**ISF 110, Lab 8 – Linear regression analysis exercise**

**Introduction**

Poverty and insecurity are two major challenges facing many African countries. Two major policy responses look at how to tackle poverty and insecurity in Africa: modernizing infrastructure and improving governance. While there is considerable evidence that infrastructure can have major effects on developmental processes, these effects vary from place to place. In this lab, we will evaluate these two policy responses and answer the following research questions:

1. Can infrastructure help reduce poverty and insecurity?
2. Can good governance (e.g., rule of law, control of corruption, government effectiveness, democratic rule, and the quality of bureaucracy) help reduce poverty and insecurity?
3. Do the effects vary by rural and urban areas and geographic regions?

**Theoretical Background**

Sociologist Michael Mann argues that states can penetrate society and implement decisions by various logistic means, soft and hard, such as by using physical infrastructure to provide services to people and win their support, or by deploying security forces to coercively implement decisions. According to him, infrastructurally powerful modern democratic states are better able to provide certain basic services to people and enjoy more stability and legitimacy. In contrast, authoritarian regimes can extract resources, but they seldom provide sufficient goods and services to the citizenry. Mann (2014) claims that most states in the Middle East and North Africa (MENA) region use their advanced physical infrastructure to logistically implement state decisions and dominate civil society as needed. Outside the MENA region, Mann (2008) argues, the unevenness of infrastructural power in most African countries is linked to governance challenges and weak service delivery provisions. For example, lightly governed and infrastructurally undeveloped areas are vulnerable to civil wars or guerilla warfare as the state forces cannot easily go there to immediately contain the unrest. On the other hand, mineral-rich and infrastructurally developed areas are directly connected to the global market via multinational corporations (MNCs) that virtually control the extraction and management of natural resources. The government cannot easily mobilize these resources for developing infrastructure and providing services in other parts of the country and thus loses legitimacy. People view the government as not representing the whole society but serving the interests of certain regions or ethnic groups, or both. Consequently, the state becomes vulnerable to the military takeover. The military usually tries to intensify its despotic power which leads to a long-term decline in infrastructural power. Under despotic rulers with declining infrastructural power people suffer from persistent poverty and lack of security (Lucas 1998).

**Data and Methods**

We will use Afrobarometer Round 5 (2015) data to answer our research questions. The Afrobarometer data has a three-level hierarchical structure, with variables used from each of the following three levels: individual respondents (level 1) nested in primary sampling units or PSUs (level 2), which in turn are nested in countries (level 3). Since intercepts may vary across countries, and since the individual-level variables may have unequal slopes across countries, we need to use multilevel mixed-effects models to correct for biases in parameter estimates and standard errors. [However, the multilevel models take a long time to run. To avoid this, we will begin by running multiple linear regression. You can try the multilevel models if your computer has dual or multiple processors.]

As we did in Lab2, we first need to create a lived poverty index (LPI) and lived insecurity index (LII) based on the following variables, using exploratory factor analysis:

*Poverty (LPI)* – gone without food, water, medicine, cooking fuel, and cash income

*Insecurity (LII)* – feared crime, physically attacked, something was stolen from the house.

*Infrastructure* is the focal independent variable in this lab. Following our theoretical framework, we will differentiate between service delivery infrastructure and coercive or despotic infrastructure. We measure service delivery infrastructureby the physical presence or absence of the following at the local level (or PSUs): *electricity grid, piped water supply, sewage system, and paved road*.

We measure coercive infrastructure by the physical presence or absence of *police stations and army vehicles* at the PSU level.

We measure governance in terms of the following dimensions:

*Rule of law*. This variable is measured by respondents’ perceptions about how often (a) president or prime minister ignores law or constitution, (b) people are treated unequally under law, (c) government officials who commit crime go unpunished, and (d) common people who commit crime go unpunished. Responses to these questions are first recoded as 1 = never/rarely, 0 = often/always, and then combined using exploratory factor analysis (EFA) to obtain factor scores, with higher scores corresponding to a better rule of law.

*Control of corruption*. Respondents were asked to give their perception about the extent of corruption in their country among (a) government officials, (b) police, (c) tax collectors, and (d) judges and magistrates. Responses to each of these items are first recoded as 1 = none/some of them were corrupt, 0 = most/all of them were corrupt and then combined using EFA to obtain factor scores, with higher scores corresponding to better control of corruption.

*Satisfaction with democratic rule*. Respondents were asked about their level of satisfaction with the democratic rule in their country. Responses are recoded as 1 = they were fairly/very satisfied, 0 = their country was not a democracy or they were not at all/not very satisfied with democracy.

*Government effectiveness*. Respondents were asked to give their perception about how well or badly their current government was (a) managing economy, (b) fighting corruption, (c) reducing crime, (d) maintaining roads and bridges, (e) improving health services, (f) addressing educational needs, (g) delivering household water, (h) ensuring food for everyone, and (i) providing electricity supply. Responses to each of these items are first recoded as 1 = well, 0 = badly, and then combined using EFA to obtain factor scores, with higher scores corresponding to better government effectiveness.

*Quality of bureaucracy:* Respondents were asked: “How difficult it is to obtain each of the following services: household services like water and electricity, medical treatment, identity document or license, help from police, and school placement.” The responses to each of these items are first recoded as 1 = easy/very easy, 0 = very/difficult, and then combined using EFA to obtain factor scores, with higher scores corresponding to a better quality of bureaucracy.

*Urban:* This variable measures if an area is urban (1) or rural (0).

*Region:* This variable measures the following geographic regions – West Africa, East Africa, Southern Africa, and Northern Africa. In the regression analysis, we use West Africa as the reference category.

**Results**

Provide the following tables and interpret the results for each table. Replace the code names of variables with their standard names (e.g., replace ‘lpi’ with ‘Poverty’).

Table 1. Descriptive statistics

Table 2. Linear regression of infrastructure and governance on poverty in 34 African countries surveyed by Afrobarometer (2015)

Table 3. Linear regression of infrastructure and governance on infrastructure in 34 African countries surveyed by Afrobarometer (2015)

**Discussions**

Summarize your main findings. Have you answered your research questions? What policy implications does your analysis have?

Find the dataset, codebook, and do file on *bCourses*. Upload the entire lap report as a standard “research paper” including all the sections above.

End of Lab