The Impact of Foreign Capital on Institutional Quality: An Empirical Study of Chinese Finances of Loans and Foreign Direct Investments in Africa

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Abstract: The African continent has since long had slow economic growth, with large infrastructural gaps compared to the Western World. This has resulted in large inflows of foreign capital to the African economies. With China becoming an increasingly important investor in Africa, the interest to understand the impact that the China-Africa relationship has on the African countries has increased. Previous research has mostly focused on areas such as the impact of FDI on economic growth and social welfare, as well as FDI's impact on institutional quality and local corruption. However, to our knowledge, no study has looked at the difference between Chinese FDI and loans in how they impact institutional quality in the host country, which is the purpose of this study, to provide guidance for policymakers. This area is important to study further as institutional quality has been found to be an important factor for long-run sustainable economic growth. Also, it is interesting to study China as a separate source of capital, as it is scoring low on measures for transparency, governance, and freedom indices. Through a fixed-effects model with lagged variables for net flows of FDI and loans, the results suggest a nonsignificant impact of FDI and a positive and significant impact of loans on institutional quality. Compared to world data, which is nonsignificant, the impact of Chinese capital is similar but of a larger magnitude, which indicates that Chinese capital follows the general trends but influences institutional quality to a larger extent.

Acknowledgments

Concepts and Definitions

FDI   Foreign direct investment. The abbreviation will be used both in singular and plural form

GDP   Gross domestic product

Home country   The country that is sending foreign capital through investment or loan

Host country   The country that is receiving foreign capital through investment or loan

Institutions   Formal and informal rules within which humans and organizations interact and perform (Sida, 2005)

Institutional quality   Defined in this study according to the following 6 metrics:
"Political Stability and Absence of Violence/Terrorism", "Control of Corruption", "Government Effectiveness", "Regulatory Quality", "Rule of Law" and "Voice and Accountability", based on the Worldwide Governance Indicators by the World Bank

CPI   Corruption perception index by Transparency International

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1. Introduction

The African continent has since long been an area of interest for many foreign countries. Since the turn of the millennium, there has been an increase in inflows of foreign capital, especially through foreign direct investments (FDI) (World Bank, 2021) but also through loans (World Bank, 2022). The purpose of this capital ranges from mitigating the effects of crises to improving economic and social development. China has recently developed a strong presence in Africa, becoming Africa's largest trade partner (Jayram et al., 2017).

Institutional quality is an important requirement to ensure economic growth (World Bank, 2021) and that FDI flows are utilized for the country's development (Claudio-Quiroga et al., 2021). Institutional quality includes several measures, with corruption level being one of them. Research has found it interesting to study the relationship between institutional quality and foreign capital. Overall, countries with higher institutional governance show larger inflows of FDI (Globerman & Shapiro, 2002), providing an incentive for countries in need of finances to improve their institutional quality (Zallé & Ouédraogo, 2021). According to the Corruption Perceptions Index (CPI) conducted by Transparency International (2019), Sub-Saharan Africa is one of the lowest scoring regions, indicating high corruption.

The most recent publications in the area have analyzed how increased flows of foreign capital impact the institutional quality in the recipient country. Since China is a country with relatively low scores for transparency and governance, and high corruption compared to other large investors (Transparency International, 2021; Freedom House, 2021), it becomes interesting to study what impact Chinese flows have on the host country's institutional quality. While studies have been performed to analyze the impact of FDI and foreign aid, to the author's best knowledge no study has yet focused on loans, as well as the potential difference in impact between Chinese FDI and loans on institutional quality in Africa. With large foreign debt and repeated debt distress in Africa, analyzing the difference in impact on institutional quality depending on the kind of foreign capital provided could facilitate policymakers' choice when it comes to which type of foreign capital should be prioritized in Africa.

For our study, we have combined two datasets on FDI and loans from China to Africa between 2003 and 2019. We have then analyzed the data through a fixed effects regression to adjust for reversed causality. Based on an optimal lag selection test, lagged variables for FDI and loans were added to the regression, as we expect that foreign capital inflows have a delayed effect on institutional quality. In this way, we aim to contribute to policymakers' choices of most beneficial forms of foreign capital in terms of impact on institutional quality.

2. Background

This section will explain the subject and the reasons for this study by presenting information on economic development in Africa and the purpose of FDI and loans, as well as an overview of institutional quality and on the China-Africa relationship.

2.1 Economic Overview

The slave trade in the 16th century (Britannica, 2022)[1] has been reported to be one of the main factors behind Africa's slower development since the population that could have been expected to contribute the most to domestic development was transported to other countries (Mlambo, 2018; Nunn, 2008). With colonization starting in the late 19th century the continent gained economic growth through technological developments and increased trade, whereas after independence, underdevelopment in infrastructure and dependence on previous colonizers made economic development difficult[2] (Mlambo, 2018), contributing to the financial gap between Africa and other continents.

The colonial time led to inherent debts toward previous colonizers, resulting in increased loans from international organizations[3] (Zajontz, 2021) and debt distress in the 1980s and 1990s due to increased interest rates (Mlambo, 2018). In 2020, Sub-Saharan Africa's external debt had increased by 130% since 2010, illustrating the growing African debt (World Bank, 2022)[4]. However, loans have been motivated as necessary for funding important infrastructure projects (Zajontz, 2021; Singh, 2020).

China has recently become a large provider of loans. In 2018, China held 14% of sub-Saharan Africa's total debt stock (Kinyondo, 2019) and 22% of the external debt in Africa's low-income countries (Zajontz, 2021). In some countries, China holds up to 80% of the external debt. This has induced speculations, especially from the US, that China will soon act as a colonizer and take over operations and exports (Kinyondo, 2019).

2.2 Purpose of FDI and Loans

FDI are investments that transfer capital, technologies, and know-how from the home country (country investing) to the host country (country receiving the investment). Usually, FDI lower

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[1] Date for Britannica sources is not reported; thus, the date of retrieval has been written in this essay, i.e., spring 2022

[2] Colonial infrastructure was purposed to bring goods to the borders for overseas trade, hence domestic infrastructure was not developed (University of Zurich, 2016). Easy access to import also reduced domestic production (Mendes et al., 2014).

[3] Such as the International Monetary Fund and the World Bank

[4] In 2020 interest payments represented an average of 20% of tax revenue in Africa, while public debt in Sub-Saharan Africa represented 58% of GDP (Georgieva, 2021).

production costs in the host country by generating a more competitive market, thus helping social and economic development (Zhang, J. et al., 2014; Fauzel et al., 2015). The host countries often attract investors because of their favorable market conditions for economic growth (Doku et al., 2017), e.g., due to accessible materials and cheap manufacturing goods (Cudjoe et al., 2021). Aside from investments, countries can also receive loans from international institutions and countries, to increase government spending and stabilize their economy (Britannica, 2022). Furthermore, borrowing money can be a way to improve a country's infrastructure development without compromising macroeconomic stability (Manasseh et al., 2022).

FDI and loans can result in capital accumulation and contribute to the total factor productivity (TFP) through transfers in business know-how and technology, hence encourage economic growth according to the Solow Swan Model (Hashi & Ericsson, 2019; Nemlioglu & Mallick, 2020; Jones, 2017). This is also in line with the Romer model, which claims that new ideas lead to sustainable growth (Jones, 2017). However, a positive impact of foreign capital is not certain, as TFP can also be affected by the quality of institutions (Jones, 2017), and therefore a transfer of corruption can affect the TFP negatively and counteract the positive impacts on economic growth.

Since the 2000s, emerging economies have become of increasing interest to foreign investors (Carril-Caccia & Pavlova, 2018), thus partly explaining the upwards trend in the Chinese FDI flow to African countries, as illustrated in Figure 1. Chinese loans have had a relatively constant increase up until 2013, followed by some fluctuations, as seen in Figure 2.
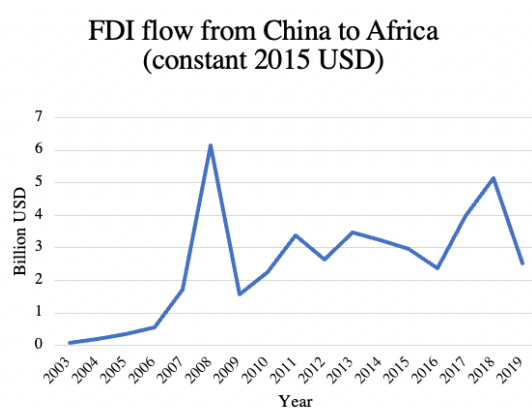

Figure 1
Source: John Hopkins University's School of
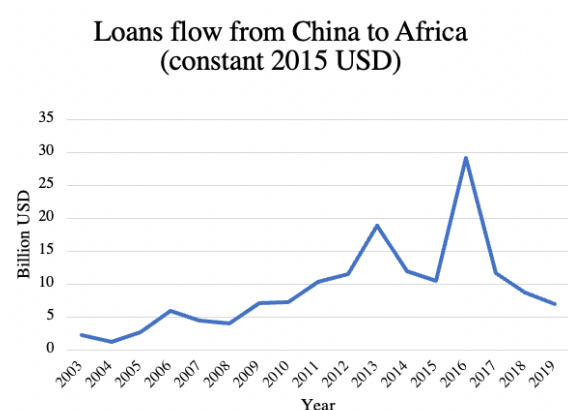Advanced International Studies, (2003-2019)

Figure 2
Source: John Hopkins University's School of
Advanced International Studies, (2003-2019)

2.3 Institutional Quality Overview

According to Sida (2005), institutions are "formal and informal rules within which humans and organizations interact and perform", and institutional quality is a complex concept that has its roots in a country's history and involves formal and informal societal norms. Institutional quality will in this study be defined in line with the six governance indicators provided by the World Bank, namely "Political Stability and Absence of Violence/Terrorism", "Control of Corruption", "Government Effectiveness", "Regulatory Quality", "Rule of Law" and "Voice and Accountability". These indicators provide an assessment of a country's institutions[5]. With several previous studies assessing institutional quality based on these indicators, our study will be based on this definition as well, although with an increased focus on corruption.

African countries score among the lowest in institutional quality. In 2019, Sub-Saharan Africa scored an average of 32 on the Corruption Perception Index (CPI), where 100 indicates no perceived corruption (Transparency International, 2019) [6]. The 2021 Country Policy & Institutional Assessment (CPIA) report[7] gave Sub-Saharan countries 3.1 points out of 6. The lack of transparency and corruption are maintaining the low level of governance by distorting resource allocation and creating an unfavorable business climate, thus preventing economic development (World Bank, 2021; African Development Bank Group, no date).
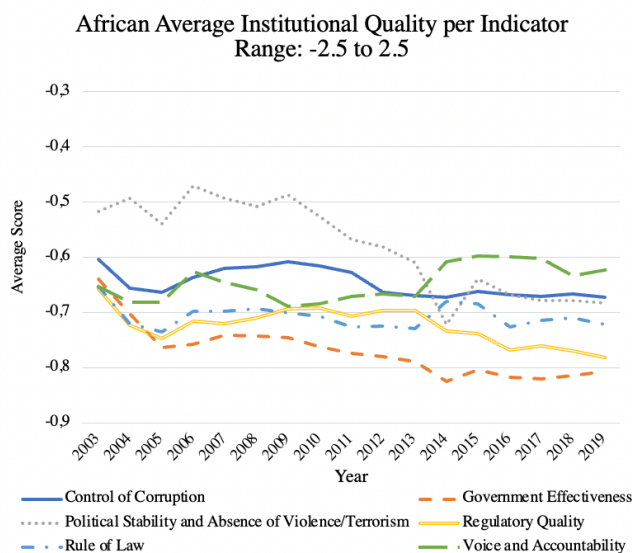
Figure 3
Source: World Bank Governance Indicators, (2003-2019)
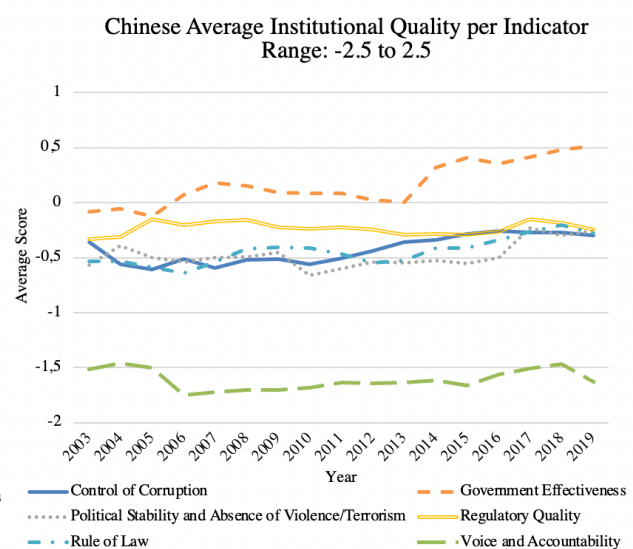
Figure 4
Source: World Bank Governance Indicators, (2003-2019)

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[5] Further description and definition of governance by the World Bank in section 5.2.1.

[6] As a comparison, New Zealand, Denmark, and Finland are the countries scoring the world's highest CPI of 88 out of 100

[7] World Bank's analysis of economic management, policies for structure, social inclusion, and public sector institutions

As illustrated in Figure 3, the average institutional quality in Africa has been in almost constant decline. "Governance effectiveness" and "Regulatory quality" have slight decreases over time while "Political stability and absence of violence/terrorism" has the largest change over time, from -0.517 in 2003 to -0.683 in 2019. This deviation could potentially be explained by the escalation in conflicts in the African region, an example of which is the increased violence from the terrorist group Boko Haram after 2009 (Britannica, 2022). It is worth noting that the governance indicators differ highly between the African countries, as shown in Table A3 in Appendix A.

With China being of interest in this study, it is important to understand the institutional quality in China. As seen in Figure 4, the average score of the indicators is -0.5 over time, with "Voice and Accountability" being close to -1.5. The six indicators have relatively stable development, with "Government Effectiveness" having a steeper increase between 2014 and 2019. This indicates an overall higher score in China than in Africa. However, compared to other investors, in 2021 China was positioned as nr. 66 out of 180 countries in CPI, while the US ranked 27 (Transparency International, 2021). As a comparison, Freedom House (2021) analyzed the perceived freedom in countries, and in 2021 China received a total score of 9/100, with the US receiving 83 and with 100 being seen as the highest possible freedom.[8]

2.4 The China-Africa Relationship

The increase in relations between China and Africa has led to a vivid debate about the Chinese incentives and the outcome for both parties. On one side, researchers argue that the exchange leads to a win-win situation, by creating increased economic growth for African countries and more opportunities for Chinese companies. On the other side, there is evidence that the relationship leads to long-term indebtment for African countries (Miao et al., 2020).

To understand the China-Africa relationship, one can begin by analyzing the patterns in which loans and FDI are given and their consequences. 76% of loans from China to Africa go to countries that have a large endowment of natural resources (Kinyondo, 2019). Kinyondo (2019) motivates a Chinese debt-trap diplomacy with natural resources being used as collateral, which secures Chinese imports of useful goods such as oil. Others mention collaterals such as

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[8] The freedom score is a combination of a score on political rights and civil liberties. China received a score of -2 out of 40 on the political rights, and 11 out of 60 on civil liberties and was hence classified as a "not free" country. In contrast, The US scored 32 in political rights and 51 in civil liberties (Freedom House, 2021).

mining goods (Alves, 2013; Singh, 2020). This results in a restriction of African exports, as the goods become interest payments to China. A dependency relationship is created, where China prolongs unsustainable loans when the borrower cannot repay them (Singh, 2020). Criticism has also been expressed on the structure of the loans' contracts, as China does not include any demands on democratic reformation, unlike developed countries and institutions such as the IMF. Nevertheless, China has stated that the countries receiving aid should decide themselves how to structure their society. This, together with low fixed rates (Singh, 2020), has been expressed as one of the reasons why China has become a favored lender in African countries (Hackenesch, 2015).

The Afrobarometer[9], a pan-African survey covering people's attitudes toward democracy, governance, and society, reports on how the Africans perceive China's influence. The results indicate that China has a strong influence on Africans, since it was ranked as the second most influential external party after the colonial powers, and as the second most desirable development model after the US, according to the 2014-2015 survey (Selormey, 2020). China's influence is mostly seen as positive, with 63% of respondents seeing China as a somewhat positive or very positive influence. As a comparison, 60% of respondents gave the same reply for the US, and 57% for United nations Agencies (Appiah-Nyamekye Sanny & Selormey, 2021). The positive attitude toward China does not seem to impact the Africans' demand for democracy. In the 2019-2020 survey, it was found that Africans rating China as the preferred development model were as likely to demand democracy and reject authoritative models as those preferring the US. According to 55% of respondents, a donor country should not set requirements on how to spend the funds, thus explaining the preference for China. They instead wish for their country to be able to set its own political agenda (Logan & Appiah-Nyamekye Sanny, 2021). However, the respondents also seem to be aware of the risks of taking in a too high share of Chinese loans, as most of the respondents are worried about becoming too heavily indebted to China (Appiah-Nyamekye Sanny & Selormey, 2021).

3. Previous Literature

This section will present a description of previous literature on foreign capital's common pre-conditions and purposes, as well as how foreign capital leads to economic growth and its

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[9] The Afrobarometer started in 1999 as a merger of three independent survey research projects. Since the start, eight rounds of surveys have been performed, with round eight having been conducted between 2019 and 2020 in 34 countries (Afrobarometer official webpage, no date).

connection to institutional quality. Increased emphasis will be placed on the last-mentioned part as this subject is the most relevant for our study, including information on method, result and data used.

3.1 Foreign Capital and Reasons behind Capital Flows

While foreign loans are binding for the receiving party, and naturally lead to a gain for the giving party in the form of interest payments, FDI is more dependent on certain pre-existing conditions in the host country. For Chinese investments, some factors that have been mentioned as important for deciding on investment location are the presence of a large regional market, good infrastructure, preferential policies, raw materials, and cheap manufacturing goods, while high labor costs are a negative factor (Cheng & Kwan, 2000; Cudjoe et al., 2021; Asiedu, 2006). Some researchers report natural resources to be an incentive for investors when providing loans (Alves, 2013), while others disagree (Kinyondo, 2019; Dreher & Fuchs, 2015).

Research is split between those claiming that investments are usually driven by higher institutional quality in the host country and those that argue for economic incentives being the main driving factor. For example, Asiedu (2006) found that corruption and political instability led to a decrease in investments, while others claim that corruption can even be a reason for an increase in FDI in a region (Helmy, 2013; Egger & Winner, 2005). More specifically for China, research is likewise split. Yuan et al. (2021) argue that Chinese multinationals seem to invest where there is lower corruption, while Brazys et al. (2017) found that China seems to prioritize investments in countries with higher levels of corruption due to lower competition, which leads to higher expected profits. Others have claimed that Chinese companies are less concerned about their investment destinations' corruption levels, compared to western donors (Dreher & Fuchs, 2015; Dreher et al., 2019). According to Fon, R. M. et al. (2021) and Fon, R. & Alon (2022), this is because Chinese multinationals are often backed by the State, thus they have lower risks when investing in countries with worse institutional quality compared to traditional investors. According to Culver (2021), Chinese firms are used to operating in a country with relatively lower institutional quality and find it easier to adapt operations to the business environment in Africa due to more similar norms, compared to other investing organizations and international firms.

3.2 The Impact of Foreign Capital on Economic Growth in Africa

Numerous studies have been conducted with the purpose of understanding and analyzing the impact of foreign capital on African countries, their economy, and societal development. Research findings indicate that through capital inflows, jobs have been created in sectors such as manufacturing, agriculture, and telecommunications, and that skill transfers have taken place due to multinational firms offering on-the-job learning and activities. Research is split on whether knowledge sharing takes place between the host and the home countries, and how it may contribute to economic growth, with some arguing for a barely noticeable impact (Park & Tang, 2021) while others have found increased knowledge sharing after investments (Li, 2016).

According to Li (2016), technology is one of the main bottlenecks in African industrialization, hindering economic development. There are different views on the impact that foreign capital may have on technological advances. On one hand, empirical findings by Park & Tang (2021) and Claudio-Quiroga et al. (2021) have shown limited technology transfers between firms, mostly due to lacking infrastructure policies, difficulties using the offered technology in the long-term, and insufficient human development. On the other hand, some reports have concluded that technological transfers exist, and that they are driven by firm incentives and government encouragements from China, which have improved industry development, helped speed up industrialization, and increased income levels (Li, 2016).

Empirical findings also differ on FDI's impact on economic growth. For example, a causal and unidirectional relationship between Chinese FDI and GDP growth in Africa has been found, to an increase of 0.6% (Doku et al., 2017). According to Dollar & Kraay (2004), FDI contribute to economic well-being in host countries by increasing income levels and decreasing of poverty rates. However, other studies have found that the positive aspects of FDI are counterweighted or outweighed by negative aspects (Fry, 1993; Alfaro, 2003).

Claudio-Quiroga et al. (2021) claim that the host countries need to have certain pre-existing criteria in place in order to fully utilize the inflows of FDI, such as strong institutional quality, developed financial markets, and economic stability[10]. Education is also a criterion, but in the opposite direction, as countries with low schooling levels have been found to benefit the most from FDI spillovers (Khordagui & Saleh, 2013). Nevertheless, other studies have found that even some of the least developed countries that are not fulfilling these criteria have gained in

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[10] Other criteria are human capital, degree of trade openness, technological pre-conditions, political stability, absence of violence, well-developed financial markets and strong domestic adaptive capacity (Alfaro et al., 2004; Miao et al., 2020). In contrast, high abundance of natural resources has a lower correlation between FDI inflows and growth (Claudio-Quiroga et al., 2021).

GDP growth, (Fauzel et al., 2015; Fowowe & Shuaibu, 2014; Soumaré, 2015) with poorer countries showing the largest impact of FDI (Gohou & Soumaré, 2011). Moreover, on a firm level, a crowding-out effect has been observed, where local firms cannot compete with the multinational firms that enter the market, contributing to the deindustrialization of African companies (Park & Tang, 2021).

Recently, the focus has shifted to analyzing the impact of Chinese capital. Chinese firms have technologies that are more adaptable to labor-intensive sectors and local raw materials, compared to US firms. This has been shown to be more favorable for many African countries that do not currently have high technological advances, but instead have labor abundance, leading to a larger impact on growth compared to other investors (Zhang, 2021). Moreover, as previously described, investments in sectors such as manufacturing and industry lead to a long-term impact. As Chinese investments are mostly done in infrastructure, mining, manufacturing, financial services, and business services, this can be a reason why Chinese FDI have a larger impact on economic development in Africa, compared to other investors (Zhang, 2021; Cudjoe et al., 2021). Nevertheless, other studies have found that FDI from China has a negative impact on economic growth (Ngundu & Ngepah, 2020; Miao et al., 2020).

3.3 Chinese Capital's Impact on Institutional Quality in the Host Country

While a large body of research has studied whether corruption in the host country influences FDI inflows, fewer have studied the opposite relationship, i.e., the influence of FDI flows, and Chinese FDI specifically, on institutional quality in the host country. As institutional quality has been found to be an important explaining factor for economic growth (Miao et al., 2020), this relationship has become increasingly interesting to study.

Fon et al. (2021) analyzed the impact of FDI inflows on institutional quality in the African host country, depending on if the home country was a developed country, a developing country, or China specifically, with the last one chosen due to its increasing presence as an investor. By using the World Governance Indicators as a metric for institutional quality, the authors found a clear difference between the effect of FDI from developed home countries and FDI from emerging markets. Investors from developed countries produce a quicker positive impact on the host country's institutions, by imposing requirements on them, and by providing them with best practices from their own experience. Investors from emerging markets tend to have a positive but much slower effect on institutions, since they at first focus on establishing a preferential agreement with the host country's authorities. Moreover, through the inclusion of

optimal lags selection tests, it was found that the impact from China was the largest for a one-year lag of FDI, with a positive impact on institutional quality through increased inflows of FDI, nevertheless the result was nonsignificant (Fon et al., 2021).

Others have found that China tends to have a negative impact on institutional quality, and on local corruption specifically, and more so compared to the World Bank and other international institutions (Dreher et al., 2019; Brazys et al., 2017; Isaksson & Kotsadam, 2018). Isaksson & Kotsadam (2018) analyzed local corruption by comparing the increase in bribery around Chinese project sites in Africa and around those of the World Bank. The corruption measurements were based on survey data for 29 countries, taken from the Afrobarometer. The results indicated an increase in petty corruption around Chinese project sites, compared to at the time of the announcement of the investment. Chinese projects were deemed to impact petty corruption in Africa not through the economic exchange itself, but on a deeper level of norm transmissions. More specifically, donors from a foreign country are expected to influence not only prescriptive but also descriptive norms, i.e., by behaving in a corrupt way at the project site, others that observe this behavior will perceive it as accepted and thus start mimicking it. China has in fact previously been accused of corrupt behavior when carrying out development projects (Isaksson, 2022; Isaksson & Kotsadam, 2018; Donaubauer et al., 2022).

Similarly, also Donaubauer et al. (2022) found no increase in corruption from economic activities but rather used norm transmissions as an explanation for the increase in corruption observed in their findings. The study analyzed the impact that FDI have on petty corruption, through combing firm level data from United Nations Industrial Development Organization's (UNIDO) Africa Investor Survey (AIS) as well as household data from the Afrobarometer surveys, for 19 countries in the Sub-Sahara Africa region. The results illustrated a statistically significant and positive impact from FDI, indicating increased local corruption from foreign investments. The authors furthermore separated the impact, stating that it differs depending on the corruption level of the foreign investor, with less corrupt investors instead reducing the corruption level in the host country, which was also motivated by norm transmissions.

On the same note, the working paper by Cha (2020) aims to analyze if foreign aid increase awareness of corruption, found that African regions with ongoing Chinese projects reported higher levels of perceived corruption among government officials and political leaders. Hence, this indicates that the effect is not only on petty corruption but can also take place on higher political levels. The results further indicated that the impact was larger from Chinese agencies compared to African or international ones. These findings, based on data from 30 African

countries from the Global Chinese Official Finance Dataset and the Afrobarometer surveys, also support the theory of potential norm transmissions taking place between China and the host countries. Also, the perceived corruption was found to differ between sectors, with social infrastructure projects increasing corruption to a larger extent than others.

Moreover, Pinto & Zhu (2016) studied the impact of inward FDI on corruption, as measured by Transparency International in their Corruption Perception Index (CPI). They found that the experienced corruption and increased bribery seem to be larger the lower the GDP per capita is in the host country. This is because market concentration increases more with FDI in less developed countries, resulting in increased rent-seeking opportunities for corrupt behavior due to FDI inflows. Also, the perceived corruption can be positively or negatively impacted based on the economic development of the host country, hence supporting previously mentioned findings that the impact can be either positive or negative.

The arguments above, complemented by claims that Chinese investors are described to use corrupt practices like bribery to circumvent regulations and increase market influence (Culver, 2021), make it relevant to investigate potential additional findings on the existence of an impact of Chinese capital on institutional quality, and its direction.

4. Research Question and Hypothesis

Based on the literature above, no studies have yet compared different flows of capital from China based on their impact on institutional quality in the host countries[11]. The purpose of this study is hence to provide guidance for policymakers regarding which kind of foreign capital is the best choice to ensure high institutional quality and sustainable growth in the host country. Therefore, the research question of this study is as follows:

Is there a difference in impact on the host country's institutional quality when receiving foreign capital through FDI and loans?

With research indicating that local corruption increases with the presence of Chinese firms, potentially explained through norm transmissions (Isaksson & Kotsadam, 2018; Donaubauer et al. 2022), an initial hypothesis can be created that increased FDI flows will result in a negative impact on institutional quality. In line with its non-interference policy (United Nations, 2012), China prefers to let a country develop on its own when lending money, without

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[11]To the authors' best knowledge when writing this paper

setting requirements for governmental development (Hackenesch, 2015). This would imply fewer possibilities for interpersonal exchange and norm transmission, according to Isaksson & Kotsadam (2018) and Donaubauer et al. (2022), thus reducing the potential negative impact of loans. Also, since previous studies have found that an increase in income levels has resulted in improved institutional quality (Fon et al., 2021), it could be expected that the capital increase through loans would have a positive impact on institutional quality.

Hypothesis 1: Chinese FDI will have a negative impact on institutional quality in the host country while loans will have a positive impact.

Fon et al. (2021) argue that institutional quality has a larger correlation with FDI from developing and developed countries when including FDI from lagged time periods, due to delayed effects. Therefore, we will hypothesize a similar pattern in our study.

Hypothesis 2: There are delayed effects, with institutional quality being impacted to a larger extent by flows of foreign capital from years further away from the point of investment.

5. Data and Methodology

This section includes descriptions of the variables used, an overview of the data for the independent-, dependent- and control variables for each country, as well a presentation of the econometric models applied in this research.

5.1 Data

The data in this report are based on a collection of different metrics for 54 African countries between 2003 and 2019. With the 16 variables chosen for the study, a compiled data set of 918 observations has been created. The larger part of the data and control variables have been collected by the World Bank, where the database used are World Development Indicators and World Bank International Debt Statistics, with institutional quality statistics data from the Worldwide Governance Indicators.

The World Development Indicators is a collection of indicators compiled by the World Bank from officially recognized international sources. The dataset includes national, regional, and global estimates for development indicators. The Worldwide Governance Indicators is a collection of indicators compiled by the World Bank on six dimensions of governance. The

World Bank International Debts Statistics are indicators accessible through the World Bank on external debt stocks and flows, where the counterparty-area chosen is "world" for the data on FDI and loans flows from the world to the African countries. The data for FDI flows and loans from China have been collected from the China African Research Initiative by John Hopkins University's School of Advanced International Studies (SAIS-CARI). Data include the net flow of FDI from China to Africa and the total amount of lending from China to African countries.

All 54 African countries have been included in the study to increase the possibilities of significant results, as more observations have been included in the chosen econometric models. The countries are of mixed characteristics and combinations of low and high flows of FDI and/or loans, as well as population and country sizes. The choice of years is due to FDI data not having been collected before 2003 by most institutions. The year 2020 has been excluded since not all the chosen variables have complete data for that year.

The data were compiled to one dataset that was transformed into a wide panel dataset where observations were made for each selected country and each observed year for the 16 selected metrics.

5.2 Variables
This section will present the variables that have been included in this study.

5.2.1 Dependent Variables
The dependent variable used in the regression is *Institutional quality*, as defined in Table A1 in Appendix A. This variable is computed as an average of six estimates of governance indicators by the World Bank. The Worldwide Governance Indicators (WGI) project collects the indicators through estimates made by large enterprises, citizens, and expert survey respondents in the selected countries. Data has been collected for over 200 countries and territories between 1996-2020. 30 data sources have been used by the World Bank to estimate the indicators through survey institutes, NGOs, think tanks, private firms, and international organizations. The WGI project defines governance as "the traditions and institutions by which authority in a country is exercised. This includes the process by which governments are selected, monitored, and replaced; the capacity of the government to effectively formulate and implement sound policies; and the respect of citizens and the state for the institutions that

govern economic and social interactions among them". The estimate a country is given results in a score, in units of standard normal distribution, ranging from -2.5 to 2.5.

An initial observation is that most nations have negative values for institutional quality whereas only Botswana, Ghana, Namibia, and South Africa have positive averages, as shown in Table A3 in Appendix A. This indicates that these countries currently have the highest institutional governance quality and lowest corruption. Nevertheless, the values generated are close to zero and hence not relatively larger than the other countries on the scale of -2.5 to 2.5.

5.2.2 Independent Variables

Net flows of FDI and of loans are the two independent variables that are used in the regressions of our study. The data have been collected through the China Africa Research Initiative by John Hopkins University's School of Advanced International Studies (SAIS-CARI) for the Chinese foreign capital data. The FDI data have been collected from the Statistical Bulletin of China's Outward Foreign Direct Investment, published by China's Ministry of Commerce (MOFCOM), which is usually updated in September or October of every year. The data on loans have been collected from various sources, including official government documents, interviews, fieldwork, contractor websites, and media sources. Since March 2021, the database has been managed by the Boston University Global Development Policy Center.

The data for aggregated net flows of foreign capital from the world have been gathered from the World Bank International Debt Statistics (IDS). The IDS is a report published annually by the World Bank on external debt stocks and flows for low- and middle-income countries, with the data on FDI being compiled by the International Monetary Fund. The information is provided for borrower and creditor on type of lending and external borrowing. The variables used are *Foreign direct investment, net inflows in reporting economy (DRS, current US$)* and *Net flows on external debt, total (NFL, current US$),* with deflated values to constant 2015 billion USD.

The values presented for the respective variable have been deflated with GDP Implicit Price Deflator in the United States, with 2015 as the baseline year provided by the Federal Reserve Bank of St. Louis, US. The purpose of deflation is to eliminate the impact of inflation on the capital flows, to get a more correct indication of trends and causality in the regression.

The total sums for Chinese FDI and loans to every African country can be observed in Graph A2 in Appendix A. The values are given in constant USD billion deflated to 2015. The largest recipients of loans are Angola and Ethiopia while Algeria received no loan from China

between 2003 and 2019. Flows of FDI have been the greatest for the Democratic Republic of Congo, South Africa, and Zambia, with the lowest aggregated flow of FDI to Burkina Faso and negative net flow for Malawi.

5.2.3 Control Variables

The purpose of the control variables is to consider the potential impacts that development in other factors than FDI and loans might have on institutional quality. The control variables used in the regression are *GDP per capita (constant 2015 US$)* to account for economic growth within the country, *Final consumption expenditure (annual % growth)* to assess the increase in government expenditures, *Fixed telephone subscriptions (per 100 people)* to account for improvements in infrastructure, and *Population growth (annual %)* for the impact of an increased population. The variables all further defined as described in Table A2 in Appendix A.

In general, an increase in GDP per capita, improvements in the country's infrastructure, and an increase in final consumption expenditure are known to enhance institutional quality. Previous research also indicates that population growth has a negative effect on institutional quality (Fon et al., 2021). While the others were included directly, to assess development in infrastructure the variable *Fixed telephone subscriptions (per 100 people)* was used as an indicator since it has large coverage over time for the respective countries. By including these control variables in the regression, the potential impact they have on the estimated corruption and governance in the country will be subtracted from the causality that loans and FDI would otherwise have indicated. With their inclusion, the impact of loans and FDI on institutional quality will be more in line with the actual impact and it will be possible to compare the extent of the influence relative to other variables. GDP per capita is taken in logarithmic form to curtail the effect of outliers in the data. In contrast, the independent variables have not been taken in logarithmic form since FDI net flows include negative values and taking only loans in logarithmic form would lead to difficulties when comparing results.

The average values of some of the control variables between 2003 and 2019 differ to a large extent between the respective countries, as illustrated in Table A4 in Appendix A. For example, fixed telephone subscriptions in Seychelles are on average 23,76% of the population, while only 0,01% in South Sudan.

5.2.3.1 Time-independent Variables

In addition to the previously mentioned control variables, the dummy variable *Landlocked* is used, where the country receives a score of 1 if it is geographically landlocked and 0 if the country has a coast. Moreover, a similar variable is *Country Area (squared kilometers)*, which also is independent of time and takes only one value for each country for all the observed years.

5.3 Econometric Models

It is worth noting that, as seen in Graph A1 in Appendix A, our average value of institutional quality takes on approximately a normal distribution with a mean of -0.68 and a variance of 0.62. After having performed a test for skewness and kurtosis for normal distribution (see Table A5 in Appendix A), we cannot reject the hypothesis that the variable institutional quality is normally distributed. This is a critical support for our study, as it means that Africa can be studied as a population when it comes to institutional quality and that even if there may be some differences between certain countries, they are part of the tails of the distribution, and not of different populations. This is a necessary criterion to analyze these countries together and draw collective results.

Initially, an OLS regression was performed including all control and independent variables, an alpha value, and an error metric which was run on the average score of institutional quality.[12] The *i* denotes the observed host country, and *t=2003, 2004,…, 2019* denotes the year.

Regression 1:

$$Inst_{qual} = \alpha_1 + \beta_1 FDI_{it} + \beta_2 LOANS_{it} + \beta_3 lnGDPPC_{it} + \beta_4 POPGR_{it} + \beta_5 FIX\_TELE_{it}$$
$$+ \beta_6 FIN\_CON_{it} + \beta_7 LANDLOCKED_i + \beta_8 AREA_i + \varepsilon_{it}$$

Through the performance of a Hausman test, it was determined that the model used in this regression should be a fixed-effects model and not a random-effects model, as described and illustrated in Table B1 in Appendix B. Changes in institutional quality happen within a country and by transforming the model into a fixed effect regression model, the time-invariant variables that do not affect the within changes will fall away due to perfect collinearity. For this purpose, the command reghdfe is used in STATA to include fixed effects on both country and year

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[12] Instqual = Institutional quality. FDI = FDI in billion USD. LOANS = Loans in bn USD. lnGDPPC = GDP per capita in US dollars, logarithmic. POPGR = Population growth (%). FIX_TELE = Fixed telephone subscriptions (per 100 people). FIN_CON = Final consumption expenditure (annual % growth). LANDLOCKED = takes value 1 if the country is landlocked, 0 otherwise. AREA = Country area (squared kilometers)

levels. Hence, dummy variables and constant country characteristics (i.e., the variables for landlocked and country areas) are eliminated as they do not vary over time. In this way, the potential bias in the estimator that may be due to characteristics that do not vary over time is removed (Fon et al., 2021). By adding fixed effects, the regression is also adjusted for potential trends over time that may already be present in the country, such as an overall increasing level of institutional quality.

Lagging the independent variables will allow us to observe whether there are any delayed effects on the observed institutional quality of the following years, as well as prevent reversed causality (Filippaios, 2022). To check for how many years the independent variables should be lagged, optimal lag selection tests were performed as illustrated in Tables B2-B4 in Appendix B. When including the whole model, the test chose three years as the optimal lag, while when taking FDI and loans separately, zero lags was chosen as optimal. Hence, regression 2 will have no lag, regression 3 will include capital lagged from 0 to 3 years, and lastly, regression 4 will only contain a three-year lag for loans and FDI. The regression models analyzing the relationship between institutional quality, the control variables, and the independent variables with their respective lags, will therefore be as follows:

Regression 2:

$$Inst_{qual} = \alpha_1 + \beta_1 FDI_{it} + \beta_2 LOANS_{it} + \beta_3 lnGDPPC_{it} + \beta_4 POPGR_{it} + \beta_5 FIX\_TELE_{it} + \beta_6 FIN\_CON_{it} + \varepsilon_{it}$$

Regression 3:

$$Inst_{qual} = \alpha_1 + \beta_1 FDI_{it} + \beta_2 FDI_{it-1} + \beta_3 FDI_{it-2} + \beta_4 FDI_{it-3} + \beta_5 LOANS_{it} + \beta_6 LOANS_{it-1} + \beta_7 LOANS_{it-2} + \beta_8 LOANS_{it-3} + \beta_9 lnGDPPC_{it} + \beta_{10} POPGR_{it} + \beta_{11} FIX\_TELE_{it} + \beta_{12} FIN\_CON_{it} + \varepsilon_{it}$$

Regression 4:

$$Inst_{qual} = \alpha_1 + \beta_1 FDI_{it-3} + \beta_2 LOANS_{it-3} + \beta_3 lnGDPPC_{it} + \beta_4 POPGR_t + \beta_5 FIX\_TELE_{it} + \beta_6 FIN\_CON_{it} + \varepsilon_{it}$$

This method has been developed to achieve what should be as close as possible to an unbiased and consistent estimator of the impact that FDI and loans from China have on institutional quality in African countries. The bias in the coefficients is reduced to its possible extent by adding the control variables that are deemed relevant according to previous literature (Fon et al., 2021), as well as by applying the fixed effects method. With 918 observations, this can be

defined as a big sample, implying that we can relax the assumptions of Homoskedasticity and Normally distributed errors, and say that under the conditions FE1-FE4 (i.e., linear in parameters, random sampling, no perfect collinearity, and strict exogeneity), our fixed effects estimators are consistent.[13]

5.3.1 Considerations when Working with Panel Data

When working with panel data, a potential issue is that of serial correlation among the errors, meaning that an error later in time can be correlated with an error earlier on. This can impact the precision of the results. Another related problem is that of Heteroskedasticity, meaning that the variance of the errors in the regression is correlated with the independent variables. To avoid serial correlation and Heteroskedasticity, cluster robust errors will be used in the regression. If not adjusted for, the risk would be that the standard errors may become too small, which would impact the coefficients and cause misleading inference. Cluster robust standard errors are usually deemed asymptotically efficient when the number of clusters is sufficiently large, and a rule of thumb for this is generally 50 (Wooldridge, 2020). We have in total 54 clusters, although due to missing observations in some of the regressions conducted in this study the number is 47, as the following countries fall out of the regressions: Liberia, Libya, Malawi, Somalia, Sao Tome, and Principe, Eswatini, and Zambia. However, we still assume this to be enough for the clustered robust errors to be asymptotically efficient.

Another potential model to use would have been first difference, however due to slow developing institutional quality (see section 5.3.3), fixed effects has been deemed to be a more efficient model, as first difference looks at changes over time and is thus less efficient if the change is not immediate.

5.3.2 Slow Developing Institutional Quality

As institutional quality can be seen as a rather slow-changing metric, one should be aware of the potential impacts that this could have on the regression. With sticky institutional quality, investors can easily predict the country's quality level in the nearby future, hence adapting their investments accordingly. With institutional quality being described as an aspect that impacts foreign financial investor decisions, as informed in section 3.1, this might lead to reversed

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[13] This means that, as the sample size grows to infinity, the coefficients get closer to the true population coefficient. The critical assumption for this to hold is strict exogeneity, meaning that the idiosyncratic errors need to be uncorrelated with the explanatory variables in the given time period, and with the explanatory variables in all other periods (Wooldridge, 2020). As testing for strict exogeneity goes beyond the scope of our study, we will assume that this hold. A case in which it would be broken would be if time-varying variable was missing, something that we have tried to avoid by adding control variables.

causality. Nevertheless, in this study we assume that institutional quality can face external shocks, hence potentially changing the institutional quality average score every year. Also, by lagging the foreign flows of capital, one could further prevent reversed causality as the current institutional quality cannot impact the flows of capital in the two previous years.

5.3.3 Limitations in the Method

One of the main limitations that this method presents is the missing observations, mostly for the variables FDI, Loans, and Final consumption expenditure. As these variables may miss observations for a whole country in some cases, this has led to seven countries dropping out of the regressions in STATA, contributing to the drop from 900 observations to circa 600 in our final regressions (see section 6). This can impact the consistency of the estimators as 600 observations could potentially no longer be considered a sample that is big enough to relax the assumptions for homoskedasticity and normally distributed errors. For the purpose of this study, the sample will still be considered big enough, however in the future, when more observations can be collected, more research will be needed to confirm our results.

The fixed effects method is useful for identifying a true causal effect, and it helps reduce potential biases and inconsistency by removing the time-independent factors. However, by taking out all the time-independent variance, there is a risk that the data loses too much variance, thus also reducing the study's efficiency. This reduction in variance can also lead to measurement errors in the independent variables and potentially cause attenuation bias, meaning that the coefficients' absolute values are underestimated (Wooldridge, 2020).

Another typical problem that may arise with fixed effects is a too high R-squared. This can happen especially when doing the fixed effect by adding dummy variables for each cluster, since when many dummy variables are added they increase the R-squared without explaining the dependent variable more. While this should not be a problem in our study as the model is based on demeaning and not on dummy variables, the R-squared will still not be commented extensively on in section 6, to avoid potentially giving a too optimistic idea of how much of the dependent variable is explained by the model (Wooldridge, 2020).

6. Results

This section will present our results firstly for regressions 1-4 mentioned in section 5.3 for Chinese foreign capital, and secondly for the same regressions but with foreign capital flows from the whole world. This section will also include results from robustness checks.

6.1 Impact of FDI and Loans

The results for the main regressions presented in section 5.3, are as follows.

Table 1: Regressions with Institutional Quality as Dependent Variable, Chinese data

VARIABLES	(1) OLS regression	(2) Fixed effects	(3) 0-3 years lag	(4) 3-years lag
FDI, bn USD	0.0588	-0.00127	-0.00549	
	(0.0732)	(0.0122)	(0.0140)	
FDI, 1-year lag			-0.0110	
			(0.0121)	
FDI, 2-years lag			-0.00871	
			(0.00913)	
FDI, 3-years lag			-0.00870	-0.00921
			(0.0148)	(0.0144)
Loans, bn USD	-0.0231	0.00671	0.00630	
	(0.0203)	(0.00440)	(0.00463)	
Loans, 1-year lag			0.00963**	
			(0.00397)	
Loans, 2-years lag			0.0176***	
			(0.00352)	
Loans, 3-years lag			0.0196***	0.0175***
			(0.00411)	(0.00406)
GDP per capita, logarithmic	0.102***	0.577***	0.509***	0.500***
	(0.0237)	(0.152)	(0.139)	(0.136)
Population growth (%)	-0.0524**	0.0422	0.0653	0.0615
	(0.0240)	(0.0412)	(0.0485)	(0.0484)
Fixed telephone subscriptions	0.0464***	0.00663	0.00351	0.00341
	(0.00447)	(0.0136)	(0.0138)	(0.0135)
Final consumption expenditure	-0.00106	3.36e-05	0.000120	9.97e-05
	(0.00105)	(0.000265)	(0.000224)	(0.000223)
Country area	-2.20e-07***			
	(2.65e-08)			
Landlocked	0.153***			
	(0.0414)			
Constant	-1.293***	-4.938***	-4.524***	-4.444***
	(0.180)	(1.115)	(1.037)	(1.015)
Clustered fixed effects	No	Yes	Yes	Yes
Observations	700	700	592	592
R-squared	0.448	0.955	0.966	0.965

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Source: Authors' rendering based on data from the World Bank and John Hopkins University's School of Advanced International Studies, (2003-2019)

In (1), the Standard OLS regression is run on institutional quality. The coefficient *FDI, bn USD* indicates a positive impact on institutional quality with 0.0588, while *Loans, bn USD* has a negative impact of -0.0231, nevertheless both coefficients are statistically nonsignificant. For

both, the p-value is higher than 0.05[14], and the coefficient interval covers the value 0[15], thus we cannot say that the coefficients are different from 0, or if they are positive or negative. Hence, the results in regression (1) do not support Hypothesis 1.

In (2), clustered fixed effects were added to the regression, with multiple levels of fixed effects, for 47 countries[16] and 17 years. The control variables that are fixed over time were hence removed, i.e., country area and the dummy variable for landlocked, as we want to study the changes that happen within the countries and not the level differences between the countries. Regression (2) observes the impact on institutional quality the same year as the flow of foreign capital took place, supporting the optimal lag selection test as illustrated in Tables B3-B4 in Appendix B. The variable *FDI, bn USD* indicates a negative relation on institutional quality of -0.00127 for each additional flow of one billion FDI, and *Loans, bn USD* has a positive coefficient of 0.00671. Hence, regression (2) generates results supporting Hypothesis 1. Both coefficients are however still statistically nonsignificant, with p-values above 0.05. Also, both 95% confidence intervals cover the value 0, thus we cannot say that the coefficients are statistically different from 0 with 95% probability.

In (3), the regression includes FDI and loans that are lagged for three time periods in the same regression as well as the variables at time t, to observe whether there are differences in the extent of the impact depending on the distance from the point of investment, as expressed in Hypothesis 2. Here, the country and year fixed effects are maintained, to adjust for reversed causality and potential time trends. The regression suggests that FDI has a negative impact on all observed time periods. The coefficients for FDI fluctuate from -0.00549 at the year of the investment, -0.0110 with a 1-year lag, -0.00871 for two years, and -0.00870 for three years, hence indicating that the impact of net FDI flows is the largest the year after the investment was made, not supporting Hypothesis 2. Also, although the impact after two years is bigger in absolute terms than at time t, it is relatively very similar to the impact after three years, not supporting Hypothesis 2. The coefficients for loans are all positive for the observed time periods, with 0.00630 at the time of the provided loan, 0.00963 for one-year lag, 0.0176 for two-year lag, and 0.0196 for three-year lag. The coefficients for loans are hence indicating an increasing trend over time, speaking of a delayed effect, and supporting Hypothesis 2. It is

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[14] A 5% level for significance has been chosen in this report in line with research standards.
[15] All p-values and confidence intervals are given in the program STATA.
[16] The regression is run on 47 countries instead of all 54 African countries since missing data points for some of the variables make 7 of the countries drop out of the regressions. For example, Eswatini does not have any reported information on FDI net flows, and Sao Tome and Principe has no reported data for loans. Libya and Liberia have no reported data on final consumption expenditure (annual % growth).

further noticeable that the absolute numbers of the coefficient for loans are overall larger than those for FDI, therefore recognizing that the impact that 1 billion USD of loans has on institutional quality is larger than 1 billion USD of net flow FDI.

However, it should be noted that all the coefficients for FDI have p-values above 0.05 and confidence intervals of 95% that cover the value 0. As an example, the p-values in (3) are 0.369, 0.346, and 0.559 for *FDI, 1-year lag*, *FDI, 2-years lag*, and *FDI, 3-years lag* respectively. This means that for FDI we cannot say that the impact is different from 0, resulting in difficulties in providing reliable conclusions on the impact on Institutional quality. Still, in (3), we see that the coefficient for *Loans, 2-years lag*, and *Loans, 3-years lag* are significant at a 1%-level and *Loans, 1-year lag* is significant at the decided 5%-level, although *Loans, bn USD* is nonsignificant with a p-value of 0.181. The results for loans are therefore more certain, especially for the 2- and 3-years lagged variables.

In (4), the 3-year lag is the only time period that is kept for FDI and loans, in line with the results from the optimal lag selection test observed in Table B2 in Appendix B. The results from this regression indicate a negative impact on institutional quality from net flows of FDI and a positive impact from loans, in line with Hypothesis 1. The coefficient for *FDI, 3-years lag* indicates a negative impact of -0.00921 for every net flow of 1 billion USD, nevertheless the coefficient is nonsignificant, making it hard to draw any certain conclusions about the variable's impact. Since the confidence interval for the coefficient covers the 0 value, we cannot differentiate this variable's impact from null impact. Just as for regression (3), also in this regression the results indicate that loans have a larger impact on institutional quality in absolute terms compared to FDI, with a positive value of 0.0175 and significance at 1% level.

As a final remark, it should be noted that the R-squared is very high in (2), (3), and (4), which would imply that the models explain the dependent variable almost perfectly. However, some caution should be applied when analyzing the R-squared in a fixed-effects model, as explained in section 5.3.3.

6.2 Impact of Control Variables

Looking at Table 1, regression (4), it should be noted that the biggest impact on Institutional quality in absolute terms is given by the variable *GDP per capita, logarithmic*, followed by *Population Growth*. As a point of reference, *GDP per capita, logarithmic* has a coefficient of 0.5 compared to 0.0615 for *Population growth*. The interpretation is that with every percentage increase in GDP per capita, institutional quality improves by 0.5 units, with the positive impact

being in line with previous research (Fon et al., 2021). Also, for every percentage increase in the population growth, the institutional quality increases by 0.0615 units. Looking at the other variables in (4), it is possible to see that they have relatively smaller coefficients in magnitude compared to the previously mentioned control variables. *Final consumption expenditure* has a coefficient of 9.97e-05 and *Fixed Telephone Subscriptions* of 0.00341. While a positive impact could be expected for the other three variables, the positive and relatively large coefficient for *Population, growth* was unexpected, as previous literature has found that more rapid growth in a country's population can lead to deteriorating institutional quality (Fon et al., 2021). Nevertheless, only the value for the coefficient on *GDP per capita* is significant at the 1% level, with the other control variables being nonsignificant. Therefore, it becomes difficult to draw conclusions on these variables' impact on institutional quality.

6.3 Results for World Data

To crosscheck our results with a benchmark, we have gathered data for aggregated FDI and loans that each country receives from the whole world, hence the total net flows of FDI and loans. The results for Chinese capital will therefore be compared to the results for world capital. This will provide a robustness check for our data, as it will give a benchmark for what the impact of foreign capital usually is on institutional quality and how Chinese capital potentially differs. In this way, we will be able to say whether Chinese capital influences host countries' institutional quality better or worse than capital from all the other countries aggregated, thus reducing the risk of overestimating the impact from China specifically and facilitating the separation of China's impact from that of the rest of the world.

In the regressions (1), (2), (3), and (4) below in Table 2, the same method as in Table 1 in section 6.1 has been applied, with the exception that FDI net flows and loans are aggregated for the world and not just for Chinese capital. The trends for the impact on institutional quality are fairly similar to those in Table 1, with a negative impact from FDI in all regressions, but in contrast to in Table 1, Loans indicate a negative general impact in all regressions except for in regression (1), which is also the only one that is statistically significant at a 1%-level.

Table 2: Regressions with Institutional Quality as Dependent Variable, using World Data

VARIABLES	(1) OLS regression	(2) Fixed effects	(3) 0-3 years lag	(4) 3-years lag
FDI world, bn USD	-0.0206** (0.00977)	-0.0111** (0.00518)	-0.00689 (0.00496)	
FDI world, 1-year lag			-0.00601* (0.00331)	
FDI world, 2-years lag			-0.00261 (0.00511)	
FDI world, 3-years lag			-0.00442 (0.00522)	-0.00458 (0.00618)
Loans world, bn USD	0.0248*** (0.00636)	-0.00351 (0.00258)	-0.00144 (0.00188)	
Loans world, 1-year lag			-0.00180 (0.00111)	
Loans world, 2-years lag			-0.000591 (0.00153)	
Loans world, 3-years lag			-0.000918 (0.00215)	-0.000744 (0.00212)
GDP per capita, logarithmic	0.0668*** (0.0258)	0.702*** (0.185)	0.641*** (0.177)	0.598*** (0.177)
Population growth (%)	0.0334 (0.0225)	0.0399 (0.0484)	0.0450 (0.0555)	0.0436 (0.0556)
Fixed telephone subscriptions	0.0510*** (0.00396)	0.00484 (0.0131)	0.00284 (0.0136)	0.00278 (0.0136)
Final consumption expenditure	-0.00106 (0.000929)	1.41e-05 (0.000288)	2.16e-05 (0.000206)	1.45e-05 (0.000209)
Country area	-2.59e-07*** (2.40e-08)			
Landlocked	0.0429 (0.0385)			
Constant	-1.239*** (0.202)	-5.786*** (1.365)	-5.364*** (1.324)	-5.066*** (1.330)
Clustered fixed effects	No	Yes	Yes	Yes
Observations	658	658	551	554
R-squared	0.472	0.945	0.957	0.956

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Source: Authors' rendering based on data from the World Bank and John Hopkins University's School of Advanced International Studies, (2003-2019)

Starting with the regression (1), the coefficient on *FDI world, bn USD* is negative at -0.0206, with significance at a 5% level. There is a positive impact of 0.0248 for *Loans world, bn USD,* which is significant at a 1% level, and with a confidence interval above the 0 value. Thus, we can say that with a probability above 99%, the coefficient is positive and different from 0. In (2), both coefficients for the *FDI world* and *Loans world* are negative, but only that

for the *FDI world* is significant at a 5% level, with loans having a larger p-value than 0.1. The results further indicate that the negative impact is larger for FDI than for loans.

Similar results can be seen in regression (3), where the coefficients for FDI indicate a negative impact that is decreasing with time over the first three years, with *FDI world, 3-years lag* increasing slightly in intensity. The values of the coefficients are similar to those for Chinese capital. However, in contrast to the Chinese loans' positive impact on institutional quality, the world coefficients indicate a negative impact with the increased flow of billion USD loans, with the impact being larger in absolute terms at the time of the provided loan and the year after but decreasing during the second and third year. No coefficients are significant at the 5%-level in regression (3) for capital from the world. Also, in regression (4) the impact on institutional quality of the three-year lag of FDI and loans is negative as in regression (3), nevertheless still nonsignificant. Hence, there is a difference in impact from loans from the world compared to China, as Chinese loans show positive impact.

It should be noted that the data for world FDI and loans lacked data points for six of our 54 countries (namely Botswana, Equatorial Guinea, Libya, Namibia, South Sudan, and Seychelles), which could partially explain the lower significance of these results.

When comparing the control variables to those in Table 1, the results are similar with most control variables having a positive impact, except for *Final consumption expenditure* in regression (1), and the coefficients being similar in size. This similarity could be expected since these values are not dependent on the provider of the foreign capital, but rather unchanged between the regressions done for Table 1 and Table 2.

6.4 Correlations and Robustness Check

To ensure that there is no multicollinearity and endogeneity problems amongst the variables used in the above regressions, a correlation matrix was created as observed in Table 3. For each variable pair, those observations that have valid values (i.e., not missing) have been chosen and a collinearity check has been performed. As we can see, the highest collinearity in absolute terms of 0.651 is found between *Fixed telephone subscriptions* and the control variable for *GDP per capita, logarithmic*, as well as between *Fixed telephone subscriptions* and *Population growth,* with a value of -0.613. However, these are still relatively small, hence indicating that multicollinearity problems are not a larger issue in this study.

Table 3: Correlation matrix for multicollinearity check:

Variables	(1) FDI, bn USD	(2) Loans, bn USD	(3) GDP per capita (ln)	(4)Population growth	(5) Fixed telephone sub.	(6)Final consumption
(1) FDI, bn USD	1.000					
(2) Loans, bn USD	0.089	1.000				
(3) GDP per capita (ln)	0.078	0.074	1.000			
(4) Population growth	-0.011	0.114	-0.380	1.000		
(5) Fixed telephone sub.	0.016	-0.076	0.651	-0.613	1.000	
(6) Final consumption	-0.005	0.011	-0.009	-0.004	-0.010	1.000

Source: Authors' rendering based on data from the World Bank and John Hopkins University's School of Advanced International Studies, (2003-2019)

As the value for institutional quality in the regression is generated by the average of six components, our last regression (4) in Table 1 was repeated in Table C1 in Appendix C for each of the six metrics. The purpose is to understand if the six indicators are impacted in similar ways and hence if an average of the six indicators can be used. As observed in Table C1, the variables that indicate significant results, i.e., *Loans, 3-year lag* and for *GDP per capita, logarithmic*, have similar values for all six indicators. These are the same variables that show significant results in Table 1 as well, hence proving robustness in the results of this study. The other variables show some shifts in values but since few of the values are significant this is not seen as problematic.

Lastly, to see if other indicators of institutional quality other than the WGI illustrate the same relation with net flows of foreign capital, our last regression (4) in Table 1 was run on the CPIA metric "CPIA transparency, accountability, and corruption in the public sector rating (1=low to 6=high)", which is one of the Country Policy and Institutional Assessment metrics created by the African Development Bank Group[17], as illustrated in Table C2 in Appendix C. With similar results as in Table 1, we can say that the results are consistent with those used in the regression of this study with the negative impact of FDI net flows and positive impact from loans on institutional quality financed by China. Nevertheless, with lower significance in the results where the variable for loans lost its significance and a reduction for GDP per capita from a 1%-level to a 5%-level.

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[17]Country Policy and Institutional Assessment metrics created by the African Development Bank Group. Assesses the quality of policies and performance of institutional frameworks. The estimation is based on a questionnaire that assesses 18 criteria. The group Governance, which assesses the quality of governance and public sector with criteria "transparency, accountability, and corruption in the public sector" was considered. Many missing datapoints indicated lower coverage than the WGI.

7. Discussion

This section will present a discussion on the results, limitations of the study, and suggestions for future research.

7.1 Discussion of Results and suggestions for future research

The results for negative coefficients on FDI contradict previous research by Fon et al. (2021), that generated a positive coefficient for FDI from China. Nevertheless, both studies have low significance, resulting in no clear overview of FDI impact on institutional quality. Also, Fon et al. (2021) used FDI inflows while we use FDI net flows, making the studies not entirely comparable.

Looking at our Hypothesis, both can only be confirmed for loans, due to the low significance in results for FDI. Comparing the regressions for Chinese capital in Table 1 and capital from the world in Table 2, it would seem that Chinese loans could be preferred by the African countries compared to other foreign lenders since their positive impact is larger. However, no certain conclusions can be drawn due to the low significance for the coefficients on loans from the world.

Looking at the size of the coefficients for FDI in the regressions (4) in Table 1 and Table 2, Chinese FDI and loans coefficients are bigger in absolute terms compared to those from the world, thus supporting the findings from the Afrobarometer on China's strong influence in Africa (Selormey, 2020). A potential explanation could be that Chinese loans do not set the same requirements for democratic developments in governance compared to traditional lenders, which according to Logan & Appiah-Nyamekye Sanny, (2021) is preferred by the African population. This could indicate that the requirements usually set by Western donors may have the opposite effect than intended, by creating negative reactions from the inhabitants in the host countries. However, once again, comparison cannot be entirely accurate due to the low significance of the results.

Our results seem to be in line with those brought forward by Isaksson & Kotsadam (2018), i.e., that FDI from China impact the host country's governance more negatively compared to other institutions or investors, although this cannot be confirmed due to low significance. However, we can also see that FDI tends to have a negative impact, although almost null due to low significance. For this, we could apply a similar explanation to that brought forward by Isaksson & Kotsadam (2018), i.e., that the negative impact of FDI can be explained by the transmission of norms between foreign investors and local workers. In contrast to the results

found on FDI impact, loans do not seem to have the same negative influence through norm transmission. This can be explained by the fact that loans, in the form of pure economic activity, do not imply interpersonal exchanges, thus not creating norm transmissions (Isaksson & Kotsadam, 2018; Donaubauer et al., 2022). While Isaksson & Kotsadam (2018) focused on the local level of bribery, our study could support their thesis also at a national level, although with uncertainties due to low statistical significance. However, while Isaksson & Kotsadam (2018) analyzed corruption through interviews, our study used a combined variable for institutional quality where "Control of Corruption" is only one of six indicators, complicating the comparison.

It is important to note that Chinese loans do not come entirely without requirements, as for example host countries often need natural resources as collateral (Kinyondo, 2019). For this, Chinese loans have been criticized for creating debt traps and putting the host countries in impossible situations of repayment (Kinyondo, 2019). Therefore, even if the loans have a positive impact on institutional quality, other aspects might be affected that are not included in the institutional quality score used in this study, which should be taken into consideration by policymakers. This could prove to be an area of future research.

Other future areas of analysis could be to see if the relationship changes depending on the sector on which the loan or investment is focused, especially in the sectors that China invests most heavily in, such as infrastructure, mining, and manufacturing (Zhang, 2021). Also, the institutional quality of the home country could be of interest when adding the focus on loans, similarly to the studies by Fon et al. (2021) that compared developed and developing countries to see if the coefficients for FDI changed with the degree of quality in the home country, and to Donaubauer et al. (2022) who found that corruption decreased if the country investing had low corruption. Lastly, as the institutional quality score differs between the countries in Africa, it could be interesting to see if the coefficients change depending on if the researched host country has a lower or higher score of institutional quality than China, in line with findings from Donaubauer et al. (2022) that indicate that the investor's corruption could result in positive or negative norm transmissions to the host country.

7.2 Discussion on Significance of Results

As was described in section 6 for results, looking at our final regression (4) in Table 1, the coefficient for *Loans, 3-years lag* was statistically significant at 99% probability with a p-value of 0.000. However, the one for *FDI, 3-years lag* was not significant even at 5% level, with p-

value of 0.527. Therefore, it is necessary to note that, although we see a steady trend of negative FDI and positive loans in regressions (2), (3) and (4), we cannot say this for sure or draw reliable conclusions on the overall impact due to the non-significance of the FDI variables.

One possible reason for the low significance in the results could be explained by the findings by Pinto & Zhu (2016), which state that the economic development of the host country impacts how the FDI affects institutional quality, with lower level of GDP resulting in a larger negative impact on corruption. With the African countries differing largely based on the level of GDP, as can be seen in Table A4 in Appendix A, this could be a possible explanation for the low significance. Another explanation could be the theories brought forward by Donaubauer et al. (2022) who found that the impact on corruption depends on the relationship between the corruption level in the home and the host country, as norm transmissions can work in both directions. This could result in low significance for the results in this study since some of the countries have a higher average score in institutional quality than China, while others have lower. This further supports the need for future research depending on the institutional quality relationship between the investor and recipient, as stated in section 7.2.

As noted by Isaksson & Kotsadam (2018) and Fon et al. (2021), low significance is a common trend among the research papers analyzing the impact of Chinese FDI in Africa, and especially the influence on institutional quality. This could be due to numerous studies focusing on a national level, and not on a local level, as on a national level there are other potential factors impacting institutional quality, as well as possibly several ongoing trends at the same time, thus making it harder to isolate the true impact coming from Chinese capital (Isaksson & Kotsadam, 2018). This could be another explanation for the low level of significance of this study as well, as it has been performed on a country level. It would therefore be interesting to perform a study like the one by Isaksson & Kotsadam (2018), which used georeferenced data for FDI, or to the one by Donaubauer et al. (2022) who analyzed corruption on a firm-level, adding loans to study the difference in impact between these forms of capital.

One way to increase the significance of the study would be to include more data points. However, this would have been possible only by increasing the number of countries analyzed or by increasing the number of years. Due to the focus on Africa, it would have been difficult to increase the number of countries, since all African countries are currently included. Otherwise, the number of years could have been extended to earlier years, nevertheless, since the database used in this study only offered FDI data from 2003 and onwards, we decided not to add data for earlier years although it was available for loans. Nevertheless, this could be a

potential future addition when data for years after 2019 are available, to increase the number of observations.

Another way to increase the significance would have been to reduce the number of missing observations by choosing data sets with greater data coverage. While most of the variables were chosen not only due to their relevance but also due to their coverage, some of them had gaps for numerous years in certain countries, thus impacting the significance of the results since countries were excluded from the regression. For example, the data on FDI and loans from the world miss data points for 6 out of 54 countries, thus possibly impacting the significance.

7.3 Discussion on Limitations in our Research

This paper has some limitations that might impact the reliability of the findings of the study. Firstly, there might be omitted-variable biases where non-included variables might impact the development of institutional quality in a country. Examples of such a variable could be education or business norms, as these could impact the population's level of awareness and acceptance toward poor institutional quality and corruption levels. Some of our variables might also be impacting other explanatory variables in the regressions. This potential bias would lead to the possibility for a variable to impact institutional quality in several ways, hence skewing the impact of other variables and resulting in a double effect of the variable. However, after having performed a multicollinearity test, as previously described in Table 3 in section 6.4, it could be observed that the currently included variables have low correlation with each other, thus reducing the risk for this bias.

Furthermore, there is a potential limitation in how the used data has been collected as the governance indicators are qualitative data received from interviews, where the societal norms could impact how an individual answers the questions and potential language barriers could impact the understanding of the questions. Hence, one country could wrongly gain a similar average score as another, as their perception of the situation could be the same even if reality differs. Moreover, since institutional quality and subjects such as corruption are relatively sensitive subjects, there is a risk for false perceptions in the responses for the data.

Missing variables is further a potential issue since the statistical program, STATA, excludes rows of data if an observation is missing. This could generate misleading results, or it could exclude valuable data. With some countries failing to report data, or not being included for a

period of time, such as South Sudan[18] which does not have available data for governance indicators between 2003-2009, some countries have impacted the results in a relatively low amount which might result in failure to give a clear picture of the situation and the relation between variables. A moving average was considered to be included in order to mimic trends in the development of values to minimize the impact of missing variables, however, since some data was missing for several years in a row, the uncertainty was deemed too large with the average potentially distorting the results more than it would contribute.

Moreover, a citation bias was considered when conducting this study since the area of research is relatively new, with most of the research being published after 2020. This means that there is a risk of research citing each other which could result in a reporting bias. Nevertheless, as this has been a concern since the beginning of the study, we have tried to understand the citation linkages between research papers used in this study to the extent possible.

Lastly, another limitation of the study has been the potential stickiness of institutional quality, which could have caused some reversed causality in the regressions. As previously mentioned in section 5.3.2, with slow development of institutional quality one could propose that flows of foreign capital are adapted depending on current level of institutional quality, since it has been shown to be a reason for investments. This risk of reversed causality has been mitigated to the possible extent using lagged variables of the independent variables.

8. Conclusion

With the increase in interest in Africa and in the size of foreign capital flowing into the continent, research analyzing the impact that the home country has on host country has strongly developed in the last few years, and especially with regards to China as a new investor. With no previous research studying the difference in impact on institutional quality between Chinese loans and FDI, this study contributes to further understanding this mentioned area of growing interest. The results indicate a negative but nonsignificant impact on institutional quality for flows of FDI and a significant positive impact from loans, hence partially answering the research question of this study regarding a potential difference on the impact depending on the type of the foreign capital. Moreover, the data shows a larger influence in the coefficients from China compared to the indicators given by world data, illustrating that the home country does

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[18] South Sudan has only been an independent country since 2011, thus explaining why some of the data are missing for earlier years. While this should not impact the regressions to a high extent as the missing observations are automatically dropped in the program STATA, it is still something that can be improved with future research when more data is available.

play an important role on how the capital influences the institutional quality of a country. It is further observable that at least loans have a larger impact further away from the point of capital transfer, hence indicating that the impact on institutional quality has delays. Potential explanations for the difference in signs, positive for loans and negatives for FDI, could be explained by loans only representing an economic activity, while FDI give the foreign investor a larger influence on how the capital is spent, therefore increasing the possibility of domestic norms being transmitted from the investor's home country to the host country. Nevertheless, with low significance for several variables in this study, further research is needed in the area to make reliable conclusions, with data collected for more years and a larger coverage amongst the analyzed countries to reduce the extent of missing variables. Extending research to analyze if the impact differs depending on the economic development of the host country, if there is an impact based on institutional quality in the home country, as well as analyzing institutional quality on a local level could further help increase the significance and give more nuanced results.

The purpose of this study has been to provide useful insights for policymakers on which kind of foreign capital to prioritize. With low significance in the results for FDI, further research is needed to deepen the understanding of the difference between the impact of loans and FDI. The findings generated in this report could still be used by policymakers in the host countries that wish to consider loans as potential foreign capital, as the results have shown positive impact on the country's governance and institutional quality. Nevertheless, it is important to regulate the demands that follow with the loans, to avoid too high levels of indebtment toward China that may lead to debt traps.

Our results could also be useful for foreign investors that wish to benefit Africa's development and reduce the infrastructure gap, by increasing their understanding of how the capital can impact institutional quality.

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All graphs, figures, and tables in the study are compiled through the authors' computation of the data provided by the source mentioned in the figure, table, or graph.

10. Appendices

Appendix A – Definition of Variables and Average Values per Country

Table A1

List of Dependent Variables

Variable	Explanation	Variable Code
Control of Corruption	Control of Corruption captures perceptions of 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.	Con_co
Government Effectiveness	Government Effectiveness captures perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies.	Gov_eff
Political Stability and Absence of Violence/Terrorism	Political Stability and Absence of Violence/Terrorism measures perceptions of the likelihood of political instability and/or politically-motivated violence, including terrorism.	Pol_stab
Regulatory Quality	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.	Reg_qual
Rule of Law	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.	Rule_law
Voice and Accountability	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.	Voice_acc

Source: World Bank, retrieval year 2022

Table A2

List of Control Variables

Variable	Explanation	Variable Code
Final consumption expenditure (annual % growth)	Average annual growth of final consumption expenditure based on constant local currency. Aggregates are based on constant 2015 prices, expressed in U.S. dollars. Final consumption expenditure is the sum of household final consumption expenditure and general government final consumption expenditure.	Fin_con
Fixed telephone subscriptions (per 100 people)	Fixed telephone subscriptions refers to the sum of active number of analogue fixed telephone lines, voice-over-IP (VoIP) subscriptions, fixed wireless local loop (WLL) subscriptions, ISDN voice-channel equivalents and fixed public payphones.	Fix_tele
GDP per capita (constant 2015 US$)	GDP per capita is gross domestic product divided by midyear population. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. In constant 2015 U.S. dollars.	Gdppc
Population growth (annual %)	Annual population growth rate for year t is the exponential rate of growth of midyear population from year t-1 to t, expressed as a percentage . Population is based on the de facto definition of population, which counts all residents regardless of legal status or citizenship.	Pop_gr

Source: World Bank, retrieval year 2022

Table A3

Average Score on Intitutional Quality per Indicator and Total Score

Institutional Quality	Total Average score	Political Stability and Absence of Violence/Terrorism	Control of Corruption	Government Effectiveness	Regulatory Quality	Rule of Law	Voice and Accountability
Algeria	-0,63	-1,17	-0,59	-0,54	-0,98	-0,76	-0,93
Angola	-0,98	-0,50	-1,31	-1,12	-1,05	-1,25	-1,13
Benin	-0,31	0,23	-0,58	-0,52	-0,45	-0,57	0,24
Botswana	0,52	1,03	0,94	0,50	0,53	0,62	0,50
Burkina Faso	-0,31	-0,41	-0,27	-0,61	-0,29	-0,43	-0,24
Burundi	-0,96	-1,67	-1,20	-1,23	-1,03	-1,22	-1,09
Cabo Verde	0,35	0,82	0,80	0,11	-0,15	0,50	0,86
Cameroon	-0,82	-0,72	-1,12	-0,83	-0,84	-1,08	-1,04
Central African Republic	-1,12	-1,91	-1,16	-1,57	-1,28	-1,56	-1,16
Chad	-1,12	-1,45	-1,40	-1,44	-1,10	-1,40	-1,36
Comoros	-0,85	-0,43	-0,78	-1,63	-1,30	-1,00	-0,42
Congo, Dem. Rep.	-1,25	-2,13	-1,39	-1,61	-1,44	-1,63	-1,42
Congo, Rep.	-0,98	-0,65	-1,17	-1,20	-1,24	-1,18	-1,11
Cote d'Ivoire	-0,74	-1,42	-0,86	-0,99	-0,70	-1,05	-0,83
Djibouti	-0,70	-0,25	-0,59	-0,88	-0,65	-0,84	-1,25
Egypt, Arab Rep.	-0,53	-1,08	-0,64	-0,53	-0,55	-0,33	-1,15
Equatorial Guinea	-1,30	0,02	-1,61	-1,52	-1,39	-1,39	-1,86
Eritrea	-1,28	-0,76	-0,74	-1,41	-2,09	-1,32	-2,14
Eswatini	-0,58	-0,26	-0,36	-0,69	-0,55	-0,54	-1,36
Ethiopia	-0,69	-1,54	-0,59	-0,60	-1,01	-0,66	-1,27
Gabon	-0,61	0,17	-0,83	-0,78	-0,60	-0,57	-0,89
Gambia	-0,52	0,02	-0,62	-0,66	-0,44	-0,47	-0,93
Ghana	0,03	0,03	-0,13	-0,10	-0,06	0,03	0,44
Guinea	-0,92	-1,25	-1,05	-1,07	-1,00	-1,34	-1,03
Guinea-Bissau	-0,99	-0,62	-1,31	-1,33	-1,14	-1,33	-0,81
Kenya	-0,44	-1,24	-0,95	-0,50	-0,24	-0,73	-0,23
Lesotho	-0,20	-0,01	0,04	-0,48	-0,53	-0,21	0,00
Libya	-1,20	-0,90	-1,30	-1,38	-1,69	-1,27	-1,58
Liberia	-0,77	-0,85	-0,79	-1,32	-1,17	-1,04	-0,33
Madagascar	-0,51	-0,32	-0,56	-0,89	-0,51	-0,67	-0,41
Malawi	-0,38	-0,04	-0,62	-0,63	-0,62	-0,22	-0,21
Mali	-0,42	-0,84	-0,64	-0,86	-0,50	-0,50	-0,03
Mauritania	-0,62	-0,59	-0,69	-0,76	-0,61	-0,79	-0,88
Mautitius	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Morocco	-0,24	-0,42	-0,29	-0,14	-0,19	-0,18	-0,68
Mozambique	-0,46	-0,08	-0,62	-0,65	-0,54	-0,74	-0,21
Namibia	0,18	0,78	0,31	0,13	0,03	0,20	0,43
Niger	-0,49	-0,90	-0,69	-0,70	-0,58	-0,59	-0,38
Nigeria	-0,79	-1,95	-1,13	-1,04	-0,86	-1,11	-0,63
Rwanda	-0,28	-0,36	0,24	-0,13	-0,24	-0,31	-1,23
Sao Tome & Principe	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Senegal	-0,15	-0,16	-0,22	-0,35	-0,21	-0,20	0,07
Seychelles	0,10	0,74	0,48	0,26	-0,37	0,10	0,11
Sierra Leone	-0,68	-0,26	-0,84	-1,19	-0,90	-0,92	-0,26
Somalia	-1,75	-2,75	-1,70	-2,20	-2,31	-2,35	-1,93
South Africa	0,29	-0,10	0,15	0,43	0,42	0,10	0,63
South Sudan	-1,46	-2,13	-1,51	-2,12	-1,77	-1,75	-1,63
Sudan	-1,20	-2,18	-1,36	-1,38	-1,42	-1,31	-1,74
Tanzania	-0,38	-0,36	-0,54	-0,58	-0,46	-0,43	-0,26
Togo	-0,80	-0,44	-0,90	-1,31	-0,82	-0,86	-0,93
Tunisia	-0,11	-0,40	-0,11	0,15	-0,19	-0,01	-0,52
Uganda	-0,44	-0,96	-0,95	-0,53	-0,21	-0,38	-0,58
Zambia	-0,39	0,29	-0,47	-0,69	-0,51	-0,40	-0,25
Zimbabwe	-1,25	-0,93	-1,33	-1,27	-1,89	-1,61	-1,40
China	-0,50	-0,48	-0,43	0,17	-0,23	-0,44	-1,61

Source: World Bank, Governance Indicators, (2003-2019)

Table A4

Average Value of Control Variables per Country

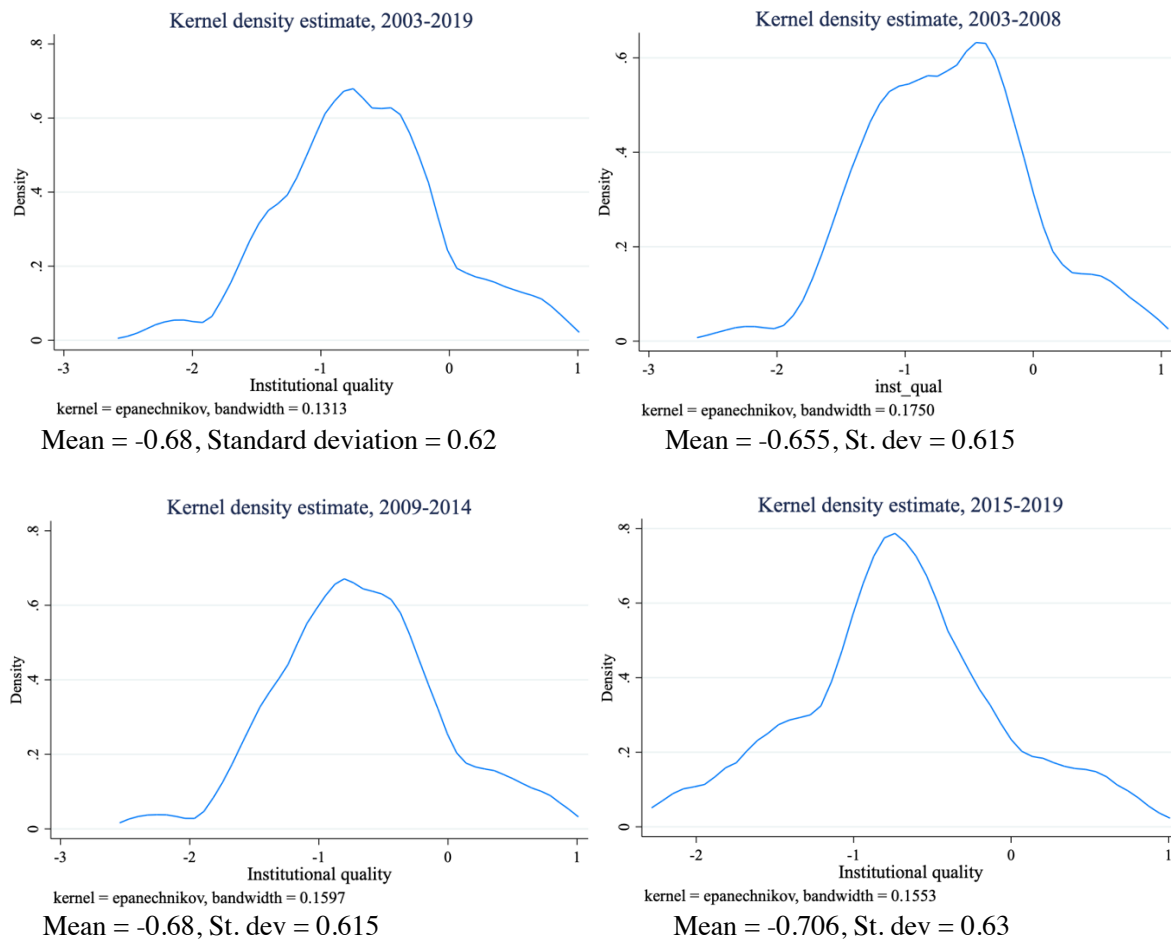| Control Variables	Final consumption expenditure (annual % growth)	Fixed telephone subscriptions (per 100 people)	GDP per capita (constant 2015 US$)	Population (in millions)	Population growth (annual %)
Algeria	4,19	8,47	3943,38	37,06	1,77
Angola	5,04	0,73	3747,25	24,49	3,51
Benin	3,65	1,19	1031,07	9,54	2,83
Botswana	5,54	7,26	5994,86	2,01	1,77
Burkina Faso	5,09	0,68	602,69	16,23	2,96
Burundi	4,57	0,29	--	0,00	3,19
Cabo Verde	2,88	13,73	2936,32	0,00	1,27
Cameroon	4,65	2,61	1301,09	21,07	2,70
Central African Republic	-0,84	0,08	452,19	4,35	1,30
Chad	0,59	0,20	677,85	12,49	3,35
Comoros	2,86	2,80	1224,00	0,00	2,36
Congo, Dem. Rep.	6,53	0,03	428,69	4,38	3,26
Congo, Rep.	3,38	0,33	2218,23	4,38	2,86
Cote d'Ivoire	4,23	1,32	1786,31	21,27	2,36
Djibouti	8,27	2,31	--	0,00	1,56
Egypt, Arab Rep.	4,13	10,46	3362,13	85,48	2,00
Equatorial Guinea	10,16	1,23	12236,72	1,00	4,25
Eritrea	42,43	1,65	714,16	2,96	2,88
Eswatini	3,07	4,41	3356,46	0,00	0,70
Ethiopia	10,24	0,92	504,65	90,95	2,76
Gabon	--	1,70	7193,92	1,71	3,07
Gambia	3,59	2,65	696,16	0,00	3,02
Ghana	6,58	1,14	1544,97	25,44	2,39
Guinea	5,18	0,14	745,98	10,53	2,34
Guinea-Bissau	3,31	0,23	592,24	0,00	2,51
Kenya	4,72	0,68	1355,92	10,53	2,61
Lesotho	3,89	1,88	1008,25	0,00	0,27
Libya	--	16,24	6603,57	0,00	1,20
Liberia	--	0,18	650,13	0,00	2,88
Madagascar	2,30	0,58	474,91	21,88	2,80
Malawi	--	0,62	347,80	15,09	2,73
Mali	5,38	0,79	728,19	15,60	3,09
Mauritania	3,75	1,53	1469,48	3,63	2,87
Mautitius	0,00	0,00	0,00	0,00	0,00
Morocco	4,14	7,25	2570,91	32,94	1,26
Mozambique	6,37	0,33	497,65	24,44	2,83
Namibia	--	7,26	4251,40	2,17	1,75
Niger	4,77	0,43	454,17	17,45	3,81
Nigeria	4,57	0,50	2330,12	164,18	2,63
Rwanda	6,57	0,26	631,00	10,38	2,38
Sao Tome & Principe	0,00	0,00	0,00	0,00	0,00
Senegal	3,74	2,20	1186,92	0,00	2,71
Seychelles	6,39	23,76	13080,75	0,00	0,90
Sierra Leone	6,35	0,32	--	0,00	2,67
Somalia	--	--	392,67	0,00	2,86
South Africa	3,03	8,57	6015,29	52,29	1,40
South Sudan	-0,27	0,01	1742,39	9,45	2,96
Sudan	2,84	1,10	1320,74	35,69	2,35
Tanzania	5,08	0,33	845,96	44,96	2,92
Togo	3,84	1,11	525,18	6,64	2,60
Tunisia	6,07	11,00	3839,54	10,76	1,00
Uganda	5,88	0,64	762,83	34,09	3,32
Zambia	--	0,70	1176,54	14,24	2,87
Zimbabwe	6,03	2,48	1266,78	13,07	1,19
Highest	42,43	23,76	13080,75	164,18	4,25
Lowest	-0,84	0,00	0,00	0,00	0,00
Average	5,19	2,98	2231,07	17,01	2,35
Median	4,40	1,01	1181,73	9,45	2,67

Source: World Bank, Development Inidcators, (2003-2019)

Table A5

Skewness and kurtosis tests for normality, Institutional quality

Variable	Obs	Pr(skewness)	Pr(kurtosis)	Joint test Adj chi2(2)	Prob>chi2
Institutional quality	911	0.1128	0.6556	2.71	0.2577

Source: World Bank, Governance Indicators, (2003-2019)

As the p-value for the test is above 0.05, we cannot reject the Hypothesis 0 of institutional quality being normally distributed. Even though this does not mean for certain that institutional quality is normally distributed, it strongly supports our thesis that it is.

Graph A1
Distribution of Institutional quality over all African countries, over time

Mean = -0.68, Standard deviation = 0.62   Mean = -0.655, St. dev = 0.615

Mean = -0.68, St. dev = 0.615   Mean = -0.706, St. dev = 0.63

Source: World Bank, Governance Indicators, (2003-2019)

The distribution for institutional quality is similar to a normal distribution. Between 2003 and 2019, however, this distribution has shifted, due to a decreasing trend in the variable. This has

implied a decrease in the mean, but also an increase in the standard deviation (from 0.615 to 0.63). However, for the purpose of our study, we can consider the distribution of institutional quality as approximately normal, which implies that we can look at the 54 countries in Africa as a population.

Graph A2

Capital Flows from China to African Countries (2003-2019)
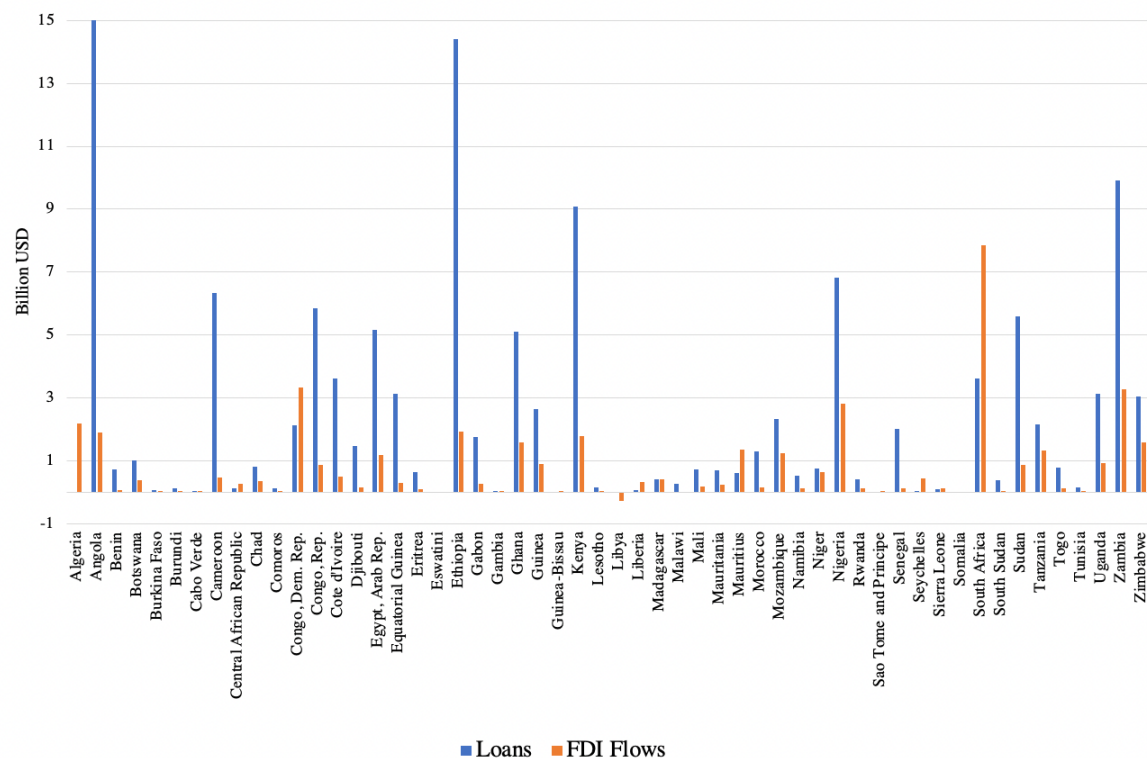
*Angola Loans: 43,63 bn USD

Source: John Hopkins University's School of Advanced International Studies, (2003-2019)

Appendix B – Supporting Tables for Method

Table B1: Hausman test for deciding whether to use fixed effects model or random effects model

Variables	Coefficients (b) Fixed	(B) Random	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
FDIs, bnUSD	-0.0021937	-0.0018584	-0.0003354	.
Loans, bnUSD	0.0057894	0.0053423	0.0004472	.
GDP per capita, logarithmic	0.334367	0.2977812	0.0365858	0.0291158
Population growth (%)	0.0601086	0.0560444	0.0040642	0.0040505
Population, total (mn)	-0.0052403	-0.0043092	-0.000931	0.0006642
Fixed telephone subscriptions	0.0091918	0.0143436	-0.0051518	0.0020808
Final consumption expenditure	-0.00000506	-0.0000218	0.0000167	.

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg
Test: Ho: difference in coefficients not systematic
$chi2(7) = (b-B)'[(V\_b-V\_B)^{\wedge}(-1)](b-B) = 16.88$
$Prob>chi2 = 0.0182$

Source: Authors' rendering based on data from the World Bank and John Hopkins University's School of Advanced International Studies, (2003-2019)

Since the p-value is below 0.05, we can reject the Hypothesis 0, i.e., that random effects should be used, and therefore we can say that fixed effect is the preferable method for our study.

Table B2: Optimal lag for regression including both FDI and loans

Model	N	ll(null)	ll(model)	df	AIC	BIC
0 lags	700	394.2763	459.4034	7	-904.8068	-872.9493
1 lag	663	395.094	455.5156	7	-897.0312	-865.5538
2 lags	628	395.7082	452.7004	7	-891.4007	-860.3029
3 lags	592	406.8459	459.972	7	-905.944*	-875.2595*
4 lags	554	397.7961	442.4729	7	-870.9459	-840.7257

AIC = Akaike information criterion;

BIC = Bayesian information criterion

Note: the symbol * is attributed to the lowest AIC and BIC, which indicate the most powerful model.

Source: Authors' rendering based on data from the World Bank and John Hopkins University's School of Advanced International Studies, (2003-2019)

The regressions with fixed effects were run separately with 0, 1, 2, 3 and 4 lags. For each regression, the AIC and BIC values were calculated. These information criteria are based on a loglikelihood, which implies that the lower they are, the bigger is the explanatory power of the model. As can be seen from the table, the regression with 3 lags is the most powerful one, which is indicated by the lowest AIC and BIC values. The regression with FDI and loans lagged

for three time periods has therefore been used as the final regression in Table 1 and Table 2, as this is the one deemed optimal by the selection above.

Table B3: Optimal lag for regression including FDI and control variables only

Model	N	ll(null)	ll(model)	df	AIC	BIC
0 lags	700	394.2763	458.8755	6	-905.751*	-878.4445*
1 lag	663	395.094	454.3617	6	-896.7234	-869.7428
2 lags	628	395.7082	449.5145	6	-887.029	-860.3737
3 lags	592	406.8459	455.8274	6	-899.6549	-873.3539
4 lags	554	397.7961	442.3077	6	-872.6154	-846.7124

AIC = Akaike information criterion;

BIC = Bayesian information criterion

Note: the symbol * is attributed to the lowest AIC and BIC, which indicate the most powerful model.

Source: Authors' rendering based on data from the World Bank and John Hopkins University's School of Advanced International Studies, (2003-2019)

When running the optimal lag test for the fixed effects regression, but excluding loans as an independent variable, the most powerful model is the one with no lags.

Table B4: Optimal lag for regression including loans and control variables only

Model	N	ll(null)	ll(model)	df	AIC	BIC
0 lags	718	410.8724	478.4304	6	-944.8607*	-917.4019*
1 lag	680	410.2792	472.8632	6	-933.7263	-906.5938
2 lags	644	410.1899	468.9312	6	-925.8624	-899.0562
3 lags	607	422.0058	476.3149	6	-940.6299	-914.1787
4 lags	568	412.6472	458.1771	6	-904.3542	-878.3015

AIC = Akaike information criterion;

BIC = Bayesian information criterion

Note: the symbol * is attributed to the lowest AIC and BIC, which indicate the most powerful model.

Source: Authors' rendering based on data from the World Bank and John Hopkins University's School of Advanced International Studies, (2003-2019)

Finally, when running the optimal lag test for the fixed effects regression, but excluding FDI as an independent variable, the most powerful model is again the one with no lags, as in Table B3. Based on Table B3 and B4, the results from the regression without lags for both FDI and loans are still interesting even though it was not deemed as the optimal model in Table B2, thus supporting their inclusion among the main regressions, more specifically in regression (2) in Table 1 and Table 2.

Appendix C – Robustness Check

Table C1: Regressions for each variable included in our Institutional Quality measure

VARIABLES	(1) Control of corruption	(2) Political stability	(3) Regulatory quality	(4) Governmenteffe ctiveness	(5) Voice accountability	(6) Rule of law
FDI (bn USD), 3-years lag	-0.0256	-0.00742	-0.00726	0.00497	-0.0186	0.00313
	(0.0171)	(0.0268)	(0.0127)	(0.00926)	(0.0219)	(0.0128)
Loans (bn USD), 3-years lag	0.0189***	0.0161	0.0138***	0.00865	0.0218***	0.0220***
	(0.00333)	(0.0102)	(0.00504)	(0.00590)	(0.00806)	(0.00569)
GDP per capita, logarithmic	0.489***	0.415	0.530***	0.405*	0.413**	0.528***
	(0.136)	(0.257)	(0.189)	(0.212)	(0.173)	(0.168)
Population growth (%)	0.0372	0.205	-0.0246	-0.0649	0.0809*	0.0392
	(0.0438)	(0.126)	(0.0546)	(0.0558)	(0.0460)	(0.0522)
Fixed telephone subscriptions	-0.0204***	0.0189	0.0312*	0.0137	-0.0328	0.0104
	(0.00629)	(0.0351)	(0.0158)	(0.0124)	(0.0257)	(0.0177)
Final consumption expenditure	-0.000175	0.000796*	-0.000208	-0.000376	0.000133	2.06e-05
	(0.000247)	0.000417)	(0.000182)	(0.000225)	(0.000312)	(0.000204)
Constant	-4.216***	-4.169**	-4.540***	-3.563**	-3.684***	-4.641***
	(0.970)	(1.860)	(1.371)	(1.546)	(1.268)	(1.220)
Clustered fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	592	591	591	591	591	591
R-squared	0.958	0.875	0.953	0.960	0.943	0.958

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Source: Authors' rendering based on data from the World Bank and John Hopkins University's School of Advanced International Studies, (2003-2019)

The coefficients for *FDI (bn USD), 3-years lag* and *Loans (bn USD), 3-years lag* show that the results for negative coefficients for FDI and positive for loans seem to be quite consistent for the variables included in our institutional quality measure, even when taken separately. Although two of the coefficients for FDI are positive, these are both highly nonsignificant with p-values at 0.5 and 0.8. For loans all the coefficients are positive and most of them significant at 1% level. Therefore, we can conclude that our results for the measure of Institutional quality, i.e., that FDI tend to have non-significant although seemingly negative impact and loans have positive impact, are robust.

Table C2: Regression with CPIA

VARIABLES	CPIA
FDI (bn USD), 3-years lag	-0.191
	(0.149)
Loans (bn USD), 3-years lag	0.00793
	(0.0123)
GDP per capita, logarithmic	0.714**
	(0.346)
Population growth (%)	0.107
	(0.161)
Fixed telephone subscriptions	-0.0570
	(0.0415)
Final consumption expenditure	0.000291
	(0.000448)
Constant	-2.369
	(2.404)
Clustered fixed effects	Yes
Observations	441
R-squared	0.873

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Source: Authors' rendering based on data from the World Bank and John Hopkins University's School of Advanced International Studies, (2003-2019)

The same regression is run but with "CPIA transparency, accountability, and corruption in the public sector rating" as the dependent variable. It is observable that the coefficient is negative for FDI and positive for loans here as well. However, neither *FDI (bn USD), 3-years lag* nor *Loans (bn USD), 3-years lag* are significant at de decide 5%-level. Also, the number of observations has dropped dramatically compared to the results in Table 1 regression (4), from 592 to 441. Therefore, the variable "CPIA transparency, accountability, and corruption in the public sector rating" has been excluded from the dependent variable for institutional quality in the main regressions, as it has not deemed to contribute to the estimation of the influence of FDI and loans on institutional quality in African host countries.