

HETEROGENEOUS GROWTH IMPACT OF INFRASTRUCTURE SPENDING IN THE PHILIPPINES

A Research Paper Submitted

By

Jed Elroy E. Rendor
51-168204

Submitted to the Graduate School of Public Policy of
東京大学 (The University of Tokyo)
in fulfillment of the degree

Master of Public Policy, International Program

Submitted on

17 May 2018

Revised on

16 August 2018

Table of Contents

Abstract.....	1
I. Introduction.....	1
II. Regional Inequality in the Philippines.....	1
III. Infrastructure budget allocation in the Philippines	4
IV. Data and Methodology.....	6
V. Findings and Analyses.....	8
VI. Conclusion.....	10
Works Cited	10
Appendix.....	13
Table 1. DPWH Capital Outlays from 2000 to 2012 in 2000 prices	5
Table 2. Regression of infrastructure budget on distance, party affiliation, and majority control.....	8
Table 3. Impact of distance and party affiliation on infrastructure budget using xtreg on panel data.....	8
Table 4. Regional impact of distance and party affiliation on infrastructure budget	9
Table 5. Fixed effect estimates on the log of per capita income	9
Table 6. Provincial Per Capita Income in the Philippines in 2000 to 2012, at 2000 regional prices.....	13
Figure 1. GDP by Industrial Origin at constant 2000 prices	2
Figure 2. GDP Growth Rate	2
Figure 3. Gross Regional Domestic Product at current prices	3
Figure 4. Provincial per capita income in 2012, at 2000 regional prices, sorted by distance...4	
Figure 5. DPWH Infrastructure budget allocation, at 2000 regional prices, sorted by distance	6

Abstract

The National Capital Region of the Philippines is often labelled as the “Imperial Manila,” with much of the growth coming from the Metro Manila region. It is often noted that that distance from Manila considerably affects infrastructure allocation, and in turn, the province’s per capita income. Infrastructure allocation, however, is often said to be a very political process with the “power of the purse” residing on the Congress. In this paper, I explore these relationships by looking at the impact of looking at the impact of distance and party politics on infrastructure allocation, then of the latter on per capita income of the province.

Using the available panel data for 87 provinces in years 2000, 2003, 2006, 2009, and 2012, I find that distance significantly affects DPWH infrastructure budget allocation. While party affiliation impacts infrastructure at a national level, this is not the case at a regional level. This can be due to the nature of the budget process and that the budget preparation may be may important in determining the regional variance of infrastructure allocation than the budget legislation phase. Furthermore, infrastructure, through distance and party affiliation, have small impact on per capita income. As such provincial and regional targeting remains important in the Philippines.

I. Introduction

The Philippines has seen improving economic performance in the growth of its GDP in the recent years. However, this growth is not pro-poor; rather, it has been “*puro-poor*” (lit. full of poor) growth (Habito 2017). This growth is likewise very unequal with most of the GDP coming from Metro Manila, the national capital region (NCR). Per capita income is, in turn, highest at NCR. This regional inequality is often cited as the basis for the push towards federalism in the Philippines, a sentiment that has been attempted many times, first in 1997 during the Ramos administration, then in 2000 during the Estrada administration, in 2006 and 2008 under the Arroyo administration, and now in the current Duterte administration.

Real inequality and such sentiment persist amidst a more region-conscious budget allocation especially infrastructure and despite turncoatism—with most members of the congress changing their party affiliation to align the party of the ruling administration. As such this paper contributes in two ways: first, this paper looks at the role of the distance of provinces from NCR and party affiliation in infrastructure budget allocation, and second, how this infrastructure budget allocation affects provincial per capita income, if there is any and/or by how much.

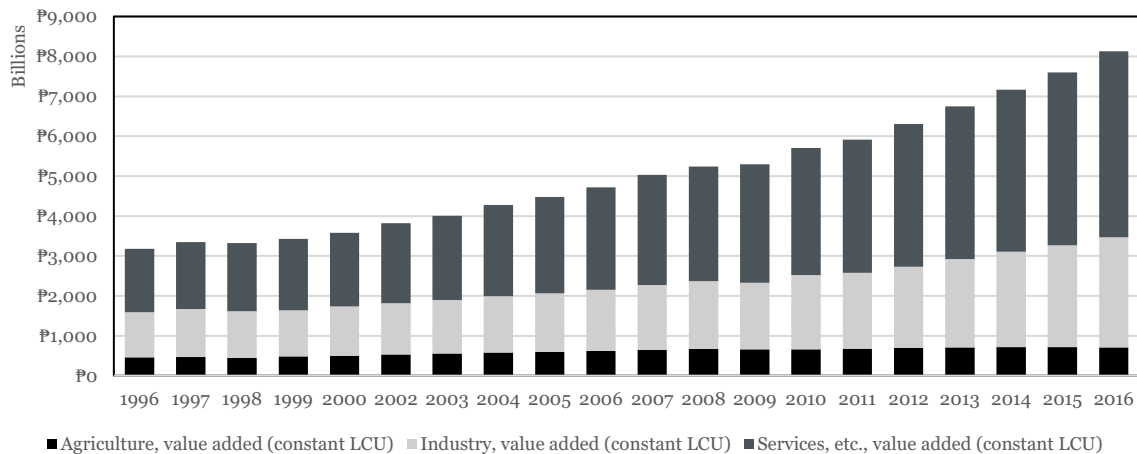
I divide this paper as follows: In Section 2, I further discuss the regional inequality in the Philippines. In Section 3 I discuss infrastructure investment in the Philippines. With these groundwork, I discuss in Section 4 the data set and the methodology. I discuss my findings and analyses in Section 5. And Section 6 concludes.

II. Regional Inequality in the Philippines

The GDP of the Philippines comes largely from the services sector (see Figure 1) and amidst the dip in the growth rate after the global crisis, the GDP growth rate is on an increasing trend (see Figure 2). The contribution of manufacturing has been steadily increasing but the leaps in the services sector overshadow this. However, the agricultural sector, on which many other farther provinces rely, have a very low output for decades. Indeed, much of the growth comes from NCR that has seen a surge from the services sector. From a 36.97% regional share of the national GDP in 2014, the share of NCR increased to 38.13%. While the regional GDP of nearby regions increased in absolute terms, their share in the national GDP decreased from 2014 to 2016. This is especially true for the adjacent Region IV-A composed of provinces Cavite, Laguna, Batangas, Rizal, and Quezon (CALABARZON).

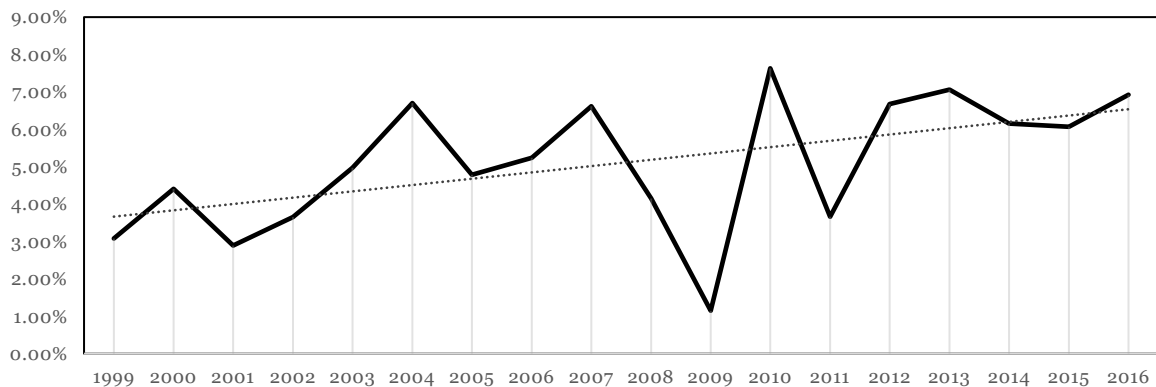
Various literature has discussed this regional inequality in the Philippines. Historically, this can be traced from how the Philippines was shaped by being a colony of Spain. Under the Spanish colonization, tobacco, abaca, and sugar were the largest exports of the Philippines made possible by enabling local land barons to manage these plantations (Dolan 1993). However, policies from the American occupation up until the signing of the Republic Act 6657 or the Comprehensive Agrarian Reform Program (CARP) in 1988 had no focus on the development of the primarily agricultural rural parts of the Philippines. In earlier studies, growth in rural agriculture did not induce poverty reduction due to uneven distribution infrastructure and educational investments (Balisacan 1993). This bias of public investments in urban areas and large farms was problematic (Bautista 1997).

Figure 1. GDP by Industrial Origin at constant 2000 prices



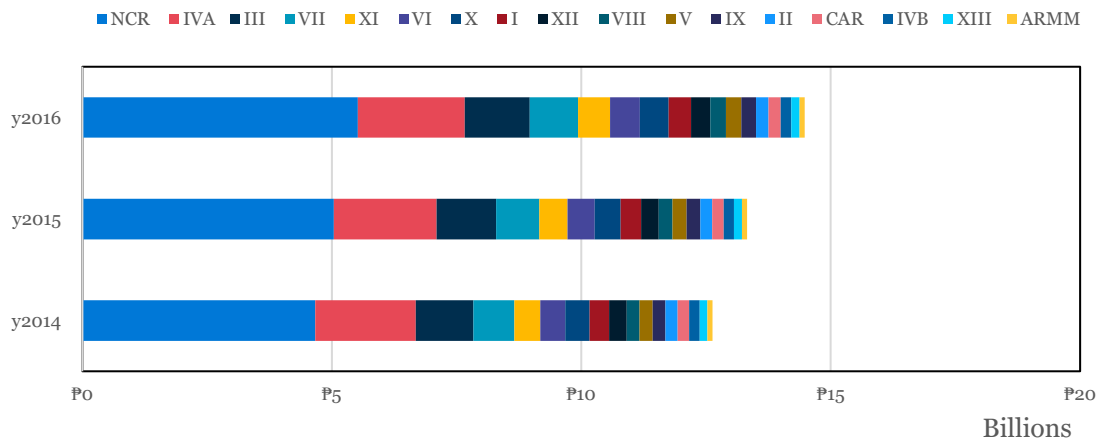
Source: "Gross National Income and Gross Domestic Product by Industrial Origin at Constant 2000 Prices, Annual (1998-2016)" from OpenStat portal (Philippine Statistics Authority 2017)

Figure 2. GDP Growth Rate



Source: Author's calculations based on "Gross National Income and Gross Domestic Product by Industrial Origin at Constant 2000 Prices, Annual (1998-2016)" from OpenStat portal (Philippine Statistics Authority 2017)

Figure 3. Gross Regional Domestic Product at current prices

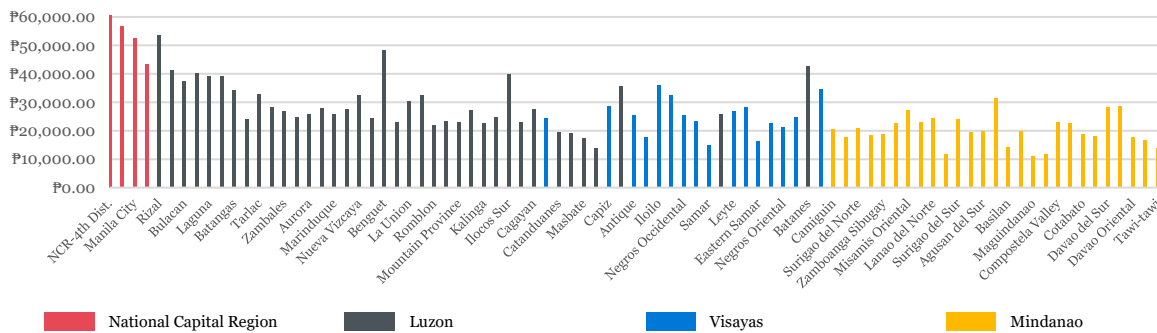


Source: “Gross Regional Domestic Product by Region at Current Prices, 2014-2016” from OpenStat portal (Philippine Statistics Authority 2017)

To analyze the government’s earlier thrusts for regional development, convergence analyses were made by either adopting a neoclassical growth framework (Barro and Sala-i-Martin 1992, 1995) using gross regional domestic product (GRDP) (Manasan and Chaterjee 2003, Manasan and Mercado 1999) or by looking at per capita expenditure from the Philippines’ Family Income and Expenditure Survey (FIES) (Balisacan and Fuwa 2003, 2004). In the latter, land inequality and CARP contributed to regional growth. Meanwhile, another study used GRDP but utilized a bidimensional inequality decomposition on structural changes in the Philippine economy (Akita and Pagulayan 2014) and finds that NCR is a major determinant of inequality as the services sector benefit from the agglomeration economies of the capital.

Another contended source of this inequality is the distance from NCR, with Filipinos calling the NCR the “Imperial Manila,” as most of the public investments have historically prioritized the NCR over farther areas. Indeed, in 2012, per capita income (PCI) in the 4th district of NCR (which includes the cities of Las Piñas, Makati, Muntinlupa, Parañaque, Pasay, and Taguig)—the financial centers and the location of the airport—is PHP 60,818.69. This is 542% larger than the smallest per capita income of PhP11,217.33 in Maguindanao. Figure 4 below shows the 2012 PCI in each province but is sorted by the geodesic distance from NCR (a complete table is in the Appendix). This figure can be read as such: a province like Benguet (which includes Baguio City) which has the second highest PCI outside of NCR, has a higher PCI than Bulacan. However, Bulacan, by virtue of being closer to NCR, has a higher PCI per kilometer of distance than the farther Benguet (and Baguio City). Davao del Sur (which includes Davao City) and Cebu (which includes Cebu City)—the centers of development in Mindanao and Visayas, respectively—do not only have lower PCI than most Region 3 and Region 4A provinces but also go further down in the ranking once distance from Manila is considered. Geographical outliers can also be seen from this figure, i.e. Ilocos Norte and Batanes have high PCI amidst being as far as other Visayan provinces, and Isabela City, while far down in Mindanao, has higher PCI than some of the nearer provinces. The nearest Visayan provinces of Aklan and Capiz have lower PCI than the farther Iloilo of the Visayas, Batanes of Luzon, and the Isabela City of Mindanao. As such while there is a decreasing trend of per capita income in terms of distance, there is also some variation in per capita income.

Figure 4. Provincial per capita income in 2012, at 2000 regional prices, sorted by distance



Source: “Family Income and Expenditure Survey” from the eFOI portal (Philippine Statistics Authority 2017)

One possible source of variation is public expenditure due to politics. In Balisacan and Fuwa (2004), political dynasties negatively affect the locality’s development. It was found that most of the provinces that lagged in achieving the MDGs were governed by dynasties (Collas-Monsod, Monsod and Ducanes 2004). It was found that 70% of the last Congress (15th Congress) of the Philippines to be dynastic (R. Mendoza, E. J. Beja, et al. 2012) and may tilt the allocation of resources necessary to achieve development goals (ibid.). Developing on this idea using OLS and MLE-BB estimation, it was found that dynasties do not significantly influence poverty in Luzon but they do in Visayas and Mindanao (R. Mendoza, E. Beja, et al. 2016). This interesting finding suggests that the presence of dynasties alone do not affect poverty; distance and geography may also matter. And while there have been perspectives regarding the role of dynasties in the Philippines, I cannot find relevant literature on the impact of party affiliation in Congress on poverty and development in the Philippines. Turncoatism is prevalent in the Philippines, and a real party system cannot be spoken of. As such party membership and siding with the party of the leading administration thus shape the allocation of public budget. To expound on this, I explain infrastructure budget allocation in the next section.

III. Infrastructure budget allocation in the Philippines

Provinces receive infrastructure through two (2) main channels: first, through the national government, and second through the local government. The Philippine national budgeting system has four phases: (i) budget preparation by the executive branch, (ii) budget legislation by the legislative branch, (iii) budget execution, and (iv) budget accountability (Department of Budget and Management 2015). During budget preparation, the government sets a budget ceiling for the next fiscal year and thereafter the departments compete for the limited fiscal space. The departments have to make necessary steps to arrive at the exact cost of their proposed projects, and within the Cabinet, the departments would deliberate which projects from which departments get approved. Extremely huge budget items have to go through another layer of approval from the Development Budget Coordination Committee (DBCC)¹. As such there is no definitive *a priori* formula in budget appropriations other than the share of each department out of the budget ceiling as part of that year’s government goals.

Then, the executive branch through the President submits this proposed budget to both houses of Congress: the Senate (higher house) and the House of Representatives (lower house). The “power of the purse,” (ibid.) therefore rests on the Congress through 4 steps. First, the representatives from lower house must scrutinize the proposed budget of the executive, make their proposed adjustments, and sponsor it as the General Appropriations Bill (GAB).

¹ The DBCC is composed of the Department of Budget and Management (DBM), the Department of Finance (DoF), the National Economic Development Authority (NEDA), the Central Bank (BSP), and the Office of the President (OP).

The Senate then deliberates on the GAB and make their own proposed adjustments. Then both houses must resolve the differences in their different versions. Once both houses decided on the final version of the budget, this is then submitted to the President where s/he signs the budget as a law called the General Appropriations Act (GAA).

Huge infrastructure projects as they are outside the capacity of local government or span multiple provinces are funded by the national government. Furthermore, the national budget distinguishes between (i) personnel services (PS) or the budget necessary for the the human resource upkeep of agencies and thus include salaries and pension, (ii) miscellaneous and other operating expenditure (MOOE) refer to, among others, the costs of offices and rentals, research and development, and other indirect services incurred, and lastly (iii) capital outlay refer to infrastructure, machineries and other capital inputs provided by government. In the capital outlay of the Department of Public Works and Highways (DPWH) in Table , NCR and the nearby Region IV-A receives large shares of the total. But there are also variation across years in provinces with Cebu's region, Region VII, and nearby Region III often also receive a large share compared to the other regions.

Table 1. DPWH Capital Outlays from 2000 to 2012 in 2000 prices

Region	2000	2000 share	2003	2003 share	2006	2006 share	2009	2009 share	2012	2012 share
NCR	₱1,478,321,000.00	9.39%	₱1,840,526,366.20	15.29%	₱1,469,803,370.79	16.21%	₱3,130,148,869.35	6.44%	₱3,709,928,264.47	9.78%
IVA - CALABARZON	₱1,102,802,000.00	7.00%	₱732,828,473.41	6.09%	₱2,369,626,972.74	26.13%	₱3,653,395,638.63	7.51%	₱3,450,970,520.23	9.10%
V - Bicol Region	₱1,446,405,000.00	9.18%	₱689,771,928.07	5.73%	₱251,226,181.82	2.77%	₱2,877,011,002.44	5.92%	₱3,025,209,397.34	7.98%
VII - Central Visayas	₱1,002,799,000.00	6.37%	₱557,036,932.19	4.63%	₱332,339,596.38	3.66%	₱2,872,950,000.00	5.91%	₱2,953,739,729.20	7.79%
III - Central Luzon	₱1,098,388,000.00	6.97%	₱758,674,451.04	6.30%	₱1,381,812,684.37	15.24%	₱5,351,570,989.55	11.01%	₱2,950,438,042.01	7.78%
VI - Western Visayas	₱1,564,620,000.00	9.94%	₱685,560,073.94	5.70%	₱830,716,506.29	9.16%	₱3,486,787,878.79	7.17%	₱2,849,223,129.85	7.51%
X - Northern Mindanao	₱766,043,000.00	4.86%	₱580,801,198.64	4.83%	₱331,360,934.18	3.65%	₱3,748,809,241.71	7.71%	₱2,338,878,020.42	6.17%
I - Ilocos Region	₱611,749,000.00	3.88%	₱452,776,785.71	3.76%	₱211,153,191.49	2.33%	₱1,675,528,700.91	3.45%	₱2,237,238,892.41	5.90%
VIII - Eastern Visayas	₱997,957,000.00	6.34%	₱777,103,244.85	6.46%	₱197,852,071.01	2.18%	₱2,703,814,681.11	5.56%	₱2,072,745,968.85	5.46%
XI - Davao Region	₱1,152,164,000.00	7.32%	₱560,190,378.83	4.65%	₱158,640,226.63	1.75%	₱2,766,203,560.83	5.69%	₱1,984,690,797.76	5.23%
II - Cagayan Valley	₱549,859,000.00	3.49%	₱469,207,666.67	3.90%	₱211,326,409.50	2.33%	₱2,341,323,891.63	4.82%	₱1,860,371,322.69	4.90%
CAR	₱889,268,000.00	5.65%	₱643,962,676.19	5.35%	₱166,433,521.92	1.84%	₱3,333,446,590.22	6.86%	₱1,787,013,006.67	4.71%
Caraga	₱815,255,000.00	5.18%	₱454,830,182.68	3.78%	₱207,689,306.36	2.29%	₱2,753,786,808.01	5.66%	₱1,721,597,081.37	4.54%
IVB - MIMAROPA	₱631,523,000.00	4.01%	₱742,061,655.23	6.17%	₱159,694,135.12	1.76%	₱3,955,356,379.64	8.13%	₱1,617,338,820.66	4.26%
IX - Zamboanga Peninsula	₱465,602,000.00	2.96%	₱461,397,169.12	3.83%	₱593,992,636.23	6.55%	₱2,613,365,117.68	5.37%	₱1,430,220,505.80	3.77%
XII - SOCCSKSARGEN	₱839,125,000.00	5.33%	₱737,606,441.82	6.13%	₱105,223,880.60	1.16%	₱913,655,514.25	1.88%	₱1,388,851,050.42	3.66%
ARMM	₱336,379,000.00	2.14%	₱890,375,033.25	7.40%	₱89,041,095.89	0.98%	₱447,465,432.77	0.92%	₱552,357,689.65	1.46%

Another channel for a province to receive infrastructure is through the local government. In 1991, Republic Act (R.A.) 7160 or the Local Government Code was signed to empower local government units (LGUs) in the Philippines. This enabled LGUs the power of taxation and charging of fees. Local governments, from their own receipts, can also fund their own projects. Furthermore, Title 3. Shares of Local Government Units in the Proceeds of National Taxes in R.A. 7160 provides the LGUs a 40% share from the national tax revenue. Section 285 apportions this Internal Revenue Allotment (IRA) as follows: provinces get 23%, cities get 23%, municipalities get 34%, and barangays get 20% (Republic Act No. 7160 1991). Provinces, cities, and municipalities receive their allotment 50% based from the population, 25% from the land area, and 25% as equal sharing between government and local government.

Barangays, the smallest political unit in the Philippines, with a population larger than 100 people, receive a minimum of PhP80,000 from the 20% share of all barangays. The balance will be given to the barangays following a 60% based on population and 40% based on equal sharing formula (ibid.). This equips the LGU two tools to fund their proposed infrastructure—their own tax revenue and their IRA.

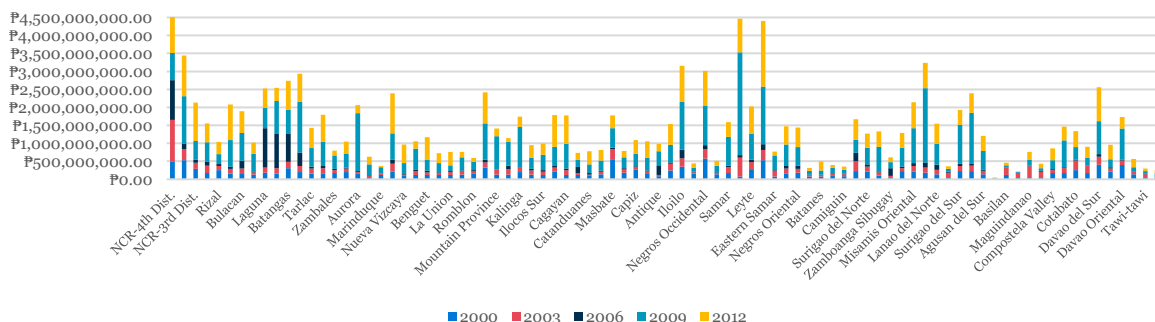
A now-defunct channel for additional local support is the pork barrel funds. Party affiliation was instrumental in receiving the Community Development Fund (CDF) and its incarnation the Priority Development Assistance Fund (PDAF) in the national budget was deemed unconstitutional (Supreme Court of the Republic of the Philippines 2013). But with the “power of the purse” still, with the Congress, party affiliation remains important in receiving “hard” infrastructure budget during budget preparation and legislation. This can be seen in how the Duterte administration still enjoys a dominant control over the House of Representatives despite the absence of a pork barrel fund.

IV. Data and Methodology

Following the literature above, I estimate the effect of infrastructure budget allocation (*rinfra*) (in 2000 prices) on provincial per capita income (in 2000 prices). Infrastructure budget allocation (*rinfra*) is based on the locally-funded, “capital outlay” budget in the General Appropriations Act of years 2000 to 2012. While the Family Income and Expenditure Survey (FIES) that provides provincial per capita income (*rpci*) have data since 1985 (Philippine Statistics Authority 2015, 2018), archived GAA begins in 2000 (Department of Budget and Management n.d.). To coincide with the years of the FIES, I, therefore, use GAA information from years 2000, 2003, 2006, 2009, and 2012. However, this paper is limited in this aspect because only the budget of the Department of Public Works and Highways (c.f. Japan’s MLITT) has provincial identifiers in most of its listed funded projects/activities in the GAA since 2000. Because there is no provincial aggregation done in the GAA, I have manually summarized the provincial allocation. Lump-sum projects without any way to trace the benefitting province (e.g. “Various local projects—Nationwide”) have been omitted. Likewise, as allocation for schools and hospitals in the Department of Education and Department of Health, respectively, also do not have any way to trace the receiving province due to lump-sums, infrastructure spending through these departments have also been omitted and is a key limitation of this paper. With this panel data available, I regress per capita income on real infrastructure budget:

$$(i.) \ln(rpci)_{it} = \alpha + \beta_1 rinfra_{it} + \varepsilon_{it}$$

Figure 5. DPWH Infrastructure budget allocation, at 2000 regional prices, sorted by distance



Source: General Appropriations Acts (Department of Budget and Management n.d.)

There is variation as well on infrastructure budget allocation across distance and time. As can be seen in Figure 5, distance is not deterministic of allocation as farther provinces such as Cebu and Zamboanga del Sur whose total infrastructure budget allocation in the

observation years are greater than in other nearer provinces. There are also variations in appropriations across years such as the large airport budget for Palawan in 2009.

However, infrastructure itself is strongly correlated with other unobservables, such as new firms and movement of populations (Dinkelman 2011). As government spends more in specific places, it may attract the growth of new firms and, in turn, may affect per capita income. Endogeneity of project placement is another consideration, i.e. it is possible that booming areas receive more infrastructure or the infrastructure is given so as to make that area boom (Nose 2017). To address this, I instrument infrastructure spending through distance from NCR (*distance_{km}*) and party affiliation (*partyaffil*). Distance may not directly affect per capita income as there are variations on per capita income despite increasing distance, as discussed earlier. Instead, distance is a key consideration in infrastructure (Hanan 2000, Dinkelman 2011, Banerjee, Duflo and Qian 2012). And as has also been discussed, politics—which in this case is measured through dynasties—matters only in Visayas and Mindanao but not in Luzon (R. Mendoza, E. Beja, et al. 2016). However, politics through party affiliation can affect the budget allocation as part of the budgeting process.

Distance is measured as the geodesic distance of the capital city of province *i* to the City of Manila. Google Maps was used (Google 2018). Other districts in NCR are given a distance of 1. I then provide two measures of party affiliation for year *t*, first as a ratio of alignment of the congressional representatives to the party of the President of that year (*partyaffil*), and second as a dummy if the province has half or more than of its congressional representatives are aligned with the President of that year (*majority*). Party information is sourced from archived web pages of the 11th (Congress of the Philippines 2003), 12th (Congress of the Philippines 2006), 13th (Congress of the Philippines 2009), 14th (Congress of the Philippines 2010), and 15th (Congress of the Philippines 2010) legislative periods. As such, my IV specifications are as follows:

$$(i.a.) \text{rinfra}_{it} = \pi + \pi_1 \text{distance}_i + \pi_2 \text{partyaffil}_{it} + v_{it}$$

$$(i.b.) \text{rinfra}_{it} = \pi + \pi_1 \text{distance}_i + \pi_2 \text{majority}_{it} + v_{it}$$

Below is the table of variables and their data sources:

Name	Description	Data source
rpci	Per capita income, in 2000 regional prices	Family Income and Expenditure Surveys (https://psa.gov.ph/fies-index) which have been made available through eFOI (https://www.foi.gov.ph/requests?agency=PSA)
rinfra	Allocated budget for infrastructure projects, in 2000 regional prices	Annual General Appropriations Acts as published by the Department of Budget and Management (http://www.dbm.gov.ph/index.php/dbm-publications/general-appropriations-act-gaa)
partyaffil	Party affiliation of politicians (value between 0 to 1 with 1 as 100% controlled by the party of the Administration)	Archived web pages of the Congress of the Philippines that contain party affiliations
majority	Party affiliation of politicians (value of 1 when the majority of the legislative districts are on the same party of the Administration)	Archived web pages of the Congress of the Philippines that contain party affiliations
distancekm	Distance, in kilometers, from City of Manila	Google Maps “measure distance” feature that uses geodesic distance (https://developers.google.com/maps/documentation/javascript/geometry)
(deflator to get 2000 prices)	Regional Core Price Indices	CPI Tables (Philippine Statistics Authority n.d.) (https://psa.gov.ph/price-indices/cpi-ir/downloads)

V. Findings and Analyses

First, I test my IV specification by regressing infrastructure budget (*rinfra*) on distance (*distancekm*) and party affiliation (*partyaffil*), and once more on distance and majority control (*majority*). In both, distance is significantly correlated with infrastructure. In the former, party affiliation is significant and, in the latter, majority control is not significant. As such, in terms of relevance, distance and party affiliation are usable for infrastructure budget, but not majority control. Thus, I am no longer factoring majority control in the succeeding parts of the study. Furthermore, by running a test of endogeneity after running an *ivregress* (instrumenting *rinfra* with distance and party affiliation), I get a Durbin statistic of 116.796 ($p=0.00$) and a Wu-Hausman F of 160.777 ($p=0.00$) and find that my instruments are exogenous.

Table 2. Regression of infrastructure budget on distance, party affiliation, and majority control

Variable	Means (standard error) on <i>rinfra</i>	
	(i)	(ii)
Distance (in km)	-135155.2*** (51355.81)	-143039.1*** (51189.14)
Party Affiliation	-7.69e+07* (4.07e+07)	
Majority control of Administration's party		-3.79e+07 (3.43e+07)
F	5.63	4.65
Prob>F	0.0039	0.0100
R ²	0.0262	0.0216

*** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Using the available panel data for 87 provinces in years 2000, 2003, 2006, 2009, and 2012, I find that distance significantly affects DPWH infrastructure budget allocation. A one (1) kilometer increase in distance away from NCR decreases, on average, the allocated budget by PHP 138,616.90²—a finding that is still significant when clustering by region. In 2012, the infrastructure allocation for the 4th District of NCR was PHP 996,800,000¹ while Sulu which is 952.03km away received PHP 119,900,000¹ only. Consistent with Figure 5 above, the 876 million difference between these two areas is not determined by distance alone.

Table 3. Impact of distance and party affiliation on infrastructure budget using *xtreg* on panel data

Variable	Means (standard error) on <i>rinfra</i>	
	(i)	(iii)
Distance (in km)	-138616.9** (62234.09)	-138616.9* (82013.04)
Party Affiliation	-6.63e+07* (4.01e+07)	-6.63e+07** (3.23e+07)
Clustered regionally?	No	Yes

*** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

To understand the role of the outlier provinces, I instead look at the impact of distance and party affiliation within regions. In Table 4, I find a more ambiguous relationship between distance and the allocated budget for infrastructure. Distance does not decrease average allocation in the Cordillera Administrative Region (CAR), Region IV-A (CALABARZON) and Region IV-B (MIMAROPA) of Luzon, Region VI (Western Visayas) of the Visayas, Region X (Northern Mindanao), Region XI (Davao Region) and Region XII (SOCCSKSARGEN) of Mindanao. However, this is only significant for regions CALABARZON, MIMAROPA, and Northern Mindanao. Following the GDP discussion above, these regions also exhibit high

² In 2000 prices.

regional GDP. The proximity of regions IV-A and IV-B to NCR may possibly provide them the priority in the budget allocation and, in turn, make them. Meanwhile, the positive coefficient in Region X can be due to the large investments in Cagayan de Oro, a priority metropole in the Mindanao region. On the other hand, distance is also significant on but negatively impacts Region VII amidst having Cebu, the regional center of the Visayas island group. Other findings of note are that Region VI which is as close to Luzon as it is close to Region VII exhibit a beneficial impact of distance albeit insignificant. Region XI comprised of Davao City in Davao del Sur, while the regional center of Mindanao has also positive but insignificant results.

Table 4. Regional impact of distance and party affiliation on infrastructure budget

	Means (standard error)						
<u>Luzon</u>	<u>Region I</u>	<u>CAR</u>	<u>Region II</u>	<u>Region III</u>	<u>Region IVA</u>	<u>Region IVB</u>	<u>Region V</u>
Distance (in km)	-775410.3 (1088341)	42813.83 (874915.1)	-244597.4 (287514.7)	-600521.8 (1597806)	3465101* (2090626)	1745653*** (636787.3)	-123150.7 (1202404)
Party Affiliation	-2.54e+08 (1.65e+08)	8.68e+07 (9.98e+07)	1.21e+07 (1.12e+08)	1275683 (1.68e+08)	-4.41e+07 (2.01e+08)	-1.34e+08 (2.42e+08)	-1.03e+08 (1.28e+08)
<u>Visayas</u>	<u>Region VI</u>	<u>Region VII</u>	<u>Region VIII</u>				
Distance (in km)	2708901 (1654246)	-8546648*** (2607308)	-1050152 (1035126)				
Party Affiliation	-1.84e+08 (1.88e+08)	-2.29e+08 (2.41e+08)	1.21e+08 (9.86e+07)				
<u>Mindanao</u>	<u>Region IX</u>	<u>Region X</u>	<u>Region XI</u>	<u>Region XII</u>	<u>ARMM</u>	<u>CARAGA</u>	
Distance (in km)	-51731.65 (3316138)	2917790* (1523898)	356058.7 (2486306)	238866.3 (966853.7)	-55603.27 (246865.7)	636833.3 (1154326)	
Party Affiliation	-3.07e+08 (3.49e+08)	-2440909 (2.06e+08)	-2.59e+08 (1.82e+08)	-1836122 (5.33e+07)	1.10e+07 (3.63e+07)	-2.39e+07 (1.47e+08)	

*** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

However, in both national and regional specifications, party affiliation does not increase the allocated budget and instead decreases it where a 1% increase in alignment to the party of the administration decreases the allocation by PHP 66,300,000.00. While party affiliation effects are significant at the national level, the counterintuitive impact of this political aspect becomes highly insignificant at the regional level. This is possibly due to each congressional seat not having equal political weight in the decision making process. It may also be possible that the executive department during the budget preparation stage have already provided for varied high-budget and/or priority projects across provinces across years. While the “power of the purse” is on the Congress for passing the over-all budget, this power does not extend in influencing significantly higher allocation for infrastructure in their provinces.

Table 5. Fixed effect estimates on the log of per capita income

variable	Fixed effect means (standard error)	
	distancekm + partyaffil	
Infrastructure allocation	.2146862** (.0968413)	.2157594** (.0967596)
Internal Revenue Allotment (IRA)		5.54e-11 (4.39e-11)

*** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Using the estimates on infrastructure budget allocation, I used a fixed-effects regression to estimate the impact on per capita income. Increasing infrastructure allocation, on average, increases per capita income by 21.46 percentage points in the distance and party specification. Another allocation given to the provinces, but is instead influenced by province size and rank is the Internal Revenue Allotment (IRA). Data on IRA is sourced from local

government data (Bureau of Local Government Finance n.d.). Estimates from infrastructure budget remain significant after factoring IRA. This shows the small impact of distance, but not party politics, on per capita income through DPWH infrastructure budget allocation.

The small impact can be attributed to the lack of available provincial breakdown of budget allocation on schools, healthcare facilities, and agriculture to estimate their local impact on provincial per capita income. Considering the regional impact of distance and that it is only significant in certain areas shows the importance of (i) provincial and regional prioritization from the budget preparation phase and (ii) presenting this budgetary information in traceable regional and provincial levels. The small impact may also be due to translating allocations into other economic results and underscores the importance of good governance that is not covered in this paper.

VI. Conclusion

In this paper, I hoped to estimate the impact of distance from NCR and party politics on provincial per capita income through the effects of the former two factors on infrastructure budget allocation. In this paper, I attempted to look at this area of development through micro-data using the FIES with a macro-policy tool in the GAA. While I found that distance is significant at the national level in decreasing allocations the further the province is from NCR, at the regional level this finding is only significant in some areas and may even show a positive relationship instead. This reveals that distance from NCR is not wholly deterministic of infrastructure allocation and more with the insignificant results on party politics. However, Regions IV-A and IV-B have definitely benefitted from its proximity to NCR. As such, provincial targeting from the onset of budget preparation is as important as “power of the purse” of the Congress in approving the overall budget. While it is unfortunate that budget and obligation data are unavailable, I believe they can help paint a better relationship of total infrastructure on provincial per capita income.

Works Cited

- Akita, Takahiro, and Mark Saliganan Pagulayan. 2014. "Structural Changes and Interregional Income Inequality in the Philippines, 1975-2009." *Review of Urban and Regional Development Studies* 26 (2): 135-154.
- Balisacan, Arsenio. 1993. "Agricultural Growth and Rural Performance: A Philippine Perspective." *Journal of Philippine Development* XX (2): 290-317.
- Balisacan, Arsenio, and Nobuhiko Fuwa. 2004. "Changes in spatial income inequality in the Philippines: An exploratory analysis." *UNU-WIDER* (United Nations University) (No. 2004/34).
- Balisacan, Arsenio, and Nobuhiko Fuwa. 2003. "Growth, inequality and politics revisited: a developing-country case." *Economics Letters* 79: 53-58.
- Banerjee, Abhijit, Esther Duflo, and Nancy Qian. 2012. "On the Road: Access to Transportation Infrastructure and Economic Growth in China." *NBER Working Paper #17897*.
- Barro, Robert, and Xavier Sala-i-Martin. 1992. "Convergence." *Journal of Political Economy* 100 (2): 223-251.
- . 1995. *Economic Growth*. New York: McGraw Hill.
- Bautista, Romeo. 1997. "Income and Equity Effects of the Green Revolution in the Philippines: A Macroeconomic Perspective." *Journal of International Development* 9 (2): 151-168.

- Bureau of Local Government Finance. n.d. "LGU Fiscal Data." Accessed January 20, 2018. <http://blgf.gov.ph/lgu-fiscal-data/>.
- Capuno, Joseph. 2013. "Fiscal transfers and gerrymandering under decentralization in the Philippines." *Discussion Paper No. 2013-04* (UP School of Economics).
- Collas-Monsod, Solita, Toby Monsod, and Geoffrey Ducanes. 2004. "Philippines' Progress Towards the Millennium Development Goals: geographical and political correlates of subnational outcomes." *Journal of Human Development* 5 (1): 121-149.
- Congress of the Philippines. 2003. "List of All House Members - 11th Congress." *Wayback Machine*. April 22. Accessed March 22, 2018. https://web.archive.org/web/20100803215349/http://www.congress.gov.ph/download/archives/mem_11th.pdf.
- . 2006. "List of All House Members - 12th Congress." *Wayback Machine*. May 19. Accessed March 22, 2018. https://web.archive.org/web/20060519105700/http://www.congress.gov.ph:80/download/archives/mem_12th.pdf.
- . 2009. "List of House Members - 13th Congress." *Wayback Machine*. January 6. Accessed March 22, 2018. https://web.archive.org/web/20110629093124/http://www.congress.gov.ph/download/archives/mem_13th.pdf.
- . 2010. "List of House Members - 14th Congress." *Wayback Machine*. August 3. Accessed March 22, 2018. https://web.archive.org/web/20110629092255/http://www.congress.gov.ph/download/archives/mem_14th.pdf.
- . 2010. "Member Information - 15th Congress." *Wayback Machine*. July 29. Accessed March 22, 2018. <https://web.archive.org/web/20100729192902/http://www.congress.gov.ph/members/index.php?v=province&congress=15>.
- Department of Budget and Management. n.d. "General Appropriations Act (GAA)." Accessed January 30, 2018. <http://www.dbm.gov.ph/index.php/dbm-publications/general-appropriations-act-gaa>.
- . 2015. "People's Budget 2015." *Department of Budget and Management*. April. Accessed May 09, 2018. <https://www.dbm.gov.ph/wp-content/uploads/Our%20Budget/2015/People%27s%20Budget%202015.pdf>.
- Dinkelman, Taryn. 2011. "The Effects of Rural Electrification on Employment: New Evidence from South Africa." *American Economic Review* 101 (7): 3078-3108.
- Dolan, Ronald. 1993. *Philippines: a country study*. Washington, D.C.: Federal Research Division, Library of Congress.
- Fujita, Masahisa. 1989. *Urban Economic Theory: Land use and city size*. Cambridge: Cambridge University Press.
- Google. 2018. "Geometry Library ." *Google Maps Platform*. May 2. Accessed May 9, 2018. <https://developers.google.com/maps/documentation/javascript/geometry>.
- Habito, Cielito. 2017. "Inclusive growth is finally happening." *Philippine Daily Inquirer*, August 08.

- Hanan, Jacoby. 2000. "Access to markets the benefits of rural roads." *The Economic Journal* 110 (July): 713-737.
- Manasan, Rosario, and Ruben Mercado. 1999. "Regional Economic Growth and Convergence in the Philippines." *Discussion Paper Series 1999-13* (Philippine Institute of Development Studies).
- Manasan, Rosario, and Shiladitya Chatterjee. 2003. "Regional Development." In *The Philippine Economy: Development, Policies, and Challenges*, edited by Arsenio Balisacan and Hal Hill. Oxford University Press.
- Mendoza, Ronald, Edsel Jr Beja, Victor Venida, and David Yap. 2012. "Inequality in democracy: Insights from an empirical analysis of political dynasties in the 15th Philippine Congress." *Philippine Political Science Journal* 33 (2): 132-145.
- Mendoza, Ronald, Edsel Jr Beja, Victor Venida, and David Yap. 2016. "Political dynasties and poverty: measurement and evidence of linkages in the Philippines." *Oxford Development Studies* 44 (2): 189-201.
- Nose, Manabu. 2017. "Advanced Development Economics I: Lecture 9." Tokyo, December 06.
- O'Sullivan, Arthur. 2000. *Urban Economics*. 4th. McGraw-Hill.
- Philippine Statistics Authority. n.d. "CPI Table by Year Published." *Philippine Statistics Authority*. Accessed May 03, 2018. <https://psa.gov.ph/price-indices/cpi-ir/downloads>.
- . 2015. "Family Income and Expenditure Survey." *Philippine Statistics Authority*. Accessed January 06, 2018. <https://psa.gov.ph/fies-index>.
- . 2017. "Gross National Income and Gross Domestic Product by Industrial Origin at Constant 2000 Prices, Annual (1998-2016)." *OpenStat*. May 22. Accessed November 02, 2017. <http://openstat.psa.gov.ph/dataset/national-accounts-philippines>.
- . 2018. "Philippine Statistics Authority." *Freedom of Information Portal*. March 7. Accessed February 23, 2018. <https://www.foi.gov.ph/requests?agency=PSA>.
- . 2017. "PSGC - List of Cities." *Philippine Standard Geographic Code*. December 31. Accessed January 20, 2018. <http://nap.psa.gov.ph/activestats/psgc/listcity.asp>.
- . 2017. "Regional Accounts - Gross Regional Domestic Product." *OpenSTAT*. October 26. Accessed November 02, 2017. <http://openstat.psa.gov.ph/dataset/regional-accounts-gross-regional-domestic-product>.
1988. "Republic Act No. 6657." *Official Gazette*. June 10. Accessed January 10, 2018. <http://www.officialgazette.gov.ph/1988/06/10/republic-act-no-6657/>.
1991. "Republic Act No. 7160." *Official Gazette*. October 10. Accessed January 20, 2018. <http://www.officialgazette.gov.ph/1991/10/10/republic-act-no-7160/>.
- Supreme Court of the Republic of the Philippines. 2013. "G.R. Nos. 208566, 208493, & 209251." *BatasNatin.com*. November 19. Accessed January 24, 2018. <https://cases.batasnatin.com/images/SupremeCourtsRulingonPDAF.pdf>.
- World Population Review. 2017. *Manila Population 2018*. October 21. Accessed January 24, 2018. <http://worldpopulationreview.com/world-cities/manila-population/>.

Appendix

Table 6. Provincial Per Capita Income in the Philippines in 2000 to 2012, at 2000 regional prices

Province	Region	2000	2003	2006	2009	2012	Distance from Manila (km)
NCR-4th Dist.	NCR	79,305.27	67,470.69	67,385.01	72,217.27	60,818.69	1
NCR-2nd Dist.	NCR	72,665.91	61,597.00	56,163.02	56,311.36	56,647.01	1
Manila City	NCR	60,687.38	63,961.35	57,737.72	56,038.54	52,600.05	1
NCR-3rd Dist.	NCR	48,790.11	46,670.53	43,034.16	42,838.76	43,282.42	1
Rizal	IVA - CALABARZON	58,521.16	49,490.25	44,090.97	43,840.21	53,751.41	15.383
Cavite	IVA - CALABARZON	44,093.16	50,518.30	44,001.04	42,434.13	41,298.69	22.005
Bulacan	III - Central Luzon	41,397.91	40,316.42	36,822.48	37,942.47	37,308.81	33.504
Bataan	III - Central Luzon	40,262.42	39,812.68	38,508.97	40,378.16	40,133.36	51.61
Laguna	IVA - CALABARZON	42,653.56	47,633.36	39,080.51	37,358.09	39,129.13	58.932
Pampanga	III - Central Luzon	33,050.87	39,739.48	40,869.96	33,342.56	39,150.34	62.153
Batangas	IVA - CALABARZON	33,983.68	36,144.24	30,279.00	33,463.04	34,415.82	94.188
Quezon	IVA - CALABARZON	24,742.39	24,531.41	18,332.09	30,851.66	23,948.40	100.61
Tarlac	III - Central Luzon	25,366.61	32,915.41	29,105.61	27,314.39	32,959.11	106.05
Nueva Ecija	III - Central Luzon	27,255.25	28,014.25	24,813.30	25,438.65	28,308.13	109.81
Zambales	III - Central Luzon	32,377.77	31,836.69	32,006.08	32,561.88	26,797.20	135.75
Oriental Mindoro	IVB - MIMAROPA	24,096.32	24,439.06	18,549.12	22,498.22	24,612.30	137.47
Aurora	III - Central Luzon	25,130.53	28,984.64	33,361.97	30,821.09	25,852.97	141.13
Occidental Mindoro	IVB - MIMAROPA	23,552.96	37,666.05	23,263.10	26,262.19	28,123.25	153.33
Marinduque	IVB - MIMAROPA	20,195.25	25,031.51	20,985.62	26,205.90	25,752.79	165.37
Pangasinan	I - Ilocos Region	24,807.45	27,532.10	22,223.34	27,197.17	27,586.26	175.79
Nueva Vizcaya	II - Cagayan Valley	29,659.43	41,094.41	32,554.81	31,834.51	32,572.43	210.12
Quirino	II - Cagayan Valley	21,503.58	34,651.22	28,260.74	28,365.31	24,283.77	210.47
Benguet	CAR	41,034.46	44,844.23	46,959.70	46,278.91	48,203.83	213.38
Camarines Norte	V - Bicol Region	20,456.96	23,470.59	22,112.01	23,332.85	23,012.43	219.51
La Union	I - Ilocos Region	27,637.55	32,037.67	27,577.35	29,441.87	30,248.92	233.12
Ifugao	CAR	16,768.43	26,246.52	23,323.94	22,444.51	32,621.09	246.9
Romblon	IVB - MIMAROPA	18,917.66	18,908.61	16,730.49	18,950.99	22,132.78	264.53
Camarines Sur	V - Bicol Region	21,219.21	21,615.45	18,173.75	20,765.33	23,326.40	272.02
Mountain Province	CAR	22,441.35	21,231.18	25,353.63	20,990.11	22,966.48	277.39
Isabela	II - Cagayan Valley	27,573.76	27,853.26	24,669.00	28,667.02	27,186.96	301.97
Kalinga	CAR	21,310.75	18,828.94	19,119.02	21,369.85	22,626.47	316.81
Abra	CAR	27,499.01	25,887.92	20,267.25	21,981.35	24,631.96	334.83
Ilocos Sur	I - Ilocos Region	28,065.70	29,431.09	28,603.55	28,478.20	39,761.95	336.83
Albay	V - Bicol Region	23,283.33	28,514.13	30,113.65	22,687.50	23,025.80	339.66
Cagayan	II - Cagayan Valley	22,506.62	28,116.26	25,541.22	27,690.10	27,535.92	344.76
Aklan	VI - Western Visayas	21,579.24	21,981.13	19,938.05	19,141.60	24,395.94	356.98
Catanduanes	V - Bicol Region	28,128.52	49,396.48	30,184.66	35,627.88	19,604.88	365.78
Sorsogon	V - Bicol Region	19,535.39	25,004.52	18,624.44	22,427.31	18,987.97	373.26
Masbate	V - Bicol Region	14,023.93	18,417.19	19,393.69	18,135.08	17,341.41	373.44
Apayao	CAR	20,730.17	20,018.16	16,472.11	19,759.50	13,863.67	381.05
Capiz	VI - Western Visayas	21,491.35	24,332.29	25,659.77	30,965.21	28,788.19	388.96
Ilocos Norte	I - Ilocos Region	34,204.10	29,680.08	28,434.30	29,614.23	35,686.17	402.54
Antique	VI - Western Visayas	23,461.10	25,780.21	17,773.01	21,199.04	25,392.78	441.06
Northern Samar	VIII - Eastern Visayas	17,214.90	20,209.53	18,842.63	18,371.93	17,694.02	464.27
Iloilo	VI - Western Visayas	33,204.30	29,897.23	28,492.97	29,155.78	36,023.41	464.6
Guimaras	VI - Western Visayas	23,078.66	21,083.22	19,158.91	24,850.55	32,445.71	478.5
Negros Occidental	VI - Western Visayas	20,894.01	24,824.62	21,351.44	22,026.84	25,656.25	490.58
Biliran	VIII - Eastern Visayas	19,275.91	24,042.78	32,837.91	32,690.09	23,436.88	501.13
Samar	VIII - Eastern Visayas	16,640.83	24,534.89	19,898.01	18,018.35	14,975.19	519.67
Palawan	IVB - MIMAROPA	26,278.39	22,195.00	21,019.57	20,401.38	26,011.04	568.39
Leyte	VIII - Eastern Visayas	24,023.39	23,590.04	22,004.49	26,432.74	26,923.93	569.95
Cebu	VII - Central Visayas	24,067.23	31,439.55	26,246.72	29,776.57	28,143.47	571.67
Eastern Samar	VIII - Eastern Visayas	16,655.74	22,300.98	23,771.01	19,497.33	16,480.38	586.06
Bohol	VII - Central Visayas	16,478.44	20,313.48	19,846.55	20,114.21	22,776.17	632.09
Negros Oriental	VII - Central Visayas	20,003.10	18,295.12	17,211.36	20,295.10	21,264.51	641.08
Southern Leyte	VIII - Eastern Visayas	21,262.60	24,818.20	23,426.21	22,986.59	24,798.03	647.56
Batanes	II - Cagayan Valley	44,349.60	50,984.32	39,559.36	40,685.87	42,680.07	661.68
Siquijor	VII - Central Visayas	20,600.52	16,329.26	24,951.86	15,269.18	34,622.13	664.92
Camiguin	X - Northern Mindanao	20,365.74	24,896.08	22,523.55	21,309.83	20,593.37	722.04
Zamboanga del Norte	IX - Zamboanga Peninsula	20,527.85	13,858.44	16,291.42	16,360.91	17,619.99	724.34
Surigao del Norte	Caraga	18,947.55	19,339.18	21,176.32	20,289.02	21,091.47	730.3
Misamis Occidental	X - Northern Mindanao	17,418.79	19,565.01	17,126.19	17,579.27	18,613.95	749.29
Zamboanga Sibugay	IX - Zamboanga Peninsula		21,184.33	19,853.05	17,553.48	18,718.42	778.43
Agusan del Norte	Caraga	19,833.02	21,907.80	20,303.86	25,144.73	22,637.57	785.89
Misamis Oriental	X - Northern Mindanao	28,066.59	29,006.81	25,784.08	29,093.77	27,391.99	791.27
Zamboanga del Sur	IX - Zamboanga Peninsula	18,687.83	22,430.83	23,205.15	25,146.35	23,190.00	798.58
Lanao del Norte	X - Northern Mindanao	22,446.47	25,407.11	27,580.96	21,232.80	24,263.07	800.05
Lanao del Sur	ARMM	16,441.31	22,046.18	13,655.84	15,103.64	11,915.72	817.71

Province	Region	2000	2003	2006	2009	2012	Distance from Manila (km)
Surigao del Sur	Caraga	20,793.47	17,796.07	19,045.51	20,407.96	24,065.02	831.97
Bukidnon	X - Northern Mindanao	22,865.77	20,206.38	20,753.11	20,780.56	19,679.00	850.18
Agusan del Sur	Caraga	14,841.09	18,583.69	17,633.78	15,451.53	19,699.78	854.06
Isabela City	IX - Zamboanga Peninsula		20,112.12	21,458.88	21,248.26	31,537.85	885.61
Basilan	ARMM	14,466.20	14,913.19	16,218.00	15,504.19	14,191.45	892.13
Cotabato City	XII - SOCCSKSARGEN	26,590.68	26,045.49	26,456.78	18,672.78	19,886.34	896.33
Maguindanao	ARMM	14,667.81	13,991.81	11,590.75	11,490.11	11,217.33	939.55
Sulu	ARMM	13,104.66	15,235.43	12,235.07	11,611.27	11,722.83	952.03
Compostela Valley	XI - Davao Region		19,843.91	17,324.16	18,891.61	23,156.80	952.44
Davao del Norte	XI - Davao Region	18,570.09	28,754.68	21,371.27	23,010.94	22,838.25	954.62
Cotabato	XII - SOCCSKSARGEN	17,871.38	20,082.34	19,572.90	20,574.10	18,773.16	956.56
Sultan Kudarat	XII - SOCCSKSARGEN	16,201.35	17,389.09	16,374.69	17,971.39	18,026.26	970.9
Davao del Sur	XI - Davao Region	27,494.47	28,530.04	27,090.69	28,844.34	28,431.92	994.99
South Cotabato	XII - SOCCSKSARGEN	27,282.33	36,791.81	24,269.57	32,018.23	28,711.01	995.92
Davao Oriental	XI - Davao Region	22,093.43	16,475.27	15,675.13	14,217.99	17,785.68	1028.1
Sarangani	XII - SOCCSKSARGEN	15,350.33	14,935.79	14,458.88	15,777.44	16,658.94	1051.2
Tawi-tawi	ARMM	15,421.29	15,513.41	8,755.78	12,388.00	13,807.69	1064.8

Dataset and Do-file available at: https://1drv.ms/f/s!AoyYsm1LKO4Sg4kkSl_m5SS4PFRi3Q