



Mines and Early Industrialization

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EQUALITY • SOCIAL ORGANIZATION • PERFORMANCE

ESOP

Emergence

- ▶ In analyzing the role of the welfare state in the development process it is important to recognize that the welfare state itself may be affected by economic development.
- ▶ In particular, structural shifts away from agriculture into organized labor are likely to spur political action.

The project

- ▶ We will contrast the Scandinavian development with the situation in present day Africa and Latin America to learn about the interplay between development and policies.
- ▶ A strong focus will be on industrial mining but we will also investigate other types of structural changes to local economies such as dams and industries more generally.

Outline

Mining in Africa

Mining and local corruption in Africa

Early Industrialization and Protests: Evidence from African Industrial Mines

Mining in the Nordic countries

Mining in Latin America

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Mining and local corruption in Africa

- ▶ Carl Henrik Knutsen, Andreas Kotsadam, Eivind Olsen, and Tore Wig (Minor revisions, *AJPS*)

Introduction

- ▶ A large literature has studied the adverse political and institutional consequences of natural resources (e.g. Boix 2003; Ross 2012).
- ▶ Cross country regressions show either a positive relation between resources and corruption (Leite and Weidmann 1999, Busse and Gröning, 2013) or no relation (e.g. Ades and Di Tella 1999, Treisman 2000, and Serra 2006).

What do we do?

- ▶ Geographically match industrial mines in Sub-Saharan Africa to over 90,000 respondents from four Afrobarometer waves in 33 countries using detailed spatial information.
- ▶ Compare communities close to mines with those further away.
- ▶ Compare communities before and after mine openings.
- ▶ Analyze the effects of industrial mining on corruption and explore the mechanisms for such effects.

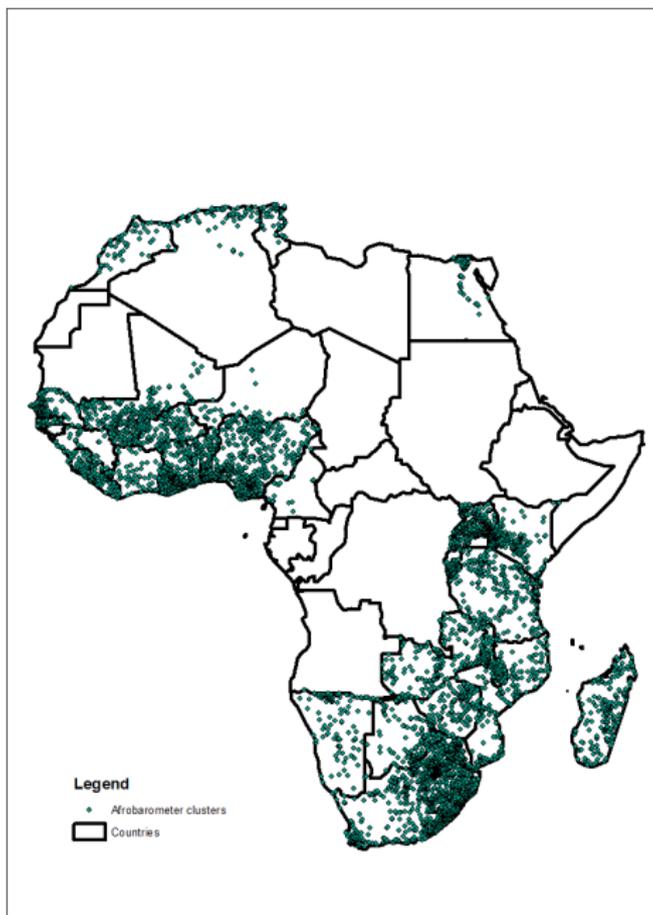
Data on mining

- ▶ We use a novel, longitudinal dataset on large-scale mines, The Raw Materials Database.
- ▶ The data is geocoded with point coordinates, and mine production data exist annually for 1975 and 1984-2013.
- ▶ It excludes small-scale mines and informal, artisanal or illegal mines.



Data on corruption

- ▶ Afrobarometer data on 92,762 respondents from 33 countries.
- ▶ Respondents are asked if they have paid a bribe “for avoiding problems with the police” or “for a document or permit”.
- ▶ And how many of their local government councilors and within the police they think are corrupt.
- ▶ We geolocated respondents using geographical information obtained from the Afrobarometer. [▶ Details](#)



Idea and finding

- ▶ We compare clusters far away and clusters close to a mine and clusters with an active mine to clusters with a not yet active mine.
- ▶ We find that mine openings clearly increase bribe payments.

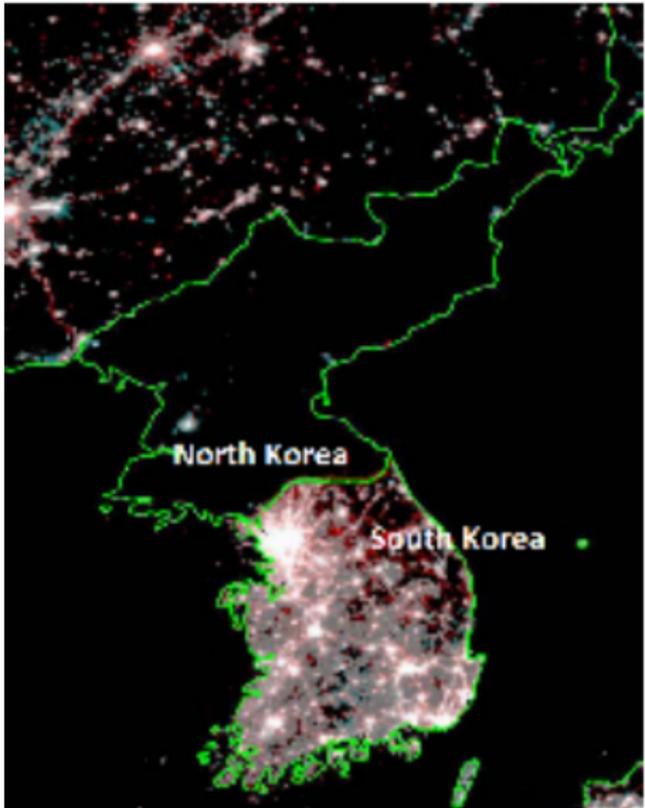
Why we think mining increase corruption locally

- ▶ We address two types of mechanisms linking mining to local corruption; one focusing on **supply** of funds available for corruption, and another on **demand** for bribes generated by inflows of corrupt officials.
- ▶ Both come in two versions—a “**general growth version**” (assuming mining income is equivalent to income from other sources), and a “**mining-specific version**” highlighting that resource extraction may have more corruption-generating potential than other activities.
- ▶ This yields 2*2 explanations, each with distinct testable implications.

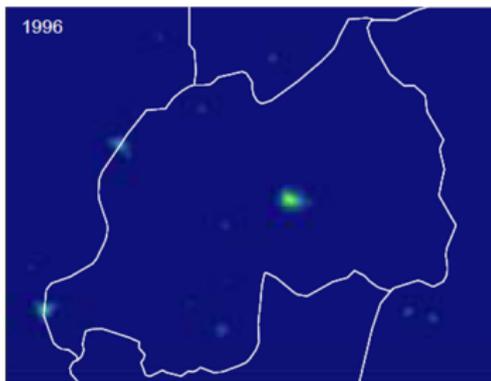
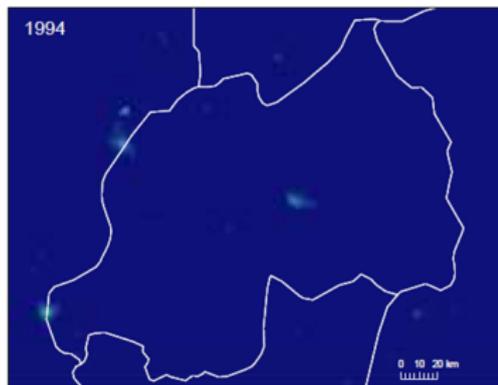
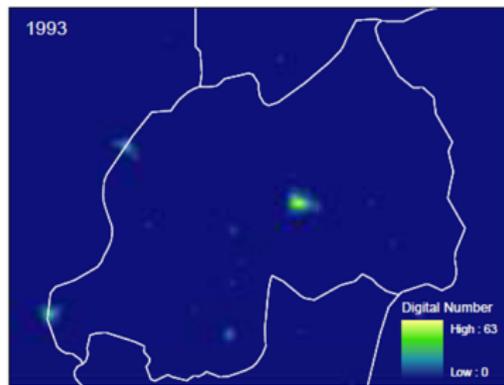
Test of the hypotheses

- ▶ In order to test the demand mechanism, highlighting that mining may attract corrupt officials, we incorporate data on whether the Afrobarometer interviewer observed Police or a police station in the PSU.
- ▶ To test the mechanisms related to the supply of funds available for corruption we need a measure of income at the local level that varies over time.
- ▶ We use nighttime light. [▶ Details](#)

The Korean peninsula 2000



UiO: Effects of the Rwandan genocide



Findings

- ▶ Using a difference-in-differences strategy, we find that mine openings clearly increase bribe payments.
- ▶ We do not find that mining increases corruption simply by boosting economic activity, or clear evidence that mining acts as a “honey-pot” in attracting new officials.
- ▶ However, increased economic activity has a significantly stronger relationship with bribes in mining areas.
- ▶ Further, mine openings induce more police bribes even when holding police presence constant. Taken together, this suggests that the mining-specific supply mechanism contributes to explain why mining increases corruption.

Early Industrialization and Protests: Evidence from African Industrial Mines

- ▶ Carl Henrik Knutsen, Andreas Kotsadam, Eivind Olsen, and Tore Wig

Introduction

- ▶ Does industrialization increase the prospects for contentious collective action, stimulating activities such as protests, strikes, and riots?
- ▶ And, if industrialization has this effect, why is this so?
- ▶ Few questions have spurred greater interest among historians and social scientists in the 18th and 19th centuries.
- ▶ Nonetheless, while much ink has been spelt on these issues, and quite different plausible theoretical arguments remain widely accepted even today, definite answers remain elusive.

Different perspectives

- ▶ The classic position on this issue, famously espoused by Marx and Engels in their Communist Manifesto, is that industrialization creates widespread social grievances and opportunities for collective action.
- ▶ A contrary argument, going back at least to de Toqueville, holds that industrialization reduces the prospects for revolution by alleviating poverty, and that it is rather economic crises that lead to protest.
- ▶ A contemporary strand holds that economic growth, and by consequence industrialization, should make societies less prone to uprisings by increasing the opportunity costs of potential rebels (Collier and Hoeffler, 2004).

Why mines?

- ▶ Many historical cases of mining-induced grievances in industrializing Europe.
- ▶ A sector with many of the same traits as early industrialization:
- ▶ Hazardous worker conditions, Clear employee-employer hierarchies, Creates dense worker networks conducive to mobilization, Known to generate local inequality and absolute growth, (often) rapid industrialization in (previously) rural areas.

Uio: **Class conscious guys**



Mining strikes in the UK



UiO: Marikana riots



Preliminary results

- ▶ Using the Afobarometer we find that mine openings increase the propensity to demonstrate, discuss politics, attend meetings, and raise issues.
- ▶ Using SCAD we find that mine openings cause more riots and demonstrations.
- ▶ Using survey data from South Africa we find that mine openings increase unionization.

More to come

- ▶ We will proceed by investigating the proposed potential mechanisms underlying this relationship by testing:
 1. Whether areas with high mining-induced economic growth are less prone to protest (opportunity costs)
 2. Whether areas with mining-induced increases in economic inequality are more prone to protest (grievances)
 3. Whether the increased social coordination is driving the results.

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Plans

- ▶ In the analysis of Norway we will make use of data on trade union membership, protests, and turnout on the one hand and connect it to data on location of industries and mines on the other.
- ▶ As a first step we will analyze the effects of local structural change in terms of mining and industrialization on trade union membership and political participation.
- ▶ Secondly, we will investigate the effects on elections and policies.

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Plans

- ▶ We plan to link the mining data to high quality survey data on distributional, labor, and social issues in Latin America from CEDLAS.
- ▶ To survey data on political participation, trade union membership, and experience of corruption from the Latin America Public Opinion Project as well as the Latinobarometro.
- ▶ To data on violence, poverty, and education from the Socio-Economic Database for Latin America and the Caribbean.

Appendix

Details on matching (1)

- ▶ This respondent-to-mine matching algorithm, which turns out surprisingly effective, was evaluated using a benchmark from South Africa: We compared the precision of our Google maps-based coordinates with those in Nunn and Wantchekon (2011) by measuring distance between estimated locations and true locations using EA information from the 2001 South African census.
- ▶ The average distance from the EA, i.e. the geolocation error, is 124km for Nunn and Wantchekon (2011) and 13km with our coordinates.

Details on matching (2)

- ▶ For Afrobarometer Wave 4, Deconinck and Verpoorten (2013) have more precise coordinates than Nunn and Wanthcekon for Wave 3, but less precise than us.
- ▶ Our geocoding precision is fairly similar for Waves 2 and 5, and altogether we located 97% (11,647/11,999) of South African respondents at the EA level. [▶ Back](#)

Satellite light density at night

- ▶ United States Air Force have satellites circling the earth 14 times per day recording the intensity of Earth-based lights.
- ▶ Every location on the planet is observed every night at some instant between 8:30 and 10:00 pm local time.
- ▶ The raw data is processed by removing observations experiencing e.g. cloudy nights, the summer months when the sun sets late, auroral activity and forest fires. [▶ Back](#)

Satellite light density at night

- ▶ Finally, data from all orbits of a given satellite in a given year are averaged over all valid nights to produce a satellite-year dataset.
- ▶ A digital number ranging from 0 to 63 is produced (0.1 percent is top censored, mainly capital areas in developed countries).
- ▶ Data is available at approximately every sq. km. (0.86 at the equator). [▶ Back](#)

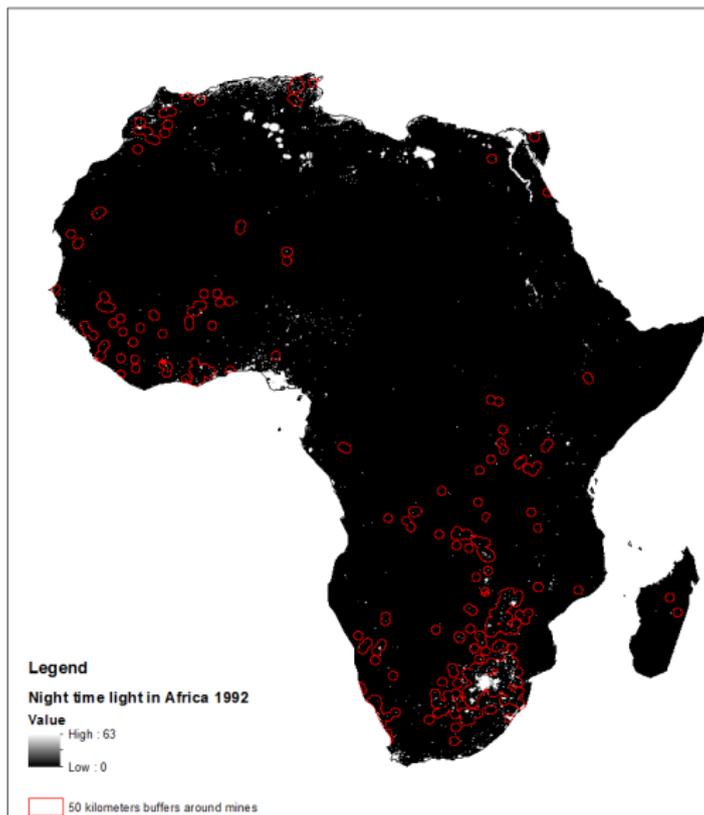
Operationalization

- ▶ From each Afrobarometer cluster point, given by its GPS coordinates, we create buffer zones in terms of concentric circles with a radius of 50 kilometers.
- ▶ We also exclude all water areas (sea and lakes) as people do not live on the water and since there are “gloomings effects” of water bodies (Pinkovskiy, 2013).
- ▶ We then proceed to calculate zonal statistics using ArcGIS for the Afrobarometer areas for each year and each satellite for which we have luminosity data.

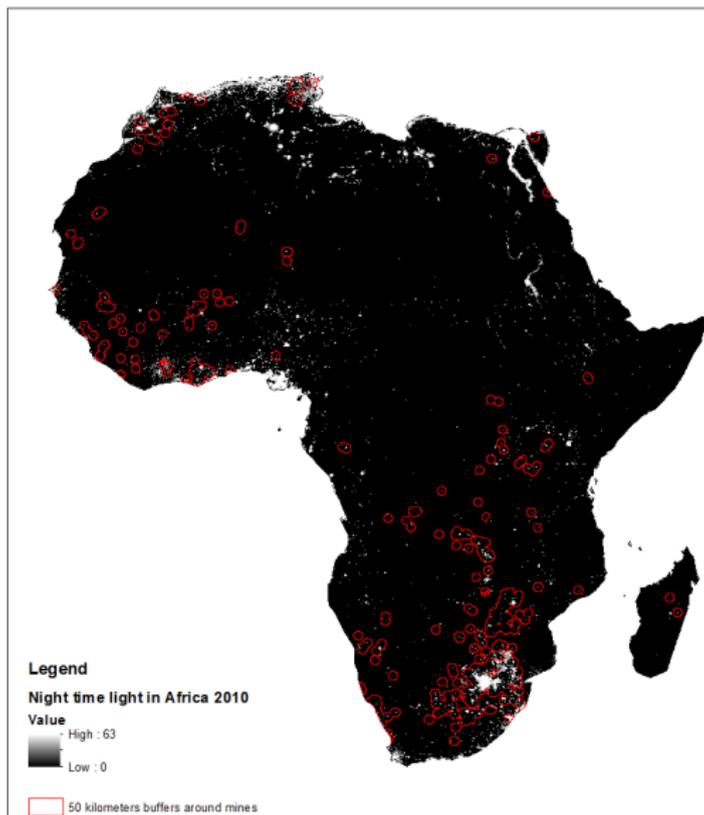
Is it a relevant measure?

- ▶ Several recent studies have provided empirical evidence showing that nighttime light corresponds well to economic activity and well-being (e.g., Alesina, Michalopoulos and Papaioannou (2015), Almås, Johnsen and Kotsadam (2014), Henderson, Storeygard and Weil (2012), Michalopoulos and Papaioannou (2013), and Pinkovskiy and Sala-i Martin (2014). [▶ Back](#)

UiO: Light in Africa 1992



UiO: Light in Africa 2010



Details on robustness tests

- ▶ There are seven other bribe measures that are available in *some* of the surveys (education, border crossing, services, health care, water, as well as bribes to election officials and bribes to tax officials).
- ▶ Out of the seven bribe items tested, six result in a positive difference-in-differences estimate. Further, two difference-in-differences results are statistically significant even at the 1 percent level, namely “Bribe for Services” and “Bribe to Tax officials”. Moreover, “Bribe for Border crossing” has a p-value of 0.054. [▶ Back](#)

IV details

- ▶ We instrument active by number of mines (active and inactive) within a band of 100-200km from the respondent.
- ▶ This instrument serves as a proxy for favorable geological conditions for mining in the area, and should be correlated with mining activity within 0-50km from respondents. Importantly, we exclude the band 50-100km, to alleviate concerns that corruption spillovers could introduce biases in our results (as noted, the results hold when we also control for national corruption, and we provide further empirical tests suggesting that large-distance spillovers are not a problem). [▶ Back](#)

Mineral presence interacted with mineral-year specific conditions

For each respondent in cluster i and year t , our instrument IV_{it} is given by:

$$IV_{it} = \sum_{j=1}^n \left(\frac{nactive_{jt}}{nmines_j} \times nwithin100_200_{ij} \right), \quad (1)$$

where the sum runs over mineral j in the set of n distinct minerals in our mining data.

IV details

- ▶ Finally, because one might anticipate that mineral prices affect the status of mines, we instrument with a 5-year moving average of mineral price interacted with the number of mines extracting that specific mineral within 100-200km. [▶ Back](#)

Table A.52: Instrumental variables regressions (2SLS)

	(1)	(2)	(3)	(4)
A: Second stage	Bribe to Police	Bribe to Police	Bribe to Police	Bribe to Police
Active 50 km	0.078 (5.19)	0.12 (2.45)	0.083 (5.33)	0.059 (3.40)
Mean dep. var	0.157	0.157	0.157	0.157
No. of observations	92,762	92,762	92,762	92,762
B: First stage	Mines 100-200km	>0 mines 100-200km	Share active	Price*presence
nwithin100_200	0.0088 (21.89)			
d_nwithin100_200		0.17 (13.47)		
sactive_nwithin			0.018 (25.98)	
price_maXpresence				0.0064 (16.04)
R-squared	0.387	0.314	0.385	0.291
No. of observations	92,762	92,762	92,762	92,762

Notes: Standard errors are clustered at EA/town level and t-statistics are in parentheses. All first- and second-stage regressions control for country- and year-fixed effects, urban area, age, age², female and education. See notes to table A.2 for information on Afrobarometer waves and sample construction.

Exclusion restriction

- ▶ The results also turn out very robust in alternative models controlling also for WBGI national-level “Control of corruption” (to ensure that national corruption does not affect both the instrument and the dependent variable).
- ▶ One potential threat is that the exclusion restriction on the mineral presence within 100-200km component fails, due to spillovers of corruption over large distances.
- ▶ We find no indications of this, however. [▶ Back](#)