An Assessment of

Impact of Institutional Capacity,

Educational Outcomes and Political Leadership in the Economic Growth of Municipalities of Nepal

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# Variables and Date Sources

1. **abs\_chgnl**: log (sum of night light of 2021 – sum of nightlight of 2017) **[Absoulte]**

*Extracted from* [*VIIRS Nighttime Lights dataset*](https://eogdata.mines.edu/products/vnl/) *using QGIS software*

1. **rel\_chgnl**: log (sum of night light of 2021) – logI(sum of nightlight of 2017) **[Relative]**

*Extracted from* [*VIIRS Nighttime Lights dataset*](https://eogdata.mines.edu/products/vnl/) *using QGIS software*

1. **log\_baseline\_nl:** log (average of sum of night light of 2014, 2015, 2016, 2017)

*Extracted from* [*VIIRS Nighttime Lights dataset*](https://eogdata.mines.edu/products/vnl/) *using QGIS software*

1. **lisa\_avg**: 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*](https://lisa.mofaga.gov.np/home) *of the government of Nepal*

1. **high\_school\_percentage:** 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*](https://censusnepal.cbs.gov.np/results/literacy)

1. **ageatelection**: age of chairperson at election in 2017  
   *Manually constructed dataset from* [*the election result pdfs*](https://oldsite.election.gov.np/election/en/election-result-book.html) *published in Nepali*

1. **gov\_coalition**: 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*](https://oldsite.election.gov.np/election/en/election-result-book.html) *published in Nepali and then coded in Stata*

1. **female**: dummy variable female = 1if the chairperson is a female  
   *Manually constructed dataset from* [*the election result pdfs*](https://oldsite.election.gov.np/election/en/election-result-book.html) *published in Nepali and then coded in Stata*
2. **ln\_popn**: log of population as per census of 2021

*Extracted from the* [*Preliminary Data of National Population and Housing Census 2021*](https://opendatanepal.com/dataset/preliminary-data-of-national-population-and-housing-census-2021)

1. **LISA sub-categories averages of 2020/21 and 2021/22**

|  |  |  |  |
| --- | --- | --- | --- |
| **SN** | **Category Title** | **Points** | **Coded variable** |
| 1 | Governance Management | 9 | gov\_magm\_avg |
| 2 | Organization & Administration | 8 | org\_admin\_avg |
| 3 | Budget Plan Management | 11 | budg\_magm\_avg |
| 4 | Fiscal Economic Management | 11 | fiscal\_magm\_avg |
| 5 | Service Delivery | 16 | service\_dev\_avg |
| 6 | Judicial Execution | 9 | jud\_exe\_avg |
| 7 | Physical Infrastructure | 13 | phy\_infra\_avg |
| 8 | Social Inclusion | 10 | soc\_inc\_avg |
| 9 | Environmental Protection and Disaster Management | 10 | env\_protec\_avg |
| 10 | Cooperation and Coordination | 6 | cop\_cor\_avg |
|  | **Total** | **100** |  |

# 

# CASE I

* **y: abs\_chgnl = log (sum of night light of 2021 – sum of nightlight of 2017)**
* **log\_baseline\_nl = present**

## Initial Regression

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| VARIABLES | abs\_chgnl | abs\_chgnl | abs\_chgnl | abs\_chgnl | abs\_chgnl | abs\_chgnl | abs\_chgnl | abs\_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

## LISA Regression

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
| VARIABLES | abs\_chgnl | abs\_chgnl | abs\_chgnl | abs\_chgnl | abs\_chgnl | abs\_chgnl | abs\_chgnl | abs\_chgnl | abs\_chgnl | abs\_chgnl | abs\_chgnl | abs\_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

## 

## Revised Regression

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| VARIABLES | abs\_chgnl | abs\_chgnl | abs\_chgnl | abs\_chgnl | abs\_chgnl | abs\_chgnl | abs\_chgnl | abs\_chgnl | abs\_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

# CASE II

* **y: abs\_chgnl = log (sum of night light of 2021 – sum of nightlight of 2017)**
* **log\_baseline\_nl = not present**

## Initial Regression

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| VARIABLES | abs\_chgnl | abs\_chgnl | abs\_chgnl | abs\_chgnl | abs\_chgnl | abs\_chgnl | abs\_chgnl |
|  |  |  |  |  |  |  |  |
| lisa\_avg | 0.014\*\*\* | 0.009\*\*\* | 0.009\*\*\* | 0.010\*\*\* | 0.010\*\*\* | 0.010\*\*\* | 0.008\*\*\* |
|  | (0.003) | (0.003) | (0.003) | (0.003) | (0.003) | (0.003) | (0.003) |
| high\_school\_percent |  | 0.059\*\*\* | 0.059\*\*\* | 0.059\*\*\* | 0.061\*\*\* | 0.060\*\*\* | 0.047\*\*\* |
|  |  | (0.013) | (0.013) | (0.013) | (0.013) | (0.013) | (0.012) |
| ageatelection |  |  |  | -0.001 | -0.002 | -0.002 | -0.004 |
|  |  |  |  | (0.003) | (0.003) | (0.003) | (0.003) |
| gov\_coalitiion |  |  |  |  | -0.108 | -0.107 | -0.101 |
|  |  |  |  |  | (0.070) | (0.070) | (0.069) |
| female |  |  |  |  |  | 0.360 | 0.371 |
|  |  |  |  |  |  | (0.262) | (0.244) |
| ln\_popn |  |  |  |  |  |  | 0.260\*\*\* |
|  |  |  |  |  |  |  | (0.058) |
| Constant | 3.681\*\*\* | 3.542\*\*\* | 3.542\*\*\* | 3.598\*\*\* | 3.663\*\*\* | 3.644\*\*\* | 1.259\*\* |
|  | (0.171) | (0.172) | (0.172) | (0.218) | (0.225) | (0.225) | (0.569) |
|  |  |  |  |  |  |  |  |
| Observations | 688 | 688 | 688 | 688 | 688 | 688 | 688 |
| R-squared | 0.039 | 0.072 | 0.072 | 0.073 | 0.076 | 0.079 | 0.125 |

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

## LISA Regression

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
| VARIABLES | abs\_chgnl | abs\_chgnl | abs\_chgnl | abs\_chgnl | abs\_chgnl | abs\_chgnl | abs\_chgnl | abs\_chgnl | abs\_chgnl | abs\_chgnl |
|  |  |  |  |  |  |  |  |  |  |  |
| gov\_magm\_avg | 0.096\*\*\* | 0.055 | 0.053 | 0.039 | 0.023 | 0.006 | 0.004 | 0.000 | -0.007 | -0.018 |
|  | (0.034) | (0.043) | (0.045) | (0.046) | (0.047) | (0.046) | (0.046) | (0.046) | (0.046) | (0.046) |
| org\_admin\_avg |  | -0.044 | -0.046 | -0.059 | -0.052 | -0.063\* | -0.070\* | -0.076\*\* | -0.076\*\* | -0.058 |
|  |  | (0.035) | (0.037) | (0.038) | (0.038) | (0.037) | (0.038) | (0.038) | (0.038) | (0.038) |
| budg\_magm\_avg |  | 0.088\*\*\* | 0.085\*\*\* | 0.078\*\* | 0.078\*\* | 0.047 | 0.043 | 0.036 | 0.036 | 0.034 |
|  |  | (0.030) | (0.031) | (0.031) | (0.032) | (0.031) | (0.031) | (0.031) | (0.031) | (0.030) |
| fiscal\_magm\_avg |  |  | 0.007 | -0.003 | -0.014 | -0.026 | -0.026 | -0.027 | -0.030 | -0.026 |
|  |  |  | (0.031) | (0.033) | (0.032) | (0.032) | (0.032) | (0.032) | (0.032) | (0.032) |
| service\_dev\_avg |  |  |  | 0.028 | 0.014 | -0.009 | -0.020 | -0.025 | -0.026 | -0.028 |
|  |  |  |  | (0.023) | (0.023) | (0.024) | (0.024) | (0.024) | (0.024) | (0.024) |
| jud\_exe\_avg |  |  |  |  | 0.067\*\* | 0.043 | 0.042 | 0.036 | 0.032 | 0.011 |
|  |  |  |  |  | (0.032) | (0.032) | (0.032) | (0.033) | (0.032) | (0.033) |
| phy\_infra\_avg |  |  |  |  |  | 0.093\*\*\* | 0.087\*\*\* | 0.069\*\*\* | 0.062\*\*\* | 0.057\*\*\* |
|  |  |  |  |  |  | (0.018) | (0.019) | (0.019) | (0.020) | (0.019) |
| soc\_inc\_avg |  |  |  |  |  |  | 0.037\* | 0.020 | 0.015 | 0.009 |
|  |  |  |  |  |  |  | (0.022) | (0.023) | (0.023) | (0.024) |
| env\_protec\_avg |  |  |  |  |  |  |  | 0.083\*\*\* | 0.071\*\* | 0.056\*\* |
|  |  |  |  |  |  |  |  | (0.028) | (0.029) | (0.028) |
| cop\_cor\_avg |  |  |  |  |  |  |  |  | 0.053\*\* | 0.048\* |
|  |  |  |  |  |  |  |  |  | (0.025) | (0.025) |
| high\_school\_percent |  |  |  |  |  |  |  |  |  | 0.049\*\*\* |
|  |  |  |  |  |  |  |  |  |  | (0.013) |
| Constant | 3.843\*\*\* | 3.770\*\*\* | 3.763\*\*\* | 3.762\*\*\* | 3.727\*\*\* | 4.027\*\*\* | 4.089\*\*\* | 4.146\*\*\* | 4.268\*\*\* | 4.143\*\*\* |
|  | (0.255) | (0.258) | (0.260) | (0.257) | (0.262) | (0.260) | (0.264) | (0.265) | (0.269) | (0.270) |
|  |  |  |  |  |  |  |  |  |  |  |
| Observations | 688 | 688 | 688 | 688 | 688 | 688 | 688 | 688 | 688 | 688 |
| R-squared | 0.011 | 0.023 | 0.024 | 0.025 | 0.032 | 0.065 | 0.068 | 0.079 | 0.084 | 0.106 |

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

## Revised Regression

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| VARIABLES | abs\_chgnl | abs\_chgnl | abs\_chgnl | abs\_chgnl | abs\_chgnl | abs\_chgnl | abs\_chgnl | abs\_chgnl |
|  |  |  |  |  |  |  |  |  |
| phy\_infra\_avg | 0.090\*\*\* | 0.068\*\*\* | 0.053\*\*\* | 0.054\*\*\* | 0.054\*\*\* | 0.054\*\*\* | 0.057\*\*\* | 0.041\*\* |
|  | (0.014) | (0.016) | (0.016) | (0.016) | (0.016) | (0.016) | (0.017) | (0.016) |
| cop\_cor\_avg |  | 0.061\*\*\* | 0.046\* | 0.047\*\* | 0.047\*\* | 0.047\*\* | 0.046\* | 0.046\*\* |
|  |  | (0.024) | (0.024) | (0.024) | (0.023) | (0.023) | (0.023) | (0.023) |
| high\_school\_percent |  |  | 0.054\*\*\* | 0.054\*\*\* | 0.053\*\*\* | 0.053\*\*\* | 0.055\*\*\* | 0.046\*\*\* |
|  |  |  | (0.013) | (0.013) | (0.013) | (0.013) | (0.012) | (0.012) |
| ageatelection |  |  |  | -0.003 | -0.002 | -0.002 | -0.003 | -0.005 |
|  |  |  |  | (0.003) | (0.003) | (0.003) | (0.003) | (0.003) |
| female |  |  |  |  | 0.372 | 0.372 | 0.371 | 0.378 |
|  |  |  |  |  | (0.254) | (0.254) | (0.260) | (0.246) |
| gov\_coalitiion |  |  |  |  |  |  | -0.119\* | -0.108 |
|  |  |  |  |  |  |  | (0.070) | (0.069) |
| ln\_popn |  |  |  |  |  |  |  | 0.239\*\*\* |
|  |  |  |  |  |  |  |  | (0.059) |
| Constant | 4.016\*\*\* | 4.019\*\*\* | 3.747\*\*\* | 3.861\*\*\* | 3.839\*\*\* | 3.839\*\*\* | 3.917\*\*\* | 1.717\*\*\* |
|  | (0.098) | (0.097) | (0.121) | (0.186) | (0.186) | (0.186) | (0.198) | (0.584) |
|  |  |  |  |  |  |  |  |  |
| Observations | 688 | 688 | 688 | 688 | 688 | 688 | 688 | 688 |
| R-squared | 0.054 | 0.062 | 0.090 | 0.091 | 0.094 | 0.094 | 0.098 | 0.135 |

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

# CASE III

* **y: rel\_chgnl = log (sum of night light of 2021) – log (sum of nightlight of 2017)**
* **log\_baseline\_nl = present**

## Initial Regression

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| VARIABLES | rel\_chgnl | rel\_chgnl | rel\_chgnl | rel\_chgnl | rel\_chgnl | rel\_chgnl | rel\_chgnl | rel\_chgnl |
|  |  |  |  |  |  |  |  |  |
| log\_baseline\_nl | 0.014 | 0.011 | 0.007 | 0.007 | 0.007 | 0.006 | 0.005 | -0.013 |
|  | (0.009) | (0.009) | (0.009) | (0.009) | (0.009) | (0.009) | (0.009) | (0.008) |
| lisa\_avg |  | 0.001\* | -0.000 | -0.000 | -0.000 | 0.000 | 0.000 | -0.000 |
|  |  | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) |
| high\_school\_percent |  |  | 0.015\*\*\* | 0.015\*\*\* | 0.015\*\*\* | 0.016\*\*\* | 0.015\*\*\* | 0.013\*\*\* |
|  |  |  | (0.003) | (0.003) | (0.003) | (0.003) | (0.003) | (0.002) |
| ageatelection |  |  |  |  | 0.000 | 0.000 | 0.000 | -0.000 |
|  |  |  |  |  | (0.001) | (0.001) | (0.001) | (0.001) |
| gov\_coalitiion |  |  |  |  |  | -0.021\* | -0.021\* | -0.021\* |
|  |  |  |  |  |  | (0.013) | (0.013) | (0.012) |
| female |  |  |  |  |  |  | 0.052 | 0.058 |
|  |  |  |  |  |  |  | (0.047) | (0.050) |
| ln\_popn |  |  |  |  |  |  |  | 0.066\*\*\* |
|  |  |  |  |  |  |  |  | (0.008) |
| Constant | 0.265\*\*\* | 0.211\*\*\* | 0.192\*\*\* | 0.192\*\*\* | 0.174\*\* | 0.191\*\*\* | 0.190\*\*\* | -0.328\*\*\* |
|  | (0.049) | (0.062) | (0.060) | (0.060) | (0.068) | (0.071) | (0.071) | (0.074) |
|  |  |  |  |  |  |  |  |  |
| Observations | 692 | 692 | 692 | 692 | 692 | 692 | 692 | 692 |
| R-squared | 0.003 | 0.012 | 0.084 | 0.084 | 0.084 | 0.088 | 0.090 | 0.176 |

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

## LISA Regression

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
| VARIABLES | rel\_chgnl | rel\_chgnl | rel\_chgnl | rel\_chgnl | rel\_chgnl | rel\_chgnl | rel\_chgnl | rel\_chgnl | rel\_chgnl | rel\_chgnl | rel\_chgnl | rel\_chgnl |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
| log\_baseline\_nl | 0.014 | 0.014 | 0.014 | 0.012 | 0.012 | 0.012 | 0.012 | 0.008 | 0.008 | 0.006 | 0.006 | 0.005 |
|  | (0.009) | (0.009) | (0.009) | (0.009) | (0.009) | (0.009) | (0.009) | (0.009) | (0.009) | (0.009) | (0.009) | (0.009) |
| gov\_magm\_avg |  | 0.004 | 0.006 | 0.002 | 0.004 | -0.002 | -0.001 | -0.003 | -0.004 | -0.004 | -0.006 | -0.010 |
|  |  | (0.007) | (0.008) | (0.009) | (0.008) | (0.009) | (0.008) | (0.008) | (0.008) | (0.008) | (0.008) | (0.008) |
| org\_admin\_avg |  |  | -0.003 | -0.006 | -0.004 | -0.009 | -0.009 | -0.011 | -0.011 | -0.012\* | -0.012\* | -0.006 |
|  |  |  | (0.006) | (0.006) | (0.007) | (0.007) | (0.007) | (0.007) | (0.007) | (0.007) | (0.007) | (0.007) |
| budg\_magm\_avg |  |  |  | 0.008 | 0.010\* | 0.007 | 0.007 | 0.004 | 0.003 | 0.003 | 0.003 | 0.003 |
|  |  |  |  | (0.005) | (0.006) | (0.006) | (0.006) | (0.006) | (0.006) | (0.006) | (0.005) | (0.005) |
| fiscal\_magm\_avg |  |  |  |  | -0.005 | -0.008 | -0.008 | -0.010 | -0.010 | -0.010\* | -0.011\* | -0.010\* |
|  |  |  |  |  | (0.006) | (0.006) | (0.006) | (0.006) | (0.006) | (0.006) | (0.006) | (0.006) |
| service\_dev\_avg |  |  |  |  |  | 0.010\*\*\* | 0.010\*\* | 0.007\* | 0.007 | 0.007 | 0.006 | 0.006 |
|  |  |  |  |  |  | (0.004) | (0.004) | (0.005) | (0.005) | (0.005) | (0.005) | (0.005) |
| jud\_exe\_avg |  |  |  |  |  |  | -0.000 | -0.003 | -0.003 | -0.004 | -0.005 | -0.012\* |
|  |  |  |  |  |  |  | (0.006) | (0.006) | (0.006) | (0.006) | (0.006) | (0.006) |
| phy\_infra\_avg |  |  |  |  |  |  |  | 0.012\*\*\* | 0.012\*\*\* | 0.011\*\*\* | 0.008\*\* | 0.007\*\* |
|  |  |  |  |  |  |  |  | (0.003) | (0.003) | (0.004) | (0.004) | (0.003) |
| soc\_inc\_avg |  |  |  |  |  |  |  |  | 0.002 | 0.000 | -0.001 | -0.003 |
|  |  |  |  |  |  |  |  |  | (0.004) | (0.004) | (0.004) | (0.004) |
| env\_protec\_avg |  |  |  |  |  |  |  |  |  | 0.006 | 0.002 | -0.003 |
|  |  |  |  |  |  |  |  |  |  | (0.005) | (0.005) | (0.005) |
| cop\_cor\_avg |  |  |  |  |  |  |  |  |  |  | 0.018\*\*\* | 0.016\*\*\* |
|  |  |  |  |  |  |  |  |  |  |  | (0.005) | (0.005) |
| high\_school\_percent |  |  |  |  |  |  |  |  |  |  |  | 0.015\*\*\* |
|  |  |  |  |  |  |  |  |  |  |  |  | (0.003) |
| Constant | 0.265\*\*\* | 0.237\*\*\* | 0.235\*\*\* | 0.235\*\*\* | 0.240\*\*\* | 0.240\*\*\* | 0.240\*\*\* | 0.299\*\*\* | 0.303\*\*\* | 0.314\*\*\* | 0.356\*\*\* | 0.323\*\*\* |
|  | (0.049) | (0.079) | (0.078) | (0.078) | (0.080) | (0.079) | (0.079) | (0.080) | (0.080) | (0.081) | (0.082) | (0.081) |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
| Observations | 692 | 692 | 692 | 692 | 692 | 692 | 692 | 692 | 692 | 692 | 692 | 692 |
| R-squared | 0.003 | 0.004 | 0.004 | 0.008 | 0.009 | 0.017 | 0.017 | 0.034 | 0.034 | 0.035 | 0.054 | 0.120 |

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

## Revised Regression

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| VARIABLES | rel\_chgnl | rel\_chgnl | rel\_chgnl | rel\_chgnl | rel\_chgnl | rel\_chgnl | rel\_chgnl | rel\_chgnl | rel\_chgnl |
|  |  |  |  |  |  |  |  |  |  |
| log\_baseline\_nl | 0.014 | 0.008 | 0.007 | 0.004 | 0.004 | 0.003 | 0.003 | 0.002 | -0.015\* |
|  | (0.009) | (0.009) | (0.009) | (0.009) | (0.009) | (0.009) | (0.009) | (0.009) | (0.008) |
| phy\_infra\_avg |  | 0.009\*\*\* | 0.004 | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 | -0.002 |
|  |  | (0.003) | (0.003) | (0.003) | (0.003) | (0.003) | (0.003) | (0.003) | (0.003) |
| cop\_cor\_avg |  |  | 0.014\*\*\* | 0.010\*\* | 0.010\*\* | 0.010\*\* | 0.010\*\* | 0.010\*\* | 0.010\*\* |
|  |  |  | (0.004) | (0.004) | (0.004) | (0.004) | (0.004) | (0.004) | (0.004) |
| high\_school\_percent |  |  |  | 0.014\*\*\* | 0.014\*\*\* | 0.014\*\*\* | 0.014\*\*\* | 0.014\*\*\* | 0.012\*\*\* |
|  |  |  |  | (0.003) | (0.002) | (0.003) | (0.003) | (0.003) | (0.002) |
| ageatelection |  |  |  |  | 0.000 | 0.000 | 0.000 | 0.000 | -0.000 |
|  |  |  |  |  | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) |
| female |  |  |  |  |  | 0.052 | 0.052 | 0.052 | 0.057 |
|  |  |  |  |  |  | (0.046) | (0.046) | (0.048) | (0.051) |
| gov\_coalitiion |  |  |  |  |  |  |  | -0.022\* | -0.021\* |
|  |  |  |  |  |  |  |  | (0.013) | (0.012) |
| ln\_popn |  |  |  |  |  |  |  |  | 0.065\*\*\* |
|  |  |  |  |  |  |  |  |  | (0.008) |
| Constant | 0.265\*\*\* | 0.240\*\*\* | 0.246\*\*\* | 0.192\*\*\* | 0.182\*\*\* | 0.181\*\*\* | 0.181\*\*\* | 0.201\*\*\* | -0.318\*\*\* |
|  | (0.049) | (0.050) | (0.051) | (0.051) | (0.062) | (0.062) | (0.062) | (0.066) | (0.075) |
|  |  |  |  |  |  |  |  |  |  |
| Observations | 692 | 692 | 692 | 692 | 692 | 692 | 692 | 692 | 692 |
| R-squared | 0.003 | 0.021 | 0.034 | 0.093 | 0.094 | 0.096 | 0.096 | 0.100 | 0.183 |

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

# CASE IV

* **y: rel\_chgnl = log (sum of night light of 2021) – log (sum of nightlight of 2017)**
* **log\_baseline\_nl = not present**

## Initial Regression

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| VARIABLES | rel\_chgnl | rel\_chgnl | rel\_chgnl | rel\_chgnl | rel\_chgnl | rel\_chgnl | rel\_chgnl |
|  |  |  |  |  |  |  |  |
| lisa\_avg | 0.001\*\* | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | -0.000 |
|  | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) |
| high\_school\_percent |  | 0.015\*\*\* | 0.015\*\*\* | 0.015\*\*\* | 0.016\*\*\* | 0.016\*\*\* | 0.013\*\*\* |
|  |  | (0.003) | (0.003) | (0.003) | (0.003) | (0.003) | (0.002) |
| ageatelection |  |  |  | 0.000 | 0.000 | 0.000 | -0.000 |
|  |  |  |  | (0.001) | (0.001) | (0.001) | (0.001) |
| gov\_coalitiion |  |  |  |  | -0.021\* | -0.021\* | -0.020\* |
|  |  |  |  |  | (0.012) | (0.012) | (0.012) |
| female |  |  |  |  |  | 0.053 | 0.056 |
|  |  |  |  |  |  | (0.047) | (0.049) |
| ln\_popn |  |  |  |  |  |  | 0.063\*\*\* |
|  |  |  |  |  |  |  | (0.007) |
| Constant | 0.260\*\*\* | 0.223\*\*\* | 0.223\*\*\* | 0.205\*\*\* | 0.218\*\*\* | 0.215\*\*\* | -0.363\*\*\* |
|  | (0.039) | (0.039) | (0.039) | (0.049) | (0.051) | (0.051) | (0.070) |
|  |  |  |  |  |  |  |  |
| Observations | 692 | 692 | 692 | 692 | 692 | 692 | 692 |
| R-squared | 0.010 | 0.083 | 0.083 | 0.083 | 0.087 | 0.089 | 0.174 |

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

## LISA Regression

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
| VARIABLES | rel\_chgnl | rel\_chgnl | rel\_chgnl | rel\_chgnl | rel\_chgnl | rel\_chgnl | rel\_chgnl | rel\_chgnl | rel\_chgnl | rel\_chgnl |
|  |  |  |  |  |  |  |  |  |  |  |
| gov\_magm\_avg | 0.005 | 0.003 | 0.004 | -0.001 | -0.001 | -0.003 | -0.003 | -0.004 | -0.006 | -0.010 |
|  | (0.007) | (0.009) | (0.008) | (0.009) | (0.008) | (0.008) | (0.008) | (0.008) | (0.008) | (0.008) |
| org\_admin\_avg |  | -0.007 | -0.005 | -0.010 | -0.010 | -0.011 | -0.011\* | -0.012\* | -0.012\* | -0.006 |
|  |  | (0.007) | (0.007) | (0.007) | (0.007) | (0.007) | (0.007) | (0.007) | (0.007) | (0.007) |
| budg\_magm\_avg |  | 0.009\* | 0.010\* | 0.008 | 0.008 | 0.004 | 0.004 | 0.003 | 0.003 | 0.003 |
|  |  | (0.005) | (0.006) | (0.006) | (0.006) | (0.006) | (0.006) | (0.006) | (0.005) | (0.005) |
| fiscal\_magm\_avg |  |  | -0.005 | -0.008 | -0.008 | -0.010 | -0.010 | -0.010\* | -0.011\* | -0.010\* |
|  |  |  | (0.006) | (0.006) | (0.006) | (0.006) | (0.006) | (0.006) | (0.006) | (0.006) |
| service\_dev\_avg |  |  |  | 0.010\*\*\* | 0.010\*\* | 0.007 | 0.007 | 0.006 | 0.006 | 0.005 |
|  |  |  |  | (0.004) | (0.004) | (0.005) | (0.005) | (0.005) | (0.005) | (0.005) |
| jud\_exe\_avg |  |  |  |  | 0.000 | -0.003 | -0.003 | -0.004 | -0.005 | -0.012\* |
|  |  |  |  |  | (0.006) | (0.006) | (0.006) | (0.006) | (0.006) | (0.006) |
| phy\_infra\_avg |  |  |  |  |  | 0.012\*\*\* | 0.012\*\*\* | 0.011\*\*\* | 0.008\*\* | 0.007\*\* |
|  |  |  |  |  |  | (0.003) | (0.003) | (0.004) | (0.004) | (0.003) |
| soc\_inc\_avg |  |  |  |  |  |  | 0.002 | 0.000 | -0.001 | -0.003 |
|  |  |  |  |  |  |  | (0.004) | (0.004) | (0.004) | (0.004) |
| env\_protec\_avg |  |  |  |  |  |  |  | 0.006 | 0.002 | -0.003 |
|  |  |  |  |  |  |  |  | (0.005) | (0.005) | (0.005) |
| cop\_cor\_avg |  |  |  |  |  |  |  |  | 0.018\*\*\* | 0.016\*\*\* |
|  |  |  |  |  |  |  |  |  | (0.005) | (0.005) |
| high\_school\_percent |  |  |  |  |  |  |  |  |  | 0.015\*\*\* |
|  |  |  |  |  |  |  |  |  |  | (0.003) |
| Constant | 0.300\*\*\* | 0.292\*\*\* | 0.297\*\*\* | 0.297\*\*\* | 0.297\*\*\* | 0.337\*\*\* | 0.340\*\*\* | 0.344\*\*\* | 0.385\*\*\* | 0.346\*\*\* |
|  | (0.057) | (0.058) | (0.059) | (0.059) | (0.060) | (0.061) | (0.061) | (0.061) | (0.062) | (0.062) |
|  |  |  |  |  |  |  |  |  |  |  |
| Observations | 692 | 692 | 692 | 692 | 692 | 692 | 692 | 692 | 692 | 692 |
| R-squared | 0.001 | 0.005 | 0.006 | 0.014 | 0.014 | 0.032 | 0.033 | 0.035 | 0.053 | 0.119 |

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

## Revised Regression

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| VARIABLES | rel\_chgnl | rel\_chgnl | rel\_chgnl | rel\_chgnl | rel\_chgnl | rel\_chgnl | rel\_chgnl | rel\_chgnl |
|  |  |  |  |  |  |  |  |  |
| phy\_infra\_avg | 0.010\*\*\* | 0.005 | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 | -0.003 |
|  | (0.003) | (0.003) | (0.003) | (0.003) | (0.003) | (0.003) | (0.003) | (0.003) |
| cop\_cor\_avg |  | 0.014\*\*\* | 0.010\*\* | 0.010\*\* | 0.010\*\* | 0.010\*\* | 0.010\*\* | 0.010\*\* |
|  |  | (0.004) | (0.004) | (0.004) | (0.004) | (0.004) | (0.004) | (0.004) |
| high\_school\_percent |  |  | 0.014\*\*\* | 0.014\*\*\* | 0.014\*\*\* | 0.014\*\*\* | 0.014\*\*\* | 0.012\*\*\* |
|  |  |  | (0.003) | (0.003) | (0.003) | (0.003) | (0.003) | (0.002) |
| ageatelection |  |  |  | 0.000 | 0.000 | 0.000 | 0.000 | -0.000 |
|  |  |  |  | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) |
| female |  |  |  |  | 0.053 | 0.053 | 0.052 | 0.054 |
|  |  |  |  |  | (0.046) | (0.046) | (0.048) | (0.050) |
| gov\_coalitiion |  |  |  |  |  |  | -0.022\* | -0.020\* |
|  |  |  |  |  |  |  | (0.012) | (0.012) |
| ln\_popn |  |  |  |  |  |  |  | 0.062\*\*\* |
|  |  |  |  |  |  |  |  | (0.007) |
| Constant | 0.280\*\*\* | 0.280\*\*\* | 0.209\*\*\* | 0.200\*\*\* | 0.197\*\*\* | 0.197\*\*\* | 0.212\*\*\* | -0.362\*\*\* |
|  | (0.019) | (0.019) | (0.024) | (0.038) | (0.038) | (0.038) | (0.041) | (0.071) |
|  |  |  |  |  |  |  |  |  |
| Observations | 692 | 692 | 692 | 692 | 692 | 692 | 692 | 692 |
| R-squared | 0.020 | 0.033 | 0.093 | 0.093 | 0.095 | 0.095 | 0.100 | 0.180 |

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1