Government Policy & Natural Resource Sector FDI: Quasi-Experimental Evidence from Liberia

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The Ellen Johnson-Sirleaf administration has made natural resource sector FDI the centerpiece of its growth and development strategy. Since 2006, it has granted more than a third of its land to foreign investors; these companies have been granted contractual rights to extract and export iron ore, gold, palm oil, rubber, and other natural resources. However, similar efforts by previous administrations led to “concession enclaves” with weak links to local economy.
Johnson-Sirleaf administration has stipulated in its contracts with private investors that they must also build and rehabilitate roads, railways, ports, bridges, power plants, and health and education systems in and around the communities where their investments are physically sited.

Johnson-Sirleaf administration is one of a growing number of governments in Africa pursuing a development corridor strategy:

- Mozambique, Senegal, Sierra Leone,
- Tanzania, Burkina Faso, DRC

MOTIVATION FOR STUDY

Do development corridor strategies work?
Development corridor strategies are guided by the belief that concentrating and co-locating public and private investments in specific geographic areas will:

- Create clusters of interconnected firms
- Nurture the development of value chains
- Reduce unemployment
- Improve the provision of basic public services

Our study provides first-of-its-kind evidence on whether these types of strategies can yield significant economic development benefits.
1. Do the local areas in which the Liberian government has granted concessions to foreign investors experience faster rates of economic growth than those areas without concessions?

2. Do concession and concessionaire attributes differentially affect local economic growth outcomes?
   - Sector (e.g. agriculture vs. mining)
   - Investor nationality (e.g. U.S. vs. China)
   - Absence or presence of corporate social responsibility commitments

3. Is there any evidence that the Ellen Johnson-Sirleaf administration’s development corridor strategy is working?
Future Corridors
12-Buchanan-Nimba-
13-Monrovia-Bong-
14-Monrovia-Camp No Way
15-Greenville-Putu
Existing Economic Corridors
Potential Iron-based DC’s

Population Density
Per Sq. Mile
1 - 30
31 - 60
61 - 100
101 - 4000

Market Frequency
Weekly
Daily
1
5
10

Primary Data Source:
Liberia Institute of Statistics and Geo-Information Services
Map Projection: UTM Zone 29N
Datum: WGS 84

Source: Government of Liberia, 2010. This map was provided by Dr. Lucie Phillips of IBI International upon request, and we are republishing it with permission from Mr. Sebastian Muah, who oversaw the preparation of the Government of Liberia’s development corridor strategy during his period of service as Deputy Minister for Economic Affairs and Policy in Liberia’s Ministry of Planning and Economic Affairs.
In partnership with the Concessions Working Group, AidData developed a dataset of all known natural resource concessions granted to investors in Liberia from 2004 to 2015.

We systematically categorized 557 concessions on 43 different dimensions, including:

- Nationality of concessionaire or its parent company
- Sector of investment
- Presence or absence of contractual commitments to undertake corporate social responsibility activities
We also developed a novel, polygon-based (rather than point-based) geocoding methodology that identifies the specific tracts of land granted to concessionaires (investors) to explore, develop, extract, or sell natural resources.

Allows us to calculate at a high-level of spatial resolution (1km x 1km grid cells) whether and when any particular location in Liberia was “treated” with an FDI project.

OUTCOME MEASURE

We use a remotely sensed measure of subnational economic activity: annual nighttime light data.
Need to overcome the “selection” problem -- the risk that ‘treated’ locations have features that predispose them to higher levels of economic growth even in the absence of FDI.

Example: ‘treated’ locations might be closer to markets and population centers where economic growth will be higher, irrespective of FDI.
ESTABLISHING A CREDIBLE COUNTERFACTUAL

Identify matched pairs of treated and untreated locations

We use a battery of spatial covariates from satellite imagery, weather stations, household surveys, and administrative records to identify matched pairs of treated and untreated locations that were equally likely to receive the "treatment" of natural resource sector FDI.

The method helps us to establish a credible counterfactual — that is, to identify a set of comparison cases that had very similar pre-treatment characteristics to the treated cases but that did not receive treatment.
Measuring the attributable, net impact of a policy or program requires a credible counterfactual
Evaluation Period: 2006-2013

Location: Liberia

Unit of analysis: 1km x 1km grid cells

Treatment: Proximity to natural resource concessions (5km, 10km, 15km, 20km, 25km, 30km)

Outcome: Nighttime light growth

Covariates: Slope, elevation, precipitation, temperature, urban travel time, population density, distance to roads, proximity to development projects, household education, household literacy, household wealth, household size, various head of household characteristics (age, gender, marital status, religion, employment status), and pre-treatment levels and trends in nighttime lights

Methodology: Matched difference-in-differences estimation
FINDING #1

Average treatment effects

Natural resource concessions improve local economic growth outcomes

On average, natural resource concessions increase nighttime light by .58% in the 25 km surrounding concession areas, which roughly corresponds to a .17% increase in local GDP.
FINDING #2
Heterogeneous treatment effects by sector

Mining concessions have a positive effect on local economic growth

By contrast, no robust evidence that agricultural concessions register consistent effects on economic outcomes

Source: Acemoglu and Robinson 2012
FINDING #3

Heterogeneous treatment effects by investor nationality

U.S. concessions do not have a discernible effect on local economic growth, but Chinese concessions do. Chinese mining investments increase nighttime light output by 1.26% in the 20 km surrounding their concession areas, which is roughly equivalent to a 38% increase in local GDP.
The evidence is consistent with theory of change underpinning the GoL’s development corridor strategy.

Concessions subject to more demanding public good provision requirements (i.e. mining investment projects) produced higher levels of local economic growth than those that faced less demanding public good provision requirements (i.e. agricultural investment projects).

Chinese investors, who have generally been more willing and able to satisfy the GoL’s public good requirements than U.S. investors, are delivering stronger growth larger economic growth impacts.
In very poor, unlit areas (grid cells with values of 0 on the 0-63 luminosity scale), it is more difficult to detect (modest) changes in local economic development outcomes. Thus, we cannot draw any causal inference about the welfare impacts of concessions on the ultra-poor.

Future research ought to evaluate whether and how natural resources concessions impact non-economic outcomes, such as social protest, land conflict, violence, and deforestation.

The growing availability of subnational geo-referenced investment, outcome, and covariate data has put this analysis within reach: http://geo.aiddata.org/
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EXTRA SLIDES
Figure 2: Effect of all concessions on local economic growth.
Figure 3: Effect of agricultural and mining concessions on local economic growth.
Figure 4: Effect of concessions with and without CSR projects on local economic growth.
Figure 5: Effect of U.S. and Chinese concessions on local economic growth.
(a) U.S. Concession without CSR project  (b) Chinese Concession without CSR project
(a) U.S. mining concession  

(b) Chinese mining concession
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