not find it to be significantly related to the growth rate.

In table 3 in appendix we report further results from estimation of equation 1. The interesting results are obtained in model 8 where we drop the colonial origin. Once we drop the colonial origin we can say the countries having French civil code have lower growth on average and

public sector corruption decreases the growth rate in statistically significant way. The coefficient of human capital is puzzling. The cross-country evidences suggest that human capital leads to higher growth rate but what we see here that the higher human capital leads to lower growth rate. Although the coefficient on education becomes insignificant when we control for colonial origin. These regressions based on average growth rates have serious limitations. First, there is very few observations as we are using one observation per country. Secondly, we cannot control for country fixed effects and we have reasons to believe that country level heterogeneity is an important determinant of the growth rate experienced by the country.

Tables 4 and 5 in appendix give the results from the same specification as above but these are pooled estimates where we use all observations. As we can see from the table now the coefficient of lag GDP per capita is negative but it is still not significant. Colonial origin matters and Spanish colonies have higher growth rate in comparison to their counterparts. The coefficient on public sector corruption index has right sign but it is not significant. The coefficient on domestic credit as percentage of GDP has opposite sign than expected.

Our further results from pooled regression suggest that FDI from China is positively related but the effect is not significant. Increase in Public sector corruption index decreases growth which is expected. Increase in investment to GDP ratio (GCF is capital formation to GDP ratio) increases growth rate which is as expected. Our coefficient of average education is still negative and is puzzling.

We have a panel data. The pooled estimation ignores both the variation across countries and variation across time in a given country. The fixed effects estimator uses the variation in countries over time and this is within estimation. The other variation is variation between countries at a given time and that that is called between estimator. When these two within and between estimator are same we call that random effects model. Therefore, first we test for the fixed effects.

The above model in equation (2) is called fixed effects model. In effect this model is model with separate intercepts which can be estimated using introducing N-1 dummies and the estimator is known as LSDV estimator. Whether this separate intercept model is better in comparison to a single constant pooled regression model can be easily tested using an F test

$$F = \frac{(R_{LSDV}^2 - R_{Pooled}^2)/n-1}{(1 - R_{LSDV}^2)/(nT - n - K)}$$

Table 6 Pooled Versus Fixed Effects Estimator

	(1)	(2)	(3)
	Model 1	Model 2	Model 3
Lag GDP Per Capita	-0.0464 (0.910)	-22.66*** (0.000)	-26.95*** (0.000)
Public sector corruption index	-3.107* (0.022)	-1.292 (0.735)	-2.340 (0.530)
Domestic credit to private sector (% of GDP)	-0.00827 (0.441)	0.0546 (0.120)	0.0451 (0.189)
FDI from China	0.000144 (0.836)	0.000270 (0.656)	0.0000323 (0.956)
Education 15+	-0.124 (0.513)	6.342*** (0.000)	2.176 (0.220)
Gross capital formation (% of GDP)	0.0943** (0.010)	0.0325 (0.429)	-0.00558 (0.895)
Constant	3.393 (0.218)	152.5*** (0.000)	207.2*** (0.000)
R^2	0.042	0.200	0.300
AIC	1791.7	1644.2	1624.0
BIC	1817.6	1670.1	1687.0
Observations	301	301	301

p-values in parentheses

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

The results from the fixed effects are reported in Table 5. There is one problem with fixed effects model is that we cannot estimate the effects of time invariant controls anymore. Therefore, we

drop the time invariant controls such as legal origin and colonial origin. Model 2 in the Table 6 gives estimate for country fixed effects and model 3 in the same table gives estimate from both country and time fixed effects. First, we do test for country fixed effects by F test using the pooled regression estimated and then we test for time fixed effects comparing the model 2 and model 3 in table 5. The test suggest presence of both time and country fixed effects. Therefore, the Model 3 in table 5 is our best model so far. This gives evidence of conditional convergence as the coefficient of lag GDP per capita in now negative and significant. FDI from China has right sign but it is not statistically significant. Education has right sign and with only country fixed effects this is significant too. When we bring time fixed effects the education coefficient becomes insignificant and that is likely because of the fact that when we control for time fixed effects the year on year variation in education may be captured by time fixed effects. We conduct a Hausman test and over identification test and both suggest the presence of fixed effects in comparison to the random effects. Table 7 in appendix reports the estimate from fixed and random effects and one can see that fixed effects estimates are more meaningful in economic sense and our test results also favor fixed effects.

Therefore, from here onwards we do report results from both country and year fixed effects because there are enough evidences to suggest that both these effects are presents. First, we report results from regression using some variables which have been found meaningful in growth regression such as trade openness and natural resource rent as well as state fragility index and same is given in table 8.

Table 8 Additional Controls

	(1)	(2)	(3)
	Model 1	Model 2	Model 3
Lag GDP Per capita	-25.65***	-25.97***	-26.94***
	(0.000)	(0.000)	(0.000)
Public sector corruption index	-1.768	-1.598	0.946
	(0.635)	(0.670)	(0.809)
Domestic credit to private sector (% of GDP)	0.0417	0.0435	-0.0122
	(0.224)	(0.207)	(0.765)
FDI from China	-0.0000242	-0.0000198	0.000131

	(0.967)	(0.973)	(0.757)
Education 15+	2.554	2.543	-2.713
	(0.152)	(0.155)	(0.330)
Gross capital formation (% of GDP)	-0.0198	-0.0166	0.0574
	(0.645)	(0.702)	(0.181)
Trade (% of GDP)	0.0204	0.0205	-0.00851
	(0.090)	(0.089)	(0.513)
Total natural resources rents (% of GDP)		0.0291	0.145**
		(0.618)	(0.008)
Fragile States Index			-0.229**
			(0.008)
Constant	193.6***	195.7***	247.7***
	(0.000)	(0.000)	(0.000)
<i>R</i> ²	0.308	0.309	0.344
<i>AIC</i>	1622.6	1624.3	1004.7
<i>BIC</i>	1689.3	1694.7	1062.1
Observations	301	301	217

Once we control for fragility there is a possibility that our more fragile states are also states with high level of public corruption. This makes the coefficient of public sector corruption index positive and insignificant. We test for heteroscedasticity in our regression and there is evidence of heteroscedasticity. Our growth rate data has significant number of outliers as well. Therefore, we estimate two additional model with country and year fixed effects and the same is given in table 9 in appendix. Model is the estimates obtained from dropping top and bottom 10 percent observation in terms of growth rate and this allows us to correct for possible outlier in our sample. Even after correcting for outlier there is no evidence that FDI from China affects growth rate in African Economies in a significant way. Model 2 in Table 9 gives the estimates obtained

from the robust estimator and again the results are same as before. There is no evidence that FDI from China affects growth in African Economies.

We also control for the displaced people and refuge as there is a possibility that once we control for conflict we may have the effect of FDI from China on growth. Table 10 in appendix present results from the same. Here we control for no of refugee hosted by the country, no of refugee originated from the country and no of internally displaced people in the country. All these three estimates also do not give any evidence that FDI from China is increasing growth rate in African Economies.

4 Conclusion

In the study, we examine what effect Chinese FDI has on Africa continent growth. This study used Stata econometrically system to measure this influence. We have chosen the question because the size of Chinese FDI has increased in Africa at the same time as many scholars around the world believe that Chinese investments are not good for the host country and many believe contrary.

So many have been written about China's financial engagement in Africa that one is usually left with the hypothesis that the Chinese are performing an influential role in the growth of African economies, is it beneficial or harmful. The data we have shows that China's impact in Africa is much less than is usually assumed, through its action on the continent is growing. Chinese finance in Africa, while less comprehensive than often believed, has the potential to create jobs and improvement in the continent. In recent year FDI from china has increase in African economies and is expected to increase in light of China's one belt one road initiative. In this paper we explore the impact of Chinese FDI on growth in African economies in a cross-country growth regression framework. There is no evidence that FDI from China affects growth in African Economies. Our evidence is not driven by outliers as clear from our robustness exercise.

We presume in our analysis that there is no evidence that FDI from China is boosting growth rate in African Economies. We have controlled for no of refugee hosted by the country, no of refugee originated from the country and no of internally relocated people in the country. besides that, there are problems of quite large and very low growth rate in our sample, hence there is an indication of an outlier in our sample. Still, after an improvement for outlier there is still no evidence that FDI from China influences growth rate in African economies in a significant approach, yet, given the estimation obtained from the robust estimator and repeat the results are similarly as previous results. yet, there is still no evidence that FDI from China affects growth in African Economies with the new changes. Alongside, adding new control variables, we reported results from regression using some variables which have been found meaningful in growth regression such as trade openness and natural resource rent as well as state fragility. yet all there is no significant evidence of the Chinese FDI's on African growth. Our further results from pooled regression suggest that FDI from China is positively associated but the result is not significant. Marking an increase in Public sector corruption index drops growth which was assumed. Increase in investment to GDP ratio increases growth rate which it was also assumed. Yet, our coefficient of average education is still negative. our results from pooled estimation where we use all observations, first the coefficient of lag GDP per capita is negative but it is still not significant, second colonial origin matters and Spanish colonies have higher growth rate in

comparison to their counterparts, third public sector corruption index has right sign but it is not significant and finally domestic credit as percentage of GDP has opposite sign than expected.

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Appendix

Table 2 Regression of average growth rate as in Equation 1

	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5
Log GDP in 2001	-0.0677 (0.842)	0.0444 (0.901)	-0.258 (0.569)	-0.355 (0.472)	-0.306 (0.573)
1. English Common Law		0 (.)	0 (.)	0 (.)	0 (.)
2. French Commercial Code		0.0646 (0.939)	0.629 (0.705)	0.308 (0.863)	0.236 (0.898)
0. Never colonized by a Western overseas colonial power			0 (.)	0 (.)	0 (.)
2. Spanish			6.865* (0.037)	7.324* (0.035)	7.268* (0.042)
3. Italian			2.082 (0.508)	2.572 (0.440)	2.573 (0.451)
5. British			3.302 (0.119)	2.962 (0.183)	3.023 (0.189)
6. French			1.604 (0.525)	1.832 (0.482)	1.919 (0.477)
7. Portuguese			4.252 (0.145)	4.357 (0.144)	4.431 (0.150)
8. Belgian			2.565 (0.385)	1.871 (0.563)	1.972 (0.555)
Public sector corruption index				-1.558 (0.572)	-1.629 (0.567)
Domestic credit to private sector (% of GDP)					-0.00417 (0.797)
Constant	2.847 (0.302)	1.761 (0.548)	1.222 (0.745)	3.348 (0.534)	3.065 (0.586)
R^2	0.001	0.001	0.378	0.388	0.391
AIC	143.5	127.8	126.1	127.6	129.4
BIC	146.5	131.9	138.4	141.2	144.5
Observations	33	29	29	29	29

Table 3 Regression of average growth rate as in Equation 1

	(1) Model 6	(2) Model 7	(3) Model 8
GDP in 2001	-0.397 (0.506)	-0.196 (0.790)	0.243 (0.111)
1. English Common Law	0 (.)	0 (.)	0 (.)
2. French Commercial Code	0.395 (0.838)	0.508 (0.799)	-0.642* (0.010)
0. Never colonized by a Western overseas colonial power	0 (.)	0 (.)	
2. Spanish	7.349* (0.045)		
3. Italian	2.646 (0.450)	2.533 (0.481)	
5. British	3.074 (0.193)	3.303 (0.181)	
6. French	1.731 (0.536)	1.440 (0.622)	
7. Portuguese	4.294 (0.175)	3.882 (0.244)	
8. Belgian	1.803 (0.601)	1.458 (0.685)	
Public sector corruption index	-1.537 (0.599)	-1.688 (0.575)	-2.003*** (0.000)
Domestic credit to private sector (% of GDP)	-0.00245 (0.886)	-0.00214 (0.903)	-0.00380 (0.353)
Total FDI from China	0.982 (0.673)	1.240 (0.612)	0.0000108 (0.941)
Education 15+		-0.188 (0.627)	-0.172* (0.025)
Constant	3.633 (0.540)	3.023 (0.625)	2.914** (0.002)
R^2	0.397	0.302	0.065
AIC	131.1	128.0	1301.7
BIC	147.5	144.0	1328.3
Observations	29	28	329

p -values in parentheses

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

Table 4 Pooled Regression

	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5
Lag GDP Per Capita	-0.0644 (0.871)	-0.0533 (0.904)	-0.674 (0.281)	-0.959 (0.143)	-0.804 (0.248)
1. English Common Law		0 (.)	0 (.)	0 (.)	0 (.)
2. French Commercial Code		0.0915 (0.933)	1.310 (0.576)	0.100 (0.968)	0.0117 (0.996)
0. Never colonized by a Western overseas colonial power			0 (.)	0 (.)	0 (.)
2. Spanish			8.379 (0.062)	10.75* (0.025)	10.32* (0.031)
3. Italian			2.960 (0.507)	5.310 (0.262)	4.976 (0.291)
5. British			4.137 (0.160)	3.710 (0.208)	3.757 (0.204)
6. French			1.610 (0.648)	3.007 (0.410)	3.079 (0.395)
7. Portuguese			4.405 (0.266)	6.019 (0.143)	6.094 (0.135)
8. Belgian			2.205 (0.587)	1.752 (0.667)	1.900 (0.638)
Public sector corruption index				-4.712 (0.145)	-4.898 (0.136)
Domestic credit to private sector (% of GDP)					-0.0106 (0.598)
Constant	2.926 (0.367)	2.730 (0.454)	4.004 (0.434)	9.756 (0.131)	8.894 (0.172)
R^2	0.000	0.000	0.025	0.032	0.034
AIC	2649.4	2304.9	2308.7	2308.5	2252.8
BIC	2657.2	2316.2	2342.6	2346.2	2293.9
Observations	373	319	319	319	312

p-values in parentheses

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

Table: 5 Pooled Regression

	(1) Model 6	(2) Model 7	(3) Model 8	(4) Model 9
Lag GDP Per Capita	-0.805 (0.250)	-0.840 (0.347)	-0.367 (0.649)	0.0806 (0.859)
1. English Common Law	0 (.)	0 (.)	0 (.)	0 (.)
2. French Commercial Code	0.0131 (0.996)	-0.152 (0.951)	0.0407 (0.975)	-0.605 (0.411)
0. Never colonized by a Western overseas colonial power	0 (.)	0 (.)		
2. Spanish	10.32* (0.031)			
3. Italian	4.976 (0.292)	4.905 (0.301)		
5. British	3.756 (0.205)	3.683 (0.212)		
6. French	3.078 (0.396)	3.377 (0.369)		
7. Portuguese	6.093 (0.136)	6.542 (0.130)		
8. Belgian	1.898 (0.640)	2.424 (0.565)		
Public sector corruption index	-4.899 (0.138)	-4.615 (0.165)	-3.949 (0.129)	-3.068* (0.033)
Domestic credit to private sector (% of GDP)	-0.0106 (0.600)	-0.0110 (0.587)	-0.0113 (0.568)	-0.00924 (0.399)
FDI from China	0.00000865 (0.995)	0.0000439 (0.973)	0.0000702 (0.957)	0.0000644 (0.928)
Education 15+		0.123 (0.783)	-0.00788 (0.985)	-0.211 (0.346)
Gross capital formation (% of GDP)				0.102** (0.006)
Constant	8.897 (0.174)	8.317 (0.210)	8.147 (0.105)	3.021 (0.282)

R^2	0.034	0.025	0.010	0.044
AIC	2254.8	2172.3	2166.9	1734.4
BIC	2299.7	2216.8	2192.8	1763.8
Observations	312	301	301	290

p -values in parentheses

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

Table 7 Fixed Versus Random

	(1) Fixed	(2) Random
Lag GDP Per Capita	-22.66*** (0.000)	-0.606 (0.435)
Public sector corruption index	-1.292 (0.735)	-4.626* (0.050)
Domestic credit to private sector (% of GDP)	0.0546 (0.120)	-0.0212 (0.265)
FDI from China	0.000270 (0.656)	-0.000225 (0.729)
Education 15+	6.342*** (0.000)	0.0564 (0.878)
Gross capital formation (% of GDP)	0.0325 (0.429)	0.0710 (0.080)
Constant	152.5*** (0.000)	8.816 (0.100)
R^2	0.200	
AIC	1644.2	.
BIC	1670.1	.
Observations	301	301

p-values in parentheses

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

Table 9 Estimates obtained from removing top and bottom 10 percent of growth observations and correcting for heteroscedasticity

	(1) Model 1	(2) Model 2
Lag GDP per Capita	-12.75*** (0.000)	-26.94*** (0.000)
Public sector corruption index	-0.953 (0.800)	0.946 (0.820)
Domestic credit to private sector (% of GDP)	-0.00668 (0.807)	-0.0122 (0.716)
FDI from China	-0.000174 (0.539)	0.000131 (0.559)
Education 15+	2.387 (0.340)	-2.713 (0.570)
Gross capital formation (% of GDP)	0.0523 (0.084)	0.0574 (0.214)
Trade (% of GDP)	0.00529 (0.583)	-0.00851 (0.559)
Total natural resources rents (% of GDP)	0.114** (0.008)	0.145* (0.030)
Fragile States Index	-0.0454 (0.483)	-0.229* (0.019)
Constant	93.92** (0.003)	283.4*** (0.000)
R^2	0.276	0.523
AIC	720.2	1058.7
BIC	775.5	1207.4
Observations	191	217

Table 10 Estimates obtained from controlling for conflict and correcting for heteroskedasticity

	(1) Model	(2) Model 2	(3) Model 3
Lag GDP per Capita	-29.26*** (0.000)	-29.55*** (0.000)	-27.27*** (0.000)
Public sector corruption index	12.24 (0.326)	11.90 (0.356)	6.121 (0.640)
Domestic credit to private sector (% of GDP)	0.0268 (0.609)	0.0237 (0.659)	0.00644 (0.901)
FDI from China	0.0000487 (0.885)	0.0000683 (0.838)	0.000584 (0.139)
Education 15+	-0.913 (0.841)	-2.601 (0.593)	-0.358 (0.940)
Gross capital formation (% of GDP)	0.0564 (0.487)	0.0744 (0.370)	0.0812 (0.257)
Trade (% of GDP)	0.0129 (0.155)	0.00852 (0.376)	0.00934 (0.304)
Total natural resources rents (% of GDP)	-0.0184 (0.831)	-0.0235 (0.779)	0.0344 (0.662)
Fragile States Index	-0.248 (0.053)	-0.236 (0.077)	-0.141 (0.179)
No of internally Displaced Person	0.00739** (0.004)		
No of refugee Originated in the Country		-0.00493 (0.535)	
No of refugee Hosted in the Country			-0.0404* (0.034)
Constant	288.7*** (0.000)	303.4*** (0.000)	265.0*** (0.000)
R^2	0.724	0.702	0.722
AIC	389.5	397.1	390.1
BIC	492.5	500.1	493.1

Observations	97	97	97
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p-values in parentheses

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