Corruption and Disaster Impact in Sub-Saharan Africa's Transportation Sector

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Conceptual Model

Main Objectives

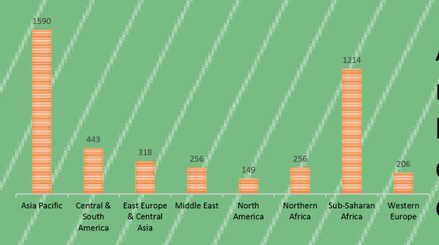
* Explore the relationship between governance (including corruption) and the impact of transportation-related hazards

*Highlight the importance of transportation hazards in SSA

* Develop/test a new model for assessing disaster impact

Context

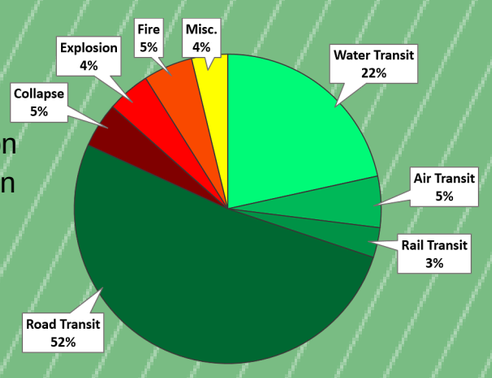
Frequency of Manmade Hazards



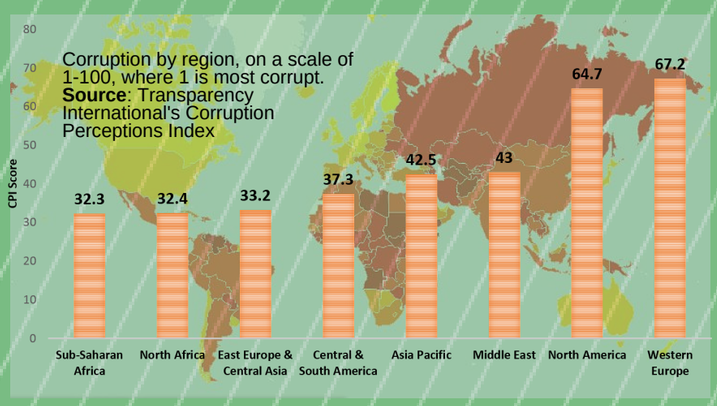
A large proportion of man-made hazards happen in SSA, compared to the rest of the world.

Types of Manmade Hazards in SSA

About 82% of man-made hazards in SSA are transportation related (based on data from 2000-2015).



Worldwide Corruption



What We Know: Literature

We know that corruption...

-- flourishes when legislative/judicial systems are weak and ethnic conflicts and divisions are deep (Johnston 1998, Mo 2001).
-- can put civil liberties at risk, create inequality, & compromise the integrity of government officials (Johnston 1998, Mbaku 2010).
-- increases mortality in disasters, and causes officials to refuse to spend money on mitigation and preparedness measures (Kahn 2005; Escaleras et al. 2007; Yamamura 2013).

We know that transportation...

-- is vital for economic development of developing regions, especially SSA (Njoh 2012, Oppong 2003).
-- infrastructure is weaker and less stable where corruption is present (Tanzi and Davoodi 1998)

How do We Measure Impact and Governance?

Measuring Hazard Impact

Measuring the overall impact of hazards in the number lifeyears lost to the burden of hazards (Noy 2015):

$$\text{Lifeyears Lost} = M\,(A^{exp}-A^{med}) + eTN^{EMDAT} + (1-c)Y/PCGDP$$

Variable	Indicator	Description	Source
M	Total deaths	Number of disaster related deaths	EM-DAT
A^{exp}	Life Expectancy, 2050	Total number of lifeyears that could potentially be realized by a citizen of the country in which disaster occurred	UN
A^{med}	Median age of population	A proxy to represent age at death	UN
N^{EMDAT}	Total affected	Number of people injured, homeless, or otherwise affected	EM-DAT
Y	Total damage	Financial damages (destroyed or damaged capital and infrastructure)	EM-DAT
PCGDP	GDP per capita (current US$)	Monetary amount obtained in a full year of human effort	World Bank
Pop	Total Population	Used to calculate LY lost per 100,000	World Bank

e= welfare reduction rate, weighted to measure association with disaster
T=time to return to normal
c= discount for time not spent doing work related activities

Measuring Governance and Corruption

World Governance Indicators (World Bank) aggregate multiple indices each year to produce measures of governance by country. While the margins of error for each of these measures is significant, they are lower than any one measure contained within them. Concepts measured in the WGI that are used for this research include:

* **Voice and Accountability** the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media
* **Regulatory Quality** the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development
* **Control of Corruption** the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests.

OK, But are these things related?

Analysis & Results

Unit of Analysis: Country-Year (52 countries, 15 years)
Dependent Variable: Lifeyears Lost per 100,000 in Population
Independent Variables:
6 Governance Indicators from World Bank
Transparency International's CPI
Urbanization Rate
Number of Vehicles per 100,000
Human Development Index

Regression Analysis:
The regression model with the most explanatory power:
R2 =.145, p<.001, n=308
Regressing the following variables on Lifeyears Lost per 100,000 in population:
Regulatory Quality = -154.308***
Voice and Accountability = 82.256***
Control of Corruption = 84.93***

In other words: When regulatory quality increases, fewer lifeyears are lost due to the burden of transportation hazards. However, when voice/accountability and control of corruption increase **more** lifeyears are lost!

Discussion

The results above do not reflect the original hypotheses or the conceptual model presented in this research.

Could this be an artifact of the data? We think so!

It stands to reason that in countries with more corruption, and where people are less likely to have a voice or government held less accountable, there would be fewer reports of the problems that plague the area, including transportation hazards

The takeaway of this research is thus that research and data collection in vulnerable regions is vital, so that the voices in these areas are heard, and we understand in more detail the issues that slow development and well-being of these vulnerable areas.

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