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**Working Paper**

## New vs. reelected mayor: Who is more responsive to disasters?

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## **UP School of Economics**

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#### **New vs. Reelected Mayor: Who Is More Responsive to Disasters?**

by

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# NEW VS. REELECTED MAYOR: WHO IS MORE RESPONSIVE TO DISASTERS?

Mel Lorenzo Accad<sup>1</sup>

Version: March 25, 2020

## ABSTRACT

Are new mayors more responsive to disasters than their reelected counterparts? The identification strategy is based on slim vote margin in which new and reelected mayors are found to be *as if* randomly assigned. We find that with greater storm exposure: new mayors spend more on health sector than reelected mayors. We don't find stable and statistically significant result in other sectors and in total municipal income or expenditure.

**Keywords:** election, accountability, disaster response

**JEL Classifications Numbers:** D72, D73, H84, O17

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## INTRODUCTION

In theory, politicians respond to electoral incentives—even more so under the context of term limit. [Duggan & Martinelli (2017); Besley & Case (1995)] We ask whether first-term mayors—whom we assume to have the most reelection incentives—are more responsive to natural disasters in terms of municipal spending compared to their reelected (in their second/third term) counterparts.

On one hand, experienced politicians may have the operational advantage gained from their broad institutional memory and time-tested organizational traction, especially in times of a fast-evolving calamity. However, it can also be argued that new mayors may have advantage in trying new ideas and being more receptive to new practices which may be more effective in disaster response. Though this study cannot answer which of the mentioned aspects play more significantly, we can boil them down into a simple research question: Are first-term mayors more responsive to disasters than the reelected mayors?

There are many confounding factors affecting both survivability in election and municipal spending pattern. As an example, reelected mayors may have easily won in places with weak competition and dismal public pressure to respond to disasters. In comparison, new mayors may have won in places with intense competition and strong demand for disaster response. In this case, we may overestimate the impact of having a new mayor—not necessarily because the mayor is new—but because the underlying institutions in two areas are different to begin with.

Our study is novel for its use of geographically small observation units—1,634 municipalities observed in one decade—for which we can afford to limit the sample to statistically comparable municipalities and election competitiveness. A technique pioneered by Lee, Moretti and Butler (2004)<sup>2</sup> and later on popularly used by Ferraz & Finan (2011) exploits the slim vote margin in which

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<sup>2</sup> Lee, Moretti and Butler (2004) looked at whether legislators' partisan policy stances are affected by "exogenous" change in electoral strength using multi-stage approach ultimately depended on the quasi-randomization of a Democrat winner

new and reelected candidates who barely won are “as if” by random. The technique mainly rests on the statistical similarity between the treatment and control groups at least based on observables. The endogeneity arising from survival selection issue is minimized by including in the balance test the following observables which we believe are likely to be related to political survivability and municipal spending: previous mayor’s number of terms served (proxy for the previous mayor’s experience); number of candidates in the election; number of family members who won in any position before and within the same election year<sup>3</sup>; total votes cast; municipal population; Internal Revenue Allotment (IRA)<sup>4</sup>; national party affiliation<sup>5</sup>; total municipal income and expenditure. By construction of vote margin (to be extensively discussed in Identification Strategy section), our sample is limited only to municipalities where the previous mayor running again. This further provides safety in the comparability of the treatment and control groups.

Challengers seem to strategize their entry to the election contest based on the electoral performance and eligibility for reelection of the incumbent. (Querubin, 2013) There are fewer challengers enticed to enter the election game when the incumbents are still up for re-election. Also, there may be more challengers when the incumbents performed poorly. In order to minimize the endogeneity arising from these factors, we included the following observables in the balance test: number of candidates; number of family members who won in any position before and within the same election year<sup>6</sup>; previous mayor’s number of terms served; national party affiliation<sup>7</sup>.

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<sup>3</sup> To consider the bias coming from family ties as shown by Atkinson, Hicken, & Ravanilla (2015).

<sup>4</sup> Internal Revenue Allotment (IRA) is the budget allocation for a specific local government unit coming from 40% of the internal revenue of the Philippines earned three years ago. Allocation to municipalities is based on formulaic method composed factors such as equal sharing, total population, and total land area. The use of IRA in the test for balance between control and treatment groups provides confidence that these two groups are indeed comparable based on observables that are not affected by either being new or reelected mayor of the municipality.

<sup>5</sup> Philippines has multi-party system and party membership changes almost every election based on alignment with the national presidential candidates’ ticket/team. Parties in the Philippines don’t have ideological differences as shown in Hicken (2015) and Quimpo (2005). Local candidates can have their own party and can be member of several national parties (as evident in the data). We only included the dummy variables for the national parties to test the spread of alignment with the national presidential tickets. This is also to avoid perfect collinearity especially in narrower bandwidths as majority of the local parties are municipality-specific only.

<sup>6</sup> To consider the bias coming congressional “pork” budget allocation (as disaster response) based on family ties as shown by Atkinson, Hicken, & Ravanilla (2015).

<sup>7</sup> Philippines has multi-party system and party membership changes almost every election based on alignment with the national presidential candidates’ ticket/team. Parties in the Philippines don’t have ideological differences as shown in Hicken (2015) and Quimpo (2005). Local candidates can have their own party and can be member of several national parties (as evident in the data). We only included

Expenditures on development-oriented programs increase the chance of the incumbent governor to win again. (Solon, Fabella, & Capuno, 2009) For the Indian case, Cole et al (2012) showed that voters reward short-term disaster relief over long-term disaster preparedness. Same findings but more specific to disasters for the German and US cases are documented by Bechtel & Hainmueller (2011) and Healy & Malhorta (2009), respectively. Reverse causality is possible as far as our main research question is concerned. Note that this is addressed in our study as we avoided contemporaneous relationship in our specification.<sup>8</sup>

Personal connections of municipal mayors to national legislators<sup>9</sup> may explain the distribution of disaster funds to local government units. (Atkinson, Hicken, & Ravanilla, 2015) The familial ties are found to be more important factor than mere party-based political ties. (Cruz, Labonne, & Querubin, 2017) With the Spanish naming convention<sup>10</sup> in the Philippines, we used the political dynasty measures in Mendoza et al (2016) in our balance test.

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the dummy variables for the national parties to test the spread of alignment with the national presidential tickets. This is also to avoid perfect collinearity especially in narrower bandwidths as majority of the local parties are municipality-specific only.

<sup>8</sup> Though this is due to data limitation of calendar year-based income and expenditure information. We cannot include the election year in our estimation because turnover of position happens in July in the same year of election. This is further discussed in the Identification Strategy section.

<sup>9</sup> Members of House of Representatives

<sup>10</sup> Naming convention in the Philippines uses mother's maiden last name as the child's middle name.

## IDENTIFICATION STRATEGY

### *Quasi-Random Treatment Assignment*

The ideal set up to answer the research question—and to address the empirical threats discussed earlier—is to randomize the assignment of new (first term) and reelected (second/third term) mayors to municipalities. If true randomization is achieved, new and reelected mayors along with their corresponding municipalities should be statistically similar with each other.

As true randomization is obviously not feasible, prior studies have exploited the slim vote margin in which candidates barely won “as if” by random. This type of empirical identification strategy is pioneered by Lee, Moretti and Butler (2004)<sup>11</sup> and later more popularized by Ferraz & Finan (2011).

For this study, vote margin is defined formally as:

$$\text{Vote Margin}_{m,e} = \frac{\text{Votes}_{m,e,\text{previous mayor running again}} - \text{Votes}_{m,e,\text{best challenger}}}{\text{Total Votes Cast}_{m,e}}$$

For each  $m$ th municipality and  $e$ th election year

By construction of vote margin, positive value means the previous mayor won for a second or third term; whereas, negative vote margin means that a new mayor won against the previous mayor who ran again. Note that to construct this measurement of vote margin, it requires cases where previous mayor ran again for another term. Moreover, if we limit our sample to a very slim bandwidth, say  $\pm 0.5\%$ , The vote shares of the two types of candidates are almost equal—to a certain extent that the winner won “as if” by chance—which is ideal to see in the balance test later on.

For a bandwidth,  $B$ , the treatment assignment is defined as<sup>12</sup>:

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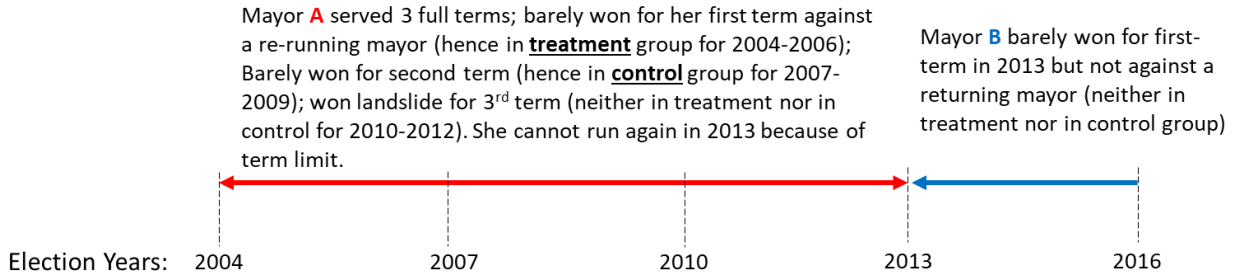
<sup>11</sup> Lee, Moretti and Butler (2004) looked at whether legislators’ partisan policy stances are affected by “exogenous” change in electoral strength using multi-stage approach ultimately depended on the quasi-randomization of a Democrat winner

<sup>12</sup> Note that there’s no zero vote margin as verified in the data.

$$\text{Treatment}_{m,e} = \begin{cases} 1, & \text{if Vote Margin}_{m,e} \in (0, B] \\ 0, & \text{if Vote Margin}_{m,e} \in [-B, 0) \end{cases}$$

Hypothetical example of treatment assignment is illustrated in Figure 1. In this example, mayor A is in treatment for the full term starting in 2004 when she ran and barely won against a returning mayor. Her treatment assignment is until her last full year in term in 2006. Mayor A qualifies to be in the control group starting in 2007 when she barely won for second term and keeps to be in the control group until her last full year in second term in 2009. When she won landslide for third term, Mayor A is neither in the treatment nor in control group. Meanwhile, mayor “B” is neither in the treatment nor in control group because he did not win against a returning mayor. From these criteria, it’s clear to see why we may not have a full panel data.

*Figure 1: Examples of Treatment and Control Assignment in a Hypothetical Municipality*



Limiting our sample to a very slim vote margin, if it satisfies balance test, is apt for our research question as we want to compare first-term mayors against their second- or third-term counterparts. For one, a new mayor who won against a running incumbent may not be similar with another new mayor who won without challenging a returning mayor. There are more new candidates during “open seat”<sup>13</sup> elections in the Philippines. (Querubin, 2013) For more discussion on the process of transforming the election data from politician-level to municipal-level, please refer to Appendix 6.

<sup>13</sup> “Open seat” election is when the previous mayor does not run again for another term.

### ***Balance Test***

Note that true randomization of treatment assignment results in statistically similar treatment and control groups prior to their treatment. This implication can be mimicked if the treatment assignment is not statistically related to the observables which are not affected by the treatment. This is checked in the balance tests across various bandwidths of vote margin. The results in this study are only as good as the choice of bandwidth guided by the balance tests which mainly depend on the observables considered. The balance test results are provided in Appendix 1.

We use the balance test as the main deciding factor for which bandwidth to use in the final analysis along with having enough sample for ample degrees of freedom. The narrowest vote margin bandwidth of  $[-0.6\%, 0.6\%]$ , which has a sample size of 126, created treatment and control municipalities which are found to be statistically similar in terms of the following observables: (1) maximum annual storm exposure; (2) number of candidates; (3) number of family members who won in any position before and (4) within the same election year<sup>14</sup>; (5) total votes cast; (6) total population; (7) total municipal income; (8) Internal Revenue Allotment (IRA)<sup>15</sup>; (9) total municipal expenditures; (10) national party affiliation<sup>16</sup>; (11) previous mayor's number of terms served; (12) regional fixed effects; and (13) year fixed effects. The considered bandwidths are from  $\pm 0.3\%$  to  $\pm 1\%$  (by increment of  $0.1\%$ ); from  $\pm 1\%$  to  $\pm 10\%$  (by increment of  $1\%$ ); and from  $\pm 10\%$  to  $\pm 50\%$  (by increment of  $10\%$ ).

As sample size is significantly reduced with smaller bandwidth, coefficients are only estimable without perfect collinearity with the fixed effects starting at vote margin bandwidth  $\pm 0.5\%$ . Although

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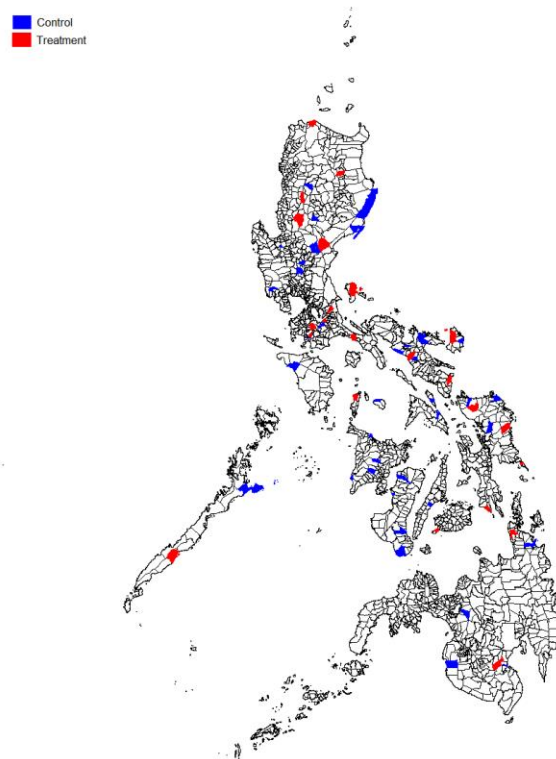
<sup>14</sup> To consider the bias coming congressional "pork" budget allocation (as disaster response) based on family ties as shown by Atkinson, Hicken, & Ravanilla (2015).

<sup>15</sup> Internal Revenue Allotment (IRA) is the budget allocation for a specific local government unit coming from 40% of the internal revenue of the Philippines earned three years ago. Allocation to municipalities is based on formulaic method composed factors such as equal sharing, total population, and total land area. The use of IRA in the test for balance between control and treatment groups provides confidence that these two groups are indeed comparable based on observables that are not affected by either being new or reelected mayor of the municipality.

<sup>16</sup> Philippines has multi-party system and party membership changes almost every election based on alignment with the national presidential candidates' ticket/team. Parties in the Philippines don't have ideological differences as shown in Hicken (2015) and Quimpo (2005). Local candidates can have their own party and can be member of several national parties (as evident in the data). We only included the dummy variables for the national parties to test the spread of alignment with the national presidential tickets. This is also to avoid perfect collinearity especially in narrower bandwidths as majority of the local parties are municipality-specific only.

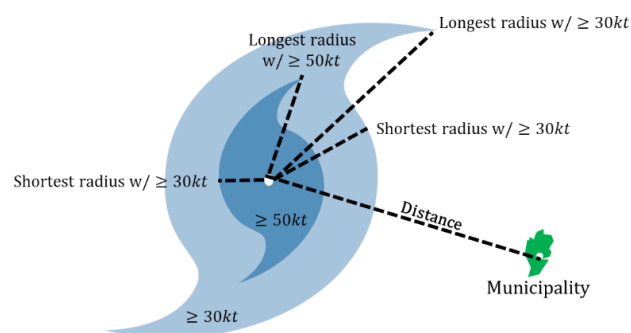
with bandwidth  $\pm 0.5\%$ , the treatment and control groups seem to be not balanced, especially for the number of candidates in the election. This is solved by marginally increasing the bandwidth to  $\pm 0.6\%$  for which treatment and control groups are balanced in the mentioned observables while at the same time having an ample sample size of 126. The geographical distribution of the treatment and control municipalities are presented below.

*Figure 2: Geographical Distribution of Treatment and Control Municipalities*



### ***Measuring Storm Exposure***

*Figure 3: Illustrated Storm Track Data Variables from Japan Meteorological Authority (and own-calculated pairwise distance between storm's eye and centroid of municipality)*



Using QGIS, we calculated the distance between the 6-hourly location of storm's eye and the centroids of all 1,634 cities/municipalities. Based on these distances of pairs of storm eyes and municipality centroid from 1997 to 2018, we used the following criteria to define storm exposure measured in wind speed (knots or kt.):

$$\text{exposure}_{m,h} = \begin{cases} 30, & \text{if distance} \leq \text{longest radius with 30kt or more} \\ \text{MSW} \in [30, \text{max}], & \text{if distance} \leq \text{shortest radius with 30kt or more} \\ 50, & \text{if distance} \leq \text{longest radius with 50kt or more} \\ \text{MSW} \in [50, \text{max}], & \text{if distance} \leq \text{shortest radius with 50kt or more} \end{cases}$$

For  $h$ th interval of 6 hours;  $m$ th municipality

Then, we sum up these exposures over the calendar year and divide this by the number of days in the year multiplied by 4 (because storm tracks are observed every 6 hours):

$$\text{Storm}_{m,t} = \frac{\sum_{h \in t} \text{exposure}_{m,h}}{\#\{\text{days in calendar year } t\} * 4}$$

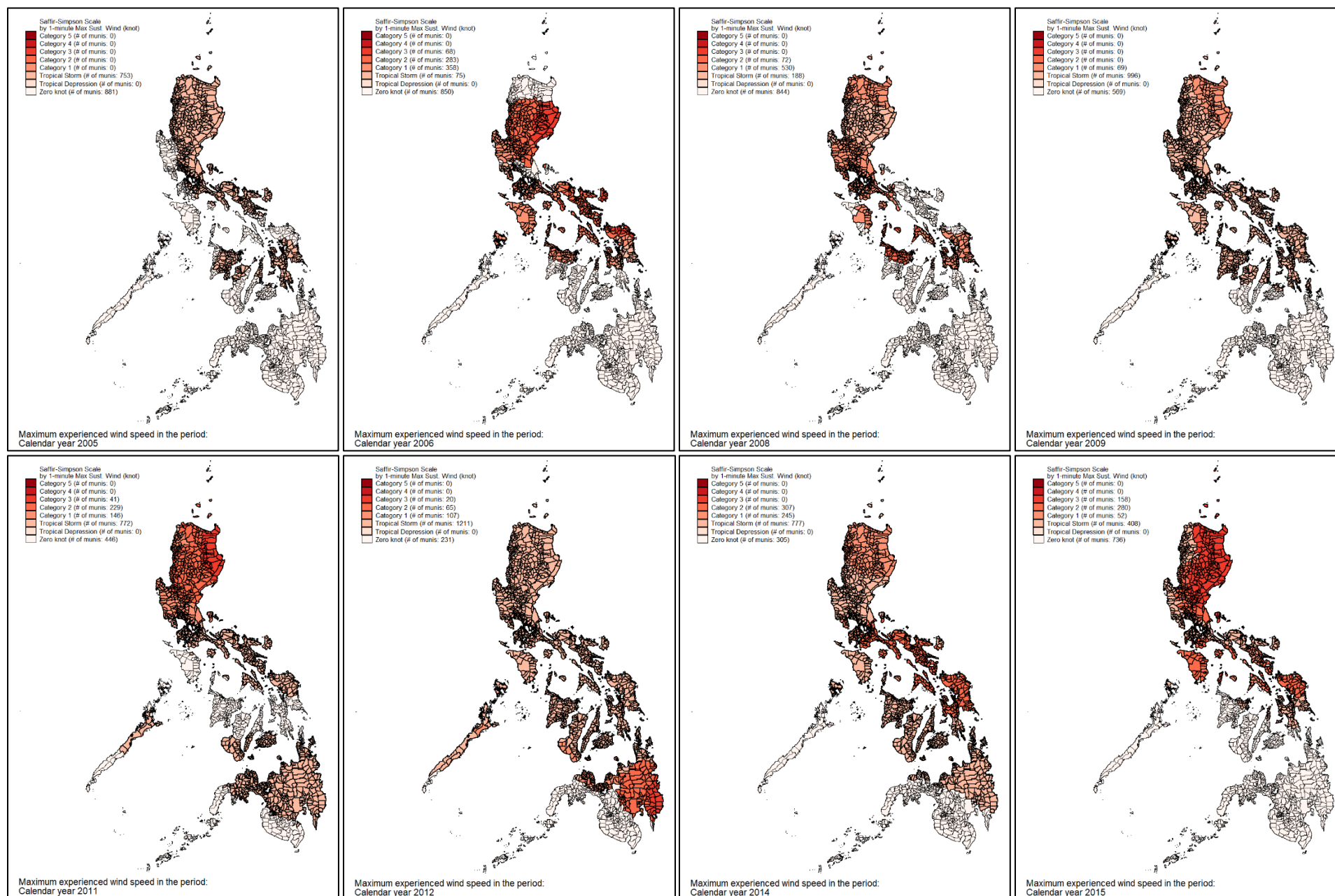
Graphical presentation of the annual maximum sustained wind speed experienced, and their corresponding Saffir-Simpson Scale are presented in Figure 4. These maps show the geographical variation in the storm exposure over the covered period.

In order to test for the measurement performance of our calculated storm exposures, we regressed the log of luminosity night-light data<sup>17</sup> on our own-calculated average storm exposure in a calendar year in Appendix 3. The annual average storm exposure measurement is compared against annual maximum storm exposure. We find that the former has a robust impact on night-light even by including year and municipality fixed effects, and provincial/regional linear time trends.

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<sup>17</sup> We used the night-light luminosity data because there's no measurement of overall economic activity, ala-GDP at the small municipal/city level. Using QGIS, we luminosity values are averaged within the area of the municipality for each year. The annual luminosity raster data is annualized and de-seasonalized by NASA.

Figure 4: Maximum Wind Speed Each Municipality Experienced in the Covered Period



### ***Outcome: Income and Expenditure Items***

We use the municipal incomes by source and municipal expenditures by sector collected by the Bureau of Local Government Finance (BLGF) which oversees and monitors the Annual Statement of Receipts and Expenditures (SRE) of 1,634 cities and municipalities in the Philippines. These income and expenditure items are defined in Appendix 5 which is based on the SRE Manual of BLGF.

Note that actual turnover of mayoral position happens in the month of July within the same year of election. Because municipal incomes and expenditures are for the whole calendar year, election years may cover both the new and the reelected mayor. Hence, election years are not included in our estimation; and only the second and third whole years are included in the analysis.

### ***Main Estimation***

We interact storm exposure variable with the treatment indicator in order to directly estimate the heterogeneity in municipal spending between the new and reelected mayors based on their storm exposure.

*Base estimation:*

$$y_{m,t} = \alpha_o + \alpha_1(\text{Treatment}_{m,\{e \in [t-3, t-1]\}} \times \text{Storm}_{m,t}) + \alpha_2 \text{Treatment}_{m,\{e \in [t-3, t-1]\}} + \alpha_3 \text{Storm}_{m,t} \\ + \gamma_r + \gamma_t + \varepsilon_{m,t}$$

For each  $m$ th municipality;  $t$ th calendar year in {2005, 2006, 2008, 2009, 2011, 2012, 2014, 2015};<sup>18</sup>  $e$ th election year in {2004, 2007, 2010, 2013};  $r$ th region.

We checked for stability/robustness of estimates by controlling municipality-level observables,  $\mathbf{X}_{m,t}$ :

$$y_{m,t} = \beta_o + \beta_1(\text{Treatment}_{m,\{e \in [t-3, t-1]\}} \times \text{Storm}_{m,t}) + \beta_2 \text{Treatment}_{m,\{e \in [t-3, t-1]\}} + \beta_3 \text{Storm}_{m,t} \\ + \beta \mathbf{X}_{m,t} + \delta_r + \delta_t + \epsilon_{m,t}$$

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<sup>18</sup> Because municipal incomes and expenditures are for the whole calendar year, election years may cover both the new and reelected mayors. Due to this data limitation, election years are disregarded and only the second and third whole years are included in the analysis.

The observables in  $X_{m,t}$  are those used in the balance test: previous mayor's number of terms served (proxy for the previous mayor's experience); number of candidates; number of family members who won in any position before and within the same election year<sup>19</sup>; total votes cast; municipal population; Internal Revenue Allotment (IRA)<sup>20</sup>; national party affiliation<sup>21</sup>. To control for the fiscal space of each local government unit, the municipal total income and total expenditure are also included in the controls if they are not the main outcome variables. The inclusion of all the control variables is to check the stability of the main parameters of interest, i.e.  $\alpha_1$  vs.  $\beta_1$ ;  $\alpha_2$  vs.  $\beta_2$ ; and  $\alpha_3$  vs.  $\beta_3$ ; whether the observed relationships between spending and storm-treatment (or storm or treatment) are due to other factors. The stability may also imply that the balance tests are clear.

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<sup>19</sup> To consider the bias coming from family ties as shown by Atkinson, Hicken, & Ravanilla (2015).

<sup>20</sup> Internal Revenue Allotment (IRA) is the budget allocation for a specific local government unit coming from 40% of the internal revenue of the Philippines earned three years ago. Allocation to municipalities is based on formulaic method composed factors such as equal sharing, total population, and total land area. The use of IRA in the test for balance between control and treatment groups provides confidence that these two groups are indeed comparable based on observables that are not affected by either being new or reelected mayor of the municipality.

<sup>21</sup> Philippines has multi-party system and party membership changes almost every election based on alignment with the national presidential candidates' ticket/team. Parties in the Philippines don't have ideological differences as shown in Hicken (2015) and Quimpo (2005). Local candidates can have their own party and can be member of several national parties (as evident in the data). We only included the dummy variables for the national parties to test the spread of alignment with the national presidential tickets. This is also to avoid perfect collinearity especially in narrower bandwidths as majority of the local parties are municipality-specific only.

## MAIN RESULTS

As shown in Table 1, with greater exposure to storms, barely elected new mayors spend more on health sector than their barely reelected counterparts. These results are stable even after controlling for municipality-level observables and fixed effects. For those experiencing an average annual storm exposure of 0.107 (provided in Appendix 2), new mayors spend around 21% more on health sector than their re-elected counterparts. Health is the only sector with stable and statistically significant results even after controlling for observables. Moreover, total municipal income and expenditure are found to have not affected by having new or reelected mayor, and whether exposed to storms or not. Regression results for each municipal income by source and municipal expenditure by sector are presented in Appendix 4.

*Table 1: Regression Results for Health Expenditures*

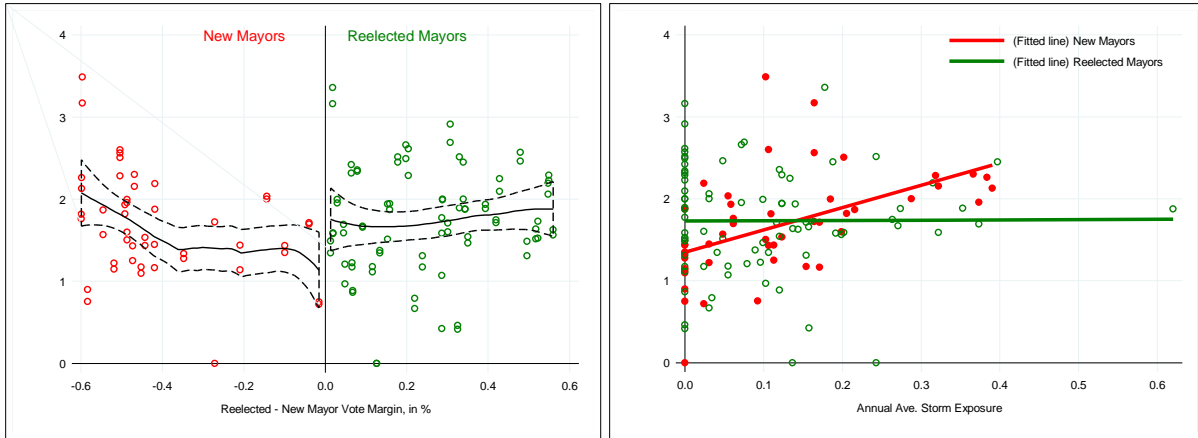
	OUTCOME: Log of Expenditures on Health, Nutrition & Population Control		
	(1)	(2)	(3)
Treatment (New Mayor) = 1	-0.231 (0.201)	-0.270 (0.183)	-0.166 (0.121)
Annual Ave. Storm Exposure	0.957** (0.441)	0.152 (0.391)	-0.143 (0.290)
Treatment X Annual Ave. Storm Exposure	1.899** (0.872)	2.609*** (0.835)	1.997** (0.827)
Observations	126	126	126
R-squared	0.478	0.587	0.868
Number of clusters	62	62	62
Region FE	X	X	X
Calendar Year FE		X	X
Controls			X
Controls excluding total expenditure			
Controls excluding total income			

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1. Robust standard errors in parentheses. Std. errors are clustered in municipal level.

-Controls included: municipal total income and total expenditure; mayor's family connections in politics; previous mayor's experience; number of candidates; total votes; municipal population; Internal Revenue Allotment; party affiliation. Sample is restricted to mayors within the vote margin bandwidth from -0.6% to 0.6%. Treatment group is composed of mayors who garnered 0.6% vote advantage against previous mayor running again. Control group is composed of mayors who garnered 0.6% vote advantage against the best challenger. For other outcomes: expenditures by sector, please refer to Appendix 4.

Note that as our sample is limited to municipalities where a previous mayor ran again and the winner barely won by a vote margin of at most 0.6% advantage, our results may not be applicable outside this range of vote margin.

Figure 5: Municipal Expenditures on Health Within the Vote Margin Bandwidth of  $[-0.6\%, 0.6\%]$



By visual inspection of the data without controlling for observables or fixed effects, Figure 5 demonstrates that even though new and reelected mayors spend similarly on average within the chosen bandwidth (as also supported in the regression results in Table 1), the variability and the moving average of health expenditures differ between new and reelected mayors when moving towards the cut-off of vote margin.

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# Appendix 1 BALANCE TESTS AND SELECTION OF BANDWIDTH

	Treatment and Control Assignment Within the Vote Margin Bandwidth:													
	±0.50% (1)	±0.60% (2)	±0.70% (3)	±0.80% (4)	±0.90% (5)	±1.00% (6)	±2.00% (7)	±3.00% (8)	±4.00% (9)	±5.00% (10)	±10.00% (11)	±20.00% (12)	±30.00% (13)	±50.00% (14)
Annual Ave. Storm Exposure	-0.126 (0.449)	0.0749 (0.456)	0.218 (0.369)	0.263 (0.384)	0.252 (0.346)	0.401 (0.357)	-0.00868 (0.280)	-0.131 (0.225)	-0.0326 (0.209)	-0.0166 (0.176)	-0.00609 (0.103)	-0.0695 (0.0840)	-0.0912 (0.0755)	-0.0688 (0.0746)
# Candidates	-0.195* (0.112)	-0.168 (0.121)	-0.163 (0.1000)	-0.161* (0.0891)	-0.134 (0.0859)	-0.126* (0.0670)	-0.0204 (0.0529)	-0.0195 (0.0316)	0.00382 (0.0151)	0.00281 (0.0132)	0.00716 (0.0107)	0.0199** (0.00881)	0.0249*** (0.00866)	0.0306*** (0.00783)
Total votes vast	5.16e-06 (2.91e-05)	1.42e-05 (3.08e-05)	1.49e-05 (3.10e-05)	1.70e-05 (2.87e-05)	4.45e-05 (3.21e-05)	6.28e-06 (1.73e-05)	-2.96e-06 (7.66e-06)	-6.14e-06* (3.65e-06)	-7.60e-07 (3.28e-06)	1.48e-06 (3.24e-06)	1.35e-06 (2.70e-06)	2.52e-06 (1.97e-06)	3.44e-06* (1.81e-06)	2.06e-06** (1.04e-06)
Population	-4.16e-06 (9.62e-06)	-1.51e-06 (1.26e-05)	-1.52e-06 (1.27e-05)	-3.41e-06 (1.15e-05)	-1.37e-05 (1.22e-05)	4.28e-06 (5.15e-06)	1.20e-06 (3.71e-06)	2.60e-06* (1.40e-06)	3.34e-07 (1.23e-06)	-6.34e-07 (1.25e-06)	-2.52e-07 (9.47e-07)	-4.60e-07 (6.14e-07)	-8.14e-07* (4.88e-07)	-5.33e-07 (3.47e-07)
Total current operating income	-0.118 (0.216)	-0.00338 (0.243)	0.0788 (0.232)	0.0506 (0.231)	0.00211 (0.246)	0.0102 (0.254)	-0.148 (0.207)	0.0741 (0.177)	-0.0331 (0.164)	-0.119 (0.149)	-0.0376 (0.0892)	-0.0714 (0.0652)	-0.0379 (0.0555)	-0.0394 (0.0471)
Internal Revenue Allotment	-0.0503 (0.424)	0.0168 (0.305)	-0.0920 (0.266)	-0.0802 (0.275)	0.0662 (0.289)	-0.0819 (0.283)	0.242 (0.200)	0.0629 (0.167)	0.164 (0.149)	0.159 (0.129)	0.0289 (0.0607)	0.00226 (0.0466)	-0.0168 (0.0407)	-0.0200 (0.0342)
Total Current Operating Expenditures	-0.0123 (0.157)	-0.185 (0.221)	-0.146 (0.224)	-0.148 (0.222)	-0.262 (0.230)	-0.199 (0.226)	-0.0469 (0.168)	-0.120 (0.147)	-0.0695 (0.133)	0.00673 (0.116)	-0.0896 (0.0744)	0.0140 (0.0537)	0.00110 (0.0451)	0.00876 (0.0383)
Number of family members won in the past in the same municipality	0.00913 (0.0394)	-0.0183 (0.0339)	0.000712 (0.0335)	0.00957 (0.0326)	0.0167 (0.0308)	0.00696 (0.0277)	0.00126 (0.0208)	0.0216 (0.0173)	0.00586 (0.0153)	0.0117 (0.0136)	0.00225 (0.00879)	0.00397 (0.00606)	0.000958 (0.00509)	-0.00128 (0.00378)
Number of family members won in the same election year and municipality	-0.122 (0.111)	-0.0744 (0.101)	-0.131 (0.0928)	-0.152* (0.0801)	-0.159** (0.0779)	-0.116* (0.0670)	-0.0850 (0.0518)	-0.124*** (0.0395)	-0.0786** (0.0340)	-0.0856*** (0.0304)	-0.0383* (0.0210)	-0.0404*** (0.0139)	-0.0360*** (0.0117)	-0.0338*** (0.00968)
PARTY_LDP	0.180 (0.396)	0.0601 (0.392)	0.0636 (0.367)	-0.0651 (0.307)	-0.138 (0.297)	-0.0553 (0.259)	0.0953 (0.240)	0.0230 (0.197)	0.132 (0.141)	0.159 (0.130)	0.199** (0.0872)	0.161*** (0.0621)	0.216*** (0.0577)	0.202*** (0.0529)
PARTY_LP	-0.133 (0.224)	-0.149 (0.201)	-0.149 (0.180)	-0.141 (0.171)	-0.177 (0.163)	-0.133 (0.151)	-0.0293 (0.105)	0.0108 (0.0827)	0.0232 (0.0706)	0.0620 (0.0629)	0.0812* (0.0438)	0.0462 (0.0308)	0.0255 (0.0248)	0.0301 (0.0223)
PARTY_NP	-0.201 (0.225)	-0.123 (0.209)	-0.179 (0.197)	-0.0408 (0.209)	0.0520 (0.185)	0.109 (0.144)	0.0771 (0.103)	0.0579 (0.0804)	0.0528 (0.0691)	0.0862 (0.0575)	0.0421 (0.0408)	0.0181 (0.0284)	0.00734 (0.0241)	0.00448 (0.0203)
PARTY_OTHERS	(BASE)	(BASE)	(BASE)	(BASE)	(BASE)	(BASE)	(BASE)	(BASE)	(BASE)	(BASE)	(BASE)	(BASE)	(BASE)	(BASE)
Previous mayor's number of consecutive terms won = 1	(BASE)	(BASE)	(BASE)	(BASE)	(BASE)	(BASE)	(BASE)	(BASE)	(BASE)	(BASE)	(BASE)	(BASE)	(BASE)	(BASE)
Previous mayor's number of consecutive terms won = 2	0.0479 (0.214)	-0.00894 (0.182)	-0.0490 (0.168)	-0.0112 (0.152)	0.0632 (0.147)	0.0102 (0.130)	-0.0140 (0.0919)	-0.0721 (0.0697)	-0.0344 (0.0604)	0.0251 (0.0524)	-0.0575 (0.0380)	-0.0335 (0.0269)	-0.0494** (0.0225)	-0.0575*** (0.0187)
Previous mayor's number of consecutive terms won = 3			-0.839** (0.379)	-0.718* (0.362)	-0.434 (0.321)	-0.402 (0.276)	-0.390*** (0.148)	-0.0550 (0.297)	-0.0699 (0.257)	0.106 (0.233)	0.0895 (0.187)	0.228 (0.164)	0.186 (0.153)	0.173 (0.147)
Previous mayor's number of consecutive terms won = 4											-0.301*** (0.0933)	-0.131** (0.0610)	-0.111** (0.0514)	-0.0967** (0.0434)
year = 2005	(BASE)	(BASE)	(BASE)	(BASE)	(BASE)	(BASE)	(BASE)	(BASE)	(BASE)	(BASE)	(BASE)	(BASE)	(BASE)	(BASE)
year = 2006	0.0260 (0.0437)	0.0329 (0.0443)	0.0225 (0.0494)	0.0195 (0.0451)	0.0339 (0.0458)	0.0183 (0.0388)	-0.0134 (0.0195)	0.00215 (0.0109)	-0.00748 (0.00911)	-0.00628 (0.00693)	0.00420 (0.00519)	0.00896** (0.00358)	0.00920*** (0.00326)	0.00791*** (0.00255)
year = 2008	0.0526 (0.251)	-0.202 (0.232)	-0.101 (0.206)	-0.0917 (0.198)	-0.112 (0.185)	-0.0303 (0.175)	-0.0237 (0.117)	0.0453 (0.0930)	0.00251 (0.0785)	0.0267 (0.0667)	0.103** (0.0450)	0.111*** (0.0322)	0.119*** (0.0279)	0.115*** (0.0238)
year = 2009	0.0808 (0.261)	-0.200 (0.244)	-0.109 (0.218)	-0.101 (0.211)	-0.123 (0.200)	-0.0533 (0.188)	-0.0424 (0.124)	0.0431 (0.0991)	-0.0151 (0.0843)	0.0175 (0.0707)	0.0967** (0.0475)	0.124*** (0.0343)	0.132*** (0.0298)	0.127*** (0.0256)
year = 2011	0.482 (0.370)	0.0200 (0.311)	-0.0599 (0.279)	-0.206 (0.255)	-0.351 (0.239)	-0.159 (0.230)	-0.190 (0.142)	-0.134 (0.104)	-0.150* (0.0868)	-0.126* (0.0724)	0.00449 (0.0439)	0.0791** (0.0334)	0.0778*** (0.0282)	0.0763*** (0.0243)
year = 2012	0.475 (0.360)	0.0275 (0.300)	-0.0587 (0.265)	-0.203 (0.244)	-0.327 (0.229)	-0.157 (0.225)	-0.180 (0.137)	-0.130 (0.101)	-0.142* (0.0852)	-0.121* (0.0714)	0.00309 (0.0482)	0.0762** (0.0333)	0.0793*** (0.0282)	0.0758*** (0.0243)
year = 2014	0.0968 (0.298)	-0.0321 (0.259)	-0.110 (0.242)	-0.193 (0.236)	-0.271 (0.219)	-0.129 (0.216)	-0.146 (0.154)	-0.0707 (0.110)	-0.0840 (0.0943)	-0.0467 (0.0820)	0.0598 (0.0562)	0.109*** (0.0392)	0.112*** (0.0340)	0.115*** (0.0293)
year = 2015	0.117 (0.318)	-0.0220 (0.271)	-0.0930 (0.260)	-0.174 (0.253)	-0.258 (0.237)	-0.101 (0.232)	-0.153 (0.161)	-0.0881 (0.113)	-0.0967 (0.0962)	-0.0511 (0.0837)	0.0576 (0.0568)	0.114*** (0.0397)	0.116*** (0.0346)	0.119*** (0.0296)
REGION_PSGC = 1	-0.233 (0.496)	-0.551 (0.485)	0.172 (0.438)	0.247 (0.379)	0.266 (0.351)	0.0729 (0.360)	0.0373 (0.274)	0.0418 (0.212)	0.0919 (0.170)	0.0366 (0.157)	-0.0836 (0.0925)	-0.0190 (0.0641)	-0.00472 (0.0461)	-0.0118 (0.0462)
REGION_PSGC = 2	0.0612 (0.447)	0.196 (0.443)	0.459 (0.393)	0.416 (0.362)	0.310 (0.320)	0.145 (0.329)	0.0708 (0.261)	-0.0144 (0.219)	0.0336 (0.184)	-0.0944 (0.163)	-0.128 (0.0973)	0.0300 (0.0700)	0.0440 (0.0587)	0.0270 (0.0519)
REGION_PSGC = 3	-0.200 (0.348)	-0.567 (0.413)	-0.315 (0.359)	-0.342 (0.329)	-0.220 (0.317)	-0.360 (0.314)	-0.0807 (0.240)	-0.0625 (0.184)	-0.0651 (0.142)	-0.0383 (0.135)	-0.119 (0.0754)	-0.0706 (0.0516)	-0.0390 (0.0454)	-0.0231 (0.0396)
REGION_PSGC = 4	0.362 (0.481)	0.0728 (0.440)	0.289 (0.399)	0.312 (0.348)	0.358 (0.306)	0.195 (0.312)	0.0975 (0.236)	-0.00163 (0.193)	0.0639 (0.149)	0.0264 (0.137)	-0.0893 (0.0735)	0.0165 (0.0520)	0.0113 (0.0453)	0.0133 (0.0393)
REGION_PSGC = 5	-0.366 (0.339)	-0.274 (0.398)	0.0938 (0.360)	0.0845 (0.320)	0.132 (0.288)	-0.0641 (0.289)	-0.0128 (0.227)	-0.0360 (0.183)	0.0390 (0.144)	-0.0119 (0.137)	-0.0465 (0.0803)	0.0329 (0.0578)	0.0295 (0.0500)	0.0407 (0.0442)
REGION_PSGC = 6	-0.331 (0.336)	-0.616 (0.375)	-0.303 (0.315)	-0.149 (0.300)	-0.0456 (0.274)	-0.223 (0.268)	-0.162 (0.228)	-0.292 (0.190)	-0.214 (0.150)	-0.223 (0.142)	-0.158* (0.0822)	-0.0908* (0.0528)	-0.0850* (0.0437)	-0.0580 (0.0379)
REGION_PSGC = 7	0.170 (0.526)	-0.396 (0.515)	-0.0701 (0.463)	-0.00934 (0.403)	-0.0393 (0.374)	0.0405 (0.321)	0.0887 (0.246)	-0.0663 (0.194)	-0.0321 (0.159)	-0.0236 (0.150)	-0.0794 (0.0833)	-0.0220 (0.0571)	-0.0239 (0.0467)	-0.0107 (0.0401)
REGION_PSGC = 8	-0.277 (0.402)	-0.191 (0.419)	0.0204 (0.383)	-0.0489 (0.347)	0.0225 (0.301)	-0.00557 (0.315)	-0.0710 (0.231)	-0.0823 (0.186)	0.0242 (0.151)	-0.0189 (0.143)	-0.118 (0.0763)	-0.0311 (0.0525)	-0.0159 (0.0446)	-0.00501 (0.0384)
REGION_PSGC = 9				-0.670 (0.420)	-0.787** (0.361)	-0.849** (0.340)	-0.118 (0.314)	-0.124 (0.234)	0.0279 (0.211)	-0.112 (0.174)	-0.202** (0.102)	-0.111* (0.0595)	-0.0648 (0.0501)	-0.0562 (0.0419)
REGION_PSGC = 10							-0.262 (0.273)	-0.128 (0.200)	-0.0256 (0.156)	-0.0295 (0.149)	-0.136* (0.0816)	-0.0197 (0.0548)	-0.00161 (0.0490)	-0.00895 (0.0421)
REGION_PSGC = 11	0.159 (0.578)	0.0364 (0.537)	0.236 (0.455)	0.358 (0.344)	0.322 (0.309)	0.197 (0.305)	-0.00141 (0.265)	-0.0417 (0.220)	-0.0480 (0.200)	-0.180 (0.174)	-0.105 (0.103)	-0.101 (0.0704)	-0.0259 (0.0563)	-0.0244 (0.0497)
REGION_PSGC = 12	-0.330 (0.525)	-0.542 (0.555)	-0.371 (0.518)	-0.321 (0.472)	-0.00681 (0.465)	-0.597** (0.300)	-0.283 (0.314)	-0.0922 (0.271)	0.0391 (0.174)	0.00872 (0.162)	-0.0675 (0.105)	0.0110 (0.0664)	-0.00274 (0.0541)	-0.0161 (0.0451)
REGION_PSGC = 13							-0.0636 (0.348)	-0.176 (0.334)	-0.136 (0.327)	-0.136 (0.256)	0.0431 (0.256)	-0.0429 (0.129)	0.0243 (0.110)	-0.0123 (0.0804)
REGION_PSGC = 14	0.240 (0.481)	0.0675 (0.490)	0.351 (0.430)	0.355 (0.389)	0.381 (0.350)	0.289 (0.379)	-0.182 (0.252)	-0.123 (0.214)	-0.0810 (0.177)	-0.160 (0.163)	-0.0263 (0.0880)	0.0936 (0.0656)	0.114** (0.0572)	0.101* (0.0526)
REGION_PSGC = 15	0.414 (0.712)	0.0725 (0.752)	0.372 (0.646)	0.389 (0.588)	0.692 (0.624)	0.00193 (0.359)	0.126 (0.534)	0.274 (0.260)	0.350* (0.192)	0.368** (0.175)	0.0256 (0.118)	0.0368 (0.0954)	0.0156 (0.0756)	-0.0136 (0.0563)
REGION_PSGC = 16	(BASE)	(BASE)	(BASE)	(BASE)	(BASE)	(BASE)	(BASE)	(BASE)	(BASE)	(BASE)	(BASE)	(BASE)	(BASE)	(BASE)
REGION_PSGC = 17	-0.0681 (0.369)	-0.109 (0.389)	0.176 (0.375)	0.0675 (0.334)	0.0600 (0.288)	-0.0601 (0.297)	-0.0553 (0.241)	-0.129 (0.190)	0.110 (0.158)	0.0140 (0.148)	-0.00586 (0.0829)	0.0480 (0.0582)	0.0667 (0.0520)	0.0761* (0.0456)
Observations	100	126	150	166	182	204	401	606	833	1,051	2,148	3,792	4,818	5,917
R-squared	0.404	0.370	0.312	0.301	0.279	0.272	0.085	0.077	0.065	0.063	0.032	0.035	0.040	0.043
Number of clusters	49	62	72	79	87	97	188	279	367	438	764	1104	1268	1418

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1. Robust standard errors in parentheses. Std. errors are clustered in municipal level. Sample is restricted to mayors within the vote margin bandwidth indicated. Treatment group is composed of mayors who garnered at most x% vote advantage against previous mayor running again. Control group is composed of mayors who garnered at most x% vote advantage against the best challenger.

**Appendix 2 SUMMARY STATISTICS FOR SAMPLE WITHIN VOTE MARGIN BANDWIDTH [-0.6%, 0.6%]**

VARIABLES	(1) N	(2) mean	(3) SD	(4) min	(5) max
Treatment Indicator (New Mayor) defined by $\pm 0.6\%$ vote margin	126	0.365	0.483	0	1
Annual Ave. Storm Exposure	126	0.107	0.118	0	0.620
Treatment X Annual Ave. Storm Exposure	126	0.0439	0.0922	0	0.390
Total Votes Cast in Election	126	15,505	10,812	2,358	57,829
Population Size	126	37,718	26,862	5,033	149,108
Log: Total Current Operating Income	126	4.212	0.647	3.068	6.392
Log: Internal Revenue Allotment	126	4.022	0.567	3.022	5.891
Log: Inter-Local transfers	126	0.0695	0.306	0	2.446
Log: Extraordinary Receipts/ Grants/ Donations/Aids	126	0.126	0.473	0	3.258
Log: Total Current Operating Expenditure	126	3.995	0.620	2.720	6.042
Log: Total Expenditure / Total Income	126	-0.221	0.218	-1.392	0.674
Log: General Public Services	126	3.503	0.616	2.378	5.674
Log: Education, Culture & Sports/ Manpower Dev't	126	0.674	0.815	0	4.273
Log: Health, Nutrition & Population Control	126	1.737	0.620	0	3.487
Log: Labor and Employment	126	0.0178	0.150	0	1.648
Log: Housing and Community Development	126	0.105	0.363	0	2.412
Log: Social Security /Social Services & Welfare	126	1.175	0.603	0	2.944
Log: Economic Services	126	2.016	0.890	0	4.322
Log: Debt Service	126	0.305	0.554	0	2.955
Log: Acquisition of Loans	126	0.128	0.586	0	3.582
Number of Candidates in Election	126	2.587	0.851	2	6
Number of Family Members Won Before in same Muni.	126	1.492	2.878	0	18
Number of Family Members Won in Same year and Muni.	126	0.667	1.073	0	5
PARTY_LDP	126	0.0635	0.245	0	1
PARTY_LP	126	0.175	0.381	0	1
PARTY_NP	126	0.127	0.334	0	1
PARTY_OTHERS	126	0.317	0.467	0	1
# of consecutive terms won as mayor= 1	126	0.365	0.483	0	1
# of consecutive terms won as mayor= 2	126	0.492	0.502	0	1
# of consecutive terms won as mayor= 3	126	0.143	0.351	0	1
1 <sup>st</sup> year in term	126	0.500	0.502	0	1
2 <sup>nd</sup> year in term	126	0.500	0.502	0	1
2005	126	0.151	0.359	0	1
2006	126	0.151	0.359	0	1
2008	126	0.135	0.343	0	1
2009	126	0.135	0.343	0	1
2011	126	0.0397	0.196	0	1
2012	126	0.0397	0.196	0	1
2014	126	0.175	0.381	0	1
2015	126	0.175	0.381	0	1
REGION1	126	0.0317	0.176	0	1
REGION2	126	0.0952	0.295	0	1
REGION3	126	0.0794	0.271	0	1
REGION4	126	0.127	0.334	0	1
REGION5	126	0.143	0.351	0	1
REGION6	126	0.0952	0.295	0	1
REGION7	126	0.0635	0.245	0	1
REGION8	126	0.127	0.334	0	1
REGION11	126	0.0317	0.176	0	1
REGION12	126	0.0159	0.125	0	1
REGION14	126	0.0476	0.214	0	1
REGION15	126	0.0159	0.125	0	1
REGION16	126	0.0317	0.176	0	1
REGION17	126	0.0952	0.295	0	1

Sample is restricted to mayors within the bandwidth of vote margin of [-0.6%, 0.6%]. Treatment group is composed of mayors who garnered at most 0.6% vote advantage against previous mayor running again. Control group is composed of mayors who garnered at most 0.6% vote advantage against the best challenger.

### Appendix 3      PERFORMANCE OF STORM EXPOSURE MEASUREMENT

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	Outcome: log of annual average of night-light at city/municipal level					
Annual Ave. Storm Exposure	-0.0443*** (0.0100)	-0.0660*** (0.0107)	-0.0845*** (0.0116)			
Annual Max. Storm Exposure				4.05e-06 (4.14e-05)	-3.97e-05 (4.08e-05)	-9.98e-05** (4.04e-05)
Observations	26,144	26,144	26,144	26,144	26,144	26,144
R-squared	0.977	0.978	0.980	0.977	0.978	0.979
Number of clusters	1634	1634	1634	1634	1634	1634
Year FE	X	X	X	X	X	X
Municipality FE	X	X	X	X	X	X
Region linear time trend		X			X	
Province linear time trend			X			X

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1. Robust standard errors in parentheses. Std. errors are clustered in municipality level. Included years: 2001 to 2012 (last year with available Night light data de-seasonalized and annualized by NASA. Annual Ave. Storm Exposure is better measurement in predicting variations in night-light at municipal levelg

## Appendix 4 REGRESSION RESULTS

OUTCOME: Log of	Total current operating income			Total Current Operating Expenditures			Inter-Local Transfers		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Treatment (New Mayor) = 1	-0.102 (0.215)	-0.128 (0.196)	-0.0366 (0.0400)	-0.0893 (0.197)	-0.130 (0.180)	-0.0321 (0.0557)	0.0301 (0.0639)	0.0625 (0.0821)	0.103 (0.128)
Annual Ave. Storm Exposure	1.076** (0.405)	0.342 (0.561)	-0.149 (0.188)	0.994** (0.399)	0.400 (0.591)	-0.0364 (0.199)	0.153 (0.246)	0.331 (0.332)	0.263 (0.289)
Treatment X Annual Ave. Storm Exposure	0.584 (0.891)	1.219 (0.972)	0.332 (0.320)	0.220 (0.837)	0.922 (0.973)	-0.0517 (0.346)	-0.159 (0.271)	-0.343 (0.385)	-0.445 (0.452)
Observations	126	126	126	126	126	126	126	126	126
R-squared	0.450	0.539	0.953	0.418	0.503	0.922	0.099	0.127	0.192
Number of clusters	62	62	62	62	62	62	62	62	62
Region FE	X	X	X	X	X	X	X	X	X
Calendar Year FE		X	X		X	X		X	X
Controls									X
Controls excluding total expenditure						X			
Controls excluding total income			X						

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1. Robust standard errors in parentheses. Std. errors are clustered in municipal level. Controls included: municipal total income and total expenditure; mayor's family connections in politics; previous mayor's experience; number of candidates; total votes; municipal population; Internal Revenue Allotment; party affiliation. Sample is restricted to mayors within the vote margin bandwidth from -0.6% to 0.6%. Treatment group is composed of mayors who garnered 0.6% vote advantage against previous mayor running again. Control group is composed of mayors who garnered 0.6% vote advantage against the best challenger. For other outcomes: expenditures by sector, please refer to Appendix 3.

OUTCOME: Log of	Extraordinary Receipts/ Grants/ Donations/ Aids			General Public Services			Education, Culture & Sports/ Manpower Development		
	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
Treatment (New Mayor) = 1	0.00177 (0.126)	-0.0304 (0.146)	0.0240 (0.148)	-0.0285 (0.194)	-0.0582 (0.170)	0.0180 (0.0540)	-0.145 (0.175)	-0.264 (0.187)	-0.0212 (0.102)
Annual Ave. Storm Exposure	-0.281 (0.332)	-1.027 (0.629)	-1.116 (0.832)	1.515*** (0.392)	0.465 (0.598)	-0.0293 (0.173)	0.0634 (0.609)	-0.00995 (0.777)	0.0133 (0.528)
Treatment X Annual Ave. Storm Exposure	0.361 (0.650)	0.962 (0.944)	0.558 (0.839)	-0.135 (0.854)	0.492 (0.996)	-0.257 (0.282)	2.370* (1.227)	3.443*** (1.156)	1.305 (0.885)
Observations	126	126	126	126	126	126	126	126	126
R-squared	0.081	0.227	0.290	0.420	0.529	0.958	0.344	0.402	0.793
Number of clusters	62	62	62	62	62	62	62	62	62
Region FE	X	X	X	X	X	X	X	X	X
Calendar Year FE		X	X		X	X		X	X
Controls			X			X			X
Controls excluding total expenditure									
Controls excluding total income									

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1. Robust standard errors in parentheses. Std. errors are clustered in municipal level. Controls included: municipal total income and total expenditure; mayor's family connections in politics; previous mayor's experience; number of candidates; total votes; municipal population; Internal Revenue Allotment; party affiliation. Sample is restricted to mayors within the vote margin bandwidth from -0.6% to 0.6%. Treatment group is composed of mayors who garnered 0.6% vote advantage against previous mayor running again. Control group is composed of mayors who garnered 0.6% vote advantage against the best challenger.

OUTCOME: Log of	Health, Nutrition & Population Control			Labor and Employment			Housing and Community Development		
	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)
Treatment (New Mayor) = 1	-0.231 (0.201)	-0.270 (0.183)	-0.166 (0.121)	0.0935 (0.0907)	0.112 (0.104)	0.112 (0.112)	0.119 (0.0844)	0.0193 (0.0925)	0.140 (0.106)
Annual Ave. Storm Exposure	0.957** (0.441)	0.152 (0.391)	-0.143 (0.290)	-0.111 (0.138)	-0.0548 (0.0889)	-0.0561 (0.113)	0.705* (0.403)	0.907** (0.382)	0.471 (0.314)
Treatment X Annual Ave. Storm Exposure	1.899** (0.872)	2.609*** (0.835)	1.997** (0.827)	-0.359 (0.386)	-0.427 (0.428)	-0.482 (0.546)	-0.505* (0.296)	0.248 (0.435)	-0.423 (0.481)
Observations	126	126	126	126	126	126	126	126	126
R-squared	0.478	0.587	0.868	0.097	0.148	0.190	0.176	0.351	0.528
Number of clusters	62	62	62	62	62	62	62	62	62
Region FE	X	X	X	X	X	X	X	X	X
Calendar Year FE		X	X		X	X		X	X
Controls			X			X			X
Controls excluding total expenditure									
Controls excluding total income									

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1. Robust standard errors in parentheses. Std. errors are clustered in municipal level. Controls included: municipal total income and total expenditure; mayor's family connections in politics; previous mayor's experience; number of candidates; total votes; municipal population; Internal Revenue Allotment; party affiliation. Sample is restricted to mayors within the vote margin bandwidth from -0.6% to 0.6%. Treatment group is composed of mayors who garnered 0.6% vote advantage against previous mayor running again. Control group is composed of mayors who garnered 0.6% vote advantage against the best challenger.

OUTCOME: Log of	Social Security /Social Services & Welfare			Economic Services		
	(28)	(29)	(30)	(31)	(32)	(33)
Treatment (New Mayor) = 1	-0.220 (0.153)	-0.213 (0.133)	-0.0944 (0.0922)	-0.172 (0.233)	-0.249 (0.218)	-0.0527 (0.109)
Annual Ave. Storm Exposure	1.343*** (0.456)	-0.0580 (0.617)	-0.473 (0.485)	1.425*** (0.517)	0.584 (0.767)	0.184 (0.309)
Treatment X Annual Ave. Storm Exposure	0.126 (0.764)	0.389 (0.923)	0.140 (0.669)	0.176 (1.111)	1.081 (1.238)	0.00334 (0.620)
Observations	126	126	126	126	126	126
R-squared	0.424	0.556	0.762	0.481	0.534	0.891
Number of clusters	62	62	62	62	62	62
Region FE	X	X	X	X	X	X
Calendar Year FE		X	X		X	X
Controls			X			X
Controls excluding total expenditure						
Controls excluding total income						

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1. Robust standard errors in parentheses. Std. errors are clustered in municipal level. Controls included: municipal total income and total expenditure; mayor's family connections in politics; previous mayor's experience; number of candidates; total votes; municipal population; Internal Revenue Allotment; party affiliation. Sample is restricted to mayors within the vote margin bandwidth from -0.6% to 0.6%. Treatment group is composed of mayors who garnered 0.6% vote advantage against previous mayor running again. Control group is composed of mayors who garnered 0.6% vote advantage against the best challenger.

## Appendix 5      DEFINITION OF INCOME AND EXPENDITURE ITEMS

These definitions are from the Statement of Receipts and Expenditures Manual<sup>22</sup>

### ***Receipts/Income Used in this Study***

- Tax Revenue (Local Sources) – refers to local taxes that accrue to the local government units in accordance with the provision of the Constitution and R.A. No. 7160.
- Internal Revenue Allotment - Share of the province/city/municipality from the national taxes collected. Other definition: LGC Section 284.
  - Internal Revenue Allotment – Current Year - Share of the province/city/municipality from the national taxes collected and received during the year from the national government.
  - Internal Revenue Allotment – Prior Year - Share of the province/city/municipality from the national taxes collected from prior year allotment received during the year (i.e., monetization of IRA from financial institutions).
- Extraordinary Income/Receipts Grants and Donations
  - Grants and Donations – Amount of income from grants/donation received in cash or in kind from domestic or foreign sources.
  - Grants and Donation – Foreign - Amount of grants/donation received in cash or in kind from foreign sources.
  - Income from Grants and Donations – Domestic - Amount of grants/donation received in cash or in kind from domestic donors that may include donations from PDAF, LAAF and others.
  - PDAF - Priority Development Assistance Fund. LAAF - Grants from Local Affirmative Action Fund. Others - Receipts from other sources.
  - Subsidy Income
  - Other Subsidy Income – Amount of subsidy received which cannot be classified under any of the specific subsidy income accounts.
  - Subsidy from GOCC - Amount of subsidy received from Government Owned and Controlled Corporations.
  - Gains and Premiums
  - Gain on FOREX - Gain in the conversion of foreign currencies to Philippine peso. In case of revaluation of outstanding foreign loan, it is the resulting difference when the prevailing exchange rate is higher/lower than the exchange rate at the time of the transaction or last adjustment.
  - Gain on Sale of Assets – Gain on the sale of assets over their book values (Cost - Accumulated Depreciation).
  - Premium on Bonds – Amount earned on sale/redemption of bonds.
  - Gain on Sale of Investment – Gain on the sale of securities such as stocks, treasury notes, etc.
- Subsidy Income (Inter-Local Transfer)
  - Subsidy from LGUs - Amount of subsidy received from other LGUs.
  - Subsidy from Other Funds – refers to the transfers between different funds (i.e. General fund to SEF) and transfers between LGUs.
- Loans and Borrowings
  - Loans and Borrowings - Amount of long-term or short-term indebtedness received by LGU from foreign or domestic creditors that is covered by a contract.

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<sup>22</sup> Bureau of Local Government Finance. (n.d.). *The Statement of Receipts and Expenditures: Systems, Concepts, Input Preparation and Reporting*. Retrieved April 2, 2019 from <http://blgf.gov.ph/wp-content/uploads/2015/12/SREManual.pdf>

- Loans and Borrowings – Foreign - Amount of Liabilities received from foreign creditors.
- Loans and Borrowings – Domestic - Amount of indebtedness received from domestic creditors.
- Bond Flotation - Amount received from bond issuance.

### ***Expenditures Classification by Function***

- General Public Services – covers sector expenditures for services that are indispensable to the existence of an organized LGU. These include executive and legislative services; overall financial and fiscal services; the civil service; planning; conduct of foreign affairs; general research; public order and safety; and centralized services. These exclude general administration, regulation, research and other services of departments that can be identified directly under each specific sector.
- Department of Education – covers sector expenditures for services in support of schools and education facilities; planning and manpower development; sports; and cultural preservation and enrichment.
- Health, Nutrition and Population Control – covers sector expenditures for health program including medical, dental and health services; planning and administration of nutrition programs; population and family planning programs; and administration of these programs.
- Labor and Employment - covers sector expenditures for the formulation, implementation and regulation of labor policies; promotion, placement, and regulation of domestic and overseas employment; and maintenance of industrial peace.
- Housing and Community Development - covers sector expenditures for the provision of housing and sanitary services, promotion of community development, slum clearance, zoning and control of population.
- Social Security/Social Services and Social Welfare – covers sector expenditures for the upliftment of disadvantaged families and children; the rehabilitation of the physically and socially handicapped; assistance to distressed and displaced individuals and families; care of the aged and other welfare services and payment of retirement pension and other social security benefits. Also included are expenditures for the provision of services and facilities for recreational, religious and other social activities not elsewhere classified.
- Economic Services – covers sector expenditures for activities directed in promotion, enhancement and the attainment of desired economic growth.
- Debt Service – covers expenditures for payment of loan principal, interest and other service charges for debts of LGU.
- Other Purpose – covers expenditures for all other services not falling under any of the other sectors.

## Appendix 6 ELECTION DATA

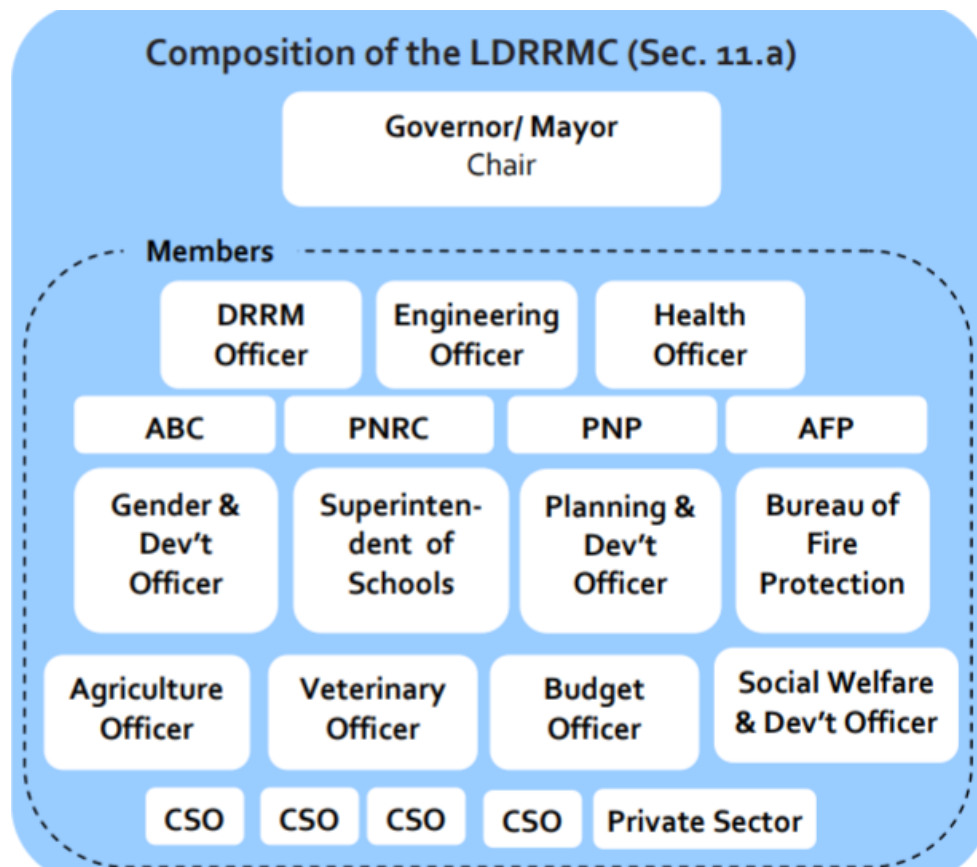
Using the politician-level data from Commission on Election, we are able to identify the change of politicians' electoral strategies from one election year to another, whether to run or not, for which positions, year, city/municipality, and the number of votes they earned whether they won or not. We also have the politician-level election results for lower positions in the municipality, such as vice-mayor and councilor; or for higher positions in the provincial level, such as governor, vice-governor, provincial councilor, or house of representatives. The table below shows the movement of strategies of 14,094 distinct politicians who ran at least once for mayor from 2001 to 2013. Looking at their strategies across 2001 to 2013, we have 70,470 politician-by-election year observations. We can see their movements across positions based on their decision to run or not, and whether they won or not (Table 3).

Table 2: Number of politicians who ran at least once for mayor from 2001 to 2013

Election Year	Councilor	Mayor	Vice-Mayor	Did not run	Total
2001	1,032	4,259	882	7,921	14,094
2004	1,090	4,257	1,060	7,687	14,094
2007	981	4,108	1,088	7,917	14,094
2010	887	4,534	960	7,713	14,094
2013	926	3,923	789	8,456	14,094
Total	4,916	21,081	4,779	39,694	70,470

Table 3: Number of politician-by-election cycle who ran at least once for mayor

			Decision & Outcome in election year $\tau - 3$							
			Run						Not run	Total
			Mayor		Lower position					
			Won	Lost	Won	Lost				
Decision & Outcome in election year $\tau$	Run	Mayor	Won	3,301	377	770	38	3,634	8,120	
			Lost	685	1,456	1,669	524	8,627	12,961	
		Lower position	Won	375	781	2,348	323	2,695	6,522	
			Lost	102	1,116	363	439	1,153	3,173	
	Not run			2,023	6,942	464	1,042	29,223	39,694	
	Total			6,486	10,672	5,614	2,366	45,332	70,470	



<sup>23</sup> Illustration from the Primer on the Disaster Risk Reduction and Management (DRRM) Act of 2010 (Department of Interior and Local Government, 2011).

Abbreviations: ABC: Association of Barangay Captains (Village Heads); PNRC: Philippine National Red Cross; PNP: Philippine National Police; AFP: Armed Forces of the Philippines; CSO: Civil Society Organization