



Land costs and citywide benefits of road improvements in a sub-Saharan African city: Evidence from Kampala

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- This study estimates the costs, benefits, and net returns of road improvements in Kampala, Uganda, a typical sub-Saharan African city.
- Improving the existing road network has local benefits, including improved road quality, increased traffic speed, and decreased dust. These factors increase the values of properties bordering these roads by an average of 26%.
- Improving the road network also generates citywide benefits through enhanced traffic flow and connectivity, approximately five times greater than the size of local benefits.
- Road improvement requires expensive additional land acquisition, representing a challenge for countries like Uganda, which faces the high cost of raising domestic funds. In turn, land costs can threaten the implementation of these projects.
- This policy brief highlights the costs and benefits of road improvements in Kampala and discusses policy implications.

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Introduction

Infrastructure is crucial for economic development, and African cities face a severe deficit in transportation infrastructure, with only one-third of roads paved (Kumar and Barrett, 2008). Despite clear evidence linking road quality and urban mobility with economic development, investments to tackle this infrastructure deficit are still limited (World Bank, 2019). In sub-Saharan Africa, governments face dauntingly high costs for infrastructure improvements, compounding the pre-existing challenges of raising domestic funds (Besley and Presson, 2014). This combination may suppress overall investments.

The costs and benefits of road improvements are multifaceted. Road improvements have both road-level and citywide benefits, as both firms and residents relocate in response to changing traffic patterns and a change in location amenities. Moreover, there are important costs beyond construction costs. For example, road improvements commonly require additional land that, by law, must be acquired from private landowners. Constrained governments often struggle to secure funding for these substantial additional expenses, hindering project implementation.

Overview of the research

This study (Sorin, 2024) estimates the net returns to road improvements in Kampala, Uganda, a sub-Saharan African city ranking at the 25th percentile of global traffic speeds (Akbar et al., 2023). Between 2017 and 2024, 140 km of roads were upgraded (paved and/or widened) in the city, or about 15% of the city's major roads (OpenStreetMap), requiring the acquisition of several feet of land on each side of existing roads. Unlike direct construction costs, land acquisition costs were not covered by funds from the World Bank and the African Development Bank. The high cost of land acquisition nearly jeopardized the project's viability, prompting the government to encourage owners to cede small portions of their land without compensation. This approach had mixed success across the city, and concerns were raised about owners' ability to exert their free will (World Bank, 2023).

To estimate the impacts of this infrastructure investment effort, this study collects the most comprehensive data to date on the net returns to road improvements in a sub-Saharan African city, accounting for costs and benefits to directly and indirectly affected stakeholders. The study conducts two surveys: a real estate broker survey (N=377) to recover land market values and a survey of landowners along upgraded roads (N=548) to examine actual land acquisition costs. Leveraging the coexistence of three property rights regimes in the city (Bird and Venables, 2020), the study characterizes the relationship between land costs and local property rights. Using variations in the timing of

road improvements, it estimates their local impacts on traffic patterns from Google Maps data and property values. Finally, with additional data from a local ride-hailing company, this study builds and estimates a model to measure the citywide benefits of road improvements.

Key findings

This study has four main findings on the impacts of realized road improvements in Kampala:

1. Road improvements had significant local benefits:

- Local traffic speed increased by 2 km/h during rush hour periods and up to 5 km/h during non-rush hour periods.
- Various amenities improved along implemented areas; perceived road quality improved, flooding and dust levels decreased, and security risk decreased.
- The value of properties on the side of the upgraded roads increased by an average of 26%.

2. Road improvements had large citywide benefits:

- Average commuting time decreased by 6.6%.
- Total property values in the city increased by 1.36%.
- Total net welfare gains at the city level were five times the local welfare gains.

3. In addition to construction costs, road improvements would have had prohibitively large land costs if the land had been acquired at market value, as mandated under the eminent domain legal framework:

- The market value of affected land is estimated at 81% of the construction costs.
- The government was able to acquire at least 80% of land without compensating landowners, decreasing land costs by an estimated 72%.
- Interviewed owners reported not claiming compensation for their affected land because of private benefits and the prohibitively high cost of obtaining copies of administrative documents needed for compensation.
- These reported private costs were heterogeneous across the city, including along the lines of Kampala's three property rights regimes.

Owners with weak or unclear property rights were less likely to be compensated.

4. High land payments threaten the implementation of road improvement projects with high benefits because of the high costs of raising domestic funds.

- Landowners not compensated for land acquisition may suffer harm, which compensations aim to mitigate.
- These compensations are often funded by raising property taxes and other fiscal costs on city residents, effectively transferring the burden to affected landowners.
- However, this transfer is not costless: Regan and Manwaring (2024) show that the Kampala city government recovers only 39 cents for every dollar due in property taxes. This is consistent with the high costs of raising domestic funds, partly due to corruption.

Policy implications

These findings have five main policy implications:

1. Local and citywide benefits should be included when assessing the impacts of road improvements or similar infrastructure projects.
2. Such projects have large costs beyond construction costs, including land acquisition costs.
3. Failure to account for land acquisition costs during these projects' design, funding, or evaluation stages may result in biased cost-benefit analyses and thus impact the set of implemented projects.
4. Because of the high cost of raising domestic funds, existing restrictions on using external funds may threaten the net returns on these projects.
5. Voluntary land take approaches like the one adopted by the Kampala city government – where landowners are asked to cede small portions of their land without compensation - may enable the implementation of high-benefit projects but also have unintended consequences:
 - a. First, owners may be hurt by the land take, especially if their property rights are relatively weak.
 - b. Second, the investments may be concentrated in areas of the city where land acquisition is the easiest, which may not be the areas where the benefits would be the largest.

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