Rebel Territorial Control and Civilian Collective Action in Civil War
Evidence from the Communist Insurgency in the Philippines
Supplementary Materials

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Please find the latest version of the paper and appendix at www.michaelarubin.com/research.html.

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A   Appendix: Quantitative Data and Robustness Checks

A.1   Quantitative Administrative Data

Family-based village networks were constructed from a 2008-2010 census conducted by the Department of Social Welfare and Development (DSWD) National Household Targeting System for Poverty Reduction (NHTS-PR). I used the *stringr* package to parse unique family names in each municipality. I then assigned a unique ID code to each name and used the *igraph* package to convert the list of municipality-specific name IDs into a network object from which to calculate the modularity and other network statistics. The R script accompanying the online appendix includes the code used to create the variables included in regression analysis. I do not include the raw data from which the name assignments and network statistics were calculated because the data were provided with the stipulation to preserve household anonymity and a commitment not to share publicly the household data. Researchers wishing to replicate the analysis or use the data for their own research purposes may file a request with the National Household Targeting Office of the Department of Social Welfare and Development in the Philippines. They have a standard process to share data with researchers, but given that I requested access to information on names I had to receive direct approval from the Secretary and sign a memorandum of agreement with a confidentiality clause. The data can be requested by contacting DSWD at http://www.dswd.gov.ph/contact-us/ or the Research Monitoring and Evaluation Office directly, rmeo@dswd.gov.ph.

The NHTS-PR conducted a full census in 710 of the total 1647 municipalities and cities in the Philippines. 595 of the sub-total 1497 municipalities and cities excluding NCR and ARMM[35] were assessed using the full census. These 595 municipalities contain 13479 villages. In the rest of the municipalities, the NHTS-PR conducted a full census only in "pockets of

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[35]I exclude Isabela City and Cotabato City for the same reasons ARMM villages are excluded. Though they are not included administratively in ARMM, Isabela City is the capital of the ARMM island of Basilan

poverty" identified by the governments own poverty assessment tools. In the areas of the municipality outside these pockets of poverty, the NHTS-PR invited households to apply for poverty assessment in order to determine their eligibility for program assistance. In these municipalities, non-poor households get included in the sample by a non-random process that differs in crucial ways from non-poor household inclusion in the full census municipalities. Figure 9 illustrates the geographic variation in the poverty assessment strategies.

Figure 9: NHTS-PR Assessment
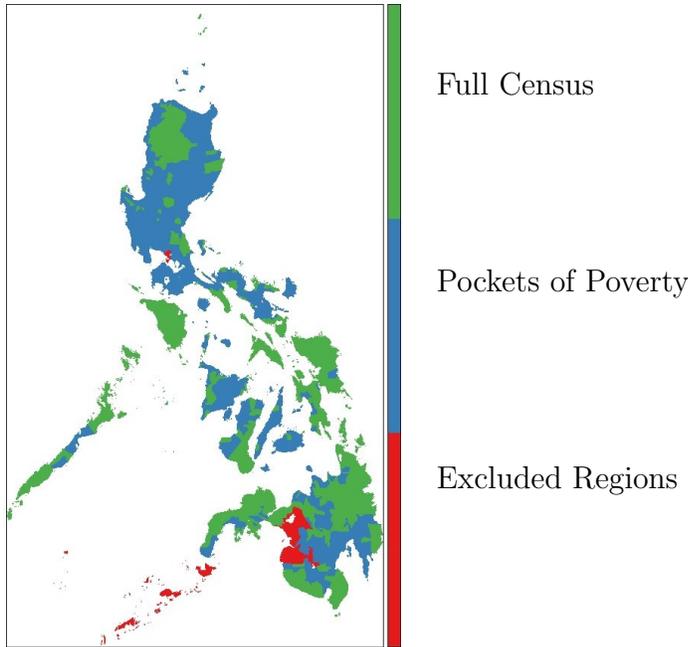
The Good Governance Index (GGI) was designed further the central government's transparency initiative, to improve local governance throughout the country. The GGI adopts a specific definition of governance, and identified key component indicators, aggregated to create the GGI score by averaging the component indicator scores. Detailed information regarding the data collection procedure for the Good Governance Index (GGI), its component indicators and calculation of the aggregate score, can be found on the governments Philippine Statistics Authority (PSA) official website: http://nap.psa.gov.ph/ggi/techNotes.asp.

The final sample used in the main regression analysis includes 12472 villages in 569 municipalities. 937 of the 1007 missing villages are excluded because they are in highly urbanized cities not assessed by the Good Governance Index, and mentioned in the main text. The remaining missing villages are excluded because there were no direct matches with the village units in the GADM database of Global Administrative Areas[36] used to calculate the geographic variables, including the distance to dense forests, terrain ruggedness, and the

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and Cotabato City is the main city center at the center of the Moro Islamic Liberation Front (MILF) factions

in Maguindanao Province of ARMM.

[36]http://gadm.org/

municipality distance to the provincial capital.

A.2 Notes on Model Specification

The logit specification models the rebel territorial control outcome as a latent continuous variable corresponding degree of communist control, C^*, divided into the observed discrete categories based on *cut-points* in the continuous scale estimated within the model:

$$C_{ij} = \begin{cases} 0 & \text{if } C^* < c_1 \\ 1 & \text{if } C^* \geq c_1 \end{cases}$$

The multi-level model is also often referred to as "random effects" regression. The multilevel model specification accounts for both group-level variation (municipality-specific effects, and year-specific effects in the model specifications that model the variation in the observed outcome over the course of the panel) and adjusts uncertainty estimates to account for dependencies inherent in the data structure (Gelman and Hill 2006, p. 246).

A.3 Main Results

Table 4 presents the full results for Model 1. The tables include numerical values for the coefficient estimates, odds ratios, and confidence intervals.

The article's main text does not include interpretation of the coefficient estimates for the variables included for covariate adjustment due to space constraints. The results are consistent with conventional wisdom suggesting "conditions favoring insurgency" increase the probability of rebel control: the village's distance to dense forests is negatively associated, and terrain ruggedness is positively associated, with observed CPP-NPA influence. The results are also consistent with conventional claims that the economic deprivation remains a key predictor of community vulnerability to rebel control. The coefficient estimate on poverty incidence in the municipality is positive and distinguishable from zero. This may be because economically marginalized communities are more likely to favor the communist rebels' political program, because they have lower opportunity costs for rebellion, or a combination of both. It is clear that these geographic features contributing to the loss-of-strength gradient and the economic factors that produce horizontal inequality across identity, sectoral, or regional groups in the country are the main contributors to variation in rebel territorial control. Nonetheless, even with covariate adjustment for these important explanatory factors, the measure of village network structure remains statistically and substantively significant in the model.
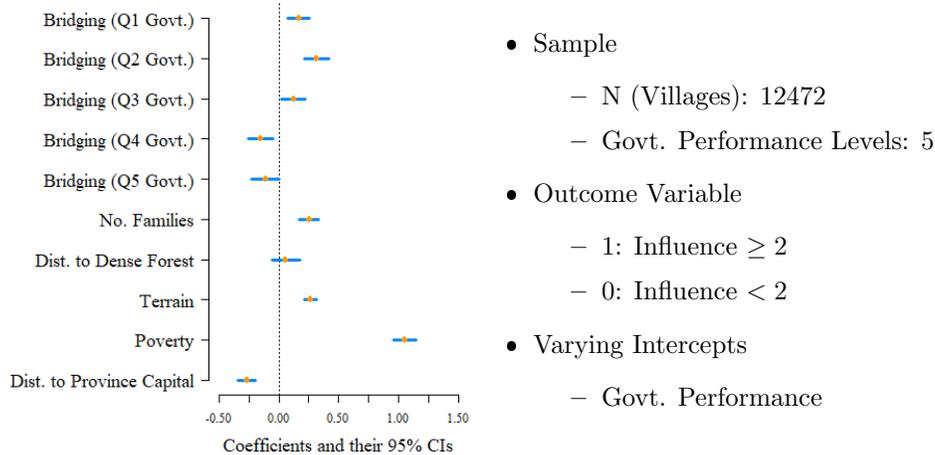
A.4 Alternative Categorization of Government Performance

Figures 10 and 11 present the results from fitting Model 1 by grouping municipaltity government performance into 5 and 10 categories, respectively. The results are largely similar to
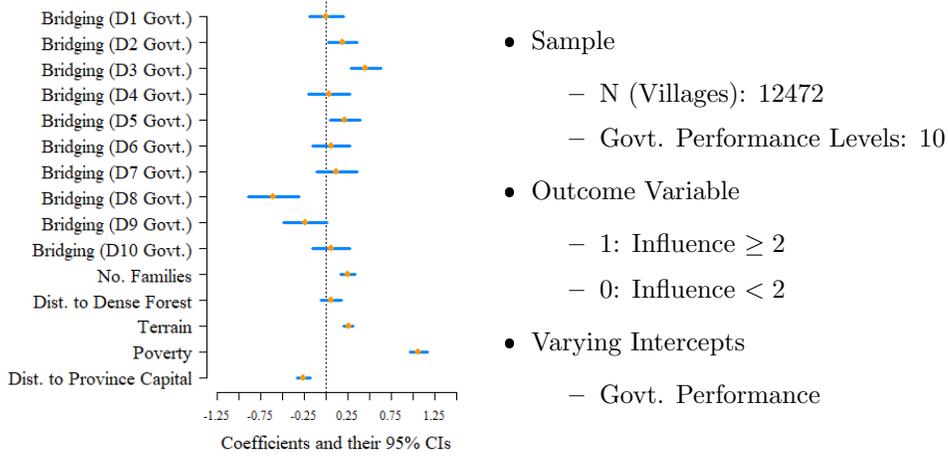
Table 4: Model 1 Results

	Coef. Estimates			Odds Ratios	
	Est.	S.E.	95% CI	Est.	95% CI
Bridging (Q1 Govt. Performance)	0.19	0.04	[0.11, 0.28]		
Bridging (Q2 Govt. Performance)	0.24	0.05	[0.15, 0.33]		
Bridging (Q3 Govt. Performance)	-0.04	0.05	[-0.13, 0.06]		
Bridging (Q4 Govt. Performance)	-0.14	0.06	[-0.25, -0.03]		
Network Size	0.26	0.04	$[0.18, 0.34]$	1.3 +29.5%	$[1.19, 1.41]$ $[+19.1\%, +40.8\%]$
Dist. to Forest	0.05	0.06	$[-0.07, 0.17]$	1.05 +5.1%	$[0.93, 1.18]$ $[-7.1\%, +18.2\%]$
Terrain	0.27	0.03	$[0.21, 0.32]$	1.31 +30.6%	$[1.24, 1.38]$ $[+23.9\%, +37.6\%]$
Poverty	1.05	0.05	$[0.95, 1.15]$	2.85 +185.1%	$[2.59, 3.14]$ $[+158.6\%, +214.3\%]$
Prov. Capital	-0.26	0.04	$[-0.33, -0.18]$	0.77 -29.5%	$[0.72, 0.83]$ $[-39.5\%, -20.3\%]$

Sample Summary		Model Fit Stats	
N (Villages):	12472	AIC:	5454.47
Govt. Performance Levels:	4	Deviance:	5422.55
		DIC:	5408.62

Figure 10: Model 1 Results, Govt. Performance Quintiles

- Sample
  - N (Villages): 12472
  - Govt. Performance Levels: 5
- Outcome Variable
  - 1: Influence ≥ 2
  - 0: Influence < 2
- Varying Intercepts
  - Govt. Performance

the results presented in the main text using 4 categories: the effect of bridging on CPP-NPA territorial control is positive for villages in municipalities with lower government performance and negative in villages with higher municipality local government performance.

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Figure 11: Model 1 Results, Govt. Performance Deciles

- Sample
  - N (Villages): 12472
  - Govt. Performance Levels: 10
- Outcome Variable
  - 1: Influence ≥ 2
  - 0: Influence < 2
- Varying Intercepts
  - Govt. Performance

A.5 Linear Interaction between Community Bridging and Govt. Performance

Model 2 includes a linear interaction between bridging and government performance to test the conditional effect of bridging:

Model 2. $C_{ij} \sim logit^{-1}(\alpha_{j[i]} + \tau B_{ij} + \rho G_j + \kappa B_{ij} * G_j + \mathbf{X_i}\beta, \sigma_C^2),$
$\alpha_{j[i]} \sim N(\delta_0 + \mathbf{W_j}\delta, \sigma_\alpha^2)$

where C_{ij} is the dichotomous indicator for whether the village is under communist insurgent control (at least "less-influenced") during at least one of the observed years in the panel, B_{ij} is the village network bridging measure, and G_j the municipality governance measure in village i and municipality j. τ and ρ represent the estimated coefficient on B_{ij} and G_j, respectively, and κ represents the coefficient on the interaction term. σ_C^2 represents the the unmeasured error in the distribution of village-level CPP-NPA influence. α_j and σ_α^2 represent the municipality-specific intercept and variance, respectively. Municipality-specific effects are drawn from a normal distribution conditional on municipality-level covariates.

Figure 12a plots the coefficient estimates and 95% confidence intervals from Model 2. Figure 12b plots the marginal effect of village bridging on CPP-NPA influence, as it changes over the range of local government performance. The correlation between insurgent control and village bridging is positive with greatest magnitude at the lowest government performance, and declines as government performance increases. The coefficient on the interaction term is negative and statistically distinguishable from 0, consistent with the predicted waning of the positive effect. Figure 13 presents the change in predicted probability of CPP-NPA control as bridging increases, holding government performance constant at select values and all other variables at their observed values. The slope of the curve representing the average (across municipalities) marginal probability of communist control over the range of bridging is positive and steep at minimum government performance, and declines precipitously as government performance increases to its 75th percentile. These findings are consistent with the hypothesis.

	Coef. Estimates			Odds Ratios	
	Est.	S.E.	95% CI	Est.	95% CI
Bridging	0.15	0.07	$[0.01, 0.29]$	1.16	$[1.01, 1.34]$
				+16.4%	$[+1.1\%, +34.1\%]$
Gov. Score 2005	0.12	0.28	$[-0.43, 0.66]$	1.12	$[0.65, 1.94]$
				+12.4%	$[-53.8\%, +94.4\%]$
Bridging*Gov.	-0.22	0.1	$[-0.43, -0.02]$	0.8	$[0.65, 0.98]$
				-24.8%	$[-53.1\%, -1.7\%]$
Network Size	0.26	0.07	$[0.13, 0.4]$	1.3	$[1.14, 1.49]$
				+30.3%	$[+13.6\%, +49.5\%]$
Dist. to Forest	-0.91	0.28	$[-1.45, -0.36]$	0.4	$[0.23, 0.7]$
				-147.9%	$[-327.4\%, -43.8\%]$
Terrain	0.52	0.06	$[0.41, 0.63]$	1.69	$[1.51, 1.89]$
				+68.6%	$[+50.8\%, +88.6\%]$
Poverty	1.7	0.1	$[1.5, 1.9]$	5.49	$[4.49, 6.71]$
				+448.8%	$[+348.7\%, +571.1\%]$
Prov. Capital	-0.37	0.2	$[-0.75, 0.02]$	0.69	$[0.47, 1.02]$
				-44.2%	$[-112.4\%, +2.2\%]$

| Sample Summary		Model Fit Stats	
N (Villages):	12472	AIC:	3853.79
Municipalities:	569	Deviance:	2834.51
		DIC:	1835.23

A.6   Logit Model with Province Fixed Effects

The multilevel model specification is vulnerable to bias if there exist omitted variables that, because they are not included in the model, induce correlation between the group-level effects and the bridging predictor of interest. As a result, I also fit Model 3, a Logit model with Province fixed effects as an alternative.

Model 3. $C_{ijk} \sim logit^{-1}(\alpha_k z_{k[i]} + \tau B_{ijk} + \rho G_{jk} + \kappa B_{ijk} * G_{jk} + \mathbf{X_i}\beta + \mathbf{W_j}\delta),$

where $z_{k[i]}$ represents the series of dichotomous indicators for the village's membership in a Province: $z_{k[i]} = 1$ if village i falls within Province k and $z_{k[i]} = 0$, otherwise. This specification results in a series of dummy variables representing the separate intercepts for each Province. Figure 14 presents the results from fitting the cross-sectional Logit model with Province fixed effects. Consistent with the theory's predictions and with the correlation detected using the multi-level logit specification, the effect of bridging on communist territorial control is positive at lowest levels of local government performance and the estimated effect declines as government performance increases.

Figure 12: Model 2 Results
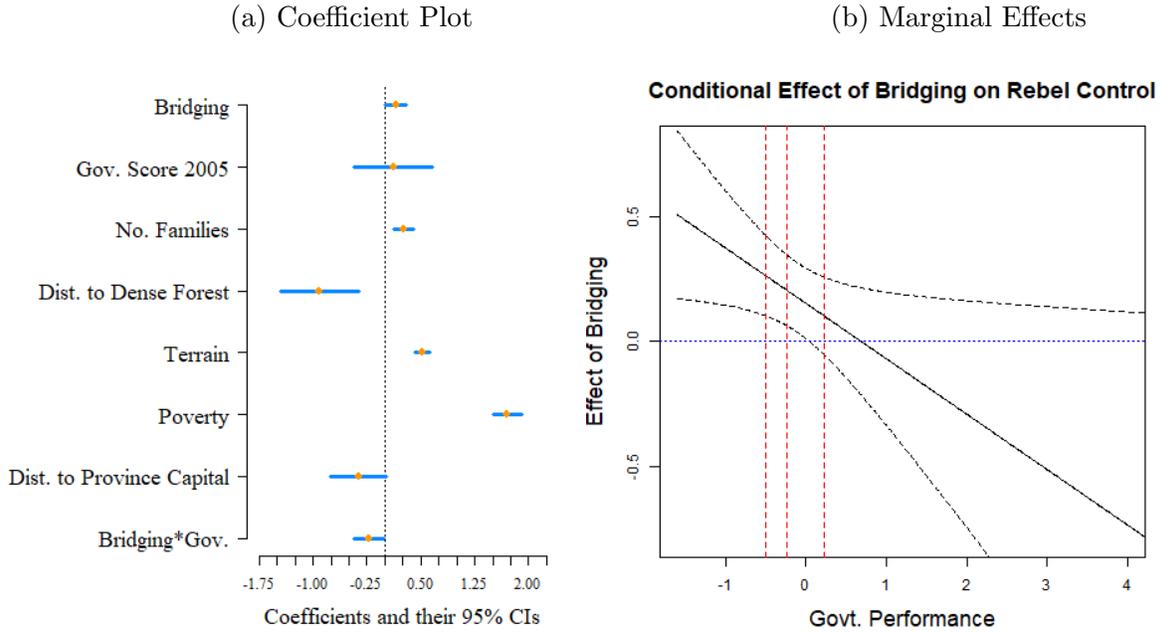
(a) Coefficient Plot

(b) Marginal Effects

Conditional Effect of Bridging on Rebel Control

Sample	Outcome Variable	Varying Intercepts
· N (Villages): 12472	· 1: Influence ≥ 2	· Municipality
· Municipalities: 569	· 0: Influence < 2	

Figure 12a: dots represent coefficient estimates and line segments represent 95% confidence intervals.
Figure 12b: The marginal effect of village level bridging as it changes with the municipality-level governance score. The dotted black lines represent the 95% confidence intervals surrounding the estimate. Vertical dashed red lines represent the 25th, 50th, and 75th percentile of Government Performance.

A.7 Alternative Operationalizations of Community Outside Options

Because the 2005 GGI score may be endogenous to prior rebel territorial control and conflict dynamics, I also present alternatives to capture community outside options in order to explore the conditional effect of collective action capacity. First, I present an alternative model specification that allows descriptive analysis examining the correlation between community social structure and CPP-NPA territorial control across regions and over time, paired with details of concurrent state-building and counterinsurgency strategies in the Philippines. Second, I use municipality-level measures of the adult literacy rate and the percentage of the population living in rural areas from the 1980 census.

Temporal and Geographic Trends

In this analysis, the outcome variable is observed yearly, even though the predictors are time-invariant. I fit a multilevel logit model with varying intercepts for municipality and

Figure 13: Model 2 Predicted Probabilities
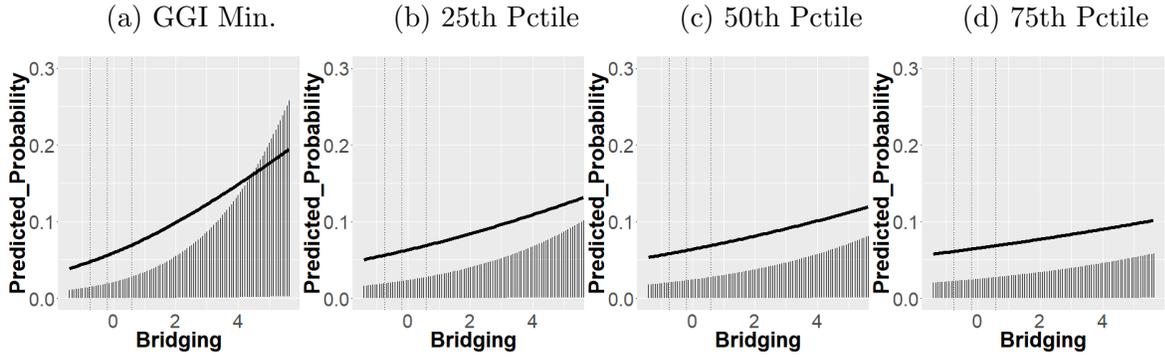
| (a) GGI Min. | (b) 25th Pctile | (c) 50th Pctile | (d) 75th Pctile |

Sample	Outcome Variable	Varying Intercepts
· N (Villages): 12472	· 1: Influence ≥ 2	· Municipality
· Municipalities: 569	· 0: Influence < 2	

Table 5 and Figure 12 present the results for Model 2. Figure 13: Plots the change in predicted probability of CPP-NPA influence over the range of the bridging score, holding the GGI 2005 score at its minimum (Figure 13a), 25th percentile (Figure 13b), 50th percentile (Figure 13c), and 75th percentile (Figure 13d). All other covariates are held at the values observed in the data at the specific bridging score. Thick solid lines represent the average marginal probability, averaged over all municipality-years. Vertical solid lines plot the middle 50% of municipality-year specific predicted probabilities at the given value of bridging. Vertical dashed lines represent the 25th, 50th, and 75th percentile of the bridging score.

year as well as municipality- and year-varying slopes for bridging.

Model 4. $C_{ijt} \sim logit^{-1}(\alpha_{j[i]} + \gamma_{t[i]} + \tau_{jt[i]}B_{ij} + \mathbf{X_i}\beta, \sigma_C^2)$,
$\quad \alpha_{j[i]} \sim N(\delta_0 + \rho G_j + \mathbf{W_j}\delta, \sigma_\alpha^2)$,
$\quad \gamma_{t[i]} \sim N(0, \sigma_\gamma^2)$,

where t represents the year of observation.

The theory predicts that the positive effect of community collective action capacity will wane over the course of the observed panel of CPP-NPA control data. The time frame of the data tracks the progression from the government's announced shift from enemy- to population-centric COIN through four years of its development and expansion. Though COIN strategy is responsive to conflict developments, decisions are made at the national level and incorporate political and external security components exogenous to the conditions in particular villages. The Aquino government simultaneously invested in complementary increases in state-building and development programs nation-wide, which also serves to increase community outside options to rebel control. The theory also predicts the positive effect of collective action capacity will be strongest in areas furthest from, and weakest (or negative) in areas closest to, centers of state power.

Figure 15 plots the change in predicted probability over the range of bridging for each

Figure 14: Model 3 Results

(a) Coefficient Plot	(b) Marginal Effects
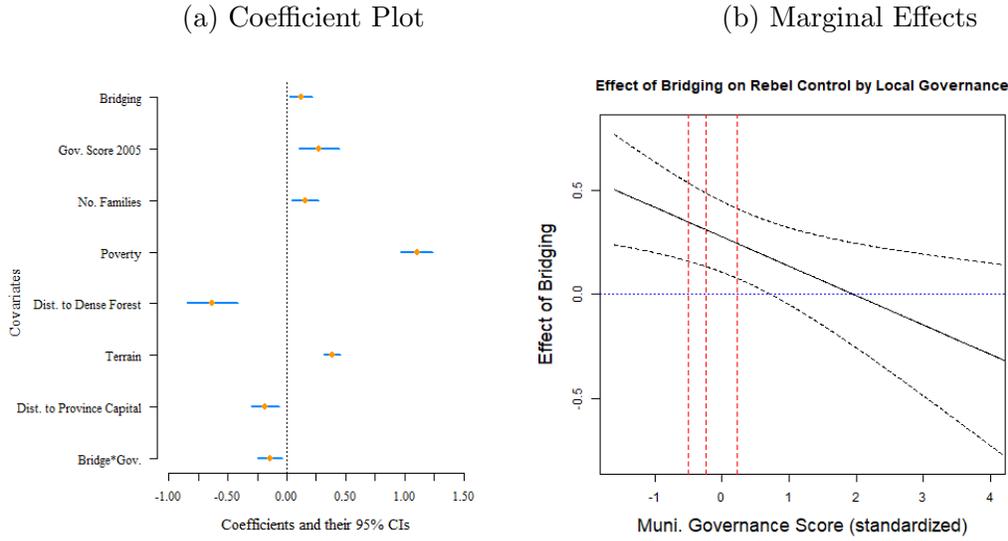
Sample	Outcome Variable	Fixed Effects
· N (Villages): 12472	· 1: Influence ≥ 2	· Province
	· 0: Influence < 2	

Figure 14a: dots represent coefficient estimates and line segments represent 95% confidence intervals.
Figure 14b: The marginal effect of village level bridging as it changes with the municipality-level governance score. The dotted black lines represent the 95% confidence intervals surrounding the estimate. Vertical dashed red lines represent the 25th, 50th, and 75th percentile of Government Performance.

Figure 15: Model 4 Results (Predicted Probabilities by Year)

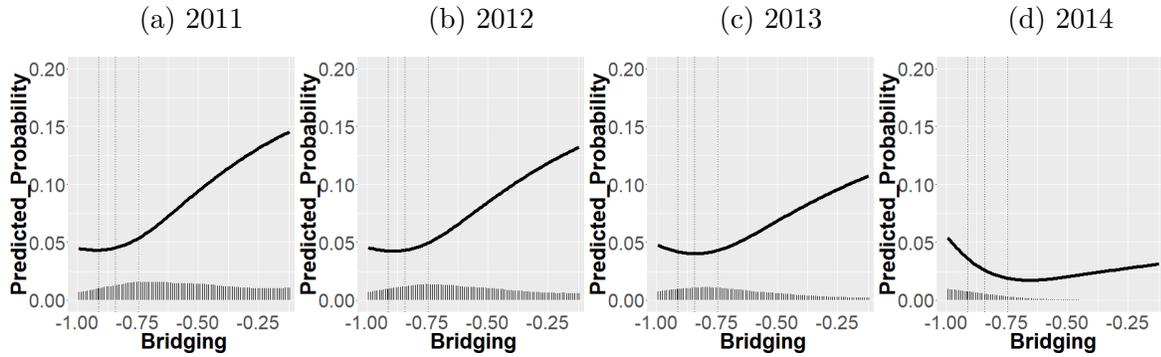| (a) 2011	(b) 2012	(c) 2013	(d) 2014

Figure 15: Predicted Probabilities of CPP-NPA influence across the range of bridging for each year in the panel. Thick solid lines represent the average marginal probability, averaged over all municipality-years. The vertical solid lines plot the middle 50% of municipality-year specific predicted probabilities at the given value of bridging. Vertical dashed lines represent the 25th, 50th, and 75th percentile of the bridging score.

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year. In 2011 and 2012, during which IPSP state-building and population-centric COIN was in its infancy, community collective action capacity is positively associated with rebel influence. Though the change in predicted probability is flat for the bottom half of the distribution of bridging scores, the slope is positive in the top half of the distribution, even between the 50th and 75th percentile where the density of bridging is concentrated but where the effect is less pronounced. In 2013, the trend only becomes positive closer to the 75th percentile and in 2014, by which time population-centric COIN had matured, the trend is negative through the 75th percentile. Because the panel coincides with a simultaneous expansion in the extent of state control and service delivery into the periphery and a strategic shift towards population-centric COIN, the trend is consistent with the theory.

Figure 16 plots the change in predicted probabilities for each region.[37] Regions 1-4 and the Cordillera Administrative Region (CAR) are on the island of Luzon, where Metro Manila is located. Regions 4A-8 are in the Visayas island chain, closest to Cebu City in Region 7. In these areas nearest centers of state power, bridging appears uncorrelated, or negatively associated, with CPP-NPA control. Regions 4A and 8 are partial exceptions, but are on the outskirts far from Cebu. Regions 9-12 and CARAGA are on the historically marginalized island of Mindanao, in which state projection of power is weakest. In these regions, bridging is consistently positively associated with CPP-NPA influence.

Alternative Measures of Local Government Performance

I fit Model 1, substituting the adult literacy rate from 1980 for the 2005 Good Governance Index score. Since the 1980 census, there have been many new municipalities created out of one or more municipalities in existence in 1980. This process also required dropping some villages that, since they were created from municipalities that were divided into multiple different municipalities, cannot be confidently placed within one municipality or the other in order to assign the appropriate 1980 census data.

Using the literacy rate and rural population figures from 1980, the results are consistent with the main analysis. The effect of bridging is positive in the bottom three quartiles of literacy, though statistically distinguishable from 0 in only the first and third quartile, and negative and statistically distinguishable from 0 in the top quartile.

A.8   Alternative Sample: Poor Household Networks

In the main regression analysis, I used only the sample of villages within municipalities in which the NHTS-PR conducted a full census, excluding the municipalities assessed using the "pockets of poverty" assessment strategy. I restricted the sample in this way because the non-poor households included in the areas of "pockets of poverty" assessment are not included by a random process nor by a process that can be argued is independent of community social structure. Non-poor households were included based on their own request for assessment,

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[37]Though the effect of bridging varies by municipality, I show the regional averages because there are too many municipalities to plot and discuss.

Figure 16: Model 4 Results (Predicted Probabilities by Region)

(a) Reg. 1   (b) Reg. 2   (c) Reg. 3   (d) CAR

(e) Reg. 4A   (f) Reg. 4B   (g) Reg. 5   (h) Reg. 6

(i) Reg. 7   (j) Reg. 8   (k) Reg. 9   (l) Reg. 10
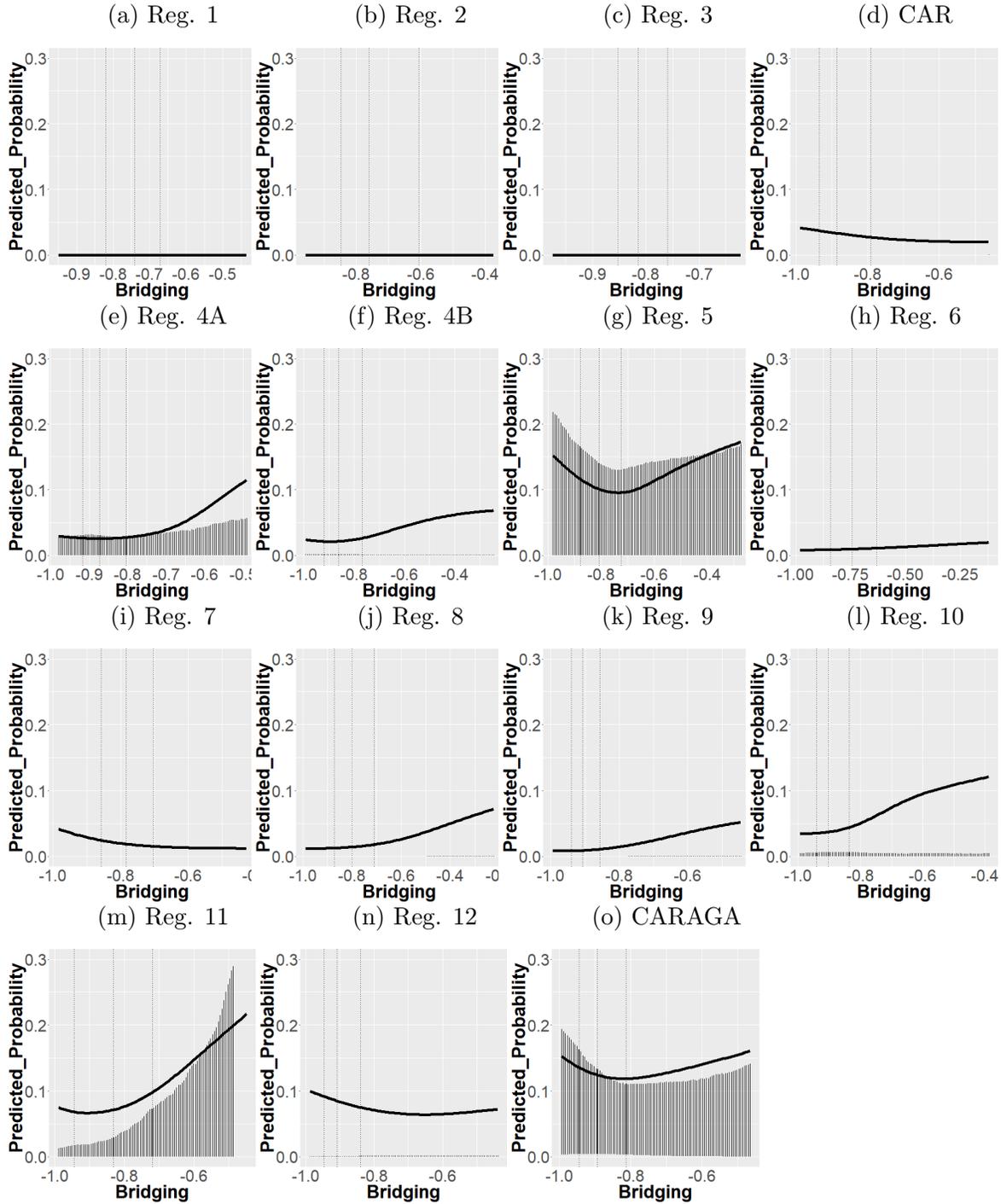
(m) Reg. 11   (n) Reg. 12   (o) CARAGA

Figure 16: Predicted Probabilities of CPP-NPA influence for each observed Region. Each includes varying intercepts for municipality. Thick solid lines represent the average marginal probability, averaged over all municipality-years. The vertical solid lines plot the middle 50% of municipality-year specific predicted probabilities at the given value of bridging. Vertical dashed lines represent the 25th, 50th, and 75th percentile of the bridging score.

Figure 17: Model 1, 1980 Literacy Rate measures Community Outside Options
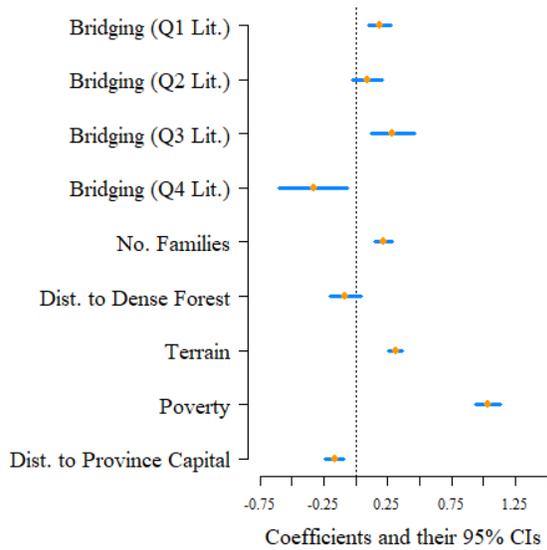
Sample	Outcome Variable	Varying Slope/Intercepts
· N (Villages): 12982	· 1: Influence $\geq$ 2	· Literacy Quartile
· Municipalities: 569	· 0: Influence $<$ 2	

Figure **??**: dots represent coefficient estimates and line segments represent 95% confidence intervals.

Figure 18: Compare Bridging across Samples

(a) Full-Census Municipalities   (b) All Municipalities, Poor HH Networks
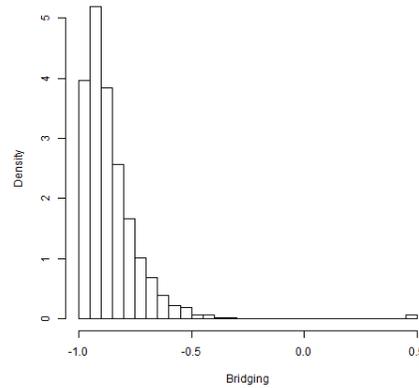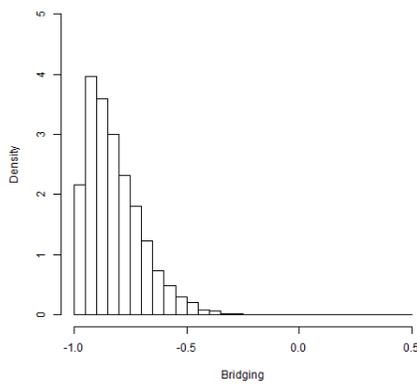
and therefore may be related to their connections with other families that were assessed by the NHTS-PR. For robustness, I estimate the same regressions included in the main empirical analysis on an alternative sample that includes all of the villages, save for those in ARMM and NCR. In this sample, measures of network structure (including bridging) are all calculated on only the sample of poor households. These are incomplete networks, but

Figure 19: Model 1 (Poor HH Networks) Results
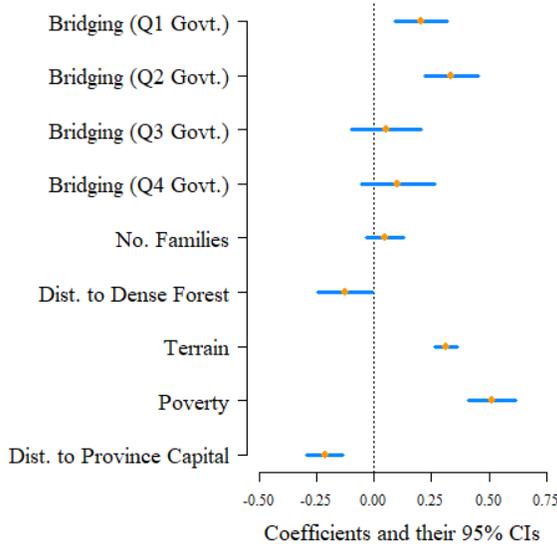
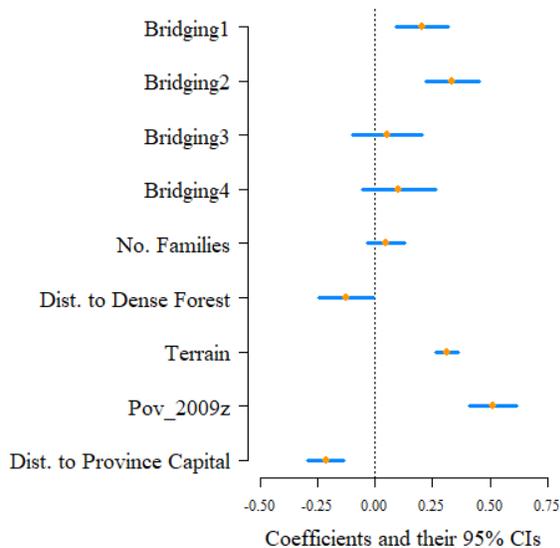| Sample	Outcome Variable	Varying Intercepts
· N (Villages): 32333	· 1: Influence ≥ 2	· Municipality
· Municipalities: 1388	· 0: Influence < 2	

the subset of poor households are targeted for full assessment in the villages in which the government conducted only a partial census such that the population of poor households is at least roughly comparable across the census collection strategies.

Figure 18 demonstrates the differences in the distribution of network bridging across the full-census and pockets of poverty assessment samples. To explore the robustness of the results to including information from the broader sample of villages, I fit Model 1 with an adjustment to measure bridging among the poor population only. This measure includes information among only the poor sub-sample of each village, but includes a larger sample of villages. It is also worth noting that instead of using the percentage of sampled households identified as poor to measure poverty, I use municipality-level poverty incidence collected by the Government's National Statistics Coordination Board. I use the poverty incidence from 2009. Finally, I also added a municipality-level covariate to indicate whether the village is in a municipality targeted with the complete census or partial census data collection strategy.

Using the larger sample of villages including those assessed using a partial census yields similar substantive results, though less supportive of the reversal in effect direction hypothesized. The effect of collective action capacity is positive and statistically distinguishable from 0 in the bottom two quartiles of local government performance. In the bottom two quartiles, the effect remains positive, though lower magnitude partially consistent with a reversal in effect direction, and are not statistically distinguishable from 0. Again, the mixed results may be explained by the networks created only among poor households.

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A.9 Alternative Measures of Collective Action Capacity

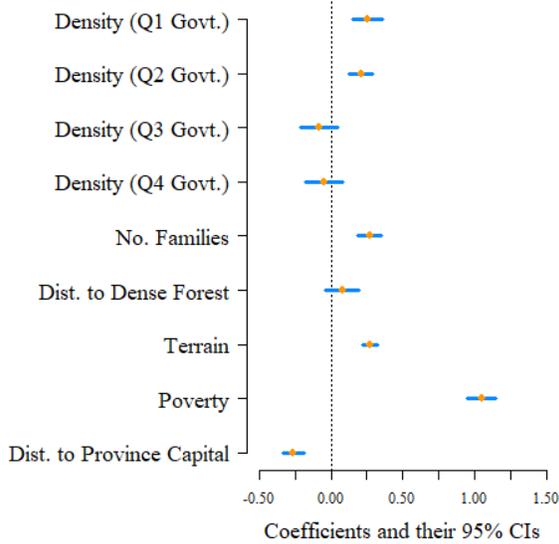Figure 20: Model 1, Largest Component Size measures CAC

Sample	Outcome Variable	Varying Intercepts
· N (Villages): 12472	· 1: Influence $\geq$ 2	· Govt. Performance
· Municipalities: 569	· 0: Influence $<$ 2	

Network bridging measures the divisions in social networks to proxy for the barriers to bridging social capital. But it is also a complex measure that is dependent on the community detection algorithm. For robustness, I also substitute alternative measures for the community network structure. Figure 20 presents the results using the size of the largest component in the network as a percentage of network size. Communities in which the largest component of the network represents a greater share of the overall network may have better communication across social cleavage divides, consistent with bridging social capital. Social ties through family connection link a greater percentage of the villagers together. Figure 21 presents the results using overall network density to measure social capital. Consistent with the accountability theory, the coefficient on each of these alternatives to the bridging (modularity) measure of community social structure suggest the effect of collective action capacity is positive and statistically distinguishable from 0 at low-to-moderate levels of local governance, and decline as local governance increases.

A.10 Family Networks and Collective Action

If family network structure is an adequate measure of collective action, it should be correlated with observable collective action outcomes in the community. To explore the validity

Figure 21: Model 1, Density measures CAC

Coefficients and their 95% CIs

Sample	Outcome Variable	Varying Intercepts
· N (Villages): 12472	· 1: Influence ≥ 2	· Govt. Performance
· Municipalities: 569	· 0: Influence < 2	

of the family network structure as a measure, I check its correlation with limited data available to measure observable collective action. Unfortunately, measures of social cohesion and collective action at the community level are very difficult to come by. I draw upon available data in only a small number of villages, not representative of the full conflict zone. The results are mixed, as discussed below.

First, I examine data provided by the Department of Agrarian Reform (DAR), which implements land reform projects and monitors performance in Agrarian Reform Communities (ARC). ARCs are clusters of barangays organized to implement DAR projects and meet performance standards. The ARC Level of Development Assessment (ALDA) measures "the levels of development of the ARCs and define the appropriate interventions." The ALDA assesses ARC performance on 6 key areas: 1) Land Tenure Improvement, 2) Economic and Physical Infrastructure Support Services, 3) Farm Productivity and Income, 4) Basic Social Services, 5) Gender and Development, and 6) Organizational Maturity.

To measure collective action outcomes, I focus on the completion of infrastructure projects, including the building of farm-to-market roads, bridges, irrigation systems, and the provision of pre- and post-harvest facilities. DAR provides funding and sets targets for the ARC to complete these infrastructure targets, and the ALDA assesses the ARC's completion of these tasks. If cohesive family network structure represents an indicator of collective action capacity, then communities with higher bridging should be more successful at completing infras-

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tructure projects. I created ARC-level family networks and summarized network structure and characteristics using the same metrics as in the village-level networks. I then regress the ALDA assessment scores for each category on the ARC-level bridging and covariates.

Figure 22: Family Network Structure and Completion of DAR Infrastructure Projects

(a) Farm-to-Market Roads (FMR)
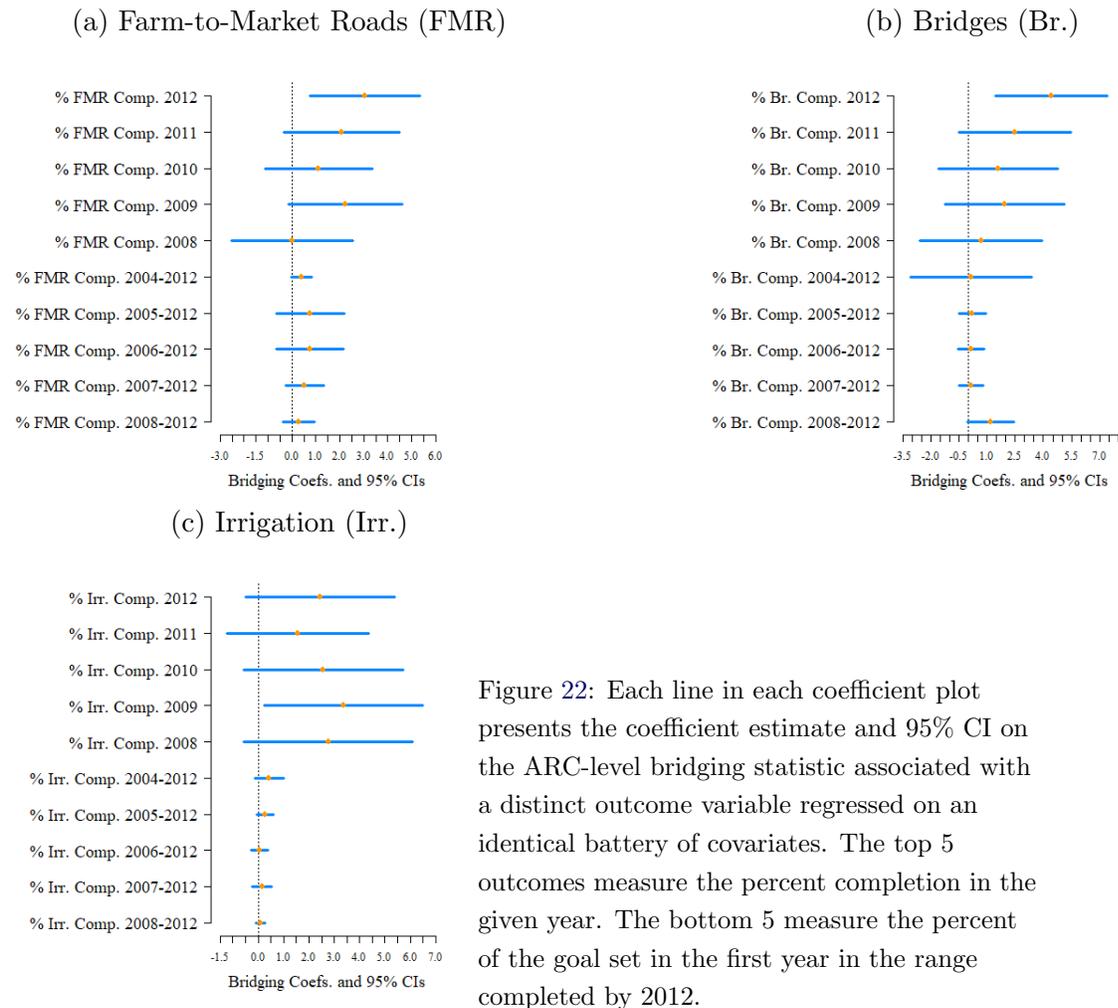
(b) Bridges (Br.)

(c) Irrigation (Irr.)

Figure 22: Each line in each coefficient plot presents the coefficient estimate and 95% CI on the ARC-level bridging statistic associated with a distinct outcome variable regressed on an identical battery of covariates. The top 5 outcomes measure the percent completion in the given year. The bottom 5 measure the percent of the goal set in the first year in the range completed by 2012.

Figure 22 reports the results from simple OLS model specifications in which the yearly assessments of ARC completion on each dimension of infrastructure, as well as aggregated measures of each dimension over the panel, are regressed on bridging and covariates. The figures report only the coefficients for the ARC-level bridging score for clarity, but each model also includes the size of the ARC family network (number of families), the Good Governance Index score from 2005 for the municipality in which the ARC is situated, and poverty incidence in the ARC. The correlation between ARC-level bridging across family groups and completion of infrastructure projects is weak but largely consistent with the expected positive relationship as proposed in the accountability theory of rebel regimes. The correlation appears to strengthen over time, suggesting the possibility that while collective action capacity does not produce immediate results, it may help communities sustain collective action

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to complete long-term infrastructure projects.

B Appendix: Village-Level Interviews

First, a word about the interviews with military personnel cited in the article. Interviews with AFP, OPAPP, DSWD, and other government officials took place during fieldwork in the Philippines July-August 2014 and September-November 2015. Interviews with Brigadier General Estomo (Ret.) and Pablo Escober for OPAPP took place in Manila, while interviews with Colonel Jake Obligado took place in Davao City. I also conducted interviews with other military and government personnel, but the discussions cited in the article touched upon topics directly germane to the theory and evidence presented here.

B.1 Design and Sampling Procedure

The survey is designed to construct a representative sample of villages, rather than of individual respondents within villages. I targeted villages as the units of analysis because CPP-NPA territorial control and governance varies at the village level. The sampling frame includes all villages in three provinces of south-eastern Mindanao: Compostela Valley, Davao Oriental, and Agusan del Sur. To conduct the interviews, I partnered with a local independent research firm, the Association of Psychologists Helping Practitioners (APHP). APHP is a team of researchers whose director and personnel are faculty and affiliates at Ateneo de Davao University, mainly in the Psychology Department. The researchers have years of experience conducting research on sensitive topics related to the the insurgency and human rights abuses by both sides in the area.

The sampling frame was restricted to the three provinces because of resource and security constraints. In case of emergency, enumerators were not sent to interview sites too far from the base in Davao City. Municipality centers are reachable by car and enumerators would be required to stay overnight in a local accommodation at most one night for each research trip to collect a round of interviews. At the same time, many villages in these provinces have been affected by the communist insurgency at some point over the last few decades, making the region an appropriate area to study the dynamics of communist insurgent interactions with local communities. In fact, the AFP intelligence report provided by OPAPP suggests that Compostela Valley and Agusan del Sur were listed as the top two provinces in terms of the level of the communist insurgency in the first half of 2013, though it ranked Davao Oriental only the 21st most affected province.[38] The rankings are based on a weighted average of the manpower, firearms, level of insurgent influence over villages, and the number of violent incidents involving the communist insurgents recorded in the Province during the first half of 2013. While Davao Oriental was not ranked as highly as the other two provinces in the aggregate measure, it did rank the fourth highest in terms of communist insurgent manpower.

To ensure the sample of villages remain representative of the three provinces while also

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[38]These rankings are reported in the AFP year-end intelligence assessment addressing the state of the communist insurgency, provided to the author by OPAPP.

maximizing the number of villages sampled within the budget constraint, I used a cluster random sampling procedure. First, municipalities were randomly selected, with probability proportional to the number of barangays in the municipality, for inclusion into the sample. Second, five barangays were selected at random within each selected municipality. The resulting sample of 75 villages is representative of the full sampling frame of villages in Agusan del Sur, Compostela Valley, and Davao Oriental.

B.2   Recruiting Subjects and Conducting Interviews

For each sampled municipality, APHP's director and research team called contacts in the Local Government Unit (LGU) office for assistance identifying and recruiting village experts in each of the sampled villages within the municipality. LGU officials were asked to provide contact information for village experts from the 5 villages sampled in their municipality. The primary targets for interview respondents were village elders, those who have lived in the village for many years and were old enough to recall details from the periods of NPA presence in the village at least since the 1980's. Other eligible interview subjects included barangay political office holders (present or former barangay captains or council members) and leaders of community organizations. The individuals selected for interviews were not selected to be representative of the village population; rather, they were selected for their knowledge of village history and their ability to comment on the CPP-NPA activities in the village since the late 1970's. When requesting potential village experts to participate in the survey as interview subjects, the APHP personnel used the IRB-approved recruitment script.

Because some sampled villages remain within or near communist insurgent presence, all interviews were arranged to take place at selected safe areas within the subject's municipality, often but not exclusively the municipality capital. Where necessary for security reasons, APHP personnel coordinated with military officers stationed in the area to ensure safe passage for the enumerators and village experts. Interview subjects were provided reimbursement for their travel to the interview site as well as a meal during their stay in the area. For the most part, especially for municipalities very far from Davao City, interview subjects from each of the five barangays within the sampled municipality were interviewed during the same field trip. Enumerators arranged a day or consecutive days for which the five selected interview subjects were all available to travel to a mutually convenient interview site within the municipality for their respective interviews. The design called for interviews to be conducted privately so that an interview subject's responses were not influenced by others. Nonetheless, logistical challenges that caused the enumerators to arrive late to appointments in a few municipalities far from Davao City required collective interviews.

B.3   Limitations

The interview data suffer from a few key limitations worth noting, since they impose some constraints on the process-tracing of causal mechanisms. First, many interview subjects seemed adamant to avoid voicing what could be construed as support for the NPA. This

leaves open the possibility that the responses may discount the ways in which NPA personnel may have invested resources and effort to provide benefits to the community. In many interviews, it was difficult to establish a direct link between the community social structure and the cost-benefit calculus of the rebel personnel deciding whether and how to infiltrate the sampled village. This is the main reason the research design called for a medium-N sample sufficient to examine the patterns in CPP-NPA territorial control and governance rather than concentrate on a small number of villages for process tracing the precise causal chain linking community collective action to NPA activities.

Second, the transcripts reveal the possibility of some confusion regarding timeline in the interviews. The questionnaire was designed to elicit subjects to recount past NPA behavior, specifically during time periods in which the NPA's local units had greater influence in the village. However, many interview subjects were either wary about assigning motives and intent to the NPA personnel in their area, especially since for many the peak of NPA presence occurred decades ago in the 1980's, or simply assumed that the researcher would be more interested in recent conflict processes. Therefore, many subjects tended to shift the conversation towards more recent history of NPA activities. Despite the request for elder subjects for the interview, occasionally the municipality government officials in the area nonetheless set the interview with current leaders who were children at the time of heavy NPA presence in the community. Enumerators occasionally failed to correct the subject's tendency to focus on recent history rather than describe the first periods of NPA presence in the 1980's-90's. The recent history of the conflict unsurprisingly yields lower levels of rebel territorial control and governance, owing to counterinsurgent success and NPA disintegration over the last decade or so of the conflict.

Finally, because the procedure for recruiting interview subjects in sampled villages operated through the research team's contacts in the municipality centers, the interview subjects are generally from central districts within the barangay rather than the outskirts in which the CPP-NPA generally operate. This subject recruitment strategy was intentional; it was designed to ensure those interviewed were more centrally connected in the village and had knowledge of the entire village and its history rather than specific peripheral areas. But, it comes at the cost that some selected subjects had less exposure to NPA activities, having lived in the central districts, and possibly increases the interview subjects' bias against the NPA.