



Natural resource sector FDI, government policy, and economic growth: Quasi-experimental evidence from Liberia



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ABSTRACT

Governments use a variety of policies to increase the impact of foreign investment on economic growth. An increasingly popular policy is to require that foreign companies provide public goods near the communities where their commercial investments are sited. This approach seeks to crowd in additional investments, create clusters of interconnected firms, and set in motion economic agglomeration processes. Post-2006 Liberia represents an ideal empirical setting to test the effectiveness of this approach. We construct a new dataset that measures the precise locations of 557 natural resource concessions granted to investors. We then merge these data with a remotely sensed measure of nighttime light growth at the 1 km × 1 km grid cell level and analyze it using a matched difference-in-differences strategy. We find heterogeneous treatment effects across sectors and investor types: mining (specifically iron-ore) investments projects have positive growth effects, while agriculture and forestry investment projects do not; furthermore, concessions granted to Chinese investors have positive growth effects while those given to U.S. investors do not. These patterns of heterogeneous treatment effects across sectors and investor types are consistent with the theory of change underpinning the government's development corridor strategy.

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1. Introduction

Estimating the economic effects of foreign direct investment (FDI) is a challenge that has vexed scholars and policymakers for decades. The effects of FDI almost certainly vary across country and project characteristics, making generalizations difficult. In addition, even though FDI projects are sited in specific locations, available data are typically aggregated to the country level resulting in imprecise estimates.¹ Faced with these challenges, scholars have turned to sub-nationally geo-referenced investment, outcome, and covariate data and quasi-experimental methods of causal inference (Aragón & Rud, 2013, 2016; Fafchamps, Koelle, & Shilpi, 2016; Knutsen, Kotsadam, Olsen, & Wig, 2017; Zhu, 2017). We make three contributions to this emerging body of work.

First, we evaluate the impact of FDI on local economic growth outcomes in post-2006 Liberia, which pursued a unique policy approach: in contrast to previous approaches—where host governments provided public goods to attract foreign investors—the Ellen Johnson-Sirleaf administration has required that foreign companies provide public goods. It has granted concessions that allow foreign investors to extract iron ore, gold, palm oil, timber, rubber, and other natural resources. However, these concession agreements also stipulate that investors must build and maintain public infrastructure—including roads, bridges, ports, railways, and power plants—near the communities where their commercial activities are sited. This strategy seeks to create new ‘development corridors’ by using privately provided public goods to set in motion economic agglomeration processes (Speakman & Koivisto, 2013).

Second, we identify the specific conditions under which this approach is most effective. We do this by assembling a dataset of all known natural resource concessions that the Liberian government granted to investors between 2004 and 2015, and then geo-referencing this dataset by constructing polygons that correspond to the specific tracts of land granted to concessionaires. We also categorize each concession by sector and investor type.

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¹ See Section 2.1 of the [Online Appendix](#) for a review of this literature.

Third, in order to address the non-random assignment of the treatment (i.e. the possibility that locations with FDI may be different from locations without FDI in a way that threatens causal inference), we use a propensity score matching procedure to first prune our sample such that it only includes ‘treated’ and ‘untreated’ locations that are extremely similar across a large number of observed covariates and equally likely to receive treatment. This procedure minimizes the risk that ‘treated’ locations have features that predispose them to higher levels of economic growth independently of FDI. We then use a difference-in-difference strategy to compare changes in local economic growth in otherwise similar subnational localities with and without investment projects. We use a remotely sense measure of nighttime light growth as a proxy for local economic growth (Henderson, Storeygard, & Weil, 2012; Weidmann & Schutte, 2017).

We recognize that investments in the natural resource sector may have negative, second-order effects, such as increased corruption and environmental degradation (Aragón & Rud, 2013; Knutsen et al., 2017). With respect to initial effect of FDI on economic outcomes, however, our results suggest that extractive sector FDI has improved local economic growth in Liberia. We also find a pattern of heterogeneous treatment effects that is consistent with the theory of change underpinning the government’s development corridor strategy. Concessions that were subject to more demanding public good provision requirements (mining investment projects in general and iron ore investment projects in particular) produced higher levels of economic growth than those that faced less demanding public good provision requirements (agricultural and forestry investment projects). Likewise, those investors that were particularly well-positioned to meet the public good requirements of the host governments (Chinese concessionaires) achieved larger economic growth impacts than investors that were less well-positioned to meet such requirements (U.S. concessionaires).²

2. Liberia’s FDI strategy

Governments have historically pursued three different strategies to increase the impact of foreign investment on domestic economic growth. Some governments have put their trust in the market mechanism and liberalized FDI inflows (Williamson, 2000, p. 252). These governments have refrained from regulating or directing foreign investment in the hopes that the market would instead identify the most optimal use of resources. A second strategy has involved the imposition of geographic restrictions by allowing foreign investors to operate only in specifically designated export processing zones. In these cases, governments hoped that the presence of foreign firms would enhance the productivity of domestic labor—for example, by training and educating a locally sourced labor force (Fosfuri, Motta, & Rønde, 2001; Gorg & Strobl, 2005). A third strategy has involved the imposition of operational requirements that foreign firms enter into joint ventures with domestic companies and share their technologies with indigenous firms. In these cases, government policy has focused on facilitating technology transfer (Wang & Blomström, 1992).

However, these strategies are most relevant to countries with existing infrastructure and an entrepreneurial base ready to benefit from knowledge and technology transfers. Liberia lacks these preconditions and has pursued a different strategy. The novelty of its approach is that, rather than supplying public goods for use by private investors, the government has required that incoming

investors provide public goods in or near the communities where their investments are physically sited. This strategy is premised on the idea that the concentration and co-location of private and public investments in specific geographic areas will crowd in additional investments, create clusters of interconnected firms, nurture the development of value chains, and set in motion economic agglomeration processes (Speakman & Koivisto, 2013).³

More specifically, the Johnson-Sirleaf administration has pursued a strategy of “develop[ing] spatial corridors off the back of concession-sponsored infrastructure” (AFDB, 2013, p. 34).⁴ In 2010, it articulated this strategy:

“[our] development corridor strategy will allow growth to accelerate by ‘crowding in’ investment, creating synergies among diverse activities along growth axes where users can share road-, rail-, port-, power-, telecommunications- and water infrastructure. . . . In the past, wasteful practices included mines created as autonomous island investments with their own infrastructure. Potential other users were closed out. . . . [Our] development corridor approach identifies potential other users of infrastructure from the start, and factors them into the design of the infrastructure. Planning shared infrastructure and communicating effectively with investors and communities can accelerate the process, reduce wasteful duplication of effort and improve both investor and community benefits.” (Government of Liberia, 2010, p. vii).

The Government of Liberia’s strategy assigns a higher level of priority to physical infrastructure investments than social sector investments such as schools and hospitals. There are good reasons to believe that the former will have larger, near-term impacts on economic growth than the latter. Existing empirical evidence indicates that investments in economic infrastructure (e.g. roads, railways, bridges, and electricity grids) produce more immediate and easily detectable growth effects (Clemens, Radelet, Bhavnani, & Bazzi, 2011), whereas the economic growth effects of human capital investment can take years, if not decades, to materialize (Mayer, 2001).

There is also descriptive evidence that suggests the government’s strategy of requiring concessionaires to invest in local public good provision may have increased the stock of physical infrastructure. While time-series data for road or rail density are not available, a recent IMF report indicates that about 1000 additional kilometers of roads were paved between 2006 and 2016 (IMF, 2016, p. 35). Liberia’s performance on UNCTAD’s Liner shipping connectivity index, which measures how well countries are connected to global shipping networks, also increased by 60% over the same period. Additionally, data from the World Bank suggest that the percentage of Liberians with access to electricity increased from 0.01% in 2003 to 9.14% in 2014. Yet it remains unclear if these changes have actually resulted in higher local economic growth. Our study seeks to address this question.

³ Alternatively, the government could have taxed foreign investors and used the proceeds to fund infrastructure itself. However, this is not the case in Liberia, for two reasons: First, fiscal revenues from foreign investors are low because the government agreed to generous tax breaks in exchange for concessionaires building public infrastructure (Qaiyim & Siakor, 2014, p. 11). Liberia’s Ministry of Planning and Economic Affairs estimated that the country’s six major iron ore concessions would together generate only \$129 million of government revenue (Government of Liberia, 2010, p. vii). Second, the government revenues that are generated via taxes on foreign investment are not used for specific infrastructure projects. Liberia’s Revenue Authority emphasizes this point, noting that “revenues from the extractive sectors are not earmarked for specific spending or regions in Liberia.” See <https://eiti.org/liberia#revenue-collection>, accessed October 6 2017.

⁴ Also, see Section 2.2 in the Online Appendix.

² We hypothesize that Chinese firms are better-positioned than U.S. companies to implement commercial investments and supply public goods in a timely manner. This might explain why Chinese-financed projects produce near-term economic growth impacts. See p. 14 for additional details.

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