An Assessment of Impact of Institutional Capacity, Educational Outcomes and Political Leadership in the Economic Growth of Municipalities of Nepal

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Abstract

Rural and urban municipalities of Nepal have witnessed an upward trajectory in economic growth in the past few years manifested as infrastructural progress such as road expansions, power connectivity, educational and health facilities, and more. A robust understanding of the factors conducive to economic growth in municipalities can provide a policy roadmap for further strengthening such factors.

In my research, I am interested in empirically analyzing the impact of three key potential determinants of economic growth---institutional capacity, educational outcomes, and political leadership---from 2017 to 2021.

In an institutional capacity, I refer to the ability of municipalities to execute their responsibilities reflected through their day-to-day performance and overall accomplishments. I am curious whether stronger institutional capacity is related to better economic growth or not. After preliminary findings, I am microscopically analyzing the most significant aspect of institutional capacity---intergovernmental co-ordination and cooperation.

In terms of educational outcomes, I am focusing on the percentage of the population with a high school degree or above. There is a plethora of literature that affirms that higher educational attainment among the population yields higher economic growth. I am eager to see if the conclusion holds true in the context of the municipalities of Nepal.

In the case of political leadership, I am specifically looking at quantifiable aspects of chairpersons of municipality---like their sex, age at election, and political affiliation. These three variables provide a foundation for analyzing the difference in the performance of male and female leaders, the impact of age on economic growth, and the performance of chairpersons belonging to the ruling party in the federal government.

Introduction of Federalism in Nepal

- Nepal became a federal republic in 2015 after promulgation of a new constitution in 2015
- The tiers of governments under federalism are:
  - 1 federal government
  - 7 provincial governments
  - 753 local governments
    - 6 metropolitan cities
    - 11 sub-metropolitical cities
    - 276 municipalities
    - 460 rural municipalities
- Government tenures:
  - 1st election: September 2017
  - 2nd election: May 2022

Quantifying Economic Growth

- Lack of data on GDP of local governments
- Nightlight data of Nepal used as a proxy for economic activities
- Nightlight data is an idea proxy for economic activities for a developing country like Nepal as a large share of economy is in informal sector, which is not effectively captured by GDP
- Researchers have used VIIRS night light data to analyze:
  - Post earthquake recovery in Nepal
  - Post covid recovery in Nepal
- Researchers have shown a strong correlation between log of total sum of night light data of Nepal and log of real GDP
  - I am currently working on extracting datasets to verify the correlation from 2017 to 2021.
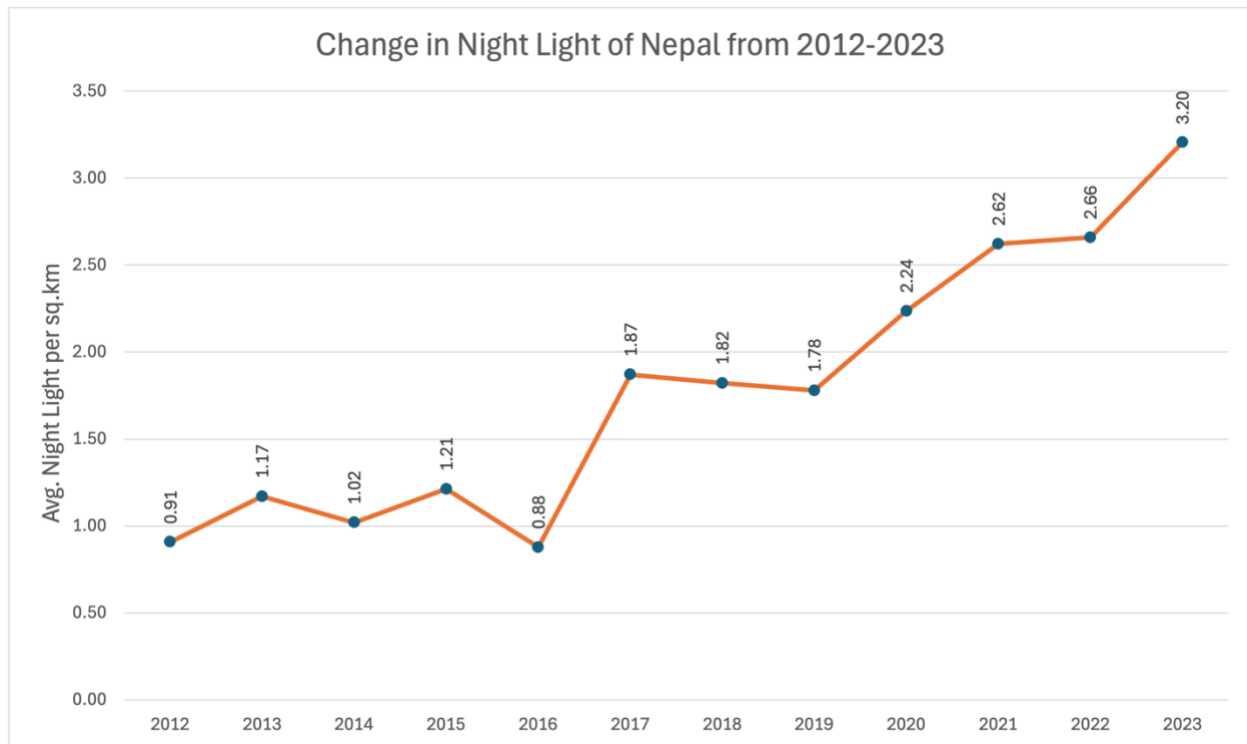
Figure 1: Line graph of average night light per square kilometer from 2012 to 2023

Plausible Explanations:

1. **Drop from 2015 to 2016:** A 7.8 magnitude earthquake hit Nepal in 2015 causing massive destruction of physical infrastructure. An economic blockade from India (60% import partner) that followed further impacted the economy.

2. **Jump from 2016 to 2017:** In Nepal, "Residential load shedding ended since early 2017, and there has been no industrial load shedding since early 2018." (World Bank, 2019)

Evolution of Real GDP and Nighlight

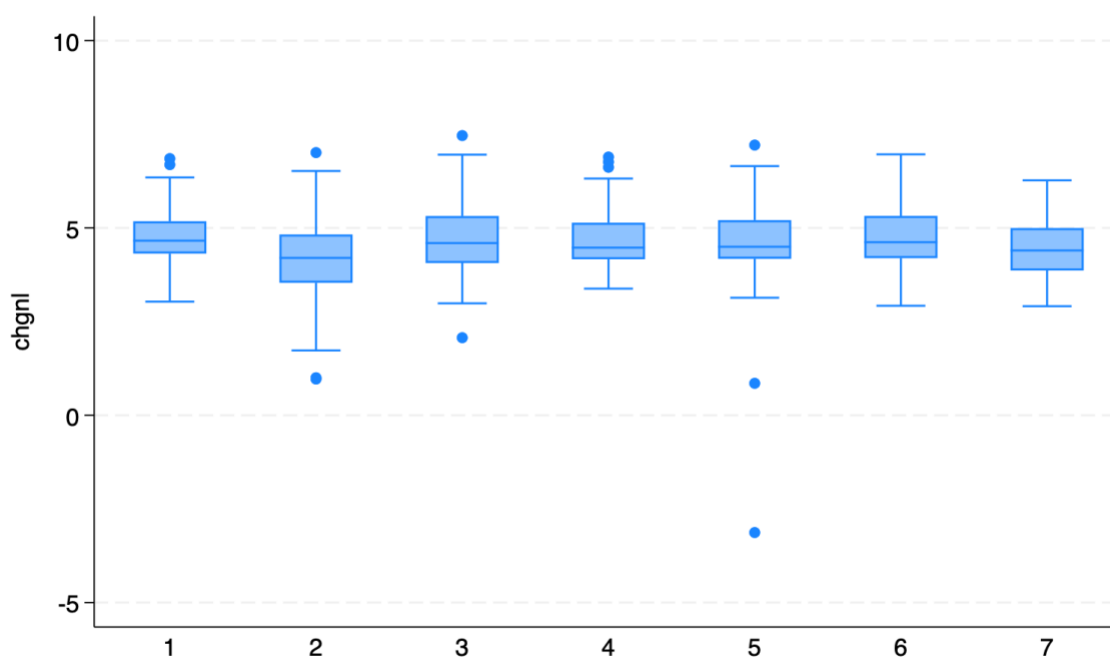*Figure 2: Evolution of ln(Real GDP) and ln(sum of nightlight) in Nepal from 2012-2023*

Figure 3: Box plot of log (Δnight light from 2017 to 2021) across 7 provinces

Institutional Capacity

- Local Government Institutional Capacity Self-Assessment (LISA)
    - An assessment metric introduced by Ministry of Federal Affairs and General Administration in 2020/21
    - Focused on day-to-day performance and overall quantitative accomplishments
- An aspect which can be substantially improved without significant investment of capital and labor
- LISA Breakdown:

SN	Category Title	Points
1	Governance Management	9
2	Organization & Administration	8
3	Budget Plan Management	11
4	Fiscal Economic Management	11
5	Service Delivery	16
6	Judicial Execution	9
7	Physical Infrastructure	13
8	Social Inclusion	10
9	Environmental Protection and Disaster Management	10
10	Cooperation and Coordination	6
	Total	**100**

- Each of the LISA Category is weighted with sub-categories as follows:

Indicators	Process Scenario	Quantitative Scenario	Total
21%	34%	45%	100%

- For instance, Cooperation and Coordination is calculated as follows:

| 10. Cooperation and Coordination Overall Scenario (6 points)					
10.1 Indicators		10.2 Process Scenario	10.3 Quantitative Scenario		
10.1.1 cooperation and coordination among federal, province & local governments	10.1.2 Inter local governments cooperation and coordination	10.2.1 Formation and operation of inter-local governments committee (more than two local governments) to address common interests.	10.3.1 Inter-government coordination and facilitation	10.3.2 Inter local governments partnership	10.3.3 Coordination with District Development Committee
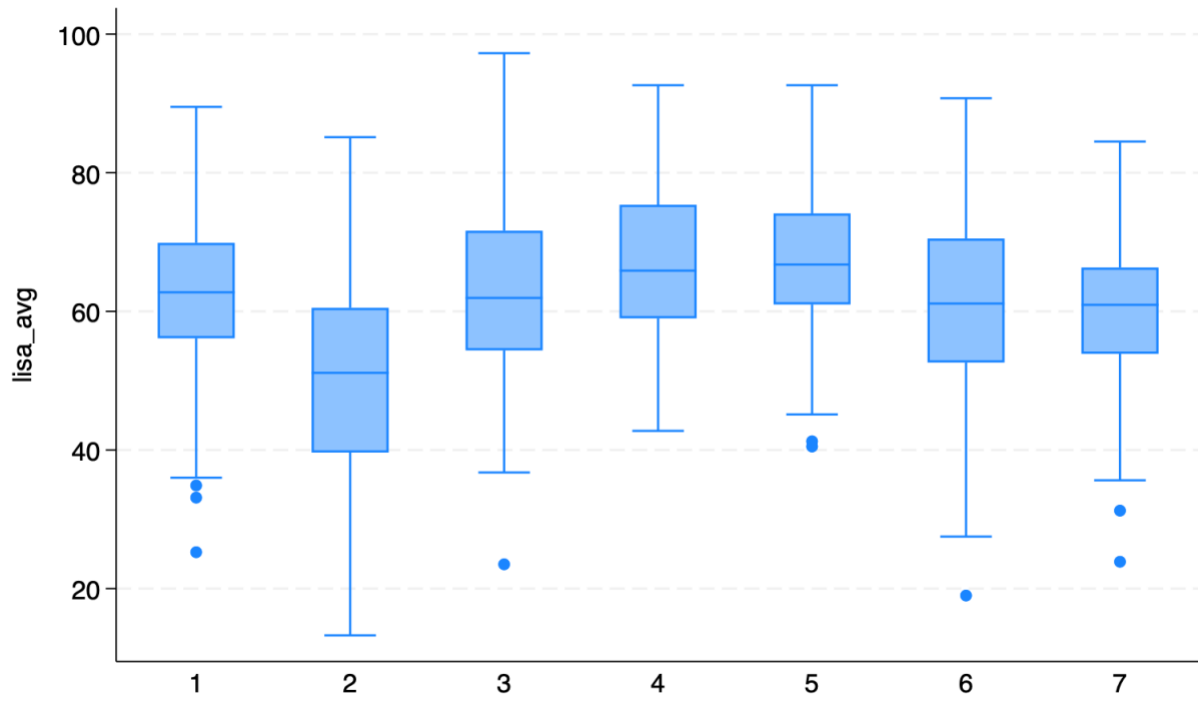
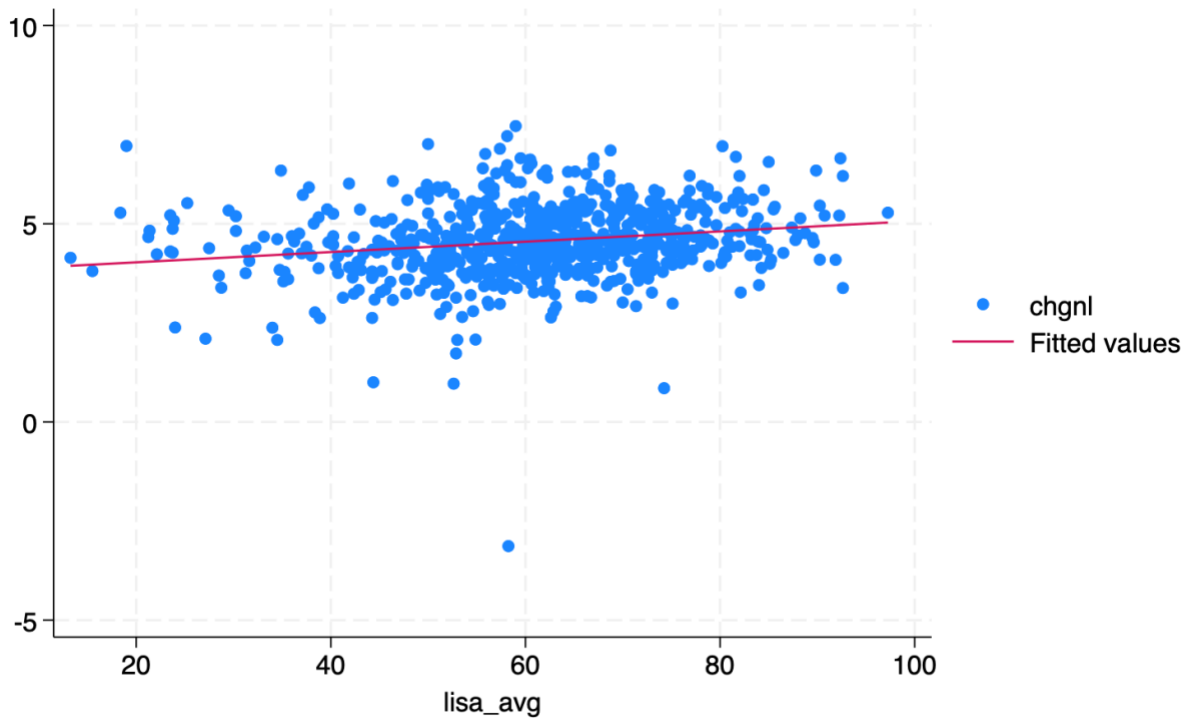*Figure 4: Box plot of average LISA score of 2020/21 and 2021/22 across 7 provinces*

Figure 5: Scatter plot with fitted line of log (Δnight light from 2017 to 2021) over average LISA score of 2020/21 and 2021/22

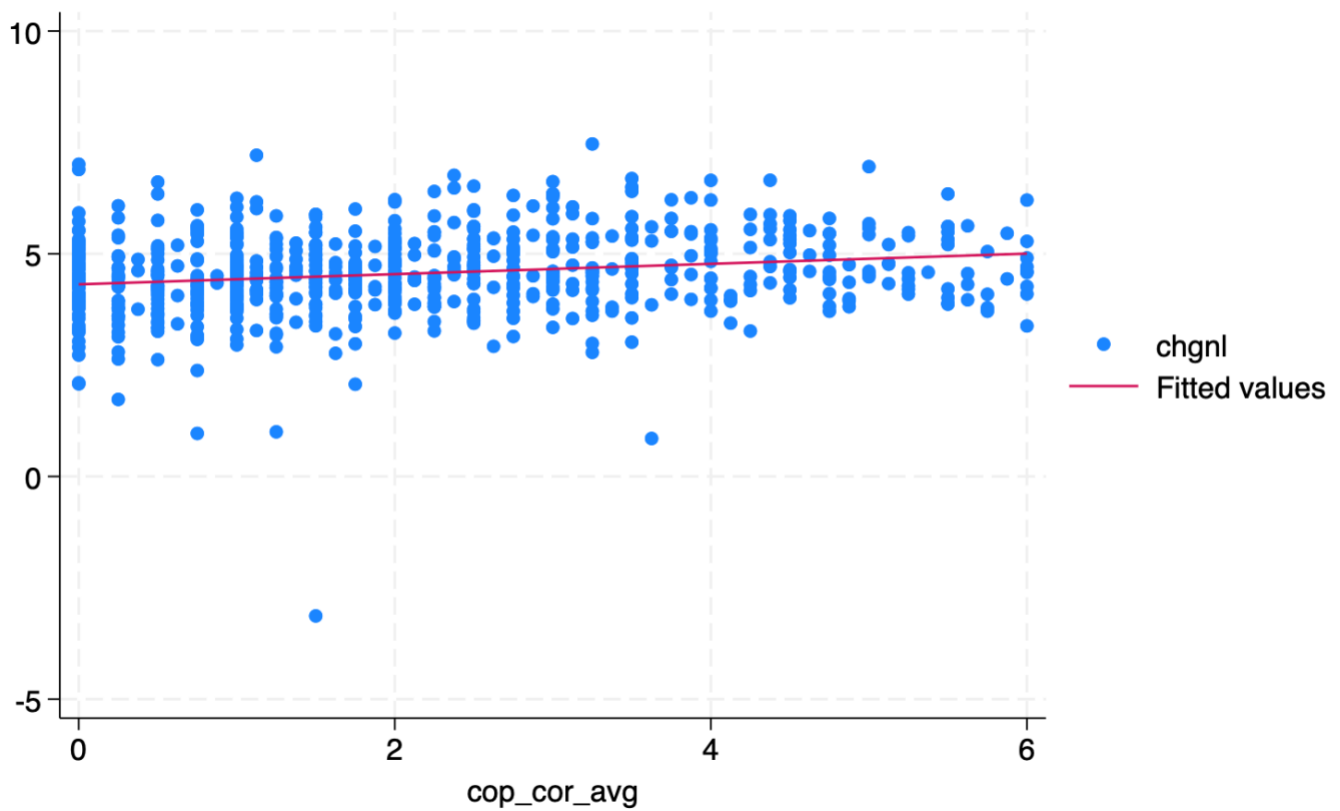*Figure 6: Scatter plot with fitted line of log (Δnight light from 2017 to 2021) over average cooperation and coordination score of 2020/21 and 2021/22*

Educational Outcome

- Currently have the data on population that has high school qualification
    - Will be replacing with population that has high school qualification and above
- It has an interesting impact in the regression
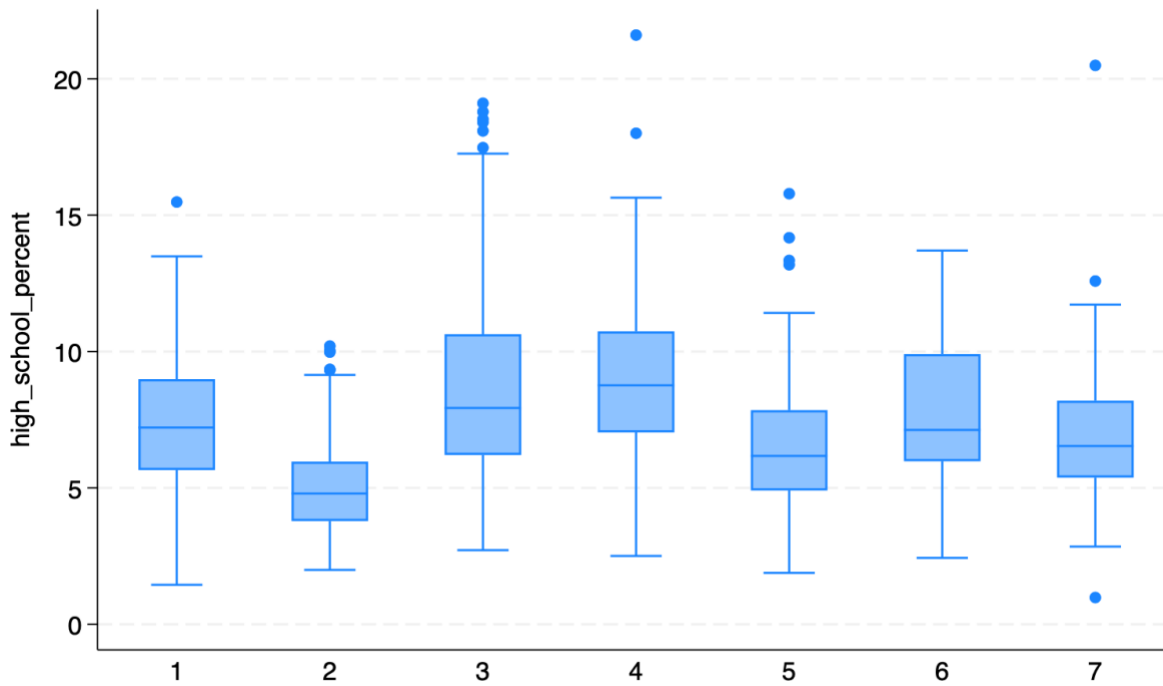
Figure 7: Box plot of high school attainment percent per 2021cencus across 7 provinces
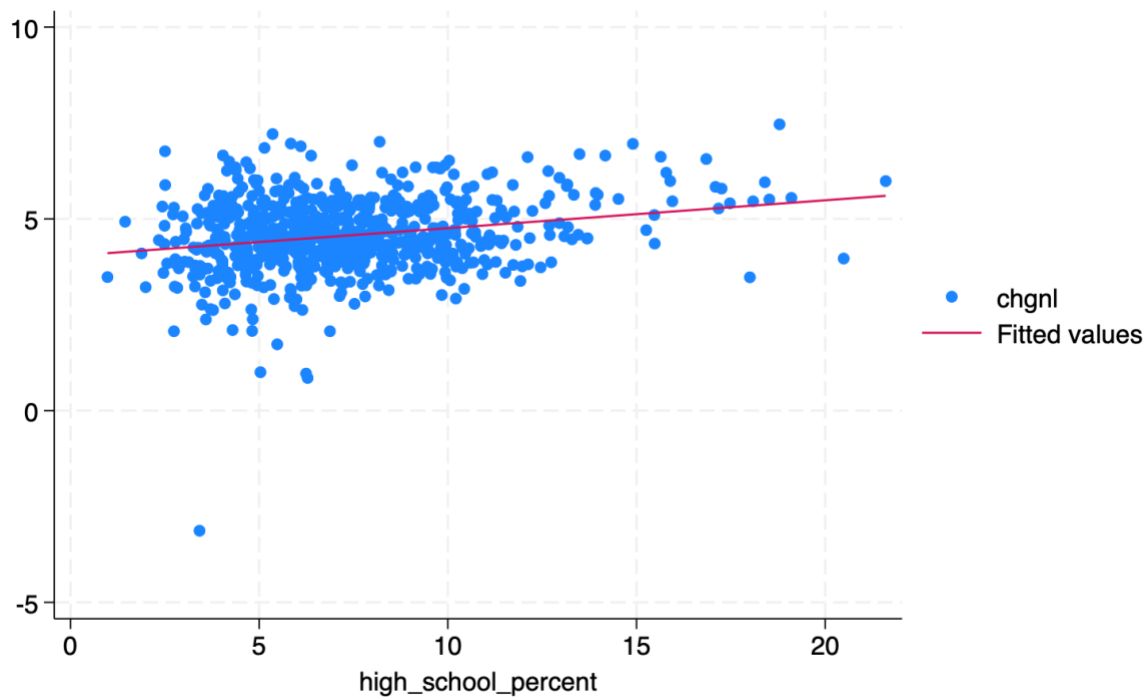
Figure 8: Scatter plot with fitted line of log (Δnight light from 2017 to 2021) high school attainment percent per 2021cencus

Political Leadership

- Focused on chairperson only

- Only 14 female observations across 735 observations

Figure 9: Box plot of log (Δnight light from 2017 to 2021) across male and female. 0 indicates males whereas 1 indicates female.
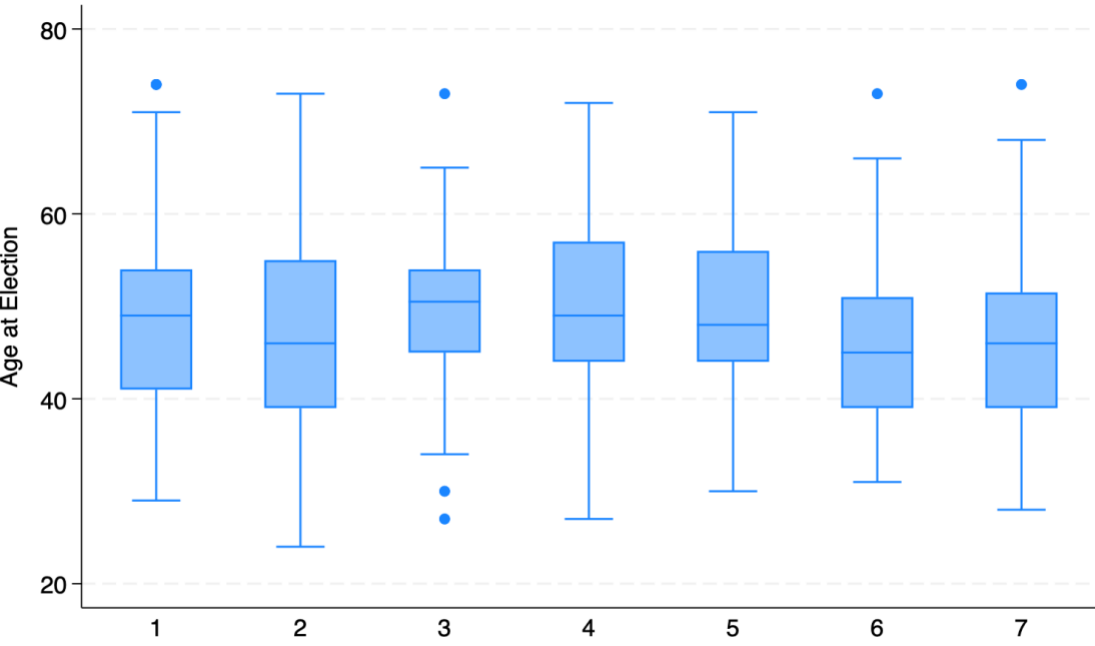
Figure 10: Box plot of age at election in 2017 across 7 provinces
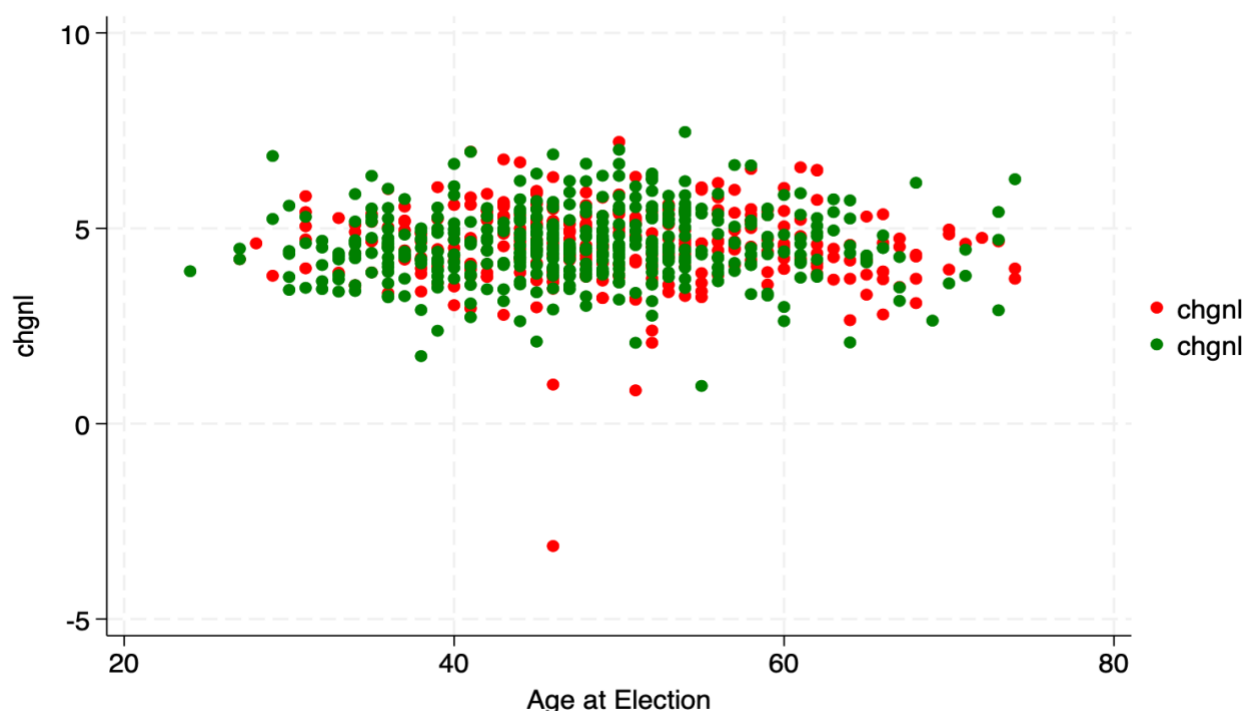
Figure 11: scatter plot of log (∆night light from 2017 to 2021) over age at election of municipality chairperson in 2017. Red dots indicate the affiliation to opposition whereas green dots indicate the affiliation to government coalition.

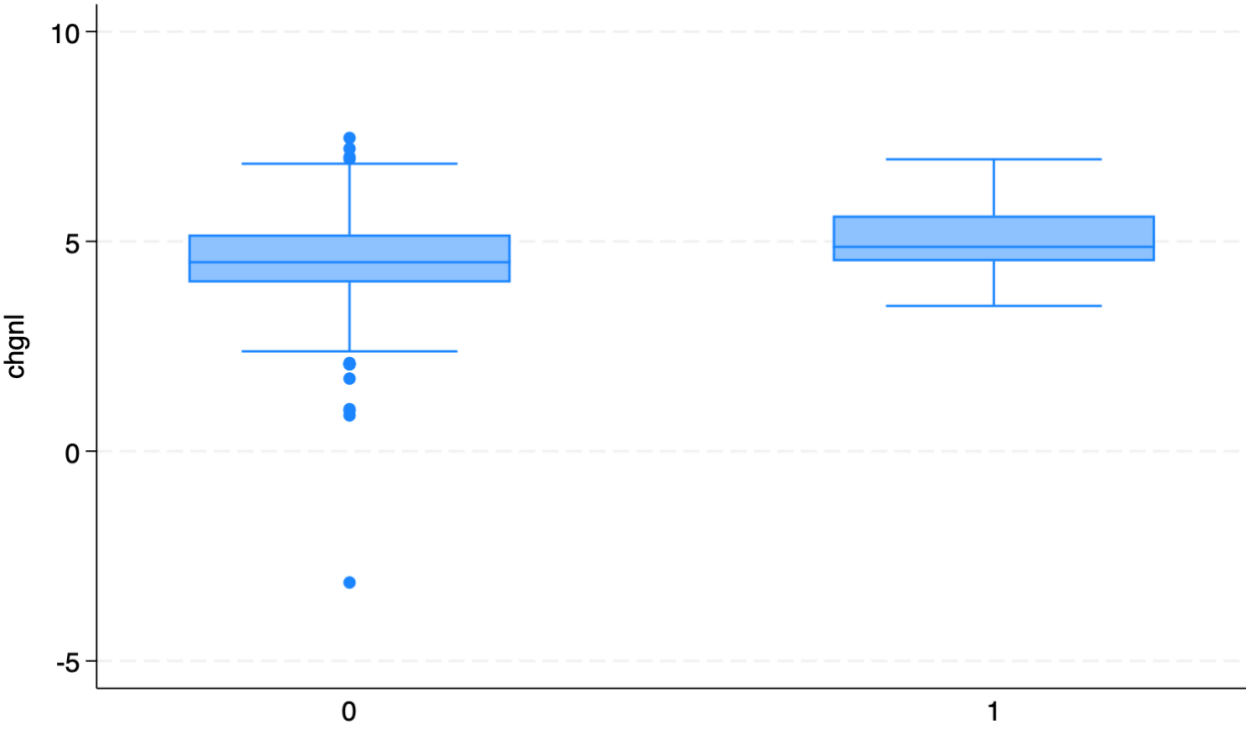## Variables and Date Sources

1. **y**: log (sum of night light of 2021 – sum of nightlight of 2017)
   Extracted from VIIRS Nighttime Lights dataset using QGIS software

2. **x1**: average LISA score of 2020/21 and 2021/22 (In case, LISA score of 2020/21 was not available, LISA score of 20 21/22 is considered to be the average)
   Downloaded from LISA website of the government of Nepal

3. **x2**: log baseline = log (average of sum of night light of 2014, 2015, 2016, 2017)
   Extracted from VIIRS Nighttime Lights dataset using QGIS software

4. **x3**: log of population as per census of 2021
   Extracted from the Preliminary Data of National Population and Housing Census 2021

5. **x4**: dummy variable Urban = 1 if a local government is municipality, sub-metropolitan city, metropolitan city
   Coded in Stata

6. **x5**: dummy variable Government Coalition = 1 if the chairperson of the municipality is affiliated with the parties in the federal government coalition

Manually constructed dataset from [the election result pdfs](#) published in Nepali and then coded in Stata

7. **x6**: age of chairperson at election in 2017
   Manually constructed dataset from [the election result pdfs](#) published in Nepali

8. **x7**: dummy variable Female = 1if the chairperson is a female
   Manually constructed dataset from [the election result pdfs](#) published in Nepali and then coded in Stata

9. **x8**: percentage of population who have completed high school (to be changed to percentage of population who have completed high school or above)
   Manually constructed dataset from datasets of each province from [National Population and Housing Census 2021](#)

Regression Results

1. Initial Regression

VARIABLES	(1) chgnl	(2) chgnl	(3) chgnl	(4) chgnl	(5) chgnl	(6) chgnl	(7) chgnl	(8) chgnl
log_baseline_nl	0.979***	0.960***	0.949***	0.949***	0.949***	0.948***	0.946***	0.929***
	(0.029)	(0.028)	(0.026)	(0.026)	(0.026)	(0.027)	(0.027)	(0.029)
lisa_avg		0.006***	0.002	0.002	0.002	0.003	0.002	0.002
		(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
high_school_percent			0.046***	0.046***	0.046***	0.047***	0.047***	0.044***
			(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
ageatelection					-0.001	-0.001	-0.001	-0.002
					(0.002)	(0.002)	(0.002)	(0.002)
gov_coalitiion						-0.038	-0.038	-0.038
						(0.051)	(0.051)	(0.051)
female							0.212*	0.217*
							(0.119)	(0.123)
ln_popn								0.061**
								(0.030)
Constant	-0.498***	-0.771***	-0.828***	-0.828***	-0.780***	-0.750***	-0.754***	-1.233***
	(0.153)	(0.198)	(0.194)	(0.194)	(0.222)	(0.233)	(0.234)	(0.250)
Observations	688	688	688	688	688	688	688	688
R-squared	0.515	0.522	0.542	0.542	0.542	0.543	0.544	0.546

Robust standard errors in parentheses
*** $p<0.01$, ** $p<0.05$, * $p<0.1$

2. LISA Regression

VARIABLES	(1) chgnl	(2) chgnl	(3) chgnl	(4) chgnl	(5) chgnl	(6) chgnl	(7) chgnl	(8) chgnl	(9) chgnl	(10) chgnl	(11) chgnl	(12) chgnl
log_baseline_nl	0.979***	0.974***	0.974***	0.968***	0.968***	0.968***	0.966***	0.950***	0.949***	0.949***	0.948***	0.945***
	(0.029)	(0.028)	(0.028)	(0.028)	(0.028)	(0.028)	(0.028)	(0.027)	(0.027)	(0.027)	(0.027)	(0.026)
gov_magm_avg		0.033	0.033	0.013	0.011	-0.004	-0.008	-0.015	-0.015	-0.015	-0.023	-0.033
		(0.024)	(0.028)	(0.029)	(0.029)	(0.030)	(0.030)	(0.030)	(0.030)	(0.030)	(0.030)	(0.030)
org_admin_avg			-0.000	-0.017	-0.019	-0.033	-0.031	-0.037	-0.038	-0.038	-0.039	-0.022
			(0.021)	(0.024)	(0.027)	(0.027)	(0.027)	(0.027)	(0.027)	(0.027)	(0.027)	(0.027)
budg_magm_avg				0.038*	0.036*	0.029	0.029	0.016	0.015	0.015	0.015	0.014
				(0.020)	(0.020)	(0.020)	(0.020)	(0.020)	(0.020)	(0.020)	(0.020)	(0.019)
fiscal_magm_avg					0.006	-0.005	-0.008	-0.013	-0.013	-0.013	-0.016	-0.012
					(0.021)	(0.022)	(0.021)	(0.021)	(0.021)	(0.021)	(0.021)	(0.021)
service_dev_avg						0.030**	0.027	0.016	0.014	0.014	0.013	0.011
						(0.015)	(0.017)	(0.017)	(0.017)	(0.017)	(0.017)	(0.017)
jud_exe_avg							0.017	0.007	0.007	0.007	0.004	-0.016
							(0.026)	(0.026)	(0.026)	(0.026)	(0.026)	(0.026)
phy_infra_avg								0.042***	0.041***	0.041***	0.034***	0.030**
								(0.012)	(0.012)	(0.013)	(0.013)	(0.012)
soc_inc_avg									0.007	0.007	0.002	-0.003
									(0.016)	(0.017)	(0.017)	(0.017)
env_protec_avg										-0.000	-0.013	-0.026
										(0.018)	(0.018)	(0.018)
cop_cor_avg											0.051***	0.046***
											(0.016)	(0.016)
high_school_percent												0.045***
												(0.009)
Constant	-0.498***	-0.717***	-0.717***	-0.719***	-0.725***	-0.728***	-0.725***	-0.514**	-0.497*	-0.498*	-0.379	-0.478*
	(0.153)	(0.247)	(0.246)	(0.246)	(0.250)	(0.248)	(0.248)	(0.249)	(0.256)	(0.257)	(0.260)	(0.255)
Observations	688	688	688	688	688	688	688	688	688	688	688	688
R-squared	0.515	0.516	0.516	0.519	0.519	0.521	0.521	0.528	0.528	0.528	0.533	0.551

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

3. Revised Regression

VARIABLES	(1) chgnl	(2) chgnl	(3) chgnl	(4) chgnl	(5) chgnl	(6) chgnl	(7) chgnl	(8) chgnl	(9) chgnl
log_baseline_nl	0.979***	0.953***	0.949***	0.940***	0.939***	0.938***	0.938***	0.936***	0.922***
	(0.029)	(0.027)	(0.027)	(0.026)	(0.026)	(0.026)	(0.026)	(0.027)	(0.029)
phy_infra_avg		0.040***	0.025**	0.014	0.014	0.015	0.015	0.016	0.013
		(0.010)	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)
cop_cor_avg			0.042***	0.030**	0.031**	0.030**	0.030**	0.030**	0.030**
			(0.015)	(0.014)	(0.015)	(0.015)	(0.015)	(0.015)	(0.014)
high_school_percent				0.042***	0.043***	0.042***	0.042***	0.043***	0.041***
				(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
ageatelection					-0.002	-0.002	-0.002	-0.002	-0.002
					(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
female						0.215*	0.215*	0.215*	0.218*
						(0.121)	(0.121)	(0.124)	(0.127)
gov_coalitiion								-0.044	-0.043
								(0.051)	(0.050)
ln_popn									0.052*
									(0.031)
Constant	-	-	-	-	-	-	-	-	-
	0.498***	0.607***	0.588***	0.756***	0.675***	0.680***	0.680***	0.642***	1.056***
	(0.153)	(0.160)	(0.160)	(0.168)	(0.202)	(0.203)	(0.203)	(0.218)	(0.249)
Observations	688	688	688	688	688	688	688	688	688
R-squared	0.515	0.525	0.529	0.547	0.547	0.548	0.548	0.549	0.550

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Key Questions

- Could you help me think what a revised model may like? Do I omit the insignificant categories of LISA?
- Should I do further breakdown of sub categories of Cooperation and Coordination?
- Should I construct a more comprehensive dataset of education?
  - It could include the levels of educations.
    - It sets me up to analyze impact of each level of education in change in nightlight.

- Could you give me suggestions on how should I approach presentation to Prof. Olivero tomorrow?
- Way forwards:

Sources

1. Power-Less to Powerful, World Bank, Nov 5, 2019, Accessed on July 6, 2024
   https://www.worldbank.org/en/news/feature/2019/11/25/power-less-to-powerful