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Foreign Direct Investment & Petty Corruption in Sub-Saharan Africa: An Empirical Analysis at the Local Level

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ABSTRACT *Inspired by a recent and ongoing debate about whether foreign direct investment (FDI) represents a blessing for or an impediment to economic, social, and political development in FDI host countries this paper addresses two issues: Does the presence of foreign investors impact the occurrence of petty corruption? If so, what are the main underlying mechanisms? Geocoding an original firm-level dataset and combining it with georeferenced household survey data, this is a first attempt to analyse whether the presence of foreign investors is associated with changes in local corruption around foreign-owned production facilities in 19 Sub-Saharan African countries. Applying an estimation strategy that explores the spatial and temporal variation in the data, we find strong and consistent evidence that the presence of foreign firms increases bribery among people living nearby. When examining two potential channels, we find no clear support that FDI-induced economic activity leads to more corruption. In contrast, the results provide evidence that FDI affects corruption via norm transmission.*

KEYWORDS: FDI; corruption; georeferenced data; Sub-Saharan Africa

1. Introduction

The African Union declared 2018 as the African Anti-Corruption Year[1] because corruption continues to be a serious problem in many (Sub-Saharan) African countries with negative implications for democratic governance, the quality of public services, inequality, and social and economic development. Sub-Saharan African countries have been struggling for decades against high corruption levels and according to Transparency International's Corruption Perception Index (CPI), in 2018 most countries in this region are far behind at the bottom of the CPI ranking with an average score of 32 (out of 100).[2] At the same time, FDI to Sub-Saharan Africa has increased dramatically over the last decades (UNCTAD, 2018). Between 2000 and 2017 FDI stocks into Sub-Saharan African economies have more than quadrupled, reaching an all-time record of 618.25 billion US$ in 2017.[3] There is, however, a recent and ongoing debate about whether foreign investments represent a blessing for or an impediment to economic, social, and political development. On the one hand, FDI advocates often argue that FDI 'brings with it not only resources, but technology, access to

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markets, and (hopefully) valuable training, an improvement in human capital' (Stiglitz, 2000, p. 1076). On the other hand, many sceptics fear that strong reliance on foreign investments creates harmful dependencies, undermines political accountability, worsens institutions, and creates incentives for corrupt behaviour (OECD, 2008; Zhu, 2017).

Motivated by these recent developments and to shed light on the link between FDI and corruption, this paper addresses two issues: Does the presence of foreign investors impact the occurrence of corruption in the FDI host countries? If so, what are the main underlying mechanisms? To answer these questions, we geocode data on foreign firms and match them with already geocoded individual-level data on petty corruption over the 2002–2013 period from 19 Sub-Saharan African countries.

While existing studies have yielded valuable insights into the nature of the relationship between foreign firm presence in terms of FDI and the occurrence of corruption, they have also been limited in several dimensions. First, FDI inflows are very unevenly distributed within countries. This implies that the presence of foreign investors might have clear-cut effects on corruption in specific areas of a country and no effects in other areas. At the same time, positive and negative effects might cancel out or might not be large enough to be observable at the country level. Second, we argue that the relevance of the mechanisms generating this relationship is not clear because the previous literature has used highly aggregated country data, regressing national measures of corruption on aggregate FDI inflows. Third, all existing studies have limited their attention to the national level for a single country (e.g. Bojanic, 2014) or to the national level across several very heterogeneous countries (e.g. Pinto & Zhu, 2016). An exception is the study by Zhu (2017) who investigates the influence of multinational companies on corruption for a panel of Chinese provinces. Forth, most studies rely on a measure of corruption perceptions, which is often found to be biased due to potential measurement errors (Olken, 2009). What is more, the measures used do typically not distinguish between the two types of corruption, namely grand or petty corruption. Grand corruption refers to large scale corruption occurring at the highest government level and most often affects the country as a whole, whereas small scale petty corruption is the everyday type of corruption that usually involves smaller payments and bribes to people low in the hierarchy (UNDP, 2008). Despite its relatively small magnitude, petty corruption causes economic damage as the habit of petty corruption can have widespread impacts on countries' development. Jahnke and Weisser (2019), for instance, show that petty corruption undermines the tax morale in Sub-Saharan African countries.

In this study, we try to overcome the above-mentioned limitations of the existing literature by examining the local corruption effects of foreign firm presence in a multi-country sample using different measures for corrupt behaviour. The focus is on the individual experience with petty corruption rather than on corruption in government. Further, we examine people's direct experiences with petty corruption and not reported corruption perceptions. To this end, we employ georeferenced data. Compared to the predominant macro-level literature on the FDI-corruption nexus, this approach enables us to analyse more precisely the impact of foreign firm presence on corruption. Our results indicate a positive and robust effect of foreign firm presence on petty corruption, which is mediated by the transmission of norms.

2. FDI and (petty) corruption

Theoretically, two main channels of how the presence of foreign investors impacts corruption are discussed in the literature, namely 1) the transmission of norms and 2) an increase in economic activity (Sandholtz & Gray, 2003; Sanyal & Samanta, 2002).

2.1. Norm transmission

FDI may affect corruption by means of norm transmission (Kwok & Tadesse, 2006). Firms conduct business transactions given their cultural background. Hence, a foreign investment is always accompanied by cultural norms. For example, firms might transfer 'gender norms' from their country of

origin to their affiliates abroad (Hoxhaj & Miti, 2020). Whereas several ways of norm transmission are conceivable, most of them directly or indirectly impact the quality of institutions, which in turn is known to determine the probability of bribery (Mocan, 2008). Norms can be transmitted directly if multinational companies (MNCs) – which often have strong bargaining power – exert pressure on host countries' local/regional governments to enforce their interests (Desbordes & Vauday, 2007). This becomes more likely and effective if foreign investment has a high share in the local economy. An example are MNCs that commit to policies that strengthen institutions in the FDI host countries and raise awareness of problems with corruption (Kwok & Tadesse, 2006). Facing pressure from actors of the civil society or the government in their home country, MNCs may act as promoters of anti-corruption policies in the host country. If this kind of lobbying increases institutional quality via intensified sanctioning of corruption, it would in turn decrease the likelihood of government officials asking for bribes (Mocan, 2008). Based on the same reasoning, FDI might also fuel corruption via norm transmission if, for example, corrupt behaviour is widespread in the FDI source economy. There is evidence that foreign individuals and firms from countries with prevalent corruption export cultural norms and corrupt behaviour to the host country resulting in more corruption (e.g. DeBacker, Heim, & Tran, 2015). Thus, heterogeneity with respect to corruption levels in the FDI source countries is likely to play a role. Further, norm transmission might work indirectly with foreign firms facilitating norm spillovers to domestic firms, analogous to productivity or management spillovers often found in the literature (e.g. Fu, 2012; Javorcik, 2004). As foreign firms often create backward or forward linkages with local firms (e.g. through procurement or subcontracting), suppliers or customers may be forced to adopt management styles and practices in order to stay competitive. The handling of corrupt behaviour within a firm and the composition of the workforce (e.g. the share of foreign workers employed in a firm) might also drive norm transmission. Fisman and Miguel (2007) show that norms relating to corruption are deep-rooted and sticky: people abroad behave as corrupt as they would in their home countries. If foreign firms bring a large share of workforce from their home countries, these people settle nearby and potentially impact norms locally. Further, the interaction between foreign and domestic employees within a firm may influence employees' behaviour and enable transmission of norms (Gong, 2003). In sum, it is not clear from a theoretical perspective whether the transmission of norms has positive or negative effects on local corruption in the FDI host countries.

2.2. Economic activity

FDI may also impact corruption via increased economic activity (Ades & Di Tella, 1999). The presence of foreign investors in a region arguably raises local economic activity – e.g. through employment creation and wage premia (Coniglio, Prota, & Seric, 2015) – and thus rents that could be shared between investors and government officials, potentially creating economic incentives to engage in corrupt behaviour. Since local bureaucrats usually have a certain degree of influence over foreign firms they might demand bribe payments directly from these firms (Zhu, 2017). What is more, government officials might increase their demand for bribes in line with citizens' increased ability to pay – as a result of higher wages – and therefore, FDI-induced economic growth may negatively impact people's experiences with corruption.

Multinational companies contribute to rent creation mainly in two ways (Zhu, 2017). First, they are usually better able to enter markets that exhibit entry barriers because of their advantages concerning capital endowment, technology, and managerial capacities etc. Second, foreign firms can crowd out domestic firms, which leads to market concentration. This second channel via increased economic activity is usually believed to be more relevant in countries endowed with large reserves of mineral resources. Especially multinational investors in extractive industries are often accused of supporting corrupt elites and of complicity in host-country corruption (Moran, 2011). Furthermore, Djankov, La Porta, Lopez-de-Silanes, and Shleifer (2002) show that in countries with higher entry regulations to start a business, corruption is more widespread and argue that is because government officials and

politicians have more opportunities to demand bribes. Likewise, low salaries of government officials relative to the salaries of private-sector employees might drive corruption levels as well (Ades & Di Tella, 1999). Nevertheless, stronger competition resulting from intensified economic activity through FDI could also lead to a more efficient allocation of resources and thereby reduce economic rents and thus drive down bribe payments (Ades & Di Tella, 1999; Sandholtz & Gray, 2003). Pinto and Zhu (2016) argue that this corruption-reducing competition effect should be more relevant in developed countries, whereas in developing countries FDI-induced competition could, due to the relatively low productivity of domestic firms, crowd out domestic firms and thus result in restricted competition. This creates economic rents and can increase the incentives for government officials to demand bribes, resulting in more corruption.

However, the argument that FDI affects local corruption via increased economic activity does not necessarily imply that foreign firms pay bribes more often than domestic firms (Zhu, 2017). For the economic activity channel to hold, it does not matter if foreign firms are more inclined to pay bribes since the argument of rent creation is independent of corrupt behaviour of firms themselves.

Taken together, from a theoretical perspective the literature on the FDI-corruption nexus makes ambiguous predictions. This ambiguity is also reflected in the existing empirical literature that directly examines the effects of FDI on corruption. The few existing papers use mostly country-level data, which could be one reason for the mixed results in the literature. Robertson and Watson (2004) look at the impact of changes in FDI on national perceived levels of corruption in a cross-country setting. Their results indicate that the more rapid the change in FDI inflows, the higher the level of corruption. Although they are not able to directly test the underlying mechanisms, Robertson and Watson (2004) relate their findings to increased economic activity associated with an expansion of the opportunities for corrupt behaviour. Pinto and Zhu (2016) argue that the effect of FDI on corruption depends on whether the entry of foreign firms changes market dynamics in the host economy. They find a positive effect of FDI on corruption for developing countries but no effect for developed countries and explain this finding with higher rents that government officials can claim due to increased market concentration resulting from FDI in developing countries. Kwok and Tadesse (2006) use a sample of 140 countries for a time period of 30 years and show that corruption levels are significantly lower in countries with high FDI inflows in the past. They argue that this corruption-reducing effect of FDI is mainly due to norm transmission. Similarly, Larrain and Tavares (2007) find for a cross-country sample that FDI inflows significantly decrease corruption in the host country. Within their simple cross-country framework, they are, however, not able to analyse the different channels and mechanisms through which FDI decreases corruption. The same is true for the analysis in Bojanic (2014). In his country study for Bolivia he finds higher shares of FDI in GDP to decrease corruption levels. The only study at the subnational level is Zhu (2017). For a panel of Chinese provinces, he finds that the presence of multinational companies increases corruption (corruption cases as well as witnessed and perceived corruption at the province level) and argues that this is driven by rent creation through foreign firm activity.

3. Data and empirical approach

3.1. Data description: georeferenced household and firm data

3.1.1. Firm survey data.

For the purpose of this paper we draw on two main datasets, namely household and firm-level survey data, which we match based on geographical information. To gather information on foreign investor presence in Africa we use a very rich and original firm-level dataset collected through United Nations Industrial Development Organization's (UNIDO) Africa Investor Survey (AIS). The survey was conducted in 19 African countries in 2010 covering nearly 7,000 firms (UNIDO, 2011).[4] The data were collected through face-to-face interviews by highly-trained interviewers with top-level managers for firms with 10 or more employees. The dataset includes, among other things, detailed

information on firm characteristics, such as size, age, ownership structure, employment, sectors, country of origin/mode of entry (for foreign firms), and detailed information on the linkages between domestic and foreign buyers/suppliers. Table A1 in the Appendix provides an overview of the composition of domestic and foreign firms, respectively. Finally, the AIS captures location details of firms, which no other study has used so far. For each firm, the city of the firm's location is reported. In order to match this data to the household locations form the Afrobarometer survey, we manually geocoded 227 different firm locations.

In the AIS, the sample of the firms was chosen based on sector, firm size, and ownership structure and is supposed to represent the scope of firms in each country. Note that the AIS dataset does not necessarily reflect representative samples of firms in each of the surveyed firm locations. While being clearly representative in terms of the above mentioned criteria at the country level we cannot rule out that some types of firms might be under-represented in certain regions of a country. If this is the case, resulting measurement issues can affect cross-country and cross-regional comparisons. Below we provide details on how we handle potential measurement problems.

3.1.2. Household survey data.

The household survey data come from four Afrobarometer cross-sectional survey waves conducted between 2002 and 2013 across up to 35 Sub-Saharan African countries[5] and were geocoded by BenYishay et al. (2017). In our analysis below, we only include those individuals for which there is precise geographic information.[6] It is also worth noting that the Afrobarometer survey is usually carried out in different areas in different years, so we cannot follow specific individuals over time. To measure corruption, we employ questions on peoples' experience with corruption from the Afrobarometer. Based on these questions, our dependent variable is coded as a dummy variable equal to one if the respondent experienced corruption, or, more precisely, if the respondent had to pay a bribe to the police or to government officials in order to gain access to certain public services or documents during the year before the respective survey took place.[7,8] Figure 1 shows the shares of respondents who had to pay a bribe at least once over the Afrobarometer rounds 2 to 5. About 18 per cent of respondents in our sample declared to have paid bribes for getting a document or permit, which is also our preferred measure for petty corruption.[9] Irrespective of the type of bribe payments, about 29 per cent of respondents paid bribes at least once in the respective year prior to the survey.

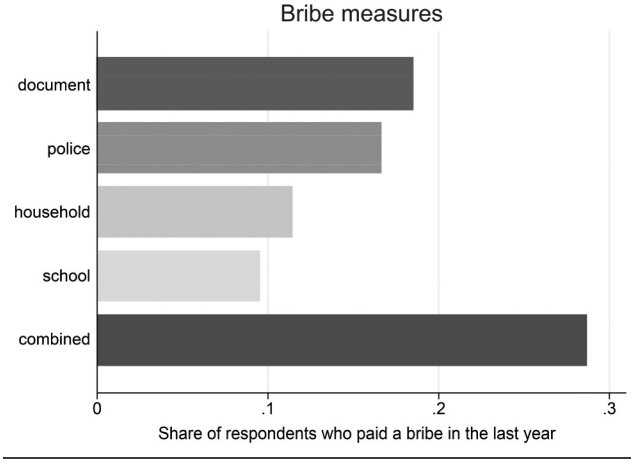

Figure 1. Share of respondents who paid bribes by type of bribe over Afrobarometer rounds 2 to 5.
Note: Combined is equal to 1 if the respondent paid a bribe at least once (document, police, household, or school) in the year before the respective survey.

3.1.3. Combining individual and firm-level data.

To analyse the effect of foreign firm presence on individuals' bribe experience we geographically match respondents from the household surveys to firms from the UNIDO dataset. First, we assume individuals to be affected by foreign firm presence only if firms are relatively close. Therefore, we define a 'range of influence' (which is 25 km for the baseline specification) and draw the respective zone around each individual. The underlying assumption is that individual corruption levels are only affected within this range of influence. In contrast, the corruption experience of individuals living sufficiently far away from an investment project is assumed to be unaffected. Second, we define whether the individual is exposed to foreign firm presence. This is done by taking the share of foreign firms over all firms within the 25 km zone and assigning the individual to be treated if this share is greater than a certain threshold (explained below in more detail). Certainly, the higher the ratio of foreign firms over the total number of firms the higher the probability that these foreign firms impact the behaviour of local individuals. The use of a relative measure of foreign firm presence (instead of simply using the absolute number of foreign and domestic firms in each firm location) also helps mitigating problems resulting from a potential sample selection bias in each of the surveyed firm locations. The rationale is that a sample selection bias should be present in both groups of firms (foreign and domestic) in a similar way, implying that changes in our relative measure of foreign firm presence over time should indeed reflect varying degrees of foreign firm presence and not be the outcome of sample selection. Nevertheless, we discuss other ways of handling possible sample selection in the robustness section below. Figure SM1 in the Supplementary Materials (SM) visualises the matching of firms and individuals.

As can be seen in Figure 2, bribe payments are indeed higher in areas with foreign firms. While about 14 per cent of the individuals with only domestic firms in their buffer zone pay bribes in order to get documents or permits, this share increases to over 18 per cent for individuals with up to 25 per cent of foreign firms in their buffer zone and to over 19 per cent for a foreign firm presence exceeding 25 per cent.

When matching firms and individuals, we end up with a sample consisting of 5,724 firms in 187 locations and 1,981 Afrobarometer survey clusters (consisting of geographically close villages or a neighbourhood in an urban area) with on average 8.56 surveyed individuals in 19 countries.[10] The distribution of firm locations and survey clusters is shown in Figure 3.

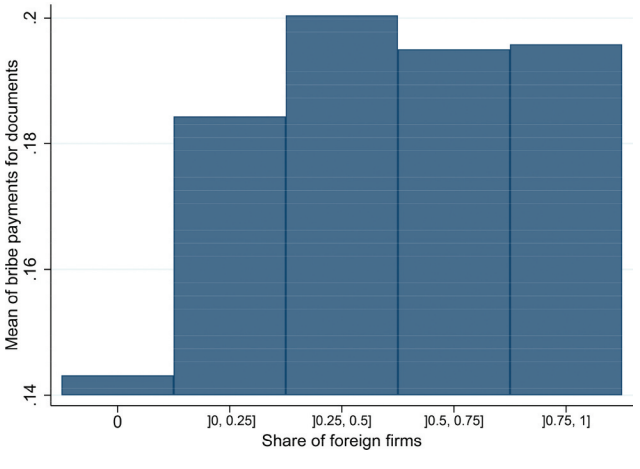

Figure 2. Share of foreign firms and mean of bribe payments.

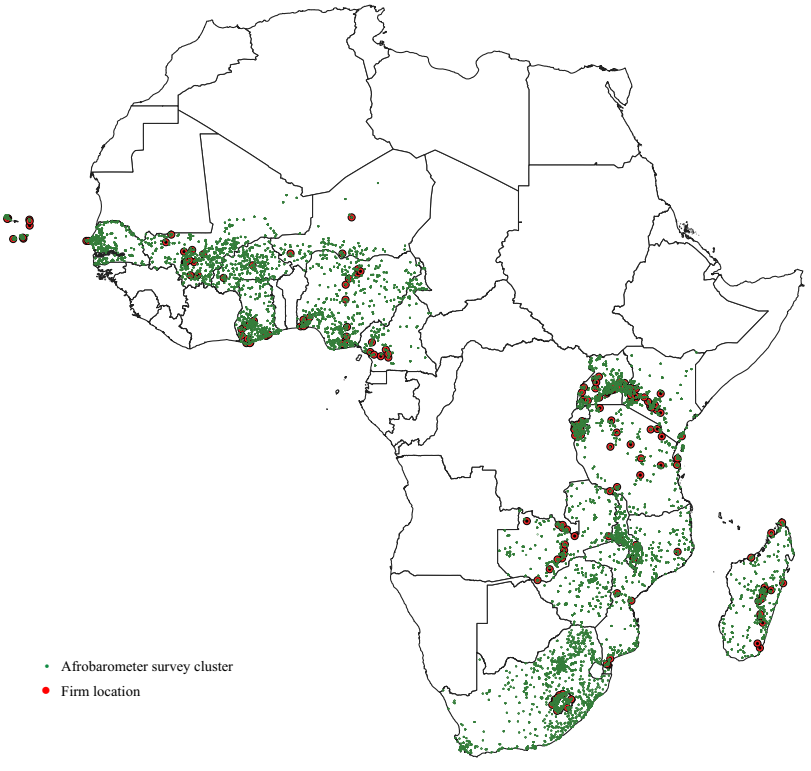

Figure 3. Location of firms and Afrobarometer survey clusters.

3.2. Empirical strategy

The identification of the effect of FDI on corruption poses an empirical challenge as it is well known that FDI decisions are not random, i.e. foreign investors prefer certain regions within a country over others. These investment decisions are also partly driven by pre-existing corruption levels (e.g. Javorcik & Wei, 2009) and are thus not exogenous to a region's level of corruption. For example, an investor that is not willing to pay bribes may not implement an investment project in a highly corrupt area. Against this backdrop we would ideally analyse the effects of FDI on corruption using panel data for individuals and firms and apply difference-in-differences regressions. Unfortunately, some limitations of both the household and the firm survey data prevent us from pursuing this approach. First, neither the Afrobarometer nor the UNIDO dataset do have a panel structure. To overcome this restriction, we rely on information on the year of first foreign investment from the UNIDO dataset to incorporate a time dimension in the firm dataset. Hence, for a specific area we can observe variation in the presence of (foreign) firms over time. This enables the analysis of differences in the extent of corruption before and after the establishment of foreign firms. Second, we are not able to observe corruption in a specific region before and after the establishment of foreign investment because Afrobarometer usually choses to survey different locations in different years. To tackle this limitation, we use individuals in regions where we do not observe foreign firms but where we have (domestic) firm-level information as our control group. Figure SM2 visualises the assignment of the individuals to the different groups and the constructed time variation. In order to deal with the above-mentioned identification problem and given the limitations of our data, we use a spatial-temporal estimation approach similar to the one employed in Isaksson and Kotsadam (2018): we compare the corruption experience of individuals

living in regions where foreign firms are present (*treatment*) with the corruption experience of individuals living in regions which will be selected as locations by foreign firms in the future but where investments were yet to begin at the survey date (*futuretreatment*). Thus, our identifying assumption is that individuals living in regions with planned foreign investment projects are valid counterfactuals for those living in regions with currently active foreign investment projects. This allows us to identify the effect of foreign firm presence although we cannot follow specific individuals or households over time. Thus, we estimate the following regression model:

$$Y_{it} = \beta_0 + \beta_1 \times treatment\_D_{it-1} + \alpha_s + \gamma \times X_{it-1} + \in_{it} \quad (1)$$

where Y_{it} denotes the corruption outcome for an individual i in year t. The lagged ordinal variable *treatment_D* is set to 0 for future-treated individuals (*futuretreatment*), 1 for treated individuals (*treatment*), and 2 for neither treated nor future-treated individuals (control group). Consequently, *treatment_D = 1* is the difference between *treatment* and *futuretreatment* and captures whether individual *i* is exposed to strong FDI presence around its place of residence. Thus *treatment_D* is coded as 1 if the share of foreign firms over all firms (foreign and domestic) within 25 km around an individual's place of residence is greater than a certain threshold.[11] The appropriate size of the threshold, above which a region around an individual will be considered a FDI region, is an empirical question, leading to a trade-off between the size of the treatment groups and noise. Unfortunately, there is no guidance in the literature in this regard. Arguably, a sufficiently large number of foreign firms is necessary to have any impact on the local economy or rather the local individuals. However, choosing a considerably large threshold seems unrealistic as few places exist with a vast majority of foreign firms. Additionally, the sizes of the three groups obviously depend on the threshold. If we take e.g. a threshold of 1/10 we have many individuals treated but only few individuals in the control and *futuretreatment* group. With a threshold of e.g. 1/2, we have only few individuals future-treated but a very large control group. We therefore experiment with different thresholds. Considering economic reasoning and the data distribution among our treatment groups, we choose one third in our baseline estimations, although our core findings are robust to thresholds smaller and larger than in the baseline model (see Table SM1). A similar reasoning applies with regard to the appropriate cut-off distance from an investment project. When choosing a very small distance, the sample of treated/future-treated individuals gets very small. With a too large distance, we fail to capture the foreign investment footprint (see, e.g. Isaksson & Kotsadam, 2018). Thus, a distance of 25 km is chosen considering practical commuting distances (see e.g. Kung, Greco, Sobolevsky, Ratti, & Ramasco, 2014). In a robustness test below, we use an alternative distance of 50 km. Analogously, *treatment_D = 0* captures whether individual *i*'s region of residence will have strong foreign firm presence in the future and thus *i* will be treated in the future (*futuretreatment*). Finally, *treatment_D = 2* gives the difference between future-treated individuals and domestic individuals and controls for pre-treatment location characteristics.

We further include country α and year dummies δ. To account for individual determinants of corrupt behaviour, we include a vector of respondent control variables (*X*): the individual's present living conditions (self-assessment on a 1–5 scale), its education (on a 0–9 scale, ranging from 'no formal education' to 'post-graduate'), gender, age, and a dummy for urban/rural residence (Mocan, 2008).[12] Standard errors are clustered at the geographical clusters of individuals (i.e. village, town, or neighbourhood).

As mentioned above, we compare the corruption experience of individuals living in regions where foreign firms are present with the corruption experience of individuals living in regions which will be selected as locations by foreign firms in the future but where investments were yet to begin at the survey date. That is why our focus is on the difference between *treatment* and *futuretreatment*, (*treatment_D = 1*) which is the effect of FDI on corruption. Thus, similar to difference-in-differences regressions, this estimation strategy controls for unobservable time-invariant characteristics that may influence investment decisions of foreign firms.[13] In other words, with this approach we are able to

difference away potential selection effects such as pre-existing local corruption that may influence the investment decision of foreign firms.

As a pre-analysis we conduct a simple *t*-test for differences in means of bribe payments in the treatment and the control group. The mean corruption experience of individuals within the control group is 16.3 per cent and 22.7 per cent in the *treatment* group (based on the sample from column (2) of Table 1). The difference between these two means is statistically significant with a *p*-value of 0.00 hinting already towards heterogeneity due to foreign firm presence. To confirm this descriptive finding, we conduct the empirical strategy outlined above.

4. Results

4.1. Main results

Table 1 presents easy-to-interpret OLS regression results for different corruption measures with our baseline estimates in column (2).[14] The coefficient on *treatment_D = 1* is positive, indicating that bribe payments are more frequent in regions where foreign firms are present compared to regions where foreign firms will be present in the future. *Treatment_D* = 2 is also found to be positively correlated with corruption experience, indicating a lower probability of paying bribes before strong foreign firm presence (or a higher probability of paying bribes for individuals that will never be treated, i.e. the control group). Our baseline estimates imply that individuals living near FDI locations are 7.9 percentage points more likely to have paid a bribe when requesting for documents or permits compared to individuals living close to a location where foreign firm presence will be strong (i.e. above the chosen threshold) in the future but where major investments were yet to begin at the survey date. Given that 18.5 per cent of the people in our sample have paid bribes at least once in order to get a document or permit this estimate implies a sizeable increase in corruption by more than 42 per cent. Regarding individual characteristics, women are less likely to pay bribes. This is in line with the existing literature (see, e.g. Gatti, Paternostro, & Rigolini, 2003; Sanyal, 2005) and appears plausible since it is usually men that are heads of households and more likely to engage with government officials. With this argument one could also explain why older people seem to be less prone to paying bribes. Also, higher education is associated with a higher likelihood of bribe experience. Better education enables people to obtain better jobs including management positions, which in turn might increase the chance of engaging with government officials. With respect to the individuals' residence, it appears that bribe payments are higher in urban areas. Further, the better individual living conditions are rated the lower are peoples' bribe experiences.

These findings are robust across alternative corruption measures, namely bribe payments to avoid problems with the police, to get household services or a place in a school for a child (columns 3–5). The last column reports the results for a specification with a combined corruption measure as dependent variable. The latter is equal to one if at least one of the single corruption measures is one. The combined corruption measure thus captures general experience with corruption independent of the occasion. People living in regions with strong foreign firm presence are 10.4 percentage points more likely to have paid a bribe compared to those living in regions where foreign firm presence is low.

4.2. Robustness tests

In order to check the robustness of our results, we return to our preferred corruption measure (bribe payments when requesting official documents or permits) and explore different model specifications. The results for these robustness tests are presented in Table 2. First, we carry out two falsification tests to minimise the probability that our results are driven by hidden omitted features (Rosenbaum, 2002). In column (1) we use a measure of perception of corruption at the country rather than the local level as dependent variable, i.e. an outcome supposed to be unaffected by the treatment.[15] Given that

Table 1. Baseline results

	(1) Bribe document	(2) Bribe document	(3) Bribe police	(4) Bribe school	(5) Bribe household	(6) Bribe combined
Treatment_D = 1	0.091***	0.079***	0.057***	0.075***	0.060***	0.104***
	(0.016)	(0.015)	(0.019)	(0.018)	(0.020)	(0.024)
Treatment_D = 2	0.056***	0.056***	0.047**	0.069***	0.023	0.080***
	(0.016)	(0.015)	(0.020)	(0.017)	(0.020)	(0.025)
ln(age)		−0.014*	−0.011	0.004	0.007	−0.015*
		(0.008)	(0.008)	(0.006)	(0.006)	(0.009)
Female		−0.055***	−0.087***	−0.012***	−0.023***	−0.076***
		(0.006)	(0.006)	(0.005)	(0.004)	(0.006)
Urban		0.033***	0.047***	0.022***	0.027***	0.047***
		(0.008)	(0.008)	(0.006)	(0.007)	(0.009)
Education		0.017***	0.013***	0.002	0.006***	0.016***
		(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Living conditions		−0.015***	−0.013***	−0.011***	−0.008***	−0.018***
		(0.003)	(0.003)	(0.002)	(0.002)	(0.003)
Constant	0.109***	0.138***	0.142***	0.073**	0.078**	0.330***
	(0.025)	(0.040)	(0.042)	(0.034)	(0.038)	(0.048)
Observations	14,534	14,363	12,994	13,218	16,789	16,931
R-squared	0.072	0.089	0.133	0.061	0.111	0.140

Notes: Time and country dummies included in all estimations. The dependent variable is coded as 0 if the respondent did not pay a bribe or 1 if the respondent paid a bribe at least once. *Bribe combined* is coded as 1 if *bribe document, bribe police, bribe school*, or *bribe household* is 1 and 0 otherwise. Robust standard errors (in parentheses) are clustered by the survey clusters: *p < 0.1, **p < 0.05, ***p < 0.01.

Table 2. Robustness

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Corruption perception	Corruption perception	Random assignment	Employment weighted	50 km	Region FE	City FE	Large firm locations
	Corruption national government	Corruption local councillors	Bribe document	Bribe document	Bribe document	Bribe document	Bribe document	Bribe document
Treatment_D = 1	0.003	0.008	0.008		0.050***	0.043**	0.052**	0.098***
	(0.021)	(0.025)	(0.016)		(0.013)	(0.020)	(0.021)	(0.024)
Treatment_D = 2	−0.001	−0.012	0.002		0.040***	0.039*	0.056**	0.061**
	(0.022)	(0.026)	(0.016)		(0.014)	(0.022)	(0.026)	(0.029)
Treatment_D = 1 (emp.)				0.042***				
				(0.013)				
Treatment_D = 2 (emp.)				0.018*				
				(0.010)				
ln(age)	−0.018**	−0.025**	−0.013*	−0.014*	−0.010	−0.012	−0.011	−0.017
	(0.008)	(0.010)	(0.008)	(0.008)	(0.007)	(0.008)	(0.008)	(0.011)
Female	−0.007	0.007	−0.055***	−0.055***	−0.052***	−0.055***	−0.056***	−0.063***
	(0.005)	(0.006)	(0.006)	(0.006)	(0.005)	(0.006)	(0.006)	(0.008)
Urban	0.029***	0.032***	0.037***	0.033***	0.041***	0.029***	0.021**	0.028**
	(0.009)	(0.010)	(0.008)	(0.008)	(0.007)	(0.010)	(0.009)	(0.012)
Education	0.017***	0.018***	0.017***	0.017***	0.017***	0.016***	0.016***	0.016***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Living conditions	−0.012***	−0.007**	−0.015***	−0.015***	−0.015***	−0.015***	−0.015***	−0.020***
	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.004)
Constant	0.910***	0.918***	0.187***	0.165***	0.111***	0.118	0.085*	0.173***
	(0.043)	(0.049)	(0.042)	(0.039)	(0.035)	(0.102)	(0.051)	(0.054)
Observations	13,211	10,780	14,363	14,363	19,927	14,363	14,363	8,849
R-squared	0.097	0.109	0.088	0.088	0.081	0.105	0.107	0.094

Notes: Time and country dummies included in columns (1)-(5) and (8). Columns (6) and (7) include time dummies and region or city dummies, respectively. In column (1) the dependent variable is a measure for country-level corruption perception (measured by perceived corruption concerning national government officials' involvement in corruption). In column (2) the dependent variable is a measure for local-level corruption perception (measured by perceived corruption concerning local government councillors' involvement in corruption). In all other cases, the dependent variable is the bribe document dummy and coded as 0 if the respondent did not pay a bribe or 1 if the respondent paid a bribe at least once. Column (3): Individuals were randomly assigned to either the control, treatment, or future-treatment group. Column (4): *Treatment* and *futuretreatment* are defined based on employment and not on the number of firms. Column (5): A 50 km instead of 25 km zone around individuals is used. Column (8): Only individuals with at least 20 firms within the firms' range of influence are considered in this regression. Robust standard errors (in parentheses) are clustered by the survey clusters: *p < 0.1, **p < 0.05, ***p < 0.01.

national corruption is the same for all citizens in a country, individuals in all three groups (control, treated, and future-treated) should not differ regarding perceived national corruption, which is clearly confirmed here. The coefficients on *treatment_D = 1* and *treatment_D = 2* turn insignificant when a country-level measure of corruption is used as dependent variable. Analogously, perception of local corruption is not affected by foreign firm presence (column (2)).[16] This demonstrates the important differentiation between actual and perceived corruption (cf. Olken, 2009) and it further shows that the effect of FDI on corruption is via civil servants and not local elected government officials. Column (3) shows the results of a 'placebo' type regression. Here we randomly assign individuals to either the control, the treatment, or the future-treatment group. As before, the coefficients on *treatment_D = 1* and *treatment_D = 2* become insignificant. As expected, we find no effect of FDI on individuals' corruption experience when randomly assigning them to be treated, future-treated, or not treated.

Second, our results are robust towards using an employment-weighted (future-) treatment measure (column (4)). To do so, we calculate the share of foreign firms' employees over total employees within the 'buffer zone' around each individual and again define whether an individual is treated, future-treated, or not treated given our threshold. The estimated coefficients on *treatment_D = 1* remains positive and significant in this setting although the effect decreases to 4.2 percentage points. As mentioned before, firm-specific employment data are only available for one year in our sample. Using this information requires the rather unrealistic assumption that the number of employees within a firm was more or less stable over our sample period, which clearly is a too strong assumption. Therefore, we do not employ these weights throughout our analysis although an employment-weighted measure might better reflect the strength of foreign presence in a specific region.[17] Third, we use an alternative cut-off distance of 50 km (column (5)). In favour of our argument on the local perspective, the coefficient on *treatment_D = 1* is smaller (though still highly significant) when considering a larger radius. Fourth, to alleviate remaining concerns about sample selection we now control for more disaggregated differences in locations and include either region or city fixed effects (columns (6)-(7)). In both alternative specifications, *treatment_D = 1* remains positive and statistically significant at the 5 per cent level, again corroborating our core findings. As a final check concerning sample selection, we restrict the analysis to individuals which have at least 20 (foreign and domestic) firms within their commuting distance of 25 km (column (8)). Naturally, the underlying assumption is that any bias resulting from a potential non-randomness of our firm data should be less pronounced the more firms we observe in an individual's neighbourhood. Importantly, our main findings carry over as *treatment_D = 1* remains statistically significant at the 1 per cent level.[18]

Overall, our results pass our falsification tests and are robust with respect to the definition of *treatment* and *futuretreatment*, the chosen cut-off distance, different levels of fixed effects for locations, and when restricting the sample to individuals with at least 20 firms nearby.

4.3. Exploring potential channels

We now turn to the exploration of potential channels that might explain why foreign firm presence leads to higher corruption in its surroundings. In Table 3 we present suggestive evidence for the two previously discussed channels through which FDI potentially affects corruption. Although data limitations prevent us from clearly identifying these channels, we try to approximate the extent to which they play a role.

4.3.1. Norm transmission channel.

To analyse the norm transmission channel, we attempt to capture different drivers of norm transmission. In this context, we explore the role of both workers and suppliers and the prevailing corruption levels in the source countries as proxy variables for norm transmission. As mentioned above, there is evidence that foreign employees enable the transfer of technological and managerial practices to domestic workers (Gong, 2003). We therefore argue that foreign workers may promote the transmission of norms to local workers. Further, foreign employees are expected to stick to the corruption norms present in their home countries and thus directly affect local corruption (Fisman & Miguel,

2007). In order to approach this potential channel, we control for the share of foreign employees in a region. Analogously, we take a look at the role of supplier linkages since the importance of linkages with local suppliers is usually emphasised when the benefits of FDI for domestic firms are analysed (i.a. Javorcik, 2004). Strong ties between foreign firms and their local suppliers could also lead to spillovers in terms of norms. Hence, we include the share of foreign suppliers over all suppliers in a region to explore linkages with suppliers as a potential norm transmission channel. However, it might not be the mere number of local suppliers that matters but rather the quality of the relationship between the foreign investor and its local suppliers. Therefore, we draw on a question on supplier interactions from the UNIDO investor survey. We define foreign investors to have active interactions with their local suppliers if they indicate that they actively assist their local suppliers in, among other things, upgrading production processes, products, or workforce training. We then use the share of foreign firms with active linkages to local suppliers over all foreign investors in a region to explore linkages with local suppliers as a potential norm transmission channel. As a final test of norm transmission, we take the degree of corruption in the investors' country of origin into account.[19] This is driven by the observation that not all investors are alike. The literature on FDI spillovers and growth effects of FDI, for instance, finds clear differences depending on the investors' home countries (Javorcik & Spatareanu, 2011).

4.3.2. Economic activity channel. To explore whether increased corruption around foreign firms is driven by a rise in economic activity, we use several proxy variables, which we think are linked to economic activity. Following Isaksson and Kotsadam (2018), we control for economic activity using satellite nightlight intensity data (*nightlight*).[20,21] Thus, we account for the economic impact of all foreign investments on bribe payments via potential rent creation. Usually it is argued that the effects of FDI on host economies depend on the characteristics and sector of the investment. From a theoretical point of view, foreign firms contribute to rent creation, among others, by crowding out domestic firms, which leads to market concentration (Zhu, 2017). There is a large literature exploring the different impacts of greenfield investment compared to mergers and acquisitions (M&As) on host countries (e.g. Harms and Méon, 2018). In line with the existing evidence we consider differences in foreign investors' entry modes to test whether it is not FDI per se that influences local corruption but rather a specific type of FDI. Specifically, we expect newly established production units (greenfield investment) to have stronger effects at the local level compared to a change in ownership resulting from foreign investors' acquisition of existing capital (M&As). As greenfield investment is more likely associated with pronounced economic and social changes, we include the share of greenfield investment over all foreign investment per region (around an individual's place of residence) as explanatory variable. Other specifics of foreign investors could originate from the sector in which the investor is active. Theoretically, foreign firms might contribute to rent creation by their ability to enter markets that exhibit high entry barriers (Zhu, 2017). Especially extractive industries are characterised by high market entry barriers. In the African context, FDI in extractive industries plays a major role and is therefore worth a closer look. Especially foreign investors in extractive industries in resource rich countries are often blamed for environmental damage, engagement in corruption, and repression of domestic businesses (Moran, 2011). The positive impact of FDI on corruption that we have found could thus be explained by sector-specific characteristics. To test that, we include the share of foreign investment in the primary sector over total foreign investment per region.

4.3.3. Mediation analysis. To analyse the described channel variables, we estimate a structural equation model (SEM) and apply a mediation analysis. Hence, we treat the potential channel variables as endogenous observed mediators through which FDI possibly affects bribe payments. The approach is sketched by the following two equations (see e.g. Imai, Keele, Tingley, & Yamamoto, 2011; MacKinnon, 2008):

Table 3. Mechanisms and channels

	(1) Logit Baseline	(2) GSEM (logit) Channel	(3) GSEM (logit) Channel	(4) GSEM (logit) Channel	(5) GSEM (logit) Channel	(6) GSEM (logit) Channel	(7) GSEM (logit) Channel	(8) GSEM (logit) Channel	(9) GSEM (logit) Channels	(10) GSEM (logit) std. channel$^{\phi}$
Treatment_D = 1	0.621***	1.083***	0.708***	0.641***	0.606***	0.650***	0.519**	0.647***	1.116***	1.083***
	(0.137)	(0.273)	(0.163)	(0.169)	(0.142)	(0.137)	(0.229)	(0.142)	(0.275)	(0.265)
Treatment_D = 2	0.509***	0.526***	0.500***	0.488***	0.507***	0.530***	0.496***	0.493***	0.511***	0.526***
	(0.143)	(0.148)	(0.147)	(0.154)	(0.143)	(0.143)	(0.147)	(0.147)	(0.148)	(0.152)
ln(age)	−0.164***	−0.177***	−0.179***	−0.170***	−0.164***	−0.162***	−0.176***	−0.180***	−0.177***	−0.069***
	(0.062)	(0.062)	(0.062)	(0.064)	(0.062)	(0.062)	(0.062)	(0.062)	(0.062)	(0.025)
Female	−0.406***	−0.410***	−0.404***	−0.432***	−0.406***	−0.407***	−0.403***	−0.405***	−0.410***	−0.410***
	(0.043)	(0.044)	(0.044)	(0.045)	(0.043)	(0.044)	(0.044)	(0.044)	(0.044)	(0.047)
Urban	0.299***	0.297***	0.301***	0.310***	0.301***	0.291***	0.303***	0.292***	0.288***	0.297***
	(0.068)	(0.069)	(0.069)	(0.074)	(0.068)	(0.069)	(0.069)	(0.069)	(0.069)	(0.060)
Education	0.112***	0.110***	0.110***	0.113***	0.112***	0.111***	0.110***	0.110***	0.110***	0.221***
	(0.013)	(0.013)	(0.014)	(0.014)	(0.013)	(0.013)	(0.014)	(0.014)	(0.014)	(0.026)
Living conditions	−0.103***	−0.103***	−0.105***	−0.100***	−0.103***	−0.103***	−0.105***	−0.105***	−0.102***	−0.113***
	(0.022)	(0.022)	(0.022)	(0.022)	(0.022)	(0.022)	(0.022)	(0.022)	(0.022)	(0.024)
Corruption source countries		−0.007**							−0.007**	−0.216**
(regional average)		(0.003)							(0.003)	(0.102)
Interactions with local			−0.147							
suppliers (regional share)			(0.151)							
Foreign suppliers				−0.008						
(regional share)				(0.216)						
Foreign employees					0.287					
(regional share)					(0.643)					
Night light						−0.002				
(regional median)						(0.005)				
Greenfield investment							0.115			
(regional share)							(0.202)			
Primary sector investment								−0.410*	−0.395	
(regional share)								(0.232)	(0.242)	
Constant	−2.002***	−1.957***	−1.931***	−1.995***	−2.000***	−1.993***	−1.947***	−1.909***	−1.929***	−2.614***
	(0.336)	(0.338)	(0.337)	(0.346)	(0.336)	(0.337)	(0.338)	(0.338)	(0.339)	(0.248)
Observations	14,347	14,139	14,223	13,373	14,363	14,256	14,192	14,223	14,223	14,139

Notes: Time and country dummies included in all estimations. The dependent variable *bribe document* is coded as 0 if the respondent did not pay a bribe or 1 if the respondent paid a bribe at least once. Robust standard errors (in parentheses) are clustered by the survey clusters: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Correlations between channel variables' error terms are included in column (10). $^{\phi}$Variables standardised in column (11): *ln(age), education, living conditions, corruption source countries (regional average).*

$$Y = \varphi_Y T + \phi_Y X + \lambda M + e_Y \tag{2}$$

$$M = \varphi_M T + \phi_M X + e_M \tag{3}$$

where Y is our dependent variable, T the treatment variable, X the vector of control variables and fixed effects, and M the vector of the discussed mediators, i.e. channels. Equation (2) is Equation (1) with the mediators M included and Equation (3) represents the regression of the mediators on the treatment and the control variables.

The results of the mediation analysis are presented in Table 3. Since we have to conduct the mediation analysis using logit estimations (cf. MacKinnon, 2008), we present in column (1) the baseline results of the logit regression without mediators. In columns (2)–(8) we show logit estimation results from a generalised SEM (GSEM) for all mediators separately. In all regressions *treatment_D = 1* is highly statistically significant in predicting the mediators, which is a prerequisite for a valid mediation analysis (results not shown but available upon request). From the mediators, only *corruption source countries* and *primary sector investment* are statistically significant at the 5 per cent and 10 per cent significance level, respectively. In column (9) we include these both mediators simultaneously and find that only the coefficient on *corruption source countries* remains significant. Thus, the corruption environment of investors' country of origin does indeed play a role: FDI from low-corrupt source countries decreases local corruption. The direct effect of FDI on bribe payments is 1.083 and the point estimate for the indirect effect is −0.449[22] such that the total effect is 0.634. Hence, about 40 per cent of the direct effect is mediated by *corruption source countries*. The remaining part of the effect is however left unexplained. The marginal effects of *corruption source countries* are plotted in Figure 4.[23]

To compare the magnitude of the effects, we present regression results for standardised variables in column (10). A one standard deviation increase in the average corruption level of investors' source countries (higher values represent less corruption) reduces the probability of bribe payments by 21.6 percentage points.

Summing up, our results suggest that investors originating from low corrupt countries reduce corruption at the local level. These results should be regarded as first attempt to capture underlying mechanisms of how foreign firm presence influences petty corruption and should thus be interpreted cautiously. The limited interpretability of our results is driven by shortcomings of our data at hand.

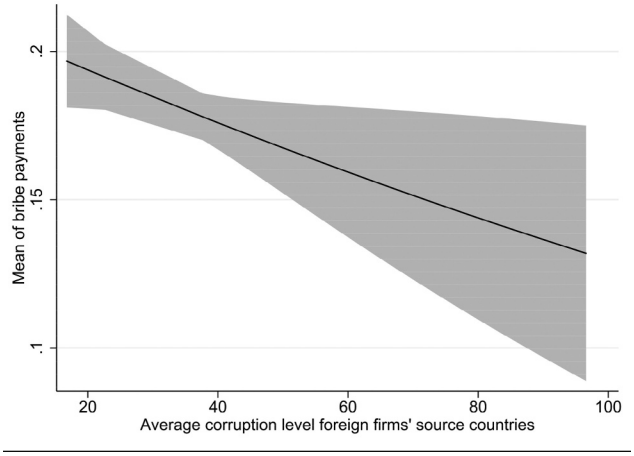

Figure 4. Marginal effects of average corruption levels in foreign firms' source countries.

Most importantly, our sample is restricted to the period before 2011 and thus excludes the most recent developments, which have taken place in many African economies and are accompanied with increasing FDI inflows and changes in stakeholder composition. Especially the insignificant proxy variables for the economic channel are a bit puzzling. One reason might be that our main proxy for economic activity, night lights data, exhibits low variation over the observed time span. Since the norm transmission channel leaves some effect of FDI on bribe payments unexplained, we cautiously presume that rent creation is likely to play a role, which we are, however, not able to disentangle with the data at hand.

5. Conclusion

Using fine-grained data on domestic and foreign firms and on corruption experience across 19 Sub-Saharan African countries and relying on a spatial-temporal estimation technique, we show that the presence of foreign firms positively impacts host countries' local corruption measured by individuals' corruption experience. Our baseline results indicate a statistically and economically significant increase in different forms of petty corruption, like payments to get documents or permits or payments to the police, around foreign firms.

When examining two potential channels, we find no unambiguous support that FDI-induced economic activity leads to more corruption. In contrast, the results provide first evidence that FDI affects corruption mainly via norm transmission. It makes a difference whether foreign investors come from relatively corrupt countries or not. FDI from countries with less corruption lowers corruption levels in the host economy. Our findings suggest that it is not sufficient for FDI host countries to create the necessary domestic conditions to facilitate direct investment inflows. At the same time, FDI host countries should 1) be aware of potentially negative effects of investments from relatively corrupt source countries, and 2) emphasise the fight against corruption by strengthening domestic anti-corruption legislation and institutions. This would enable countries to reap the full benefits of getting more integrated into the global economy via foreign investment while at the same time associated costs resulting from increased corruption are reduced. The crux is, however, that in weak states like Mali or Nigeria, central governments and local authorities often lack the capacity to regulate commercial operations.

An important question is to what extent the findings from Sub-Saharan Africa can be generalised to other developing countries. Apparently, this question cannot be answered conclusively without further research and data gathering. What is more, our data exclude the most recent years, which, as it is well known, came along with increasing engagement of investors from emerging economies. Chinese investors currently play a major role in many African economies and it would be interesting to understand the impact of these non-traditional investors on petty corruption in comparison to investors from developed countries.

Notes

1. https://au.int/en/pressreleases/20180122/african-union-launch-2018-african-anti-corruption-year%E2%80%A6 (last retrieved: 01/24/2021).
2. https://www.transparency.org/news/feature/cpi2018-subsaharan-africa-regional-analysis (last retrieved: 01/24/2021).
3. Data taken from https://unctadstat.unctad.org/wds (last retrieved: 05/14/2019).
4. The UNIDO data was kindly provided by UNIDO on request. For details see UNIDO (2011).
5. The Afrobarometer data are available at http://www.afrobarometer.org.
6. Corresponding to precision codes 1 and 2 in the Afrobarometer. A precision code of 1 indicates that the assigned geographical information corresponds to an exact location, such as a populated place, whereas a precision code of 2 is used when the respective location is up to 25 km away from an exact location. See Strandow, Findley, Nielson, and Powell (2011) for details.
7. Bribes in order to a) get a document or permit; b) avoid problems with the police; c) get a school placement; d) get household services.

8. Naturally, definitions of corruption and also perceptions of what constitutes corruption might vary across cultures and countries, leading to a potential measurement error and an associated bias. However, with country (or regional/city) dummies we are able to control for these differences.
9. We prefer this corruption measure over other measures available in the Afrobarometer for two main reasons: First, it is a very general measure for the everyday type of corruption and not related to the provision of very specific public services (like avoiding problems with the police or getting a school placement). Second, it helps minimising the loss of observations because this measure is available over all survey rounds and the number of missing values is comparatively low. Nevertheless, we show in the results section below that our main findings are robust to using other, less general measures for petty corruption.
10. Burkina Faso, Burundi, Cameroon, Cape Verde, Ghana, Kenya, Lesotho, Madagascar, Malawi, Mali, Mozambique, Niger, Nigeria, Senegal, South Africa, Tanzania, Uganda, Zambia, and Zimbabwe.
11. Arguably, an employment-weighted measure might better reflect the strength of foreign presence in a specific region. As firm-specific employment data are only available for one year in our sample we do not employ these weights throughout our analysis but instead use this employment-weighted measure in a robustness test below.
12. Summary statistics for the main variables are presented in Table A2.
13. Please note again that we are not estimating a difference-in-differences model since we do not have neither panel nor necessarily repeated cross-sectional data and therefore cannot check the parallel trends assumption.
14. Using logit regressions does not qualitatively change our findings (see Table 3 for our baseline results from Table 1).
15. National corruption is proxied by perceived corruption concerning national government officials' involvement in corruption (also taken from Afrobarometer).
16. Local corruption perception is proxied by perceived corruption concerning local government councilors' involvement in corruption (also taken from Afrobarometer).
17. Practically, using other measures for weighting the strength of foreign firm presence is possible, like sales or output. However, for these measures the assumption of stable values over time is even stronger. Therefore, we refrain from using these alternative weighting schemes.
18. Results are also unaffected for larger thresholds of 30 or 50 firms. However, the sample becomes considerably smaller then.
19. Ranging from 0 to 100, where higher values imply less corruption. These country-level data are taken from the Worldwide Governance Indicators available at http://info.worldbank.org/governance/wgi.
20. We thank Julian Hinz for operationalising data from the National Oceanic and Atmospheric Administration and providing these data.
21. See Henderson, Storeygard, and Weil (2012) for a justification of using nightlight intensity as proxy for economic activity.
22. This is the product of the coefficients from regressing the mediator on the treatment and from regressing the outcome on the mediator.
23. Table SM3 shows marginal effects for all logit regressions of Table 3.

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Please note that due to confidentiality issues we are not allowed to distribute the UNIDO and Afrobarometer data. Those who wish to access the respondent level data must request access from Afrobarometer and UNIDO, respectively.

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Appendix

Table A1. Summary statistics for foreign and domestic firms (2010)

	Domestic firms				Foreign firms			
	Mean	Std. Dev.	Min	Max	Mean	Std. Dev.	Min	Max
Employment (# of full-time employees)	166.97	602.99	10	17,601	268.69	793.41	10	16,000
Age of the firm (in years)	19.40	15.10	1	163	18.49	16.43	1	142
Sales (in US$ million)	7.87	48.51	0	1,544.55	20.07	89.00	0	1,865
Foreign employees (% full-time workforce)	1.99	6.91	0	209	9.30	12.41	0	108
Foreign suppliers (number)	3.73	11.49	0	200	7.44	12.80	0	100
Interactions with local suppliers (dummy)	0.04	0.20	0	1	0.56	0.50	0	1
Capital intensity (fixed assets in 1,000 US$/empl.)	50.52	371.54	0	9,595.38	132.64	2,033.10	0	81,111.11
Export intensity (exports/sales)	7.36	20.85	0	100	19.53	34.05	0	100
Primary sector (%)	3.55	18.51	0	100	7.40	26.18	0	100

Notes: Summary statistics are based on the sample and variables in column (2) of Table 1. N = 3,831 for domestic and N = 1,893 for foreign firms. Foreign firms are firms where foreign investors have a majority in ownership (≥50 %).

Table A2. Summary statistics for household characteristics

	Observations	Mean	Std. Dev.	Min	Max
Bribe document	14,363	0.185	0.388	0	1
Treatment	14,363	0.372	0.483	0	1
Futuretreatment	14,363	0.048	0.214	0	1
ln(age)	14,363	3.498	0.390	2.890	4.605
Female	14,363	0.490	0.500	0	1
Urban	14,363	0.654	0.476	0	1
Education	14,363	3.612	1.998	0	9
Living conditions	14,363	2.682	1.099	1	5

Note: Summary statistics are based on the sample and variables in column (2) of Table 1.