Reversing the Resource Curse: Foreign Corruption Regulation and Economic Development

By HANS B. CHRISTENSEN, MARK MAFFETT, and THOMAS RAUTER*

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Abstract: We examine whether foreign corruption regulation reduces corruption and increases the local economic benefits of resource extraction. After a mid-2000s increase in enforcement of the US Foreign Corrupt Practices Act (FCPA), economic activity (measured by nighttime luminosity) increases by 14% (3%) in African communities within a 10- (25-) kilometer radius of resource extraction facilities whose owners are subject to the FCPA. Local perceptions of corruption decline by 8%. Consistent with changes in existing extraction firms' business practices contributing to the increase in development, the association between resource production, instrumented by world commodity prices, and local economic activity increases by 40%.

Keywords: Foreign Corruption Regulation; Foreign Corrupt Practices Act (FCPA); Economic Development; Natural Resource Extraction

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* University of Chicago Booth School of Business, 5807 South Woodlawn Avenue Chicago, IL 60637 (hans.christensen@chicagobooth.edu; mark.maffett@chicagobooth.edu; thomas.rauter@chicagobooth.edu). We thank Mia Giuriato and Ginha Kim for outstanding research assistance. We appreciate helpful comments from Ray Fisman, Ben Olken, Angela Reitmaier (Transparency International), Silvia Vannutelli, and workshop participants at the Arizona State University, the University of Chicago, the University of Mannheim, and the Early Insights in Accounting Webinar. We thank Nicola Coniglio and Adnan Seric for sharing the UNIDO African Investor Survey data. We gratefully acknowledge financial support from the University of Chicago Booth School of Business. This work is also supported by the Accounting Research Center, the Asness Junior Faculty Fellowship, the David G. Booth Faculty Fellowship, the IBM Corporation Faculty Fellowship, the John E. Jeuck Faculty Fellowship, and the Neubauer Family Faculty Fellowship at the University of Chicago Booth School of Business.

1. Introduction

Large natural-resource endowments are often an economic boon for well-governed countries but a burden for those with weak political institutions, a phenomenon known as the "political resource curse" (Mehlum et al. 2006; Armand et al. 2020). In the presence of weak political institutions, the fiscal revenue windfalls from abundant natural resources create opportunities for corrupt government officials to extract rents and divert funds from the local economy (Robinson et al. 2006). With varying degrees of success, policymakers have tried to combat the harmful effects of natural resources in high-corruption-risk countries by strengthening local institutions and governance (e.g., by implementing domestic corruption laws and tying aid disbursements to a country's corruption record). Yet, foreign multinational firms, which are typically outside local governments' regulatory reach, are often complicit in bad governance and corruption (e.g., Guidolin and Ferrara 2007). Recognizing the costs of corruption in the developing world, governments in many developed countries have enacted foreign corruption regulations to curb firms' corrupt business practices abroad (e.g., Karpoff et al. 2017; Zeume 2017)—the most prominent and widely enforced being the US Foreign Corrupt Practices Act (FCPA). In this paper, we examine how foreign corruption regulation, in the form of a significant increase in US FCPA enforcement, affects economic growth in resource-rich areas of Africa.

If the FCPA reduces corruption and mitigates the negative aspects of resource extraction, such as inefficient resource allocation and the reinforcement of extractive political regimes, it could foster increased economic growth (Shleifer and Vishny 1993; Mauro 1995; Acemoglu and Robinson 2012; Ortiz-Ospina and Roser 2016). The FCPA could reduce corruption by directly increasing the costs of engaging in corrupt business practices for the multinational firms under its jurisdiction, as well as by indirectly increasing the incentives of these firms' local partners to avoid perceptions of corruption. FCPA compliance typically

necessitates third-party evaluations of a contracting partner's corruption risk. Thus, local firms hoping to work with a firm under US jurisdiction have an incentive to avoid engaging in corrupt business practices, even when working with firms not subject to the FCPA. Given the sizable economic influence that extraction firms have on the surrounding communities, the FCPA's indirect effects on local firms could be significant.

Alternatively, prior research shows that one consequence of the compliance costs imposed by anti-corruption regulation is a reduction in foreign direct investment in high-corruption-risk countries (e.g., Beck et al. 1991; Hines 1995; Cuervo-Cazurra 2006; Christensen et al. 2020). Some argue that without the ability to bribe public officials it is hard to operate in areas with inefficient bureaucracies (Dutt and Traca 2016). If the costs imposed by foreign corruption regulation lead to a reduction in economically beneficial foreign investment, or the inability to pay bribes prevents regulated firms from competing against less efficient unregulated firms, foreign corruption regulation could hamper economic development. Ultimately, the net economic impact of foreign corruption regulation depends on how much the regulation decreases corruption, what regulated firms do instead of paying bribes, and whether the marginal investments forgone because of the regulation would have positively impacted development.

To speak to the impact of foreign corruption regulation, we examine changes in economic activity, as measured by nighttime light emissions, in African communities near large resource extraction facilities following a major increase in US FCPA enforcement in the mid-2000s. In our research design, we exploit the fact that 1) for reasons related to the feasibility of enforcement, FCPA cases are almost exclusively limited to firms under US jurisdiction that are headquartered in OECD countries (Christensen et al. 2020), and 2) following several prominent legal and regulatory changes (see Section 2), US enforcement of the FCPA against both US and non-US firms under US jurisdiction increased dramatically after 2004 (Martin

et al. 2012; Olken and Pande 2012). Consequently, the enforcement shock likely impacts only the subset of African communities located near extraction facilities with a beneficial owner that is under US jurisdiction and headquartered in an OECD country after 2004. This feature of the setting allows us to estimate the treatment effect of the FCPA benchmarked against a control sample of likely unaffected communities (i.e., those located near an extraction facility with an owner that is not subject to the FCPA).

Our study focuses on the extraction industry in Africa, which is a powerful setting to examine the impact of foreign corruption regulation on economic development because resource extraction comprises a significant proportion of the African economy, is prone to corruption, and foreign corporations play a major role in these activities (Chuhan-Pole et al. 2017). We measure economic development using satellite images depicting the density of nighttime light emissions (i.e., luminosity) measured at levels of spatial stratification from 10- to 50-kilometers around an extraction facility. In rural Africa, luminosity is highly associated with economic activities, which provides us with reliable, uniform estimates of development in very localized areas (Henderson et al. 2012; Michalopoulos and Papaioannou 2014; Mamo et al. 2019). We combine the luminosity data with location, ownership, and commodity data for extraction facilities across Africa. This high degree of spatial resolution allows us to assess the impact of foreign corruption regulation at the local level, where it is most plausible that firm activities could affect economic development. To alleviate concerns about endogenous extraction site openings, closings, and ownership changes, we determine whether the facility's owner was subject to the FCPA in 2004 (i.e., before the FCPA enforcement increase).

Over a six-year period after 2004, we find that geographic areas with an extraction facility whose owner is subject to the FCPA gradually exhibit higher levels of economic activity relative to areas surrounding extraction sites that are not

subject to the regulation. As we increase the radius of the cell surrounding the extraction site, the estimated average treatment effect monotonically declines; falling from a 14% increase in luminosity within 10 kilometers of the facility (where the extraction industry plays a central role in the economy, directly employing nearly 20% of the total workforce) to an increase of 3% within 25 kilometers. Countries with weak political institutions before the FCPA enforcement increase, where prior research finds the resource curse's effects to be most pronounced (e.g., Mehlum et al. 2006), experience the largest increase in economic activity. Our results are robust to excluding luminosity emanating directly from the extraction facility, controlling for regional time trends, and controlling for changes in economic conditions in the headquarter country of the extraction-facility owner. We also find no evidence of a significant counterfactual treatment effect from being under US jurisdiction or being headquartered in an OECD country absent an increase in the threat of FCPA enforcement.

We find that employment levels in the local extraction sector remain relatively stable, suggesting that the observed positive association between foreign corruption regulation and economic development is not explained by a decline in activity in the extraction sector. Rather, the consistent level of activity suggests that the increase in development is driven by changes in the business practices of firms and local officials in and around the extraction sector. To assess this possibility, we estimate changes in perceived corruption and the direct contribution of resource production to local economic development.

To the extent that corruption negatively affects growth, the observed increase in local economic activity following the increase in FCPA enforcement could be explained (in part) by a reduction in corruption. For instance, foreign corruption regulation could make it more difficult for local officials to extract rents and thus improve resource allocation and increase the amount of extraction revenues that reach the local community. Consistent with this possibility, using

microdata from the *Afrobarometer* survey, we find that individuals living near extraction sites whose owners are subject to the FCPA are 8% less likely than individuals living in other areas to perceive their government as corrupt and 18% more likely to be satisfied with their local government after 2004.

If, as a result of foreign corruption regulation, firms in (and connected to) the extraction sector stop paying (and soliciting) bribes and engaging in activities that have a negative economic impact on the local community, we expect the association between resource production and economic activity to increase. To mitigate concerns about the endogeneity of production decisions, we use variation in world commodity prices as an instrument for production quantities. Consistent with the increase in development being driven, at least in part, by changes in extraction firms' business practices, we find that the introduction of foreign corruption regulation increases the elasticity of luminosity to world commodity prices by 40% within a 10-kilometer radius of an extraction site. The change in elasticity declines predictably as we increase the radius of the extraction area up to 50 kilometers. Additional analyses indicate that the extraction sector's increased contribution to local economic activity is not explained by ownership changes after 2004. These results, which condition the baseline association between foreign corruption regulation and economic activity on an exogenous shock to production, also help to alleviate the concern that a shock around 2005 (unrelated to the extraction sector) that differentially affects treated and non-treated cells could present an alternative explanation for our results.

Our findings contribute most directly to the literature on anti-corruption regulation. Most prior work focuses on foreign corruption regulation's impact on the operations of multinational corporations (e.g., Graham 1984, Beck et al. 1991; Hines 1995; Zeume 2017; Christensen et al. 2020; Rauter 2020; Sanseverino 2020). We instead provide evidence on how foreign corruption regulation impacts economic development in the host countries where bribes are paid and where the

negative consequences of corruption are most acutely felt. Some prior studies examine the effects of domestic corruption regulation on corruption (Olken 2007; Ferraz and Finan 2008; Bobonis et al. 2016; Zamboni et al. 2018; Avis et al. 2016) and local firm behavior as well as economic growth (Colonnelli and Prem 2020). In contrast, we examine how foreign corruption regulation, originating in developed countries, affects local economic conditions in the developing world. Reducing foreign corruption by multinational corporations is likely more difficult than prosecuting domestic corruption because it is challenging for local law enforcement, especially in developing countries with weak institutions, to gather evidence and sanction perpetrators located abroad. Our evidence indicates that, despite any increase in the costs of operating in high-corruption-risk countries, foreign corruption regulation stimulates economic development by changing how foreign firms operate in these regions.

Our results are also related to a large literature that examines the impact of resource extraction on economic development, beginning with the finding by Sachs and Warner (1995) that countries rich in natural resources tend to experience lower growth (i.e., the "resource curse"). Although most recent work does not support an overall negative impact of natural resources on economic growth (e.g., Smith 2015; Mamo et al. 2019), many argue that the local benefits from natural resources are less than one would expect and that the political institutions of host countries explain the divergent outcomes (e.g., Mehlum et al. 2006; Robinson et al. 2006; Humphreys et al. 2007; Sarr et al. 2011). Our results suggest that anti-corruption regulation imposed on multinational corporations by countries with strong institutions (in this case, the US) can increase the extraction sector's contribution to local economic development in countries with weak political institutions. This is important because developing countries may not have the institutional strength or political will to address misconduct by multinational corporations themselves.

2. Institutional Details and their Connection to the Research Design

Estimating the impact of foreign corruption regulation on economic development is challenging because corruption is unobservable and its effect on economic activity is difficult to isolate absent clearly defined treatment and control groups. To overcome these challenges, we examine a major increase in the enforcement of foreign corruption regulation that affects only a subset of African resource extraction facilities and measure economic activity based on nighttime light emissions in highly geographically localized areas around these facilities.

A mid-2000s increase in extraterritorial FCPA enforcement likely significantly increased the costs of engaging in corruption for firms under US jurisdiction (Olken and Pande 2012). Although Congress enacted the FCPA in 1977, because of a lack of domestic support and limited international cooperation, the law was not widely enforced for over two decades, particularly against non-US firms (Martin et al. 2012). Data from the *Stanford Foreign Corrupt Practices Act Clearinghouse*, reported in Internet Appendix Section IA1.1, provide evidence of a dramatic increase in FCPA enforcement beginning in 2005. From 1977 until 2004, there were 53 FCPA enforcement actions against corporations (fewer than 2 per year); from 2005 until 2017, there were 284 cases (more than 20 per year). For non-US firms, the increase in enforcement was even more pronounced, growing from 4 enforcement actions from 1977 until 2004 to 97 cases from 2005 until 2017. As discussed in Internet Appendix Section IA1.1, a confluence of factors all occurring in 2004 help to explain the timing of this increase in FCPA enforcement, including (i) an expanded legal definition of bribery, (ii) the introduction of deferred and non-prosecution agreements in FCPA cases, and (iii) the enactment of the Sarbanes-Oxley Act (Martin et al. 2012; Brewster 2017).

To assess when firms first broadly became aware of the increase in FCPA enforcement, we examine changes in investment flows to high-corruption-risk countries (see Internet Appendix Section IA1.2), which we expect, based on prior

research, to adjust relatively quickly to any perceived increase in anti-corruption enforcement (Zeume 2017; Sanseverino 2020). Figure IA2 shows that foreign direct investment flows to high-corruption-risk countries decrease sharply starting in 2005, suggesting that multinational firms under FCPA jurisdiction were aware of (and responded to) the deterrent effect of the increase in FCPA enforcement soon after the 2004 legal and regulatory changes. Based on this evidence and the timing of the increase in enforcement actions, we use 2005 to mark the onset of the treatment period in our empirical analyses.

The FCPA's jurisdictional scope is expansive, and either the SEC and/or the DOJ can bring cases against US- and non-US-domiciled issuers, domestic concerns, and firms acting in US territory (SEC and DOJ 2012). Based on FCPA guidelines, we classify an extraction facility as being under FCPA jurisdiction if at least one of the facility's corporate owners has a stake of 20% or more and is: 1) headquartered in the US, 2) has an SEC-registered cross-listing on a US stock exchange, or 3) discloses an operating segment in the US.[1] A 20% ownership stake generally provides the owner with significant influence, which is an important factor in determining culpability under the FCPA. We obtain information on the identity, ownership stakes, and headquarter countries of the ultimate owners of extraction sites from *SNL Metals and Mining ("SNL")* and *Enverus International ("Enverus")*. We collect data on US cross-listings from the websites of the major depository banks (Bank of New York and Citibank) and data on US reporting segments from *Worldscope*. We verify that a cross-listed firm is an SEC registrant through a search of 20-F and 40-F filings in the *SeekEdgar* database.

[1] Under international accounting standards, if a firm has a significant operational presence in another country, the firm must publicly disclose disaggregated financial information for operations in that country. For foreign firms that disclose a US segment, it is more likely that, if the firm commits an FCPA violation, that action will fall under US jurisdiction.

Effective prosecution of non-US firms under the FCPA typically requires cooperation from foreign regulators. Likely for this reason, FCPA enforcement against non-US firms has been limited to firms headquartered in countries that have signed the legally binding *Convention on Combating Bribery of Foreign Public Officials in International Business Transactions* (i.e., the Anti-Bribery Convention). The Anti-Bribery Convention requires cooperation among signatory countries and has been signed by all OECD members and six non-members (as of the end of our sample in 2013)—for brevity, we refer to all signatory countries as "OECD countries." [2] Of the 97 non-US firms targeted by an FCPA enforcement action between 2005 and 2017, only two were headquartered in a non-OECD country (Stanford FCPA Database 2020). Because enforcement of the FCPA has in practice been limited to firms headquartered in Anti-Bribery Convention signatory countries, we consider only owners that are under US jurisdiction and are also headquartered in an OECD country as being subject to the FCPA (i.e., treated).[3]

To avoid the possibility that our estimates reflect endogenous variation in ownership, we base our treatment assignment on data from 2004 and consider extraction facilities subject to the FCPA in 2004 to always be subject to the FCPA. About 15% of all extraction sites in our sample are treated (i.e., have at least one owner with significant influence that is subject to the FCPA, see Internet Appendix Section IA2 for details). The location of extraction facilities owned by a company subject to the FCPA is fairly dispersed across Africa (see Figure 1 Panel A).

We use the African extraction sector as our setting because, if foreign corruption regulation has an effect on high-corruption risk areas, the effect is likely to be particularly strong in this setting. Specifically, the African extraction sector is

[2] For a list of Anti-Bribery Convention signatory countries, see www.oecd.org.
[3] Although all OECD countries have their own foreign corruption regulations and some, such as Germany and the UK, have recently increased enforcement, the US accounts for 83% of all anti-bribery sanctions against legal entities from 1999 to 2018 (OECD 2019).

prone to corrupt business practices and is a frequent target of FCPA enforcement after 2005. Survey data from the *Afrobarometer* in Table 1 Panel A show that residents of communities within 50km of an extraction site are significantly more likely to perceive foreign businessmen as corrupt compared to residents not in the proximity of an extraction site. Of the 284 total FCPA enforcement actions between 2005 and 2017, 70 included FCPA violations in Africa (nearly 25%), and 41 of these 70 cases (nearly 60%) were against firms in the natural resource extraction industry (Stanford FCPA Database 2020).

The FCPA's potential impact on corruption extends beyond transactions involving firms directly subject to the FCPA. The FCPA also creates an incentive for local suppliers and contractors that want to work with firms subject to the regulation (e.g., construction firms) to avoid engaging in corrupt activities, even in transactions with firms not subject to the regulation. For example, besides prohibiting bribery, the FCPA also imposes recordkeeping requirements that force firms to ensure their internal control systems can prevent and detect improper payments. To ensure compliance with the FCPA's accounting provisions, firms typically perform due diligence of suppliers and service providers (Huskins 2008). This due diligence typically involves screening new and existing business partners for possible affiliations with high-corruption-risk individuals and companies that have a record of previously engaging in corrupt activities or have connections to government officials (SEC and DOJ 2012). Given these compliance requirements, prior involvement in corruption would almost certainly impede transactions with a firm subject to the FCPA. Because extraction firms are major purchasers of local services and materials in the communities around them, the indirect effects of the FCPA on local businesses could be significant.[4]

[4] One reason for foreign firms' local purchases is the common practice of imposing "local content obligations" on foreign businesses, which typically require foreign companies to source certain

Because we expect the effect of FCPA enforcement to be strongest locally, our unit of observation is the circular geographic area with a radius of 10 to 50 kilometers around an active extraction facility (henceforth, a "cell"). We collect mine-level data from *SNL* and oil-well data from *Enverus*. Both databases provide the latitude and longitude of extraction sites, which enables us to match these data to a particular cell and to assess the FCPA's impact at a highly geographically localized level, where, because of mineral extraction's significant economic importance, the regulation could significantly affect corruption levels. For instance, using occupational microdata from the 2004 *Afrobarometer* survey (see Section 4.1 for details), in Table 1 Panel B, we estimate that, within a 10-kilometer radius of an extraction site, 18% of the local workforce is employed in the extraction industry. This proportion monotonically decreases to 10% as the radius is extended to 50 kilometers. In communities not classified as extraction areas (i.e., those more than 50km from an extraction facility), the fraction of mine workers is only 0.9%.

To avoid treatment spillovers across oil wells, we drop blocks that are operated by multiple firms.[5] If more than one commodity is extracted on the same site, that cell appears in the dataset as a separate observation for each commodity. We drop inactive mines, oil and gas wells, and wells located offshore. In Internet Appendix Section IA2, we provide details on each restriction's impact on the sample. In Internet Appendix Section IA3, we discuss the robustness of our results to alternative sampling procedures, including dropping overlapping extraction areas and keeping only commodities with the highest production value per facility.

Overall, our sample contains 487 mines of 18 minerals (673 mine-mineral pairs) and 113 oil and gas wells located across 34 African countries. Most of our

goods and services from local enterprises and provide training to their employees as a condition of their operating licenses (see UNCTAD 2012 for details).

[5] Blocks are geographic areas where firms with licenses can drill for oil. Host governments can award different portions of the same block to different firms, particularly if the block is large.

extraction facilities are located in South Africa (48%), followed by Libya (8%), the Democratic Republic of Congo (5%), and Zimbabwe (5%). In Internet Appendix Section IA2, we report the sample composition by African country and region.

Internet Appendix Table IA2.2 reports the distribution of extraction facilities across resource types. Our sample includes facilities that extract 20 different commodities, with the largest concentration in gold (23%), followed by coal (14%), and oil (13%). We map the geographic distribution of commodities throughout Africa in Figure 1 Panel B. As expected, individual resource types cluster geographically, but none of the five regions of Africa contain fewer than eight different minerals.

We measure economic development using the density of nighttime light emissions. GDP estimates based on national accounts and other common proxies for economic development are often measured with significant error in developing countries (Johnson et al. 2009) and are generally only available at the national level. In contrast, luminosity estimates are available at a much finer geographic specificity and allow for accurately estimating changes in economic growth at the subnational level (Henderson et al. 2011; Henderson et al. 2012; Michalopoulos and Papaioannou 2014). Compared to other economic development measures (e.g., GDP), luminosity reflects the level of economic activity more broadly. If the benefits of an increase in economic growth are highly concentrated, it is unlikely to significantly impact luminosity. Thus, the level of luminosity is more indicative of the overall well-being of people throughout the community.

We collect luminosity data from the *United States Air Force Defense Meteorological Satellite Program* (*DMSP*). *DMSP* satellites collect data on low-light imaging for every location on the planet every night. The National Geophysical Data Center (NGDC) processes these data (e.g., by removing natural light sources and images obscured by cloud cover) and publishes the final, annualized data. We compute the cloud-free-observation weighted average over all

stable nightlight pixels for each cell. Table 2 reports descriptive statistics for *Luminosity* across 10,318 cell-year observations from 2000 to 2013.[6] *Luminosity* ranges from 0 (no light) to 63 (a highly developed urban area). Average *Luminosity* within 10 kilometers of an extraction site is 7.7 and monotonically decreases as the radius around the extraction site increases.

3. Effect of Foreign Corruption Regulation on Economic Development

3.1 Main Results

To examine how foreign corruption regulation affects economic development, we estimate the change in nighttime light emissions after the mid-2000s increase in US FCPA enforcement in geographic cells with radii ranging from 10 to 50 kilometers around natural resource extraction facilities. Our generalized difference-in-differences design compares luminosity in cells with an extraction facility that has a controlling owner subject to the FCPA to cells where the extraction facility does not have an owner subject to the FCPA. Because economic activity likely responds gradually, we plot yearly coefficient estimates of the treatment effect from the following OLS regression:

$$Luminosity_{c,t} = \beta_1 FCR_i \times Year_t + Fixed\ Effects + \varepsilon_{c,t} \quad (1)$$

Luminosity is the natural logarithm of the average luminosity in cell *c* and year *t* plus 1.[7] *FCR* is an indicator equal to one if, in 2004, at least one extraction site owner (of 20% or more) is subject to the FCPA (i.e., is under US jurisdiction and headquartered in an OECD country). *Year* is a set of indicators for each year of our sample period. We omit the indicator for 2004, which serves as the benchmark period. To control for differences in luminosity arising from time-invariant (or slow-moving) factors that are specific to each extraction site (e.g., geological

[6] Our sample ends in 2013 because the NGDC changed its processing methods in 2014.

[7] To include observations with a value of zero and to account for the variable's skewness, we use the natural logarithm of *Luminosity* plus one in our analyses. We find similar results using an inverse hyperbolic sine transformation (see Table 3 and Table 5 Panel B) or dropping zeros and using *Ln(Luminosity)* as the dependent variable (see Internet Appendix Section IA3).

conditions, property size), we include extraction-site-by-commodity fixed effects (*Property*×*Commodity*). We add *Commodity*×*Year* fixed effects to account for commodity-specific time trends. We test for statistical significance using Conley (1999) standard errors to account for spatial correlation within a 500-km radius and infinite serial correlation.

In Figure 2 Panel A, we graph the yearly *FCR*×*Year* coefficient estimates and their corresponding 95% confidence intervals. In support of the parallel-trends assumption, treated and control cells have similar trends in luminosity before 2005. Consistent with foreign corruption regulation increasing economic activity, between 2005 and 2010, treated cells exhibit a gradually increasing level of luminosity relative to control cells. After 2009, the treatment effect stabilizes at an approximately 20% higher level. In interpreting the economic significance, it is important to note that in this specification, we focus on the area in the immediate vicinity (i.e., a 10-kilometer radius) of the facility, where the extraction industry employs an estimated 18% of the cell's workforce.

To estimate the average post-2004 treatment effect and to simplify the reporting of sensitivity tests, we also present results based on a specification where we replace the individual *Year* indicators with a single *Post 2004* indicator, which equals one for all years after 2004. Table 3 reports the results. In Column (1), the *FCR*×*Post 2004* coefficient estimate is positive and statistically significant, indicating that economic activity increases by approximately 14% in the cells surrounding extraction facilities subject to the FCPA relative to cells that do not.

If the observed increase in luminosity is attributable to changes in the extraction sector, we expect the magnitude of the treatment effect to diminish as we increase the cell size and the facility becomes a less central part of economic activity within a particular cell. In Figure 2 Panel B, we graph the *FCR*×*Post 2004* coefficient estimates and their corresponding 95% confidence intervals for cells with radii from 10 to 50 kilometers. The *FCR*×*Post 2004* coefficient estimate

decreases monotonically in the length of the radius of the cell. The point estimates are positive and statistically significant for radii up to a distance of 25 kilometers. At a 25-kilometer radius, the coefficient on *FCR×Post 2004* implies an increase in luminosity of approximately 3%.

In Table 3 Columns (2) to (5), we present the results of four sensitivity tests.[8] First, instead of adding one to *Luminosity* to account for zero-value observations, we use an inverse hyperbolic sine transformation. The estimated treatment effect in Column (2) increases from 13% to approximately 18%. Second, to ensure that we capture economic activity in the communities surrounding extraction sites rather than only for the extraction site itself, we exclude a one-kilometer-radius cell around the extraction site. In Column (3), where we re-estimate our baseline model on the donut-shaped 1-10 km area around the extraction site, we find that the estimated treatment effect remains positive, statistically significant, and only slightly attenuates. Third, in Column (4), we include *Region×Year* fixed effects to account for time-varying institutional and political factors (e.g., climate conditions, armed conflicts) that are correlated with Africa's five main geographic regions (shown in Figure 1). The estimated treatment effect increases from 0.136 to 0.141.[9]

Fourth, we examine placebo treatment effects for subsamples of our control group. Our treatment group consists of extraction facilities owned by firms under US jurisdiction headquartered in OECD countries. A potential concern is that either being under US jurisdiction or being located in an OECD country is associated with factors (unrelated to foreign corruption regulation) that change around 2005 and

[8] In Internet Appendix Section IA3, we report results for several additional sensitivity tests, including individually dropping each commodity, excluding overlapping extraction areas, and keeping only the main commodity for each facility.

[9] We do not include *Country×Year* fixed effects because the geographical clustering of commodities (see Figure 1 Panel B) severely limits the number of observations that would contribute to the *FCR×Post 2004* coefficient estimate. See Internet Appendix Section IA2.3 for details.

explain our results (e.g., a financial market shock). Fortunately, our control group, which includes firms under US jurisdiction headquartered in *non-OECD* countries and firms *not* under US jurisdiction headquartered in OECD countries, allows us to speak to the severity of this concern. US jurisdiction firms not headquartered in an OECD country are almost never targeted under the FCPA. Similarly, although the jurisdictional scope of the FCPA is broad and some treatment effect could be expected for all OECD-headquartered firms, firms that are not SEC-registered and do not have a US operating segment are substantially less likely to be targeted (Christensen et al. 2020). If the observed changes in luminosity are attributable to a factor associated with US jurisdiction or being headquartered in an OECD country, but unrelated to foreign corruption regulation, we would expect to observe similar treatment effects for these firms.

In Table 3 Column (5), we include separate interactions for *USJ Non-OECD×Post 2004* and *Non-USJ OECD×Post 2004*. Consistent with the increase in economic activity being attributable to foreign corruption regulation, we find no evidence of a significant change in luminosity in areas where an extraction facility's owner is under US jurisdiction but *not* headquartered in an OECD country or where the owner is headquartered in an OECD country but *not* under US jurisdiction. Both coefficients are significantly different from the *FCR×Post 2004* estimate (at the 10% level or higher).[10]

3.2 Heterogeneity in Political Institutions

Prior research finds that the effect of natural resources on economic development depends on the quality of local institutions (e.g., Mehlum et al. 2006;

[10] In Internet Appendix Section IA3.5, we present all of the results from Table 3 including these two additional interactions. In Internet Appendix Section IA3.6, we present results from an alternative approach to addressing concerns about macroeconomic shocks in the facility owner's home country where we control for observable macroeconomic conditions. This approach directly addresses selection on the observables we control for (e.g., GDP growth) and, to the extent the observable and unobservable factors are correlated, provides a way to gauge the magnitude of any potential effect of unobservable factors (Altonji et al. 2005).

Robinson et al. 2006). Countries with strong institutions that promote political accountability tend to benefit more from their resource endowments because these institutions mitigate the rent-seeking opportunities that resource extraction can create. Accordingly, we expect to observe larger increases in economic development after the FCPA enforcement increase in countries with weak political institutions, where the political resource curse is likely most prevalent.

To test this prediction, we separately estimate Eq. (1) for countries with strong or weak political institutions based on the Center for Systemic Peace's *Polity IV Democracy Index* in 2004 (i.e., the year before the FCPA enforcement increase). The *Polity IV* index ranks countries based on the strength of their political institutions on a scale from -10 (autocracy) to 10 (full democracy). We classify countries as strong-political-institution countries if their *Polity IV* score is 6 or higher, the threshold for a democracy.

Figure 2 Panel C shows that, after the FCPA enforcement increase, the observed increase in economic activity is substantially larger in weak-political-institution countries (the solid red line) compared to strong-institution countries (the dashed blue line). The regression results in Table 3 Columns (6) and (7) corroborate this finding—the treatment effect is about 25 percentage points larger in countries with weak political institutions (the difference between countries with weak and strong political institutions is statistically significant; p-value = 0.02).

3.3 Changes in the Size of the Extraction Sector

The opportunity to obtain bribes can incentivize government officials to allow extraction firms to produce at levels that exceed what is optimal for the local economy. If foreign corruption regulation reduces the availability of bribes and decreases the incentives of officials to permit overproduction, the positive association between FCPA enforcement and local economic development could be explained by a shift in resources away from the extraction sector. Such an effect would reduce the extraction sector's direct contribution to local economic growth

but could allow other sectors (e.g., agriculture) to thrive, potentially increasing the overall level of development.

In Internet Appendix Section IA4, we examine employment changes in the extraction sector. Inconsistent with a decline in extraction activity explaining the increase in development, results from this analysis provide no evidence of a decline in extraction-sector employment levels after the 2004 FCPA enforcement increase.

3.4 Summary of Results

To summarize, the evidence in this section indicates that local economic activity increases in cells around extraction facilities with owners subject to foreign corruption regulation, suggesting that the FCPA's corruption reducing effects outweigh any opposing effects arising from a reduction in economically beneficial investment. Consistent with foreign corruption regulation helping to reverse the political resource curse, the increase in economic activity is most pronounced in areas with weak political institutions. We find no evidence that the positive association between foreign corruption regulation and economic development is explained by a decline in activity in the extraction sector, suggesting that the observed increase in development is driven (at least in part) by a change in the business practices of firms and local officials in and around the extraction sector.

4. Changes within the Extraction Sector

To assess whether changes in the business practices of firms and local officials in and around the extraction sector (e.g., engaging in less corruption) can explain the observed increase in development, in this section, we estimate changes in perceived corruption and the contribution of extraction firms' activities to local economic growth.

4.1 Perceived Corruption

The observed increase in economic activity in extraction areas subject to foreign corruption regulation is consistent with a decline in corruption and an accompanying increase in the efficiency of resource allocation. However,

providing evidence of a direct link is difficult, given that corruption is unobservable. Instead, we examine changes in a survey-based measure of local residents' *perceptions* of corruption. However, unlike the underlying level of corruption, the effect of foreign corruption regulation on corruption perceptions is not obvious. If the increase in FCPA enforcement leads to an increased awareness of corrupt activities, it is possible that the perceived level of corruption could increase even if the underlying level of corruption decreases. For this reason, we also examine satisfaction with the local government. If in the presence of foreign corruption regulation public officials can less easily extract bribes, they may be less inclined to prioritize extraction firms over other more socially beneficial sectors of the economy. Although it is less related to the underlying construct of interest, relative to perceived corruption, satisfaction with the local government is more easily observable by survey respondents and is less likely to be directly influenced by witnessing an increase in enforcement actions.

We collect sub-nationally geocoded data on corruption perceptions from the *Afrobarometer* survey. *Afrobarometer*, a non-partisan research institution, regularly conducts public opinion surveys at the individual level in more than 30 African countries. We use data from rounds one to six of the survey, a period that stretches from 1999 to 2015, and measure perceived corruption using answers to the question "How many of the following people do you think are involved in corruption: Government officials?" We define an indicator, *Corrupt Government*, equal to one if the response to the question is "most of them" or "all of them." To examine satisfaction with the local government, we use the answers to the question: "Do you approve or disapprove of the way the following people have performed their jobs over the past twelve months: Local government/official/assembly?" We define an indicator, *Satisfaction with Local Government*, equal to one if an individual responds "approve" or "strongly approve."

We restrict the sample to survey respondents who live within 100 kilometers of an extraction facility.[11] Our final sample covers the survey responses of 56,276 participants in 4,531 villages across 31 African countries between 1999 and 2015. In Internet Appendix Section IA5, we report the number of observations by country and survey round. Table 4 Panel A presents descriptive statistics. Approximately 18% of survey participants live in close proximity to an extraction site whose owner is subject to the FCPA. 44% of individuals perceive the government to be highly corrupt, and 53% are satisfied with their local government. Roughly three-quarters of the survey responses were collected after 2004. 49% of respondents are female, 44% live in urban areas, and their average age is 37 years old.

To examine how foreign corruption regulation affects corruption perceptions and satisfaction with the local government, we estimate the following OLS regression:

$$Perception_{i,t} = \beta_1 FCR\ Exposure_i \times Post\ 2004_t + Controls_i + Fixed\ Effects + \varepsilon_{i,t} \quad (2)$$

Perception is either *Corrupt Government* or *Satisfaction with Local Government* (as defined above) for individual *i* in survey round *t*. *FCR Exposure* is an indicator equal to one if the closest extraction facility within 100 km of survey respondent *i* is subject to the FCPA. *Post 2004* is an indicator for survey rounds after 2004. We include controls for several individual characteristics that could be associated with perceptions, including gender (*Female*) because perceptions often differ across genders (e.g., Croson and Gneezy 2009; Melgar et al. 2010; D'Acunto 2020); *Urban* because individuals living in cities might more frequently interact with government officials (Hunt 2004; Mocan 2004); and age (*Ln(Age)*) to account for

[11] We use a larger radius (100km) in this analysis because *Afrobarometer* does not survey the same villages across rounds (for the same reason, we do not include individual survey respondent or geographic area fixed effects in Eq. (2)). If we use a narrower radius (e.g., 25km or 50km), few extraction areas enter our sample in both the pre- and post-periods. In untabulated analyses, we use radii of 25km and 50km and find evidence supporting an increase in satisfaction with the local government but little evidence of a reduction in corruption perceptions.

intergenerational differences in perceptions (Torgler and Valev 2006). We include *Region×Year* fixed effects to account for time-varying political factors (e.g., corruption scandals) that are correlated with Africa's five main geographic regions. We add *Commodity* fixed effects to control for time-invariant or (slow-moving) differences in corruption perceptions across areas that extract different commodities. We cluster standard errors at the village level because individuals' perceptions are likely correlated within localities.

In Table 4 Panel B, we report the regression results from estimating Equation (2). In Column (1), the *FCR×Post 2004* coefficient estimate is negative, statistically significant, and indicates that individuals living near extraction sites whose owners are subject to the FCPA are 8% less likely to perceive their government as corrupt after 2004, compared to the pre-period average (-0.043/0.548). In Column (2), we include control variables and find that, although the control-variable coefficient estimates are statistically significant, the estimated *Corrupt Government* coefficient magnitude remains virtually unchanged. The fact that including these control variables has little effect on the *FCR×Post 2004* coefficient suggests that differences in survey respondent characteristics across treatment and control areas are unlikely to explain our findings.

In Figure 3 Panel A, we plot the treatment effect over time for each *Afrobarometer* survey round. In support of the parallel-trends assumption, there is no visible difference in the pre-treatment trends in corruption perceptions for areas subject to foreign corruption regulation and those that are not. In the post-2004 period, the treatment effect is negative for all periods and particularly strong in the period immediately following the increase in FCPA enforcement (i.e., round R3 in 2005/2006). That the estimated treatment effect is largest in the period immediately after the enforcement increase and then subsequently declines is consistent with respondents benchmarking their perceptions against the "new normal" of a less corrupt environment over time.

In Table 4 Panel B Columns (3) and (4), we examine changes in individuals' satisfaction with their local government. We find that, after the 2004 FCPA enforcement increase, residents of extraction areas subject to the regulation are approximately 18% more likely to be content with the performance of their local government. In Figure 3 Panel B, we map out the treatment effect over time and find no evidence of differing pre-period trends between the treatment and control groups. In the post-period, the treatment effect is positive for all periods and, once again, strongest immediately after the enforcement increase.

Overall, the analyses in this section suggest that a reduction in corruption is a potential explanation for the observed increase in economic activity around treated extraction areas following the post-2004 increase in FCPA enforcement.

4.2 Contribution of Extraction Activity to Economic Growth

Although we cannot directly measure changes in corrupt activities by firms in and connected to the extraction sector, if the increase in economic development following foreign corruption regulation is attributable to a reduction in corruption, we expect the activities of extraction firms to provide more benefits to the local community (e.g., by selecting the most economically efficient rather than the most politically connected supplier or contractor). To assess this possibility, we examine changes in the association between resource production and economic development around 2004 for facilities subject to the FCPA, relative to those that are not.

Examining changes in the association between resource production and economic development is complicated by two concerns. First, production decisions are endogenous. For instance, if the economic conditions in an area improve (e.g., because of business development unrelated to natural resources), resource extraction could become more profitable, and production quantities could increase. Second, because not all firms report facility-level production, data are limited.

To mitigate these concerns, we use variation in world commodity prices as an instrument for production quantities based on the idea that production should

increase as the world commodity price increases (and vice versa). Fluctuations in world commodity prices are plausibly exogenous to the production decisions of individual facilities (i.e., individual extraction sites are too small to affect global commodity markets), and thus likely satisfy the exclusion restriction (below we provide evidence that the instrument also satisfies the relevance criterion). Using world prices as an instrument also has the advantage that it does not restrict our sample (Dube and Vargas 2013; Berman et al. 2017).[12] We collect commodity prices from the *US Geological Survey* and the *World Bank Commodities* database and exclude coal and natural gas, for which there is no uniform global price.

These results, which condition the baseline association between foreign corruption regulation and economic activity on an exogenous shock to production, also alleviate the concern that a shock around 2005 (unrelated to the extraction sector) that differentially affects treated and non-treated cells could present an alternative explanation for our results. For instance, if the firms subject to foreign corruption regulation tend to operate in areas where their headquarter country has close economic connections (e.g., former colonies), any factor correlated with that economic connection that changes around 2005 (e.g., trade agreements, headquarter-country growth, or development aid) represents a potential correlated omitted variable. The narrower focus on how extraction activity maps into local economic development alleviates concerns about omitted variables that are uncorrelated with changes in world commodity prices. Table 2 reports descriptive statistics for the price instrument.

4.2.1 Relevance of World Commodity Prices as an Instrument

We assess the relevance of the price instrument by examining the association between commodity prices and resource production at the facility level

[12] A potential concern is that changes in commodity prices are highly correlated, limiting the variability of the instrument. However, as shown in Internet Appendix Section IA5.2, there is significant variation in world prices across commodities over time.

(for the subset of facilities that report production quantities) using the following OLS regression:

$$Production_{c,t} = \beta_1 Ln(Price_{m,t}) + Fixed\ Effects + \varepsilon_{c,t} \quad (3)$$

Production is the production value (calculated using constant commodity prices from the year 2000) for the facility in cell *c* and year *t*. *Price* is the average world price for commodity *m* in year *t*. We include *Property*×*Commodity* and *Year* fixed effects and test for statistical significance using Conley (1999) standard errors corrected for spatial correlation within a 500-km radius.

Table 5 Panel A Column (1) reports results. The *Ln(Price)* coefficient estimate is positive and statistically significant, indicating that facilities produce more when world commodity prices are higher. The coefficient magnitude, which can be interpreted as an elasticity, implies that a one percent increase in commodity prices is associated with a 0.807 percent increase in production. This elasticity decreases to 0.760 when we additionally control for region-specific time trends in Column (2). Overall, the results in Table 5 Panel A indicate that world commodity prices are a relevant instrument for extraction activities.

4.2.2 Unconditional Association between Commodity Prices and Luminosity

To provide a benchmark for how resource extraction affects economic activity, we examine the unconditional association between world commodity prices and luminosity. We use Eq. (3) but replace *Production* with *Luminosity*. Figure 4 graphs the β_1 coefficient estimates and 95% confidence intervals for cells with radii from 10 to 50 kilometers. The association between luminosity and commodity prices is positive for all radii and statistically significant for a radius of 10 kilometers when we include *Property*×*Commodity* and *Year* fixed effects, and for all reported radii when we replace *Year* with *Region*×*Year* fixed effects. At 10 kilometers, the β_1 coefficient estimate implies an elasticity of luminosity to world commodity prices of approximately 0.05. Consistent with the increase in luminosity

being attributable to the extraction facility, regardless of the fixed effect structure, the association between resource prices and luminosity monotonically declines in the radius of the cell.[13]

4.2.3 Contribution of Resource Extraction to Development

To examine how foreign corruption regulation affects the mapping of resource extraction into economic activity, we estimate the following regression:

$$\begin{aligned} Ln(Luminosity_{c,t}) = {} & \beta_1 FCR_i \times Year_t \times Ln(Price_m) \\ & + \beta_2 FCR_i \times Year_t + Fixed\ \ Effects + \varepsilon_{c,t} \end{aligned} \tag{4}$$

Similar to Eq. (1), we first estimate the treatment effect by year. As in Eq. (1), we include *Property*×*Commodity* and *Commodity*×*Year* fixed effects. In addition, we include *FCR*×*Year* fixed effects to control for time-trends in luminosity that differ between cells where facilities are subject to foreign corruption regulation and those that are not. We test for statistical significance using Conley (1999) standard errors corrected for spatial correlation within a 500-km radius.

Figure 5 Panel A graphs the results from estimating Eq. (4). The estimated counterfactual treatment effects in the pre-treatment period are close to zero and statistically indistinguishable from the benchmark period. In the post-period, variation in resource production in treated cells, as captured by changes in world commodity prices, exhibits an increasing association with luminosity relative to control cells. The treatment effect stabilizes at an increase in the elasticity between luminosity and commodity prices of around 0.025—an approximately 50% increase relative to the unconditional association between luminosity and commodity prices in a 10-kilometer radius, reported in Figure 4.

[13] Consistent with the evidence in Mamo et al. (2019), the positive association between resource extraction and luminosity also provides evidence against a strong form of the resource curse in Africa—although it does not preclude a less extreme version of the resource curse whereby the positive economic impact of resource extraction is less than what it would have been in the absence of corruption.

In Table 5 Panel B, we report the magnitude of the average increase in extraction activities' contribution to economic growth over the entire post-2004 period and report several robustness tests. The baseline results reported in Column (1) suggest that, in the pre-period, the effect of extraction activities on economic growth is higher in areas with a facility subject to foreign corruption regulation relative to areas that are not, but the difference is not statistically significant (the *FCR×Ln(Price)* coefficient is 0.085). More importantly, the estimated treatment effect of foreign corruption regulation, *FCR×Post 2004× Ln(Price)*, is 0.020 and statistically significant. The magnitude of the coefficient estimate implies a 40% increase relative to the unconditional association between luminosity and commodity prices in the 10-kilometer radius reported in Figure 4.

In Figure 5 Panel B, we graph the *FCR×Post2004×Ln(Price)* coefficient estimates and their corresponding 95% confidence intervals for cells with radii of 10 to 50 kilometers. We find that the impact of foreign corruption regulation on the association between production and luminosity decreases monotonically in the length of the radius around the extraction sites. The point estimates are positive for the radii up to 25 kilometers but statistically significant only within 10 kilometers of the extraction site.

In Table 5 Panel B Columns (2) to (5), we present the results of the same four sensitivity tests we report in Table 3. First, the estimated treatment effect increases to 0.026 in Column (2) when we transform our luminosity variable using the inverse hyperbolic sine. Second, we find results almost identical to the baseline model when we measure luminosity based on the donut-shaped 1-10 km area around the extraction site (coefficient of 0.019 compared to 0.020 in Column 1). Third, when we control for time-varying factors that are correlated with Africa's five regions in Column (4), the estimated treatment effect attenuates from 0.020 to 0.017 but remains statistically significant at the 10% level. Fourth, in Column (5), we find no evidence that a facility's being under US jurisdiction or being

headquartered in an OECD country is associated with a treatment effect absent an increase in FCPA enforcement.

Overall, consistent with firms and local officials in and around the extraction sector altering their business practices after the post-2004 increase in FCPA enforcement, the evidence in this section suggests that extraction firms' contribution to local economic activity is higher in the presence of foreign corruption regulation.

4.3 New Firms Entering the Extraction Sector

Our findings that perceived corruption decreases and economic growth increases after foreign corruption regulation could be explained by extraction facilities being acquired by firms that do not pay bribes (perhaps because they are more productive than bribe-paying firms). In this section, we examine whether changes in ownership can explain the increase in extraction firms' contribution to local economic development.

To assess whether new owners drive the observed increase in economic activity, in Internet Appendix Section IA6, we examine changes in luminosity around mine ownership changes in the post-2004 period. These results indicate that, among extraction sites that change owners, the increase in growth mainly occurs before the ownership change. This suggests that the increase in economic activity is more likely attributable to changes in how existing owners operate extraction sites than new (non-bribe paying firms) entering the market.[14]

[14] This finding raises the question of how firms can continue to operate without paying bribes. One possibility is that firms appease local officials by engaging in business practices that are more beneficial to the local communities where they operate (but that were more expensive than paying a bribe prior to the increase in FCPA enforcement). In Internet Appendix Section IA7, we report some of the activities firms report engaging in that could potentially benefit the local communities where they operate. Based on micro survey data from 2010 (Boly et al. 2015), we show (cross-sectionally) that OECD firms operating in Africa report that they are more likely than non-OECD firms to hire local suppliers, train local employees, and pay their employees more.

5. Conclusion

Recognizing the negative economic impact of corruption in developing countries, governments in many developed countries have enacted regulations to curb the bribery of foreign public officials. The most prominent and widely enforced of these foreign corruption regulations is the US FCPA. We examine the impact of a significant increase in FCPA enforcement on economic development in the corruption-prone African extraction sector. Measuring local economic activity by nighttime luminosity, we document that, after the increase in FCPA enforcement, economic activity increases by 14% within a radius of 10 kilometers of extraction facilities whose owners are subject to the FCPA. This increase in economic development is concentrated in areas with weak political institutions, where we expect that the resource curse is most prevalent. Consistent with a decline in corruption contributing to the increase in economic activity, local perceptions of corruption decline, and peoples' satisfaction with the local government increases. We find no evidence of a decline in employment in the extraction sector. Rather, consistent with the increase in economic activity being driven (at least in part) by extraction firms shifting to business practices that are more beneficial (or less detrimental) to the local communities where they operate, the association between extraction activities and local economic activity increases by 40%.

Our findings suggest that foreign corruption regulation can be an effective policy instrument for changing corporate behavior and that, despite any increase in the costs of operating in high-corruption-risk countries, foreign corruption regulation originating in developed countries can have a positive impact on the economic conditions in developing countries—that is, it can (to some extent) mitigate factors that contribute to the political resource curse. This is important because developing countries may not themselves have the institutional strength or political will to address misconduct by multinational corporations.

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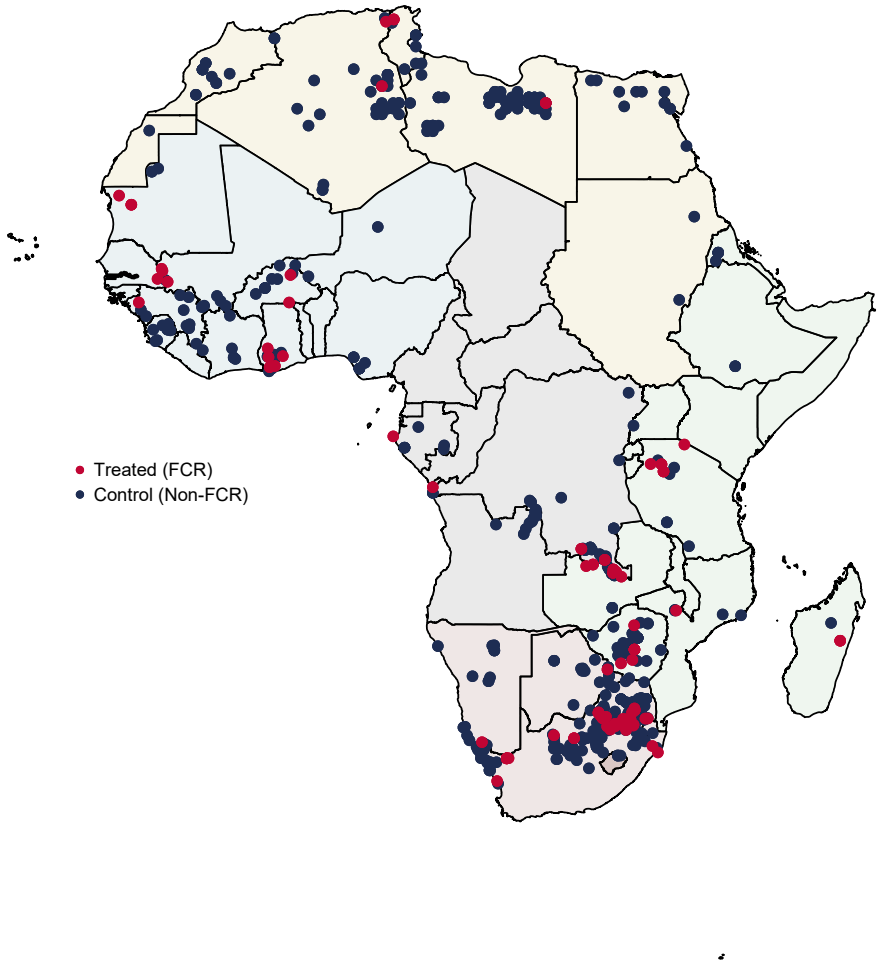
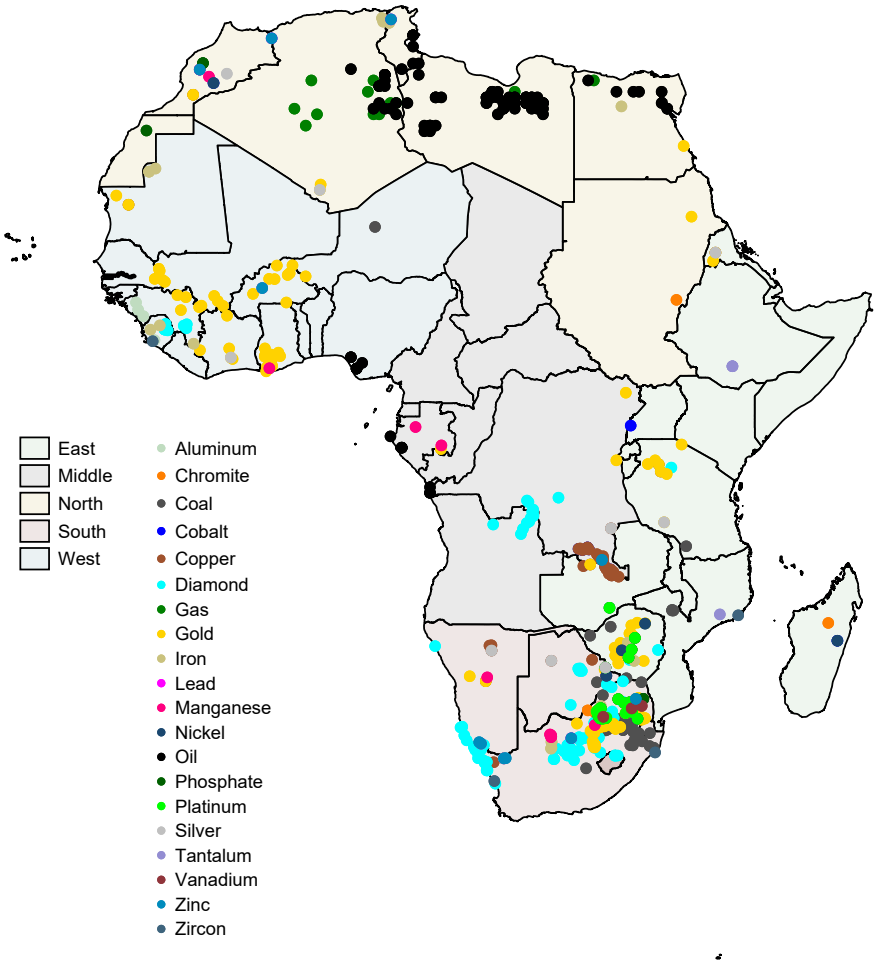
Figure 1: Geographical Distribution of Extraction Facilities and Commodities

Panel A: Treated and Control Extraction Facilities



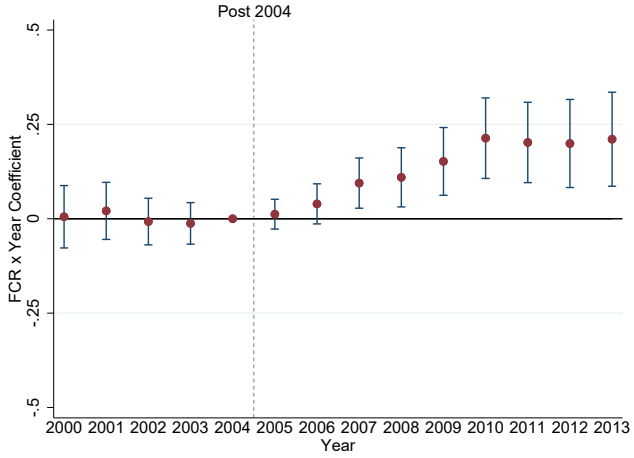
Panel B: Extraction Facilities by Commodity



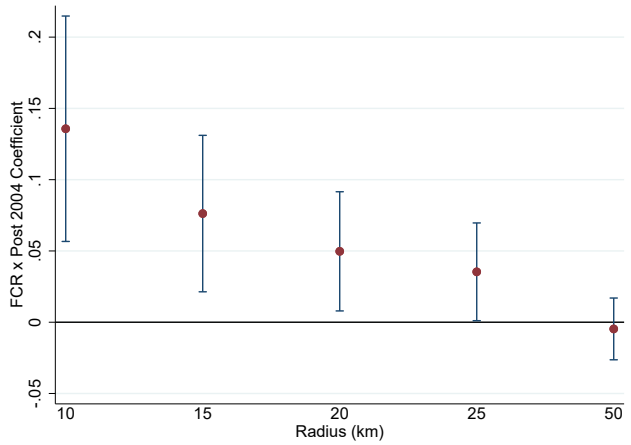
Notes: Panel A shows the geographical location of treated and control facilities in our sample. Treated extraction facilities have at least one significant owner (with an ownership stake of 20% or more) in 2004 who is headquartered, cross-listed, or operates a segment in the US and is from a signatory country of the OECD Anti-Bribery Convention. All other extraction facilities belong to the control group. Panel B shows the geographical location of extraction facilities in our sample by commodity. Both figures also show the five main geographic regions of Africa.

Figure 2: Foreign Corruption Regulation and Economic Activity in Extraction Areas

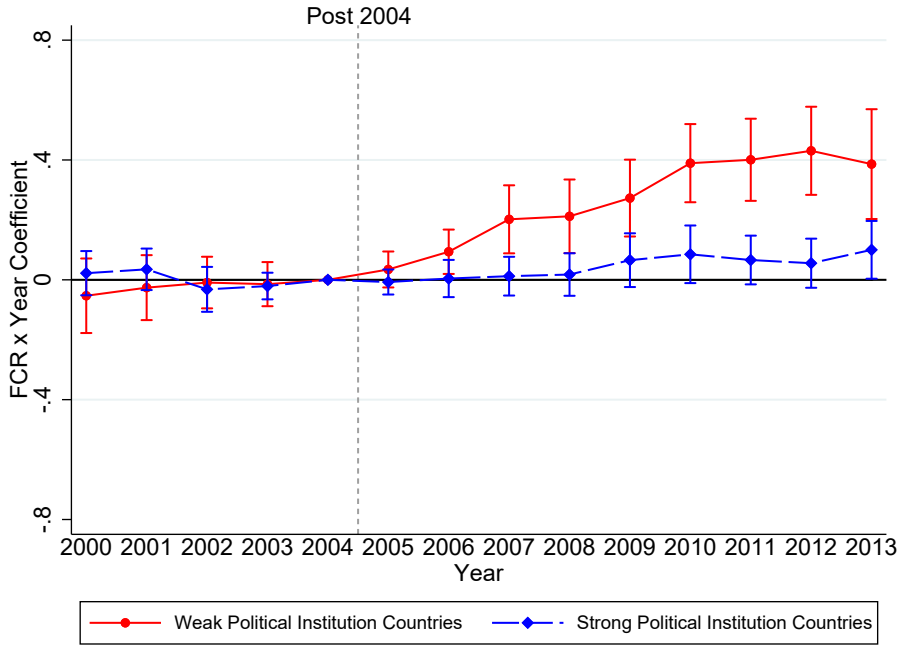
Panel A: Event-time Chart



Panel B: Spatial Diffusion of Luminosity Effect

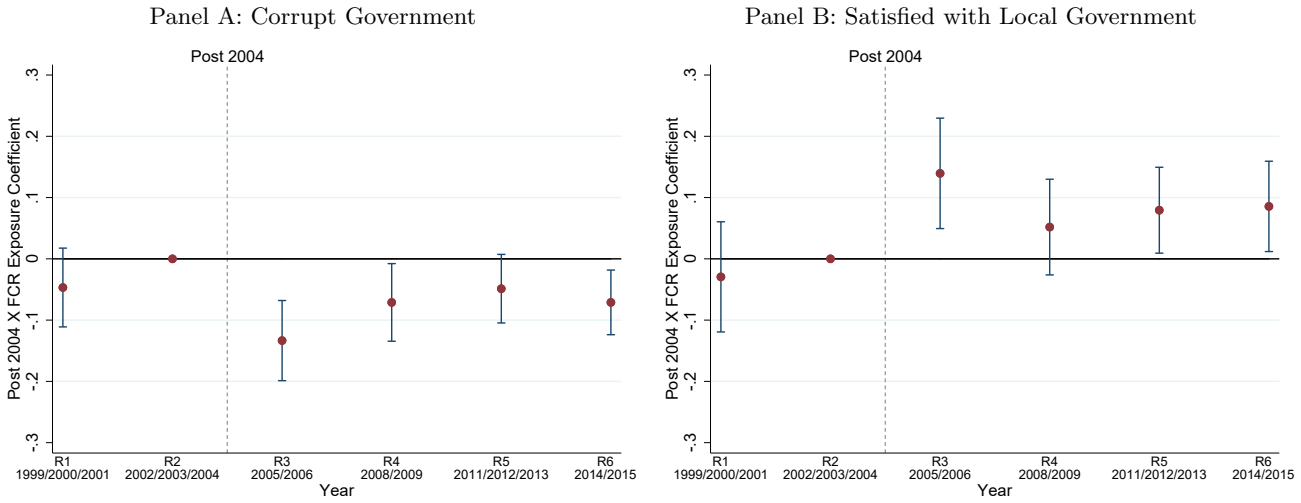


Panel C: The Role of Political Institutions



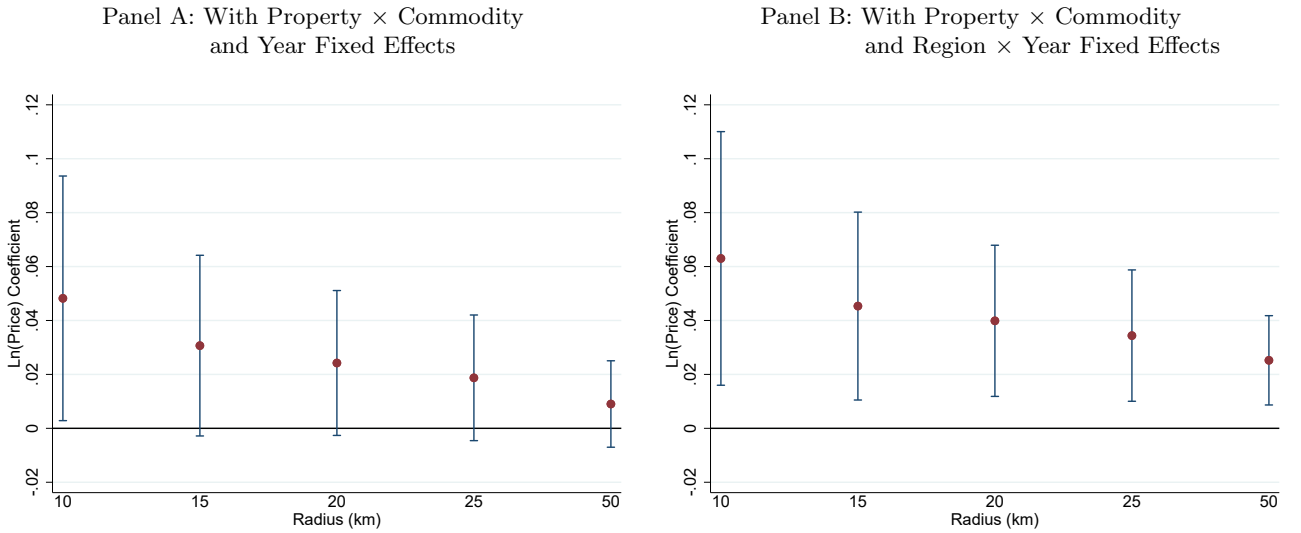
Notes: Panel A shows coefficient estimates and 95% confidence intervals for OLS regressions estimating the effect of the post-2004 increase in FCPA enforcement on nighttime luminosity. We estimate the model from Column (1) of Table 3 but replace the *FCR* × *Post 2004* indicator with separate interactions for each of the years in our sample (except for 2004, which serves as the benchmark). Panel B shows coefficient estimates of *FCR* × *Post 2004* and 95% confidence intervals for cell areas with radii of 10km, 15km, 20km, 25km, and 50km, respectively. We estimate the model from Column (1) of Table 3 but use different cell areas. Panel C shows coefficient estimates and 95% confidence intervals for OLS regressions estimating the effect of the post-2004 increase in FCPA enforcement on nighttime luminosity for weak and strong political institution countries, respectively. We estimate the model from Columns (6) and (7) of Table 3 but replace the *FCR* × *Post 2004* indicator with separate interactions for each of the years in our sample (except for 2004, which serves as the benchmark).

Figure 3: Foreign Corruption Regulation, Perceptions of Corruption, and Satisfaction with Local Officials



Notes: Panel A shows coefficient estimates and 95% confidence intervals for OLS regressions estimating the effect of the post-2004 increase in FCPA enforcement on the perceived corruption of government officials. We estimate the model from Column (1) of Table 4 Panel B, but replace the *FCR Exposure* × *Post 2004* indicator with separate interactions for each survey round in our sample (except for round 2, which serves as the benchmark). Panel B shows coefficient estimates and 95% confidence intervals for OLS regressions estimating the effect of the post-2004 increase in FCPA enforcement on the perceived satisfaction with local governments. We estimate the model from Column (3) of Table 4 Panel B, but replace the *FCR Exposure* × *Post 2004* indicator with separate interactions for each survey round in our sample (except for round 2, which serves as the benchmark).

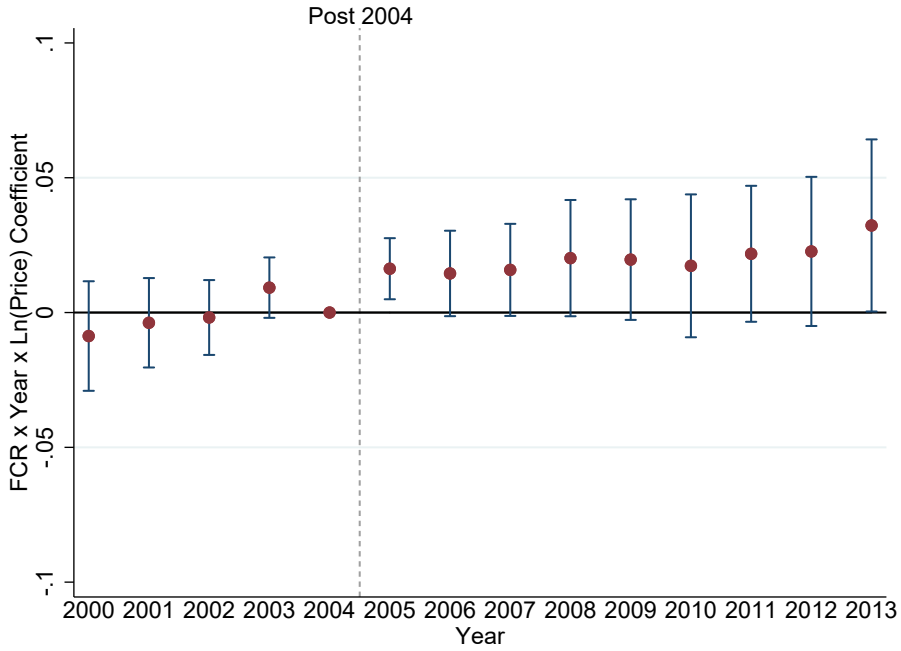
Figure 4: Unconditional Association between Commodity Prices and Luminosity



Notes: This figure shows the coefficient estimates and 95% confidence intervals of OLS regressions estimating the association between world commodity prices and nighttime luminosity for cell areas with radii of 10km, 15km, 20km, 25km, and 50km, respectively.

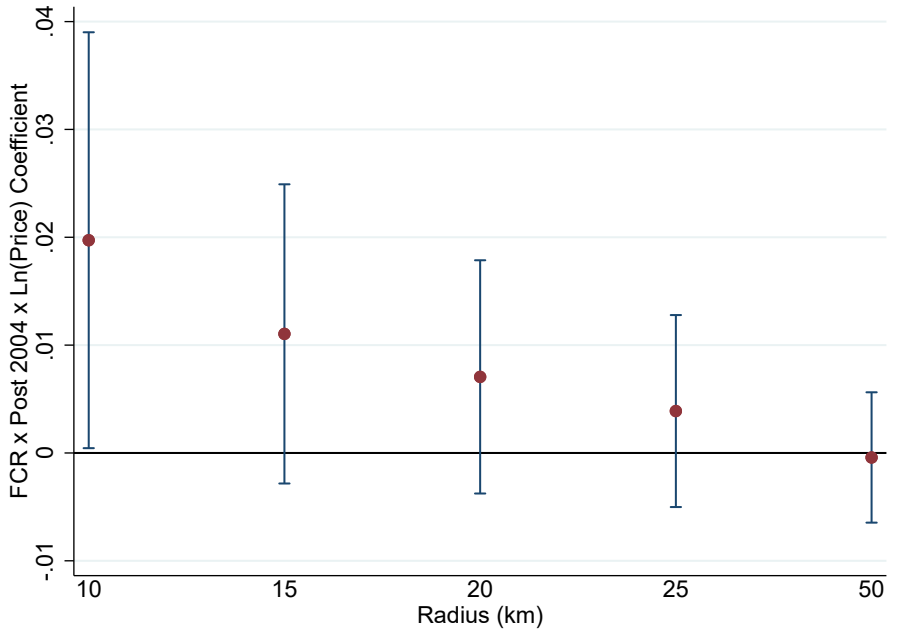
Figure 5: Foreign Corruption Regulation and the Contribution of Resource Extraction to Development

Panel A: Event-time Chart



Notes: Panel A shows coefficient estimates and 95% confidence intervals for OLS regressions estimating the effect of the post-2004 increase in FCPA enforcement on the association between world commodity prices and nighttime luminosity. We estimate the model from Column (1) of Table 5 Panel B but replace the *FCR* × *Post 2004* × *Ln(Price)* indicator with separate interactions for each of the years in our sample (except for 2004, which serves as the benchmark).

Panel B: Spatial Diffusion of Luminosity Effect



Notes: Panel B shows coefficient estimates of *FCR* × *Post 2004* × *Ln(Price)* and 95% confidence intervals for cell areas with radii of 10km, 15km, 20km, 25km, and 50km, respectively. We estimate the model from Column (1) of Table 5 Panel B but use different cell areas for our dependent variable *Ln(Luminosity + 1)*.

Table 1: Characteristics of Extraction Areas

Panel A: Perceived Corruption of Foreign Businessmen

	Number of Respondents	Perceived Corruption of Foreign Businessmen	Difference Extraction vs. Non-Extraction Areas (p-value)
Extraction Areas (0-50km)	15,165	0.0714	0.0711 (0.000)
Non-Extraction Areas	15,190	0.0004	

Notes: This table presents descriptive statistics for corruption perceptions of foreign businessmen in extraction and non-extraction areas. P-values of the mean comparison t-tests are reported in parentheses. We de-mean *Perceived Corruption of Foreign Businessmen* before computing averages for extraction areas and non-extraction areas. A survey location is in an extraction area if the distance between the survey location and the closest extraction property is less than or equal to 50km. A survey location is in a non-extraction area if the distance between the survey location and the closest extraction property is more than 50km. *Perceived Corruption of Foreign Businessmen* is the average response value for the Afrobarometer survey question: *How many of the following people do you think are involved in corruption, or haven't you heard enough about them to say: Foreign businessmen?* 0=None, 1=Some of them, 2= Most of them, 3=All of them.

Panel B: Employment in Mining Sector

	Number of Respondents	Fraction of Mine Workers	Difference Mining vs. Non-Mining Areas (p-value)
Mining Areas:			
0-10km	1,407	0.182	0.173 (0.000)
0-15km	2,369	0.179	0.170 (0.000)
0-20km	3,709	0.166	0.157 (0.000)
0-25km	5,115	0.154	0.145 (0.000)
0-50km	15,874	0.097	0.088 (0.000)
Non-Mining Areas (> 50km)	18,044	0.009	

Notes: This table presents descriptive statistics for mining-related employment in mining and non-mining areas. P-values of the mean comparison t-tests are reported in parentheses. A survey location is in a mining area if the distance between the survey location and the closest mine is less than or equal to 10km, 15km, 20km, 25km, and 50km, respectively. A survey location is in a non-mining area if the distance between the survey location and the closest mine is more than 50km. *Fraction of Mine Workers* is the fraction of workers that indicated their main occupation as *Miner* based on the Afrobarometer survey question: *What is your main occupation? (If unemployed, retired, or disabled, what was your last main occupation?).*

Table 2: Descriptive Statistics for Luminosity Analyses

	N	Mean	SD	P1	P25	P50	P75	P99
Luminosity (10)	10,318	7.662	10.399	0.000	0.476	3.046	10.317	44.141
Luminosity (1-10)	10,318	7.596	10.369	0.000	0.449	2.964	10.158	44.151
Luminosity (15)	10,318	6.190	8.566	0.000	0.439	2.336	8.843	37.104
Luminosity (20)	10,318	5.361	7.329	0.000	0.393	2.071	7.750	32.284
Luminosity (25)	10,318	4.786	6.396	0.000	0.396	2.045	7.099	28.341
Luminosity (50)	10,318	3.544	4.619	0.000	0.308	1.651	4.824	20.418
FCR	10,318	0.155	0.362	0.000	0.000	0.000	0.000	1.000
USJ Non-OECD	10,318	0.199	0.400	0.000	0.000	0.000	0.000	1.000
Non-USJ OECD	10,318	0.141	0.348	0.000	0.000	0.000	0.000	1.000
Post 2004	10,318	0.643	0.479	0.000	0.000	1.000	1.000	1.000
Price	8,694	6,430.251	10,334.401	0.024	1.450	51.800	10,400.000	38,200.000

Notes: This table presents descriptive statistics for the luminosity analyses in Table 3 and Table 5 Panel B. We describe the sample selection in Internet Appendix Section IA2. The sample is from 2000 to 2013. *Luminosity (X)* is the stable light mean unsaturated nighttime luminosity within an X km radius of the respective property, where we consider X values of 10, 1-10, 15, 20, 25, and 50. *FCR* is a binary indicator equal to one if an extraction facility has at least one significant owner (with an ownership stake of 20% or more) in 2004 who is headquartered, cross-listed, or operates a segment in the US and is from a signatory country of the OECD Anti-Bribery Convention. *USJ Non-OECD* is a binary indicator equal to one if a property has at least one significant owner (with an ownership stake of 20% or more) in 2004 who is cross-listed or operates a segment in the US but is not from a signatory country of the OECD Anti-Bribery Convention. *Non-USJ OECD* is a binary indicator equal to one if a property has at least one significant owner (with an ownership stake of 20% or more) in 2004 who is from a signatory country of the OECD Anti-Bribery Convention but is not cross-listed and does not operate a segment in the US. *Post 2004* is a binary indicator equal to one for years after 2004. *Price* (in USD) is the world price of a given commodity in a given year.

Table 3: Foreign Corruption Regulation and Economic Activity in Extraction Areas

	Baseline	Sensitivity Analyses				Role of Institutions	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Dependent Variable: Ln(Luminosity (10) + 1)	0-10 km Radius	Asinh (Luminosity)	1-10 km Radius	Within Region × Year	USJ Non-OECD and Non-USJ OECD	Weak Political Institutions	Strong Political Institutions
FCR × Post 2004	0.136	0.184	0.130	0.141	0.134	0.290	0.043
	(0.040)	(0.052)	(0.039)	(0.039)	(0.041)	(0.074)	(0.043)
USJ Non-OECD × Post 2004					-0.030		
					(0.040)		
Non-USJ OECD × Post 2004					0.043		
					(0.039)		
Difference in Coefficients (p-value):							
[FCR–USJ Non-OECD]×Post 2004					0.00		
[FCR–Non-USJ OECD]×Post 2004					0.08		
Weak–Strong Political Institutions						0.02	
Fixed Effects:							
Property × Commodity	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region × Year	No	No	No	Yes	No	No	No
Commodity × Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Property-Commodity-Year Observations	10,318	10,318	10,318	10,318	10,318	3,836	5,824

Notes: This table reports coefficient estimates of OLS regressions estimating the effect of the post-2004 increase in FCPA enforcement on nighttime luminosity in extraction areas. We describe the sample selection in Internet Appendix Section IA2. The sample is from 2000 to 2013. Conley (1999) standard errors allowing for spatial correlation within a 500km radius and for infinite serial correlation are reported in parentheses. *Luminosity (10)* is the stable light mean unsaturated nighttime luminosity within a 10 km radius of the respective property. *Luminosity (1-10)* is the stable light mean unsaturated nighttime luminosity within a 1-10 km radius of the respective property. *FCR* is a binary indicator equal to one if an extraction facility has at least one significant owner (with an ownership stake of 20% or more) in 2004 who is headquartered, cross-listed, or operates a segment in the US and is from a signatory country of the OECD Anti-Bribery Convention. *USJ Non-OECD* is a binary indicator equal to one if a property has at least one significant owner (with an ownership stake of 20% or more) in 2004 who is cross-listed or operates a segment in the US but is not from a signatory country of the OECD Anti-Bribery Convention. *Non-USJ OECD* is a binary indicator equal to one if a property has at least one significant owner (with an ownership stake of 20% or more) in 2004 who is from a signatory country of the OECD Anti-Bribery Convention but is not cross-listed and does not operate a segment in the US. *Post 2004* is a binary indicator equal to one for years after 2004.

Table 4: Effect of Foreign Corruption Regulation on Perceptions of Corruption and Satisfaction with Local Officials

Panel A: Descriptive Statistics

	N	Mean	SD	P1	P25	P50	P75	P99
FCR Exposure	56,276	0.176	0.381	0.000	0.000	0.000	0.000	1.000
Corrupt Government	56,276	0.444	0.497	0.000	0.000	0.000	1.000	1.000
Post 2004	56,276	0.767	0.423	0.000	1.000	1.000	1.000	1.000
Female	56,276	0.489	0.500	0.000	0.000	0.000	1.000	1.000
Urban	56,276	0.438	0.496	0.000	0.000	0.000	1.000	1.000
Age	56,276	37.151	14.779	18.000	25.000	34.000	46.000	79.000

	N	Mean	SD	P1	P25	P50	P75	P99
FCR Exposure	54,423	0.185	0.389	0.000	0.000	0.000	0.000	1.000
Satisfied with Local Government	54,423	0.528	0.499	0.000	0.000	1.000	1.000	1.000
Post 2004	54,423	0.769	0.421	0.000	1.000	1.000	1.000	1.000
Female	54,423	0.492	0.500	0.000	0.000	0.000	1.000	1.000
Urban	54,423	0.428	0.495	0.000	0.000	0.000	1.000	1.000
Age	54,423	37.386	14.907	18.000	26.000	34.000	46.000	79.000

Notes: This table presents descriptive statistics for the perception analyses in Table 4 Panel B. We define all variables in Table 4 Panel B. The sample is from 1999 to 2015.

Panel B: Regressions

	Corrupt Government		Satisfied with Local Government	
	(1)	(2) Including	(3)	(4) Including
	Baseline	Controls	Baseline	Controls
FCR Exposure × *Post 2004*	-0.043	-0.044	0.103	0.103
	(0.019)	(0.019)	(0.025)	(0.025)
FCR Exposure	-0.002	0.005	-0.052	-0.060
	(0.017)	(0.017)	(0.024)	(0.024)
Controls:				
Female		-0.021		0.010
		(0.004)		(0.004)
Urban		0.055		-0.069
		(0.006)		(0.007)
Ln(Age)		-0.019		0.051
		(0.006)		(0.006)
Fixed Effects:				
Region × Year	Yes	Yes	Yes	Yes
Commodity	Yes	Yes	Yes	Yes
Standard Error Clusters:				
Village	4,531	4,531	4,340	4,340
Adjusted R-Squared	0.051	0.055	0.051	0.057
Observations	56,276	56,276	54,423	54,423

Notes: This table reports coefficient estimates of OLS regressions estimating the effect of the post-2004 increase in FCPA enforcement on the perceived corruption of government officials and the perceived satisfaction with local governments. The sample is from 1999 to 2015. Standard errors clustered at the village level are reported in parentheses. *FCR Exposure* is a binary indicator equal to one if the closest extraction facility within 100 km of a survey respondent has at least one significant owner (with an ownership stake of 20% or more) in 2004 who is headquartered, cross-listed, or operates a segment in the US and is from a signatory country of the OECD Anti-Bribery Convention. *Corrupt Government* is a binary indicator equal to one if the response value to the following Afrobarometer survey question equals "Most of them" or "All of them": *How many of the following people do you think are involved in corruption, or haven't you heard enough about them to say: Government officials?*. *Satisfied with Local Government* is a binary indicator equal to one if the response value to the following Afrobarometer survey question equals "Approve" or "Strongly approve": *Do you approve or disapprove of the way the following people have performed their jobs over the past twelve months, or haven't you heard enough about them to say: Your Local Government/official/assembly?*. *Post 2004* is a binary indicator equal to one for years after 2004. *Female* is a binary indicator equal to one if the respondent's gender is female. *Urban* is a binary indicator equal to one if the respondent lives in an urban area. *Age* is the age of the respondent.

Table 5: Extraction Activities' Contribution to Economic Growth

Panel A: Association between World Commodity Prices and Local Commodity Production

	(1)	(2)
Dependent Variable:	Ln(Production+1)	Ln(Production+1)
Ln(Price)	0.807	0.760
	(0.351)	(0.343)
Fixed Effects:		
Property × Commodity	Yes	Yes
Year	Yes	No
Region × Year	No	Yes
Property-Commodity-Year Observations	7,350	7,350

Notes: This table reports the coefficient estimates of OLS regressions estimating the association between world commodity prices and property-level production. We describe the sample selection in Internet Appendix Section IA2. The sample is from 2000 to 2013. Conley (1999) standard errors allowing for spatial correlation within a 500km radius and for infinite serial correlation are reported in parentheses. *Price* (in USD) is the world price of a given commodity in a given year. *Production* is the reported actual production of the respective commodity (in metric tonnes) in a given year multiplied by the world commodity price in 2000.

Panel B: Foreign Corruption Regulation and the Contribution of Resource Extraction to Development

	Baseline	Sensitivity Analyses			
	(1)	(2)	(3)	(4)	(5)
Dependent Variable:	0-10 km	Asinh	1-10 km	Within	USJ Non-OECD
Ln(Luminosity (10) + 1)	Radius	(Luminosity)	Radius	Region × Year	and Non-USJ OECD
FCR × Post 2004 × Ln(Price)	0.020		0.019	0.017	0.010
	(0.010)		(0.010)	(0.010)	(0.004)
FCR × Ln(Price)	0.085		0.086	0.083	0.122
	(0.070)		(0.066)	(0.067)	(0.055)
FCR × Post 2004 × Asinh(Price)		0.026			
		(0.012)			
FCR × Asinh(Price)		0.118			
		(0.092)			
USJ Non-OECD × Post 2004 × Ln(Price)					-0.006
					(0.014)
USJ Non-OECD × Ln(Price)					-0.054
					(0.053)
Non-USJ OECD × Post 2004 × Ln(Price)					0.004
					(0.003)
Non-USJ OECD × Ln(Price)					0.079
					(0.046)
Difference in Coefficients (p-value):					
[FCR–USJ Non-OECD]×Post 2004×Ln(Price)					0.26
[FCR–Non-USJ OECD]×Post 2004×Ln(Price)					0.16
Fixed Effects:					
Property × Commodity	Yes	Yes	Yes	Yes	Yes
Region × Year	No	No	No	Yes	No
Commodity × Year	Yes	Yes	Yes	Yes	Yes
FCR × Year	Yes	Yes	Yes	Yes	Yes
Property-Commodity-Year Observations	8,694	8,694	8,694	8,694	8,694

Notes: This table reports coefficient estimates of OLS regressions estimating the effect of the post-2004 increase in FCPA enforcement on the association between world commodity prices and nighttime luminosity. We describe the sample selection in Internet Appendix Section IA2. The sample is from 2000 to 2013. Conley (1999) standard errors allowing for spatial correlation within a 500km radius and for infinite serial correlation are reported in parentheses. *Luminosity (10)* is the stable light mean unsaturated nighttime luminosity within a 10 km radius of the respective property. *Luminosity (1-10)* is the stable light mean unsaturated nighttime luminosity within a 1-10 km radius of the respective property. *FCR* is a binary indicator equal to one if an extraction facility has at least one significant owner (with an ownership stake of 20% or more) in 2004 who is headquartered, cross-listed, or operates a segment in the US and is from a signatory country of the OECD Anti-Bribery Convention. *USJ Non-OECD* is a binary indicator equal to one if a property has at least one significant owner (with an ownership stake of 20% or more) in 2004 who is cross-listed or operates a segment in the US but is not from a signatory country of the OECD Anti-Bribery Convention. *Non-USJ OECD* is a binary indicator equal to one if a property has at least one significant owner (with an ownership stake of 20% or more) in 2004 who is from a signatory country of the OECD Anti-Bribery Convention but is not cross-listed and does not operate a segment in the US. *Post 2004* is a binary indicator equal to one for years after 2004. *Price* (in USD) is the world price of a given commodity in a given year.