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## Violent conflicts in ARMM: Probing the factors related to local political, identity, and shadow-economy hostilities

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# **Violent conflicts in ARMM: Probing the factors related to local political, identity, and shadow-economy hostilities**

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## *Abstract*

The Philippines has a long history of internecine warfare or conflicts, especially in Mindanao where the secessionist conflicts alone since the 1970s have resulted in enormous human and economic costs. That violent social discords remain varied and widespread in Mindanao underscores the need for a better understanding of their causes to guide policy. Applying regression analysis on a panel dataset for 2011-2014, we examine the factors behind the municipal- and city-level incidence of violent conflicts related to political, identity and shadow-economy issues in the Autonomous Region of Muslim Mindanao. Indicating that geography matters, we find evidence that conflicts spill over between neighboring localities, although the type of conflicts in one locality may not be same as that in its neighbors. Having many neighbors makes a locality more susceptible to political or identity conflicts, while those lying along the coast are more prone to shadow-economy conflicts. Indicating the importance of the quality of local governance, there are fewer cases of identity conflicts in localities where the mayor was re-elected, but more cases of shadow-economy and identity conflicts where the mayor and the vice-mayor or the district representative to Congress are relatives or belong to the same political clan. Also, we find the level of local government fiscal resources to be associated with lower incidence of identity conflicts, but also with higher incidence of disputes related to the underground economy. Moreover, the incidence of identity or shadow economy conflicts is higher in cities and in highly-urbanized provincial capitals than in municipalities. Finally, we find that political conflicts are indeed more frequent in 2013 (election year), and that both identity and shadow economy conflicts have become prevalent in 2014 than in 2011. These results identify some critical areas for interventions to reduce the occurrence or spread of violent discords in ARMM.

*JEL Codes:* O17, O18, R10, H77

*Key words:* Political conflicts, identity conflicts, shadow economy, local governments, negative binomial model, Mindanao

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## I. INTRODUCTION

Violent conflicts, whether they be skirmishes among tribes, clans or groups, or armed challenges against the State, are widespread, persistent, and exact heavy economic and social toll, even long after they have ceased. Estimates from the Uppsala Conflict Data Program show that over the period 1989-2014 there have been 1003 instances of armed conflicts, of which around 20 percent are considered wars, in over 760 locations worldwide, but mostly in Africa and Asia (Pettersson and Wallensteen, 2015).<sup>1</sup> These conflicts have resulted in possibly over a million battle-related deaths. Additionally, wars or armed conflicts lead to injuries and forced displacement, destruction of public infrastructures and physical capital, and an overburdening of the public social services in places where the refugees and displaced population relocate. The civil wars in Peru, El Salvador, Nicaragua, Angola, Democratic Republic of Congo and Burundi adversely affected their economy's total output (Collier et al., 2003). This echoes the finding that political instability impedes economic growth (Barro, 1991). When social and political institutions are likewise disrupted or destroyed, recovery is difficult and the adverse effects linger, especially on the health and education of children in refugee camps and the inability of firms to recruit workers in the affected areas (Collier and Duponchel, 2010). All these push a country closer to a "conflict trap" (Collier et al., 2003).

To control or contain the incidence and consequences of wars and violent conflicts, their causes should be understood and the appropriate interventions adopted. On the face of it, competing groups appear to have distinct identities, be it based on race, ethnicity, religion or nationality. Often, however, their social aggressions have underlying economic and political reasons (Brown and Stewart, 2015), especially inter-group inequalities in economic or political positions or opportunities (Nelson, 1998). In their analysis of civil wars in Africa, Collier and Hoeffler (2000) report that it is the control over a natural resource or a "lootable" resource like diamonds and other minerals, especially in countries that rely heavily on exports of such primary resources, that predicts bloody confrontations between ethnic rival groups. Geography also matters. Landlocked African countries are found more susceptible to civil strife (Collier, 2006). Measuring inter-group inequalities based on household assets and education levels for several countries, Østby (2007) finds that while the risks of in-country conflict occurrence is positively associated with inequalities between ethnic or religious groups,

it is the inequality across regions that counts most. In Nepal during the period 1996-2006, the fatalities due to armed conflicts are found greater in poor districts and in forested and mountainous areas, that is, in places where insurgents are already located (Do and Iyer, 2010). Not to discount the insights gained from these studies, further investigations could confirm if the findings so far are general or specific to a setting, or could point out some of the causal pathways leading to the eruption of violent discords.

This study probes the factors behind the incidence of violent conflicts in southern Philippines, particularly in the Autonomous Region of Muslim Mindanao (ARMM). The prevalence and persistence of violent conflicts in ARMM and in the rest of Mindanao have deep historical roots that can be traced far back to the Spanish and American colonial periods (Corpuz, 2007; Abigale, 2000; Amoroso, 2005). While the Philippine government continues to address the problem, part of the difficulty it faces stems from the sheer variety, complexity, and interlinkages of conflicts in Mindanao. This is best illustrated in the case of *rido* or clan feuds, whose origins could be a slight of honor or disrespect, theft or destruction of property, land dispute, political rivalry, jealousy or accidents. Initially involving only two persons usually from different clans, such incidents escalate automatically into a feud between their respective clans, sometimes across generations as well. Often these feuds are settled out of court, involving various intermediaries (traditional leaders, influential persons, elected officials, or the military) and based on traditional practices and Islamic laws.<sup>2</sup> (For example, see various case studies of *rido* feuds in Torres III (2014).)

The need to manage, if not end, the *rido* conflicts and other violent discords in Mindanao is underscored further by the enormous human and economic toll they exact. For one, the secessionist conflicts between the Muslim separatist groups (Moro National Liberation Front, in particular) and government forces since the 1970s have resulted in more than a hundred thousand casualties, including loss of civilian lives, and the displacement of millions of people (Schiavo-Campo and Judd, 2005), often leading to “the minoritisation of the indigenous Moro and Limed peoples” in their resettlement areas (Tango, 2016). Recent estimates of the economic losses during the first decade (1969-1979) of the secessionist conflict put it at US\$400 per person per year. By the third decade (1990s), the economic losses had risen to US\$1600 per person per year. These figures are equivalent to about 18 percent and 46 percent of the country’s average annual Gross Domestic Product per capita during the respective periods

(Molato, 2015). Add to these the enormous material resources spend in and the loss of credibility of government anti-rebellion and peace-building efforts (Vitug and Gloria, 2011).

In addition to the conflict trap, Collier's three other traps (Collier, 2007) that contributed to the persistence of widespread poverty in Africa find resonance as well in Mindanao, perhaps no less than in other parts of the Philippines. One such trap is bad governance, which in many parts of the country is often associated with patronage politics, a practice that has kept local elite families or clans in political power for generations (De Dios, 2007; Rivera, 2011), is pervasive and pernicious in Mindanao as well (McCoy, 1994; Coronel et. al, 2004). The so-called Ampatuan Massacre in Maguindanao in 2009 is perhaps the most infamous, recent manifestation of violent political conflicts (between two political clans) in Mindanao. The natural resource trap in recent years in Mindanao takes the form of fights over control mineral wealth among local elected officials (Verbrugge, 2015). In recent years, some Islamist militant groups (the Abu Sayaff, for example) have victimized foreigners and Filipinos ostensibly for ideological reasons, but whose nefarious tactics like bombings, kidnappings and extortions render them indistinguishable from common bandits. That they continue to elude government forces is partly due to the difficult inland terrain and the wide coastal areas in the region that enable them to transfer their operations to otherwise peaceful areas, which are unfortunately trap with having "bad" neighbors. Due to these incidents, foreign embassies in Manila regularly issues advisories to their nationals to refrain from visiting Mindanao, especially ARMM.<sup>3</sup> The heavy toll of the breakdown in local peace and order situation on tourism, investments, entrepreneurship, trade and other economic activities manifest in official poverty estimates.<sup>4</sup>

Using municipal-level conflict data for 2011-2014 collected under the Bangsamoro Conflict Monitoring System (BCMS), this paper branches off from previous studies by undertaking an econometric analysis of the incidence of violent conflicts in ARMM cities and municipalities. We focus on the correlates of political, identity, and shadow-economy conflicts, which, arguably, are triggered, albeit unequally, by both greed and grievance factors (Collier and Hoeffler, 2000). Specifically, we seek to answer the following questions: First, do violent conflicts spill over across areas? Is the incidence of violence in a locality influenced by the incidence of similar or different types of conflicts in its neighbors? Third, does geography matter? Do interior

municipalities (or cities) or island municipalities (or cities) have fewer cases of violent conflicts? Third, how important are fiscal and economic factors? Are the local government's fiscal revenues, the local poverty rate and the locality's cityhood status associated with the occurrence of violent conflicts? Fourth, does the quality of local governance make a difference? Is violent discord less frequent in places where the incumbent mayor is given another mandate or where the mayor and other elected officials belong to the same political clans? Lastly, does the incidence exhibit a temporal pattern? Specifically, are there more cases of violent conflicts during an election year than in other years? While the findings will not necessarily indicate causal relations, we hope they can still serve as "flash points" or identify "hot spots" to where policy attention can be focused. If indeed violent political conflicts, for example, are found to cross borders systematically, then it would make sense to contain them immediately where they first occur.

## II. AUTONOMOUS REGION OF MUSLIM MINDANAO

A special regional government entity created by law in 1989, the Autonomous Region of Muslim Mindanao lies southwest of Mindanao, the second biggest and southern-most island group in the Philippines (Figure 1). It comprises 5 provinces, 2 cities, 116 municipalities and 2488 barangays (villages) (Table 1). Unlike other regions, ARMM has its own executive branch, headed by the Regional Governor, and a legislative assembly. From 1990 to 2016, there had been eight regional governors, including Nurallaj Misuari, the founding leader of the secessionist organization Moro National Liberation Front,

The region occupies a total area of 33.51 thousand square kilometers (km<sup>2</sup>) or about 11.2 percent of the country's total land area. In terms of land area, Lanao del Sur is the largest with 13.5 thousand km<sup>2</sup>, followed by Maguindanao with 9.7 thousand km<sup>2</sup>. Both provinces are in the main island of Mindanao. The land area of Basilan, Sulu or Tawi-Tawi is only about a third of Maguindanao's. Off the main island, these three provinces comprise a scattering of various islands in the Celebes Sea and Sulu Sea (Figure 1). Due to its varied geographical features, some municipalities in ARMM, especially those in Lanao del Sur and Maguindanao, are landlocked or far from the coast. In contrast, many

in the three other provinces are coastal towns and some are island municipalities without land neighbors.

Together, the five provinces account for about 3.53 percent of the country's total population in 2010. With 945 thousand inhabitants in 2010, Maguindanao is the most populous. While officially not part of the ARMM, geographically the cities of Isabela and Cotabato are in the provinces of Basilan and Maguindanao, respectively. Cotabato City is one of the principal economic hubs and political centers in Mindanao. According to the Philippines Statistics Authority, 90 percent of the population in ARMM in 2000 was Muslim. Despite this widely shared characteristic, the people in ARMM belong to different ethnolinguistic groups, including Maguindanao, Maranao, Yakan, Tausug, Samal, Iranun and *Lumads* or non-Muslim, indigenous population.

Among the country's 17 regions (in 2015), the ARMM has the lowest level of socioeconomic development. Consistently the poverty rates in all ARMM provinces were worse than the national rates of 26.3 percent in 2009 and 25.2 percent in 2012. While the country's overall score in the Human Development Index (HDI) – a composite of average family income, life expectancy at birth and adult literacy rate – improved from 0.609 in 2009 to 0.644 in 2012, the individual HDI scores of the ARMM provinces were consistently way below the national scores, with that of Lanao del Sur and Maguindanao even deteriorating between 2009 and 2012.

Partly due to their poor local economies, the local government units (LGUs) in ARMM are unable to raise revenues from real property taxes, business taxes, and other local sources. Thus, they rely heavily on their internal revenue allocations (IRA)<sup>5</sup>, the single most important central fiscal transfers and source of revenues for most local governments (Llanto, 2012). In a typical local government in ARMM the IRA contributes 90 pesos out of each hundred in the fiscal budget. Transferred as a lump sum, the LGU can use the IRA for public services to improve household welfare, boost local economies or resolve conflicts. Since the IRA is also fungible, local officials can misappropriate it as rents or to fund patronage activities.

The uses or misuses of public funds like the IRA are arguably a function of the quality of local governance, especially of the attributes of local leaders (De Dios, 2007; Rivera, 2011). As in most places in the country where political parties are weak, local politics in ARMM is dominated by a few families or clans. Related by blood or marriage, these politicians occupy simultaneously or sequentially key elective offices in the



municipality, city, congressional district or province (Gutierrez, 1994; Coronel et al., 2004; Simbulan, 2005). Perhaps more so in ARMM than elsewhere in the country, politicians in the region can trace their lineages to traditional leaders dating back to the Spanish and American colonial periods. Their forebears lend their names to several ARMM municipalities, like Datu Odin Sinsuat, Datu Paglas, Datu Piang and Datu Salibo. Rivalries among the traditional elites then and their descendant clans now permeate politics, elections, trade and businesses. These rivalries often escalate to armed conflicts. Thus, election outcomes and the clan affinities of the elected leaders in ARMM may be correlated with the occurrence of violent incidents (Kruezer, 2005). The correlation may be direct as when clan competition during elections turns bloody or intense, or indirectly as when the clan in power expends government resources to thwart the opposition. Perhaps the worst election-related violence due to clan competition in the region is the infamous massacre of 58 individuals in Maguindanao in November 2009 that was allegedly perpetrated by the family of the then Maguindanao Governor Andal Ampatuan, Sr. against the family members and supporters of the then rival gubernatorial candidate Esmael Mangudadatu.<sup>6</sup>

### III. DATA

The data used here are of two types. The first type consists of the reported incidence of violent conflicts in the 118 component cities and municipalities of the provinces of Basilan, Lanao del Sur, Maguindanao, Sulu and Tawi Tawi, and in the cities of Cotabato and Isabela. The conflict data are culled from the Bangsamoro Conflict Monitoring System (BCMS), which is a “subnational conflict monitoring system that systematically tracks the incidence, causes, and human costs of violent conflict and violent crime in the proposed areas of the Bangsamoro” (International Alert, 2014). In turn, the BCMS derived its raw data from regional and provincial police blotters, supplemented them with media reports, and then validated these through meetings with various local stakeholders.<sup>7</sup> Obtained from the BCMS website on 26 February 2016, the conflict dataset used here covers the period 2011-2014. In the BCMS, a violent conflict “refers to incidents where two or more parties use violence to settle misunderstanding and grievances, and/or defend and expand their individual or collective interests (e.g., social, economic, political resources and power, etc.)”

(International Alert, 2014). Also covering the same four-year period, the second type of data consists of fiscal, socioeconomic, and geographic indicators, and election outcomes obtained from the Bureau of Local Government Finance, the Philippine Statistics Authority (PSA), and the Commission on Elections (COMELEC).

Compared to the crime data from the Philippine National Police, the BCMS distinguishes violent crimes from and non-violent ones. Further, the BCMS reports the number of displaced, kidnapped, killed, trafficked or injured/wounded persons involved in violent conflicts. In addition, the BCMS classifies the causes of violent conflicts into seven broad types, namely extrajudicial crime/popular justice, governance, identity, political, resource, shadow economy, and others (undetermined). The definitions of these seven types are shown in Appendix 1. The last type (others) pertains to cases of violent conflicts not included in the other types because of incomplete information. It can be inferred from their given definitions that political conflicts may be driven by both greed and grievance factors, identity conflicts are probably caused more by grievance factors, and shadow economy conflicts are triggered more by greed factors.

As of February 2016, the BCMS identified a total of 4881 cases of violent conflicts. As shown in Figure 2(a), the highest number of cases (1788) occurred in 2014 and the least (730) in 2012. Of the total for the four-year period, conflicts of undetermined causes account for around 38 percent, conflicts related to illicit activities or shadow economy account for around 20 percent, while crime-related conflicts and political-related conflicts each account for about 14 percent. Among the five ARMM provinces, Maguindanao (including Cotabato City) registered the highest incidence of violent conflicts – a total of 1862 cases or about 38 percent of the total in 2011-2014 (Figure 2(b)). It also had the most number of cases every year except in 2011, when Basilan topped the list. The next most conflict-ridden provinces are Basilan (1165 cases, including those in Isabela City) and Lanao del Sur (897 cases). In each year, Tawi Tawi had the least number of cases.

An LGU-level analysis is deemed relevant to policy since cities and municipalities, besides being in the forefront, have the requisite mandates and the basic powers and resources to prevent, control, manage and resolve conflicts within their jurisdictions. Thus, a panel dataset is assembled wherein the cross-section unit is the local government (city or municipality) and the period covered is 2011-2014. The assembled dataset has some limitations. First, the fiscal and socioeconomic data are

available only on annual basis, and cannot be matched with the monthly or quarterly analysis of conflict possible with the BCMS dataset. Second, a balanced panel is possible only for 100 LGUs. Of the 20 LGUs excluded due to missing fiscal and socioeconomic variables, 15 are in Maguindanao, 4 in Basilan and 1 in Sulu. Altogether, these 20 LGUs account for about 10 percent of all instances of violent conflicts during the period 2011-2014. Third, official municipal-level poverty estimates are available only for the years 2006, 2009 and 2012. So, the 2009 poverty estimate is used for 2011 and the 2012 estimate for 2012-2014. Fourth, province-level consumer price index (the base is 2006) and the 2010 municipal- or city-level actual population counts are used to adjust the nominal values of the fiscal variables for population and prices. There are no municipal-level estimates of prices or actual population counts for the period under study.<sup>8</sup>

#### IV. METHODS

##### a. Negative binomial regression models

To carry out our empirical analysis, we fit negative binomial models on our incidence data. Two features of the data warrant the use of the negative binomial (NB) regression model. Specifically, the incidence events are discrete and countable, with many observations having no reported incidents and only a few of them have large number of incidents. Since the NB can be framed as a functional form modification of the Poisson regression model, it is convenient to begin with the latter. Following the exposition in Greene (2008, pp. 907-918), let  $y_i$  be the incidence of an event for the  $i$ th observation, where  $i=1, \dots, N$  and  $y_i=0, 1, 2, \dots$ . Further, let  $y_i$  follow a Poisson distribution with parameter  $\lambda_i$ :

$$\text{Prob}[Y = y_i | \mathbf{X}_i] = \frac{e^{-\lambda_i} \lambda_i^{y_i}}{y_i!}, \quad (1)$$

where  $\lambda_i = e^{\mathbf{X}_i' \boldsymbol{\beta}}$ ,  $\mathbf{X}_i$  is a vector of regressors, and  $\alpha$  and  $\boldsymbol{\beta}$ 's are parameters. Note that in the Poisson model, the conditional mean and the conditional variance are equal, i.e.,  $E[y_i | \mathbf{X}_i] = \lambda_i = \text{Var}[y_i | \mathbf{X}_i]$ , a condition that is not satisfied by our incidence data, as will be shown in the next section. When the sample variance exceeds the sample mean, this case (also referred to as “overdispersion”) is usually modeled by introducing an unobserved, individual heterogeneity in the conditional mean of the Poisson model, i.e.,

$$E[y_i | \mathbf{X}_i, \varepsilon_i] = e^{\mathbf{X}_i' \boldsymbol{\beta} + \varepsilon_i}. \quad (2)$$

From (2), define  $\ln \mu_i = X_i' \boldsymbol{\beta} + \varepsilon_i = \ln \lambda_i + \ln u_i$ . Further, assume that  $u_i = e^{\varepsilon_i}$  has a gamma distribution with parameter  $\theta$ . Then, it can be shown that  $y_i$  now follows a negative binomial distribution, given by

$$\text{Prob}[Y = y_i | \mathbf{X}_i] = \frac{\Gamma(\theta + y_i)}{\Gamma(1 + y_i)\Gamma(\theta)} r_i^{y_i} (1 - r_i)^\theta, \quad (3)$$

where  $r_i = \lambda_i / (\theta + \lambda_i)$ . Further, it can be shown that the conditional variance of the negative binomial distribution exceeds its conditional mean, that is

$$\text{Var}[y_i | \mathbf{X}_i] = \lambda_i [1 + (1/\theta)\lambda_i] > \lambda_i = E[y_i | \mathbf{X}_i]. \quad (4)$$

Note that when  $(1/\theta) = 0$ , then both the variance and mean in (4) would be equal to  $\lambda_i$ , i.e., the negative binomial model reduces to the Poisson model.

An alternative form of the negative binomial model assumes  $\theta_i = \theta \lambda_i$ , which leads to  $r = 1/(1 + \theta)$  and

$$\text{Prob}[Y = y_i | \mathbf{X}_i] = \frac{\Gamma(\theta \lambda_i + y_i)}{\Gamma(1 + y_i)\Gamma(\theta \lambda_i)} r_i^{y_i} (1 - r_i)^{\theta \lambda_i}. \quad (5)$$

The negative binomial models given by equations (3) and (5) are referred to as NB2 and NB1, respectively, in the literature (Cameron and Triverdi, 1998).

The NB2 model has been extended to accommodate heterogeneity in the panel data, where  $y_{it}$  now refers to the incidence event for the  $i$ th group in time  $t$  (Greene, 2008; Cameron and Triverdi, 1998). In this case, the group-specific heterogeneity,  $\delta$ , is assumed to enter  $\lambda_{it}$  additively and has a gamma distribution with mean 1,  $\Gamma(\delta, \theta)$ . In the random-effects NB2 model,  $\delta$  is assumed to vary across groups such that  $1/(1 + \delta)$  has a beta distribution with parameters  $a$  and  $b$ . The random-effects NB2 model is

$$\text{Prob}[Y = y_{it} | \mathbf{X}_{it}, \delta_i] = \frac{\Gamma(\delta + y_{it})}{\Gamma(1 + y_{it})\Gamma(\delta)} r_{it}^{y_{it}} (1 - r_{it})^\delta, \quad (6)$$

where  $\lambda_{it} = e^{X_{it}' \boldsymbol{\beta} + \delta_i}$ , and  $r_{it} = \lambda_{it} / (\delta + \lambda_{it})$ . We estimate the random-effects NB2 model (6) and the two NB models (3) and (5) using maximum likelihood methods in STATA. Since each NB model is different from and not necessarily better than the other (Greene, 2008. p. 913), both are estimated here to evaluate the robustness of the parameter estimates. We adjust for municipal-level clustering of standard errors in both the NB2 and NB1 models, and use the observed information matrix to compute for the standard errors in the random-effects NB2 model.<sup>9</sup>

Each of regression models (3), (2) and (6) has two variants. In the first variant, the vector  $\mathbf{X}$  includes a summary measure of the incidence of violent conflicts in all

municipalities and cities adjacent to the reference LGU. In the second variant, the several conflict variables are included, each referring to the total incidence of a particular type of violent conflicts in the adjacent LGUs.<sup>10</sup> Common to all model variants, the other regressors include fiscal, economic, political, demographic, geographic and year indicators.

#### b. Variables

Table 2 shows the definitions and descriptive statistics of the regression variables. The three indicators of local incidence of conflicts are *political conflicts*, *identity conflicts*, and *total shadow economy conflicts*. On the average, about one incident of political conflict or identity conflict and two incidents of shadow conflicts happen in a typical ARMM LGU each year.

To examine the issue of inter-LGU spillover of conflicts, first, a neighbor of a given LGU is defined as another LGU in ARMM with whom it shares a land border. The land borders are ascertained using official maps and Google maps. Following this definition, a municipality alone in an island (*island LGU*) has no neighbor. Note that LGUs outside ARMM are not counted here as neighbors regardless of their physical proximity to an LGU in ARMM.<sup>11</sup> An *interior LGU* is one with neighbors on all sides (landlocked). The default category is an LGU with some neighbors and lie along a coast. These LGU categorizations will indicate whether geography matters. Around half of the LGUs are landlocked, while another 14 percent are island municipalities.

Eight variables indicate the incidence of different violent disputes in the neighboring LGUs, namely *neighbors' total conflicts*, *neighbors' political conflicts*, *neighbors' identity conflicts*, *neighbors' shadow economy conflicts*, *neighbors' crime conflicts*, *neighbors' governance conflicts*, *neighbors' resource conflicts*, and *neighbors' other conflicts*. These variables should shed light on whether the same type or different types of conflicts spill over across borders. The average total number of conflicts of all types in neighboring LGUs is around 37. The mean incidence of conflicts in neighbors is five for those related to political issues, three for identity-related issues, and seven for shadow economy-related issues. Another variable that accounts for spatial spillovers is the *number of LGU neighbors*, which, on average, is about three, with some LGUs having as many as ten neighbors.

The LGUs are further classified by their socioeconomic, geographic and administrative features. An indicator of their fiscal resources, the *IRA real per capita* is

the amount of internal revenue allocation (IRA) of the LGU adjusted for population (based on the 2010 census of population) and inflation (province-level consumer price index computed at 2006 prices). The mean IRA real per capita is around 20 pesos. The municipal-level *poverty rate* is the proportion of poor in the population in the locality, based on the PSA's small-area estimates for 2009 and 2012. Since there are no similar poverty estimates for other years, the poverty rate for 2011 is set equal to the official 2009 figure, and those for 2012, 2013 and 2014 are set equal to the official 2012 estimate. The average *poverty rate* is around 54 percent. Moreover, LGUs are classified as *city* based on an official list (that uses population and local government income as criteria for cityhood). The four cities are Lamitan, Marawi, Cotabato and Isabela. Not officially part of ARMM, Cotabato City and Isabel City are also distinguished from the rest with dummy variables bearing their names. To account for other possible province-level factors, four province dummy variables are constructed (*Basilan, Tawi Tawi, Sulu and Lanao del Sur*), with Maguindanao as the reference province. The dummy variable *provincial capital* serves to differentiate further certain localities where the provincial governments and local branches of national government agencies are situated.

To test the idea that the quality of local governance and political competition also matter, four binary variables are constructed to indicate whether the incumbent mayor was re-elected (*if mayor is re-elected*) in the immediately preceding local election, is related by blood or marriage to the vice mayor of the same LGU (*mayor and vice mayor are relatives*), or to the district representative to Congress<sup>12</sup> (*mayor and congressperson are relatives*), or to the incumbent governor of the province where the LGU is located (*mayor and governor are relatives*). Following the convention (e.g., Gutierrez, 1994; Rivera, 1999; Simbulan, 2005), kinship ties and therefore membership in political clans or dynasties are determined by comparing the surnames or middle names of the incumbent and past elected officials or that of their spouses. Here, the kinship affinities for 2011 and 2012 are based on the results of the May 2010 elections, while those for 2013 and 2014 based on the outcomes of the May 2013 elections. Of the total observations, around 34 percent have incumbent mayor and vice mayor who are relatives, about 11 percent have mayors and the congressperson who are kin, and around 7 percent denote that the mayor and governor are related. About 44 percent of the incumbent mayors are re-elected.

Finally, dummy indicators for the years 2012, 2013 and 2014 are introduced to account for possible temporal factors that influence occurrence of violent disputes. For example, the estimated coefficient of Year 2013 should indicate whether the incidence of violence is different in 2013 (an election year) from that in 2011 (the base year).<sup>13</sup>

[Insert Table 2 here.]

## V. RESULTS

This section presents and discusses the results of the negative binomial regression analysis of political conflicts (Table 3), identity conflicts (Table 4) and shadow economy conflicts (Table 5). Each table shows six sets of regression results: two for NB2 model ([1] and [2]), two for NB1 model ([3] and [4]), and random-effects NB model ([5] and [6]). For ease of interpretation, the coefficient estimates are converted to marginal effects – the change in the incidence per unit change in the relevant covariate – with their corresponding standard errors reported in parentheses. But first, we show evidence of the inadequacy of the Poisson model (equation (1)) to account for the actual distribution of the conflict incidence data.

### a. Testing the Poisson model

Indeed, the greater mass of the frequency distribution of political, identity or shadow economy conflict hovers over zero, and only a few observations have large numbers of incidents (Figure 3). It can be inferred from the figure that the mean is smaller than the variance in all three conflict types. We also fitted the Poisson model on the data and found the fit to be poor. As can be seen in Appendix 2, both the deviance goodness-of-fit test and the Pearson goodness-of-fit test are rejected in all models. Altogether these results justify using the NB models.

[Insert Figure 3 here.]

### b. Political conflicts

Consistently across estimation models ([1], [3] and [5] in Table 3), the local incidence of political conflicts is positively associated with the total incidence of conflicts of all types in the neighboring jurisdictions. However, a more detailed analysis reveals that it is specifically associated with the neighbors' conflicts related to shadow economy ([2]) and political issues ([6]). This result is consistent with reports that some local politicians compete not only for elective office but also for profits derived from the

underground economy (Lara, 2016). Interestingly, local political conflicts appear correlated negatively with the incidence of identity conflicts in the adjacent LGUs ([2]), and positively with the number of LGU neighbors ([1]-[4]), although both associations are not robust after controlling for possible unobserved individual-effect variable ([6]). Consistently across all estimates, island LGUs have fewer incidence of political conflicts, while the incidence in interior LGUs is not systematically different from that in a coastal LGU (the default). Altogether these results suggest spatial correlation, if not spillover, of conflicts among neighbors.

Further, the incidence appears to rise with poverty rate ([1] and [5]). While the IRA real per capita appears to reduce the incidence, the marginal effect however is not statistically significant.

The frequency of political conflicts seems independent of the incumbent mayor's re-election status or kinship relation with the incumbent vice mayor. Interestingly, when the mayor and the governor are related, the incidence could be lower than when they are not ([1]-[4]), although the association weakens after controlling for possible omitted variable bias ([5] and [6]). Controlling for this possible bias results in a negative marginal effect of the mayor and congressperson being relatives on the incidence of political conflicts.

Generally, the incidences in cities and in non-cities (municipalities) are not systematically different. However, the incidences in Cotabato City and in provincial capitals are each significantly greater (also by around 2 cases) than that in any other place in the region. Relative to the incidence in Maguindanao, it is significantly higher in Basilan, and lower in both Tawi Tawi and Lanao del Sur.

There is some evidence of election-year effect: the incidence of political conflict appears higher in 2013 (election year) than in 2011 (base year). In general, the variations across years are not systematic.

The bottom part of Table 3 shows that pooled, cross-section negative binomial models account for about 20 percent of the total variations in the dependent variable. The results of the Wald chi-squared test indicate that the explanatory variables in the panel-data negative binomial model are jointly different from zero. The likelihood ratio tests imply that the pooled, cross-section NB1 model can be rejected in favor of the random-effect panel data NB model.

[Insert Table 3 here.]



### c. Identity conflicts

Unlike political conflicts, the local incidence of identity conflicts is not correlated with the overall incidence of conflicts in the adjacent LGUs ([1], [3] and [5] in Table 4). However, its co-incidence with particular types of conflicts in neighboring jurisdictions is like that of political conflicts. Consistent with the results in Table 3, the incidence of identity conflicts also appears negatively correlated with the incidence of political conflicts in the neighboring LGUs ([2], [4] and [6]). Interestingly, it is correlated with the incidence of shadow economy conflicts in its neighbors, but not to the incidence of identity conflicts in its neighbors ([2], [4] and [6]). Those with many neighbors also have higher incidence of identity conflicts ([1] and [6]).

Unlike in the case of political conflicts, the frequency of identity conflicts is lower in interior LGUs than in coastal LGUs, where the incidence is not systematically different from that in island LGUs.

Further, the incidence is negatively correlated with IRA real per capita and, interestingly, poverty rates. The first correlation is consistent with some field reports that local officials use local government resources to pay for blood money and settle inter-family feuds (*rido*) (see, Torres III, 2014). The second correlation could indicate that poverty reduces the inclination or opportunities of local groups to further engage in costly hostilities.

Where the incumbent mayors have won another term, there is lower frequency of identity conflicts ([1]-[6]). However, the frequency is higher where the mayor and congressperson are related ([4]-[6]). In general, the incidence is not systematically associated with the kinship ties between the mayor and vice mayor or governor.

Again, cities in general have greater number of identity conflicts, although Isabela City has lower incidence than the average LGU in the region. The incidence is not particularly different in Cotabato City or in provincial capitals than elsewhere.

Relative to the incidence of identity conflicts in Maguindano, it is lower in Tawi Tawi and Sulu. The incidence in Basilan or in Lanao del Sur is not significantly different from that in Maguindanao.

There are no systematic variations in the annual incidence between 2011 and 2012 or 2013. However, it appears to be higher in 2014 than in 2011.

The pseudo *R*-squared indicate that the NB2 and NB1 models explain below 15 percent of the total variations in the incidence across localities. Again, the Wald chi-

squared tests indicate that the covariates are jointly different from zero in the panel data model. However, the likelihood ratio tests suggest that pooled, cross section estimates cannot be rejected in favor of the panel data estimates.

[Insert Table 4 here.]

d. Shadow economy conflicts

More than in the case of political conflicts or identity conflicts, the incidence of shadow economy conflicts is positively correlated more with the overall level of conflicts than with any particular type of conflict in the neighboring LGUs (Table 5). While it also appears to be associated with the neighbors' incidence of shadow economy conflicts ([2]), the correlation is not robust ([4] and [6]). It is also not particularly sensitive to the number of neighbors. Further, we also fitted the Poisson model on the data and found the

The incidence in interior LGUs or island LGUs is also lower than that in coastal LGUs. Perhaps this is expected since barter exchange, which is part of the underground economy, is largely an inter-island trade.

There is also some evidence that a higher IRA is associated with lower incidence of shadow conflicts ([1] and [2]), although the association is not robust. Poverty appears to contribute to the frequency of shadow conflicts ([5] and [6]).

Interestingly, the incidence appears lower where the mayor and governors are kin ([1]-[4]), but this association becomes insignificant after controlling for unobserved individual fixed effects. In this case, it is the kinship tie between the two top local government officials that matter ([5] and [6]). The incidence does not systematically vary with the mayor's re-election status or kinship relation with the congressperson.

As in the case of political and identity conflicts, the incidence of shadow economy conflicts is greater in cities than in municipalities. It is also higher in provincial capitals than in a typical locality in the region. While there is some evidence that the incidence is greater in Cotabato City and lower in Isabela City ([3] and [4]), the correlation is not robust after controlling for possible omitted variable.

Also, there is no strong evidence that the incidence in Maguindanao and that in any of the other four provinces are significantly different. The overall incidence in 2012 or in 2013 appears systematically lower than that in 2011. There are no other differences in annual incidence.

The pooled, cross section NB2 and NB1 models each explain about 20 percent of the variations in the incidence. Again, the Wald chi-squared test indicates the joint significance of the covariates in the panel data model, while the likelihood ratio tests suggest rejecting the pooled, cross-section estimates in favor of the panel data estimates.

[Insert Table 5 here.]

## VI. DISCUSSION AND CONCLUSION

Our regression results yield some insights concerning the spatial and temporal characteristics of the incidence of violent conflicts in the ARMM cities and municipalities, Isabela City and Cotabato City during the period 2011-2014. Consistent with the findings made in the qualitative studies (e.g., Torres III, 2014), the conflicts in these areas are nuanced, varied, complex and intertwined, and whose successful resolutions may require special dispute resolution mechanisms. Notwithstanding the data limitations, our results point to some key variables that would help identify possible intervention points for policymakers, development practitioners, peace advocates, and other stakeholders.

First, there is evidence of spatial correlation of the incidence of violent conflicts. However, the correlated conflicts in a given LGU and in its neighbors may be of the same or different type. On the one hand, political conflicts coevolve in adjacent jurisdictions. This may be the result of election-related feuds of rival political clans for dominance of contiguous LGUs. On the other hand, disputes related to the shadow economy in a given locality may be associated to the political conflicts or identity conflicts in its neighbors. This is consistent with anecdotal evidence that show some politicians in ARMM have business interests in the underground economy (Lara, 2016). The interrelatedness of different types of violent discords in ARMM is like the linkage between conflicts over mining resources, drug trade and armed clashes between illegal organizations in Latin America (Rettberg and Ortiz-Riamalo, 2016; Aslam and Tanimoune, 2016).

The importance of geography is further underscored by the finding that LGUs with large number of neighbors are especially susceptible to political or identity conflicts, while LGUs lying along the coast are more prone to discords related to the shadow economy. However, without a suitable instrumental variable, it cannot be determined from the results whether the conflicts spill from the given LGU over to its

neighbors, vice versa, or they react to a common trigger. While this is an issue that must be explored in future studies, our results suggest an aggressive containment measure once a conflict arises in given locality before it spreads out to its neighbors and morph into another type of conflict.

Second, there is some, but rather weak, evidence that poverty worsens social disputes related to politics or the shadow economy. Recall, however, that our poverty figures may be picking up the effects of omitted variables that are fixed for all LGUs in 2011 or in 2012-2013. To resolve this ambiguity, future may use instead annual poverty estimates other measures of wealth or socioeconomic inequality.

There is evidence that local government fiscal resources could reduce the incidence of identity conflicts. This result is consistent with anecdotal evidence that some local officials (mayors) use the IRA is used to pay blood money to settle rido conflicts among their constituents (Torres III, 2014; Montillo-Burton et. al, 2014). However, it appears to increase incidence of violent discords in the shadow economy, which pertain to illicit or underground economic activities. Field reports from International Alert suggest that the correlation could be partly explained by the fact that some local officials use fiscal resources to promote or protect their involvement in the shadow economy. The contrasting effect of the IRA on the frequency of conflicts is perhaps another evidence of the ambiguous effect of decentralization violence and disorder (see, for example, Pierskalla and Sacks (2015) on the effects of decentralization in Indonesia). Whether and when the IRA is used as an instrument to address the grievance (of feuding families) or to fuel the greed (of unscrupulous politicians) is a topic that warrants further investigation.

Third, the quality of local governance is likewise important. Cases of identity conflicts are fewer in places where the mayor was re-elected, perhaps an indication of approval of the mayor's past performance, which may include successful mediation of disputes or targeted provision of public services to the disadvantaged groups. Cases of shadow-economy conflicts appear greater in places where the mayor and vice-mayor are relatives, while cases of identity conflicts are greater where the mayor and congressperson are relatives. Thus, the lack of credible political competition or the continued dominance of political clans may exacerbate conflicts possibly because the officeholders are partisans or have stakes in the underground economy to protect.

Fourth, the conflicts in ARMM are also largely an urban phenomenon. The incidence of identity or shadow economy conflicts is higher in cities than in municipalities, although there is no difference between the two areas in terms of political conflicts. Social disputes related to politics or the underground economy are also more prevalent in Cotabato City and in highly-urbanized provincial capitals. The incidence of political or identity conflicts are also generally higher in Maguindanao than in any other ARMM province. Interestingly, the prevalence of shadow economy conflicts is largely the same across provinces.

Last, there are some temporal variations in the incidence of violent conflicts. Perhaps unsurprisingly, political conflicts are more frequent in the election year (2013) than in 2011. Both identity conflicts and shadow economy conflicts have become more prevalent in 2014 than in 2011. Perhaps a longer time series would confirm if these will hold out.

Notwithstanding the data limitations that preclude us from drawing the exact causal relations between the incidence of violent conflicts and the selected explanatory variables, we conclude nonetheless the interesting and policy-relevant correlations are revealed with our limited fiscal, socioeconomic, geographic, administrative and time variables. Our findings regarding the nuanced characteristics of local conflicts and the need to adopt interventions to local conditions underscore similar advice of studies of local conflicts in other developing countries (Barron, Kaiser and Pradhan, 2009; Findley, Powell, Strandow and Tanner, 2011).

## NOTES

1. Also based on the estimates from the Uppsala Conflict Data Program, Gledistch et al. (2002) report around 225 armed conflicts over the period 1946-2001.
2. Bardhan (1997) has emphasized the relative efficacy of traditional mediating institutions for resolving ethnic or sectarian conflicts in developing countries.
3. In April 2016 when the Malaysian government closed off its border in Sabah to protest the kidnapping of its nationals by the Abu Sayyaf group, the prices of rice and other basic commodities in the province of Sulu reportedly rose due to the resulting trade embargo. <http://www.gmanetwork.com/news/story/562786/money/economy/armm-economy-hurt-by-closure-of-sabah-border-due-to-abu-sayyaf-kidnappings>. Dated 15 April 2016.
4. See Monsod (2016) for a more incisive account of the links between human development and conflicts in ARMM.
5. The IRA is the share of the local governments in the revenues collected from income taxes and consumption taxes of the national government. It is apportioned to local governments based on a formula that factors in, first, the level of local government (province, city, municipality, barangay) and then, within each level, the local government's share in the total population, land area and the number of other local governments in the same level. The total IRA share of local governments increased significantly since 1992 under the government's fiscal decentralization program (Diokno, 2012).
6. For news accounts of this incident see, for example, "Maguindanao Massacre –How it happened" by Matikas Santos, dated November 21, 2014. <http://www.inquirer.net/143183/maguindanao-massacre-how-it-happened>. Or, "Maguindanao Massacre: One Year After" by Ed Lingam, dated December 28, 2010. <http://pcij.org/tag/maguindanao-massacre/>
7. The BCSM, according to the its website, "... was established in 2013 by International Alert UK Philippines Office in partnership with the World bank, with the cooperation of the Mindanao State University System and the Western Mindanao State University." <http://bcms-philippines.info/vers1>. Accessed on February 2, 2016. Starting October 25, 2016 the BCMS is renamed Alert Conflict Monitoring System. <https://conflictalert.info>

8. Municipal-level population projections in ARMM may not be stable due to the displacement or migration arising from violent conflicts.
9. We use the random-effect NB rather than the fixed-effect NB model in STATA since the latter is not a true fixed-effect method in that it only allows for different dispersion parameter across observations and not in the intercept, as is in the true fixed-effect method (Allison and Waterman, 2002). Nonetheless, we interpret our estimates more as correlates than as causal effects because of possible omitted variable bias.
10. It is possible though that it is the incidence in the reference LGU that influences the incidence in its neighbors or that all of them are jointly influenced by an external factor. This problem can be addressed using instrumental variables (Revelli, 2005).
11. It is possible though that these non-ARMM neighbors are the sources of spillovers. However, this issue cannot be pursued here because there is no suitable or comparable conflict data for the non-ARMM LGUs.
12. "Congressperson", henceforth.
13. Alternatively, a variable that indicates the number of years before the next election may be used to test if the conflict incidence follows an election cycles. The advantage though of the year dummy variables used here is that it captures the effects of other year-specific factors as well.

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**Table 1. Socioeconomic and fiscal characteristics of the ARMM provinces**

Characteristics	Basilan	Lanao del Sur	Maguindanao	Sulu	Tawi Tawi
Number of cities	1 City, 11	1 city, 39	36	19	11
municipalities,	municipalities	municipalities	municipalities	municipalities	municipalities,
barangays (as of	210 barangays	1,159	506	410	203
May 1, 2010)		barangays	barangays	barangays	barangays
Land area in 2010, in 1000 km <sup>2</sup> (as % of total Philippines)	3.22 (1.07%)	13.49 (4.50%)	9.73 (3.24%)	3.44 (1.15%)	3.63 (1.21%)
Population, as of May 1, 2010 (as % national)	293,322 (0.32%)	933,260 (1.01%)	944,718 (1.02%)	718,290 (0.78%)	366,550 (0.4%)
Poverty rate among population					
2009	36.6%	56.6%	52.2%	41.6%	35.3%
2012	41.2%	73.8%	63.7%	45.8%	28.6%
Human Development Index					
2009	0.460	0.416	0.300	0.266	0.350
2012	0.419	0.217	0.309	0.303	0.403
Internal Revenue Allocation per capita (in 2006 pesos), province					
2010	13.70	32.63	28.59	17.26	14.31
2011	13.90	33.09	29.01	17.53	14.47
2012	12.84	30.53	26.76	16.17	13.41
2013	12.26	29.85	24.38	15.42	13.17
2014	13.30	32.48	26.53	16.78	14.26
Share of IRA in total revenues, province <sup>a</sup>	95%	96%	96%	97%	97%
Internal Revenue Allocation per capita (in 2006 pesos), all munis. and cities					
2010	22.32	77.51	61.21	32.46	21.96
2011	24.18	75.02	54.12	31.47	22.71
2012	26.16	67.48	54.79	27.61	20.71
2013	23.81	60.37	30.90	21.52	13.05
2014	25.81	67.99	55.14	28.67	20.52
Share of IRA in total revenues, all munis. and cities <sup>a</sup>	95%	96%	91%	96%	94%

Sources: Philippine Statistics Authority, Bureau of Local Government Finance.

<sup>a</sup>Average annual share for the period 2010-2014.

**Table 2. Variable definitions and descriptive statistics (N=400)**

Independent variables	Definition	Mean	Std. Dev.	Min.	Max
Political conflicts	Total incidence of political conflicts	1.388	3.285	0	29
Identity conflicts	Total incidence of identity conflicts	0.925	1.778	0	19
Shadow economy conflicts	Total incidence of shadow economy conflicts	2.265	6.515	0	60
Neighbors' total conflicts	Total incidence of violent conflicts in LGU neighbors	36.96	52.23	0	283
Neighbors' political conflicts	Total incidence of political conflicts in LGU neighbors	5.243	9.200	0	58
Neighbors' identity conflicts	Total incidence of identity conflicts in LGU neighbors	3.123	3.809	0	22
Neighbors' shadow economy conflicts	Total incidence of shadow economy conflicts in LGU neighbors	7.338	12.654	0	70
Neighbors' crime conflicts	Total incidence of crime conflicts in LGU neighbors	5.138	9.597	0	55
Neighbors' governance conflicts	Total incidence of governance conflicts in LGU neighbors	1.723	3.267	0	34
Neighbors' resource conflicts	Total incidence of resource conflicts in LGU neighbors	0.743	1.364	0	8
Neighbors' other conflicts	Total incidence of other conflicts in LGU neighbors	13.650	20.621	0	143
Number of LGU neighbors	Number of LGUs that share physical land border with the reference LGU	3.320	2.147	0	10
Interior LGU	=1 if interior LGU, otherwise	0.520	0.500	0	1
Island LGU	=1 if LGU is an island municipality/city, 0 otherwise	0.140	0.347	0	1
IRA real per capita	Internal revenue allocation, per capita (in 2006 pesos)	19.75	8.39	3.64	60.26
Poverty rate	Poverty rate (2011; same rate for 2012, 2013 and 2014)	53.60	15.47	17.50	84.76
If mayor is re-elected	=1 if mayor was re-elected in the previous election, 0 if not	0.435	9.496	0	1
Mayor and vice mayor are relatives	=1 if mayor and vice mayor are related by blood or marriage, 0 otherwise	0.340	0.474	0	1
Mayor and congressperson are relatives	=1 if mayor and congressperson are related by blood or marriage, 0 otherwise	0.105	0.307	0	1
Mayor and governor are relatives	=1 if mayor and governor are related by blood or marriage, 0 otherwise	0.065	0.247	0	1
City	=1 if city, 0 otherwise	0.040	0.196	0	1
Cotabato City	=1 if Cotabato City, 0 otherwise	0.010	0.100	0	1
Isabela City	=1 if Isabela City, 0 otherwise	0.010	0.100	0	1
Provincial capital	=1 if LGU is the provincial capital, 0 otherwise	0.040	0.196	0	1
Basilan	=1 if province is Basilan, 0 otherwise	0.090	0.287	0	1
Tawi Tawi	=1 if province is Tawi Tawi, 0 otherwise	0.110	0.313	0	1
Sulu	=1 if province is Sulu, 0 otherwise	0.180	0.385	0	1
Lanao del Sur	=1 if province is Lanao del Sur, 0 otherwise	0.400	0.491	0	1
Year 2012	1 if year is 2012, 0 otherwise	0.250	0.434	0	1
Year 2013	1 if year is 2013, 0 otherwise	0.250	0.434	0	1
Year 2014	1 if year is 2014, 0 otherwise	0.250	0.434	0	1

**Table 3. Marginal effects of the correlates of political conflicts**

Independent variables	NB2		NB1		Random-effect panel NB	
	[1]	[2]	[3]	[4]	[5]	[6]
Neighbors' total conflicts	0.007** (0.004)		0.006* (0.004)		0.006*** (0.002)	
Neighbors' political conflicts		0.034 (0.021)		0.009 (0.021)		0.024** (0.011)
Neighbors' identity conflicts		-0.130** (0.065)		-0.057 (0.061)		0.001 (0.033)
Neighbors' shadow economy conflicts		0.048** (0.024)		0.044 (0.030)		0.020* (0.012)
Neighbors' crime conflicts		-0.007 (0.031)		0.007 (0.044)		0.0005 (0.013)
Neighbors' governance conflicts		-0.026 (0.033)		-0.005 (0.038)		0.001 (0.023)
Neighbors' resource conflicts		-0.002 (0.097)		0.017 (0.088)		0.031 (0.052)
Neighbors' other conflicts		-0.001 (0.013)		-0.017 (0.018)		-0.009 (0.010)
Number of LGU neighbors	0.247** (0.112)	0.314** (0.123)	0.181* (0.104)	0.265* (0.140)	0.085 (0.069)	0.103 (0.073)
Interior LGU	1.142 (0.810)	0.378 (0.781)	1.000 (0.662)	0.407 (0.701)	0.557 (0.441)	0.185 (0.434)
Island LGU	-1.962** (0.930)	-1.565** (0.784)	-1.354* (0.763)	-1.218* (0.682)	-1.171** (0.522)	-1.033* (0.529)
IRA real per capita	-0.041 (0.026)	-0.041 (0.027)	-0.030 (0.027)	-0.027 (0.026)	-0.020 (0.017)	-0.018 (0.017)
Poverty rate	0.025** (0.013)	0.019 (0.014)	0.021 (0.014)	0.018 (0.019)	0.017* (0.010)	0.016 (0.010)
If mayor is re-elected	-0.098 (0.322)	-0.315 (0.294)	-0.083 (0.291)	-0.198 (0.342)	-0.103 (0.172)	-0.149 (0.174)
Mayor and vice mayor are relatives	-0.540 (0.377)	-0.390 (0.342)	-0.175 (0.321)	-0.132 (0.354)	-0.009 (0.189)	0.031 (0.194)
Mayor and congressperson are relatives	0.044 (0.483)	0.051 (0.472)	0.049 (0.511)	0.040 (0.528)	-0.547* (0.298)	-0.586* (0.319)
Mayor and governor are relatives	-1.187** (0.568)	-0.944* (0.564)	-1.249** (0.494)	-1.391** (0.561)	-0.634 (0.526)	-0.736 (0.531)
City	0.862 (0.784)	0.749 (0.820)	0.549 (0.499)	0.396 (0.665)	0.601 (0.632)	0.444 (0.657)
Cotabato City	2.477** (1.100)	2.349** (1.140)	2.881*** (0.912)	2.604* (1.461)	2.110** (1.043)	1.947* (1.106)
Isabela City	-1.302 (0.915)	-1.802* (1.061)	-0.700 (0.710)	-0.226 (0.989)	-1.433 (1.106)	-1.068 (1.140)
Provincial capital	2.094** (1.005)	2.332** (0.982)	1.891*** (0.534)	1.939*** (0.568)	1.789*** (0.581)	1.799*** (0.600)
Basilan	1.835** (0.725)	1.441* (0.750)	1.888*** (0.651)	1.666 (1.026)	1.349*** (0.512)	0.972* (0.542)
Tawi Tawi	-2.051* (1.074)	-3.151** (1.241)	-1.169 (0.874)	-2.069* (1.168)	-1.337* (0.783)	-1.744** (0.782)
Sulu	1.306 (0.882)	0.033 (0.852)	0.983 (0.721)	0.083 (0.990)	0.517 (0.488)	0.007 (0.511)
Lanao del Sur	-3.226*** (0.750)	-3.136*** (0.706)	-2.341*** (0.659)	-2.555*** (0.700)	-1.775*** (0.306)	-1.814*** (0.321)
Year 2012	-0.220 (0.326)	0.057 (0.369)	-0.140 (0.284)	-0.111 (0.345)	-0.152 (0.211)	-0.031 (0.224)
Year 2013	0.555* (0.333)	0.087** (0.388)	0.356 (0.318)	0.466 (0.372)	0.233 (0.203)	0.401* (0.219)
Year 2014	-0.154 (0.330)	0.421 (0.404)	-0.460 (0.423)	-0.090 (0.573)	-0.404* (0.228)	-0.106 (0.261)
No. of obs.	400	400	400	400	400	400
No. of groups					100	100
Log pseudolikelihood	-463.27	-453.959	-468.684	-463.919	-449.707	-445.924
Pseudo R-squared	0.2017	0.2177	0.1924	0.2006		
Wald chi-squared					150.22	162.32
Prob> chi-squared					0.000	0.000
Likelihood-ratio test <sup>a</sup>					37.95	35.99
Prob> chi-squared					0.000	0.000

Note: Figures in parentheses under columns [1]-[2] are robust standard errors adjusted for municipality-level clusters. Figures in parentheses under columns [5] and [6] are standard errors computed based the observed information matrix.

<sup>a</sup>Likelihood ratio test of panel estimator vs. pooled estimator (i.e., NB1 model)r.

\*\*\*p<0.01, \*\*p<0.05, \*p<0.10

**Table 4. Marginal effects of the correlates of identity conflicts**

Independent variables	NB2		NB1		Random-effect panel NB	
	[1]	[2]	[3]	[4]	[5]	[6]
Neighbors' total conflicts	-0.002 (0.001)		-0.0008 0.002		-0.001 (0.002)	
Neighbors' political conflicts		-0.031** (0.014)		-0.026** (0.012)		-0.028** (0.012)
Neighbors' identity conflicts		-0.001 (0.032)		-0.016 (0.027)		-0.018 (0.026)
Neighbors' shadow economy conflicts		0.017* (0.009)		0.018* (0.010)		0.020* (0.011)
Neighbors' crime conflicts		-0.009 (0.012)		-0.014 (0.013)		-0.015 (0.014)
Neighbors' governance conflicts		-0.010 (0.019)		-0.022 (0.015)		-0.024 (0.023)
Neighbors' resource conflicts		0.049 (0.071)		0.048 (0.064)		0.051 (0.064)
Neighbors' other conflicts		-0.008 (0.007)		0.0001 (0.006)		0.0001 (0.007)
Number of LGU neighbors	0.101** (0.051)	0.128** (0.056)	0.074 (0.054)	0.098 (0.060)	0.073 (0.059)	0.106* (0.058)
Interior LGU	-0.726*** (0.262)	-0.732*** (0.267)	-0.657*** (0.235)	-0.676*** (0.259)	-0.725*** (0.269)	-0.731*** (0.237)
Island LGU	-0.431 (0.380)	-0.506 (0.373)	-0.345 (0.453)	-0.417 (0.410)	-0.527 (0.447)	-0.451 (0.408)
IRA real per capita	-0.047*** (0.018)	-0.045*** (0.017)	-0.031** (0.014)	-0.031** (0.015)	-0.028** (0.013)	-0.034*** (0.012)
Poverty rate	-0.016* (0.008)	-0.015* (0.008)	-0.023** (0.009)	-0.022** (0.009)	-0.024*** (0.009)	-0.024*** (0.009)
If mayor is re-elected	-0.289* (0.150)	-0.299* (0.154)	-0.319** (0.143)	-0.288* (0.148)	-0.349** (0.162)	-0.311* (0.158)
Mayor and vice mayor are relatives	-0.147 (0.182)	-1.124 (0.182)	0.055 (0.166)	0.062 (0.170)	0.034 (0.175)	0.067 (0.161)
Mayor and congressperson are relatives	0.450 (0.295)	0.471 (0.288)	0.474 (0.302)	0.509* (0.300)	0.485* (0.260)	0.550** (0.226)
Mayor and governor are relatives	-0.512 (0.407)	-0.589 (0.364)	-0.717 (0.450)	-0.703* (0.426)	-0.765 (0.501)	-0.760 (0.469)
City	1.411** (0.708)	1.654*** (0.561)	0.851* (0.437)	1.257*** (0.447)	1.187** (0.556)	1.359*** (0.418)
Cotabato City	0.684 (0.765)	-1.028 (0.667)	0.002 (0.492)	-0.500 (0.542)	-0.291 (0.829)	-0.541 (0.572)
Isabela City	-1.226* (0.650)	-0.987* (0.596)	-0.951 (0.690)	-1.095* (0.632)	-1.018 (0.958)	-1.184* (0.802)
Provincial capital	-0.014 (0.669)	-0.107 (0.565)	0.647 (0.514)	0.456 (0.467)	0.396 (0.559)	0.493 (0.433)
Basilan	-0.076 (0.327)	0.191 (0.349)	-0.265 (0.284)	0.041 (0.298)	-0.274 (0.395)	0.044 (0.351)
Tawi Tawi	-2.106*** (0.534)	-2.205*** (0.520)	-2.108*** (0.576)	-2.139*** (0.532)	-2.161*** (0.593)	-2.312*** (0.557)
Sulu	-1.224*** (0.394)	-1.226*** (0.398)	-1.032*** (0.388)	-1.005*** (0.374)	-1.034*** (0.380)	-1.086*** (0.374)
Lanao del Sur	0.0005 (0.247)	-0.213 (0.262)	0.089 (0.274)	-0.043 (0.291)	0.034 (0.248)	-0.047 (0.238)
Year 2012	-0.490* (0.282)	-0.487* (0.259)	-0.227 (0.273)	-0.297 (0.267)	-0.256 (0.266)	-0.321 (0.268)
Year 2013	-0.107 (0.251)	-0.091 (0.249)	0.073 (0.237)	-0.018 (0.242)	0.085 (0.253)	-0.019 (0.266)
Year 2014	0.666*** (0.214)	0.581*** (0.222)	0.841*** (0.195)	0.700*** (0.207)	0.908*** (0.231)	0.756*** (0.252)
No. of obs.	400	400	400	400	400	400
No. of groups					100	100
Log pseudolikelihood	-452.427	-448.607	-449.394	-444.798	-448.402	-444.798
Pseudo R-squared	0.1278	0.1351	0.1336	0.1425		
Wald chi-squared					128.21	232.70
Prob> chi-squared					0.000	0.000
Likelihood-ratio test <sup>a</sup>					1.98	0.00
Prob> chi-squared					0.080	1.00

Note: Figures in parentheses under columns [1]-[4] are robust standard errors adjusted for municipality-level clusters. Figures in parentheses under columns [5] and [6] are standard errors computed based the observed information matrix.

<sup>a</sup>Likelihood ratio test of panel estimator vs. pooled estimator (i.e., NB1 model).

\*\*\* $p < 0.01$ , \*\* $p < 0.05$ , \* $p < 0.10$

**Table 5. Marginal effects of the correlates of shadow economy conflicts**

Independent variables	NB2		NB1		Random-effect panel NB	
	[1]	[2]	[3]	[4]	[5]	[6]
Neighbors' total conflicts	0.020** (0.009)		0.012** (0.005)		0.004** (0.002)	
Neighbors' political conflicts		0.039 (0.038)		0.027 (0.023)		0.010 (0.009)
Neighbors' identity conflicts		0.107 (0.089)		0.038 (0.091)		0.020 (0.028)
Neighbors' shadow economy conflicts		0.089** (0.040)		0.038 (0.032)		-0.007 (0.012)
Neighbors' crime conflicts		-0.010 (0.041)		-0.004 (0.032)		0.011 (0.011)
Neighbors' governance conflicts		-0.106 (0.073)		-0.059 (0.066)		-0.015 (0.019)
Neighbors' resource conflicts		0.110 (0.155)		0.075 (0.109)		-0.030 (0.049)
Neighbors' other conflicts		-0.012 (0.026)		0.007 (0.021)		0.011 (0.008)
Number of LGU neighbors	-0.134 (0.203)	-0.089 (0.213)	-0.013 (0.145)	-0.013 (0.154)	-0.030 (0.079)	-0.054 (0.085)
Interior LGU	-1.749* (0.985)	-2.111** (0.959)	-1.023 (0.742)	-1.267* (0.683)	-0.263* (0.400)	-0.221 (0.430)
Island LGU	-3.276* (1.682)	-2.664 (1.739)	-2.289* (1.226)	-2.003 (1.261)	-0.911* (0.531)	-1.002* (0.560)
IRA real per capita	-0.179** (0.073)	-0.183** (0.076)	-0.052 (0.054)	-0.054 (0.053)	-0.012 (0.016)	-0.008 (0.018)
Poverty rate	0.027 (0.027)	0.026 (0.028)	0.030 (0.022)	0.027 (0.023)	0.022** (0.009)	0.023** (0.009)
If mayor is re-elected	0.429 (0.506)	0.402 (0.508)	-0.070 (0.434)	-0.149 (0.452)	0.008 (0.166)	-0.007 (0.164)
Mayor and vice mayor are relatives	-0.449 (0.677)	-0.297 (0.659)	0.084 (0.458)	0.245 (0.451)	0.301* (0.171)	0.361** (0.178)
Mayor and congressperson are relatives	0.988 (0.902)	1.007 (0.908)	0.283 (0.747)	0.355 (0.762)	-0.246 (0.328)	-0.296 (0.334)
Mayor and governor are relatives	-3.393** (1.168)	-3.477*** (1.167)	-1.624* (0.841)	-1.641* (0.842)	-0.348 (0.521)	-0.278 (0.539)
City	5.809*** (2.163)	5.923*** (2.267)	3.465*** (0.966)	3.418*** (1.102)	1.643** (0.764)	1.443* (0.821)
Cotabato City	1.088 (1.799)	0.791 (1.823)	3.139*** (1.065)	2.668** (1.228)	0.846 (1.255)	1.081 (1.386)
Isabela City	-3.307 (2.296)	-3.381 (2.398)	-2.966** (1.479)	-3.032** (1.456)	-1.715 (1.306)	-1.891 (1.412)
Provincial capital	6.077*** (1.780)	6.503*** (1.936)	5.617*** (0.674)	5.794*** (0.627)	2.871*** (0.660)	3.159*** (0.706)
Basilan	0.132 (1.515)	0.085 (1.409)	0.496 (0.957)	0.136 (1.090)	0.719 (0.570)	0.619 (0.622)
Tawi Tawi	-1.292 (1.652)	-2.021 (1.821)	0.143 (1.048)	-0.224 (1.136)	0.037 (0.622)	0.165 (0.677)
Sulu	-0.604 (1.472)	-1.583 (1.667)	0.099 (0.966)	-0.382 (1.050)	0.114 (0.501)	0.371 (0.569)
Lanao del Sur	-1.165 (0.720)	-1.672* (0.883)	-1.122 (0.730)	-1.180 (0.832)	-0.503 (0.322)	-0.479 (0.353)
Year 2012	-1.664*** (0.615)	-1.604** (0.686)	-1.869*** (0.672)	-1.835*** (0.683)	-0.963*** (0.223)	-0.979*** (0.234)
Year 2013	0.055 (0.570)	0.236 (0.622)	-0.596 (0.575)	-0.571 (0.563)	-0.506** (0.201)	-0.547** (0.215)
Year 2014	1.278** (0.605)	1.282* (0.673)	0.302 (0.663)	0.323 (0.628)	-0.020 (0.184)	-0.078 (0.213)
No. of obs.	400	400	400		400	400
No. of groups					100	100
Log pseudolikelihood	-519.611	-516.085	-522.845	-520.779	-509.712	-506.430
Pseudo R-squared	0.2012	0.2066	0.1962	0.1994		
Wald chi-squared					181.45	189.76
Prob> chi-squared					0.000	0.000
Likelihood-ratio test <sup>a</sup>					26.26	28.70
Prob> chi-squared					0.000	0.000

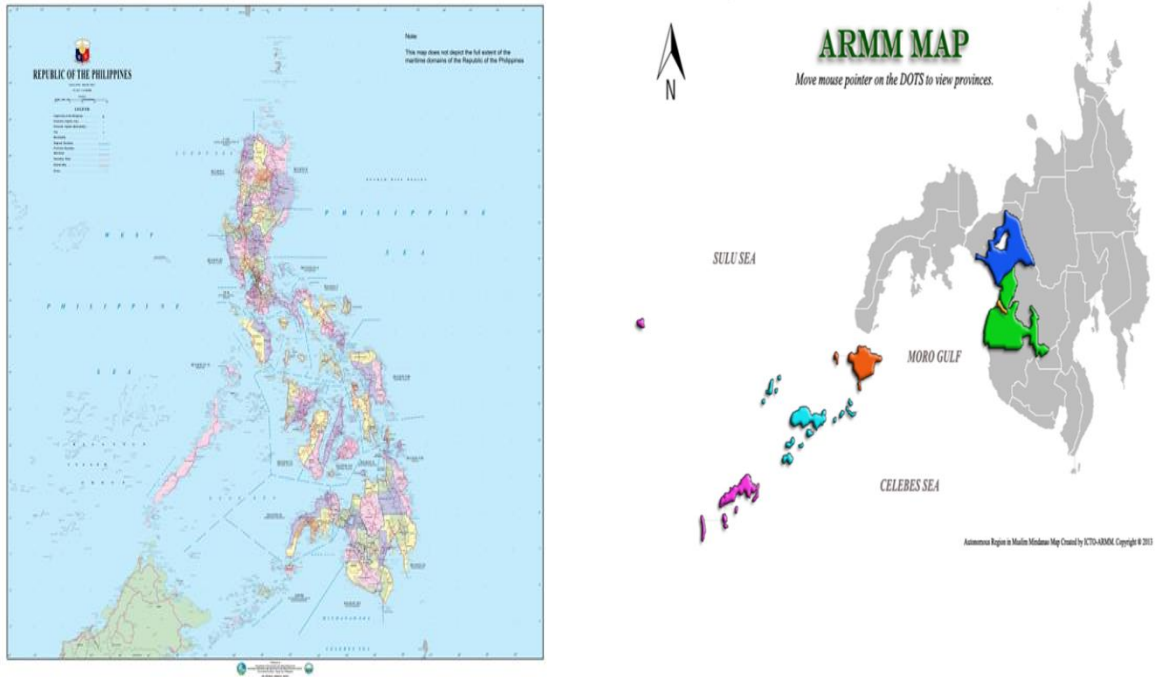
Note: Figures in parentheses under columns [1]-[4] are robust standard errors adjusted for municipality-level clusters. Figures in parentheses under columns [5] and [6] are standard errors computed based the observed information matrix.

<sup>a</sup>Likelihood ratio test of panel estimator vs. pooled estimator (i.e., NB1 model).

\*\*\* $p < 0.01$ , \*\* $p < 0.05$ , \* $p < 0.10$

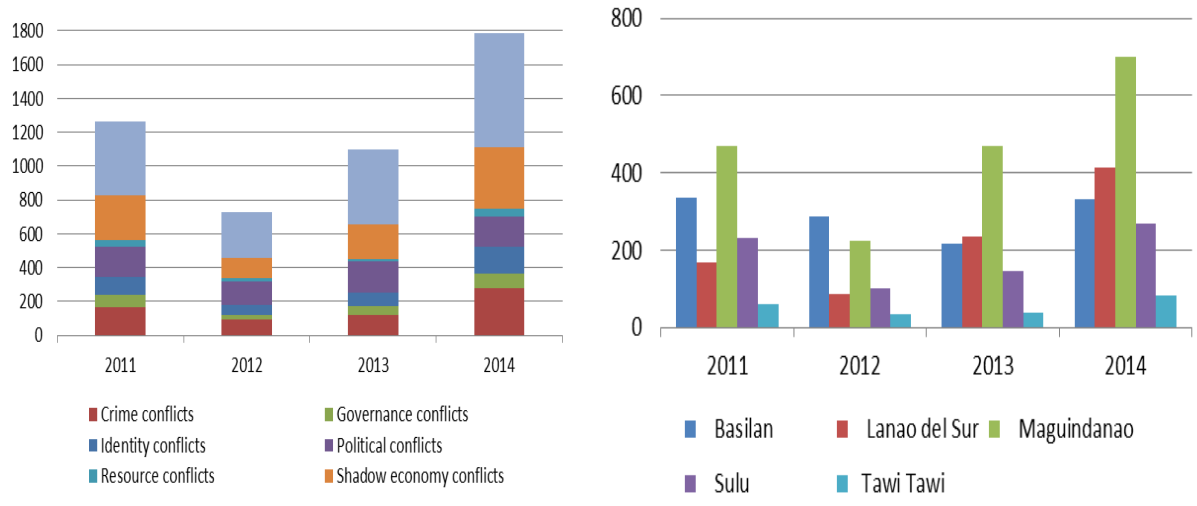


**Figure 1. Maps of the Philippines and the Autonomous Region of Muslim Mindanao**



Sources of maps: National Mapping and Resource Information Authority (<http://www.namria.gov.ph/download.php>), Autonomous Region of Muslim Mindanao (<http://www.armm.gov.ph/armm-map/>)

**Figure 2. Number of violent conflicts, 2011-2014**

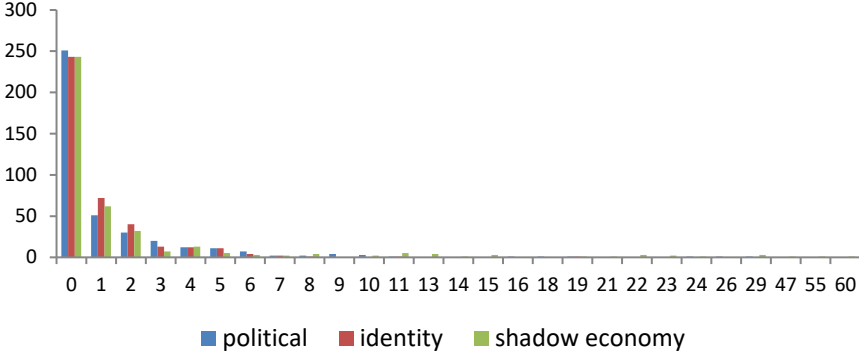


(a) By cause

(b) By province

Source of raw data: BCMS.

**Figure 3. Frequency distributions of the incidence of violent conflicts**



## Appendix 1. Classification of violent conflicts

Classification	Definition
Extrajudicial crime/popular justice	Pertain to violent conflict triggered by cases of robbery, rape and damage to properties. They also include cases of domestic violence, sexual indiscretion and slander.
Governance issues	Pertain to violent competitions for government resources and rents, including conflicts associated with bidding processes and other government related transactions. They also include violence associated with government development projects.
Identity issues	Pertain to violence arising from inter- and intra-ethnic and tribal identities, violent struggles between and among families and clans, including violence emanating from gender differences and racial and religious tensions. The category includes cases of violence arising from honour (maratabat) issues.
Political issues	Pertain separatist or non-separatist armed challenges against the State (vertical); violence emanating from political (electoral) competition, abuse of power and authority or political repression, and violent struggles between rival insurgent groups or factions for politico-military influence and control (horizontal). This category also includes violent power struggles among mainstream political parties, tribal leaders and indigenous authorities.
Resource issues	Pertain to conflict over ownership, utilisation, and control of land and other natural resources, including "lootable" resources such as gems and "nonlootable" resources such as water, oil, and gas, including violent business competition. All cases of violence associated with land are included in this category.
Shadow economy issues	Pertain mainly to conflict emanating from the illicit or underground economies of Mindanao. In particular, the production and trade of illicit guns and drugs; kidnap for ransom; cattle rustling; and smuggling. They include violent conflict from illegal gambling, human trafficking and pyramiding scams.
Others	Undetermined

Source: Bangsamoro Conflict Monitoring System.

## Appendix 2. Test of the goodness of fit of the Poisson model

Dependent variable (model)	Deviance goodness-of-fit <sup>a</sup>	Pearson goodness-of-fit <sup>a</sup>
Political conflicts <sup>b</sup>	715.11 (0.000)	999.43 (0.000)
Political conflicts <sup>c</sup>	661.93 (0.000)	825.98 (0.000)
Identity conflicts <sup>b</sup>	553.98 (0.000)	628.22 (0.000)
Identity conflicts <sup>c</sup>	537.93 (0.000)	603.25 (0.000)
Shadow economy conflicts <sup>b</sup>	819.45 (0.000)	985.70 (0.000)
Shadow economy conflicts <sup>c</sup>	807.92 (0.000)	965.92 (0.000)

<sup>a</sup>The figures in parantheses are  $\text{prob} > \chi^2$ .

<sup>b</sup>The covariates are neighbors' total conflicts, number of LGU neighbors, interior LGU, island LGU, IRA real per capita, poverty rate, if mayor is re-elected, mayor and vice mayor are relatives, mayor and congressperson are relatives, mayor and governor are relatives, city, Cotabato City, Isabela City, provincial capital, Basilan, Tawi Tawi, Sulu, Lanao del Sur, Year 2012, Year 2013, and Year 2014.

<sup>c</sup>The covariates are neighbors' political conflicts, neighbors' identity conflicts, neighbors' shadow economy conflicts, neighbors' crime conflicts, neighbors' governance conflicts, neighbors' resource conflicts, neighbors' other conflicts, number of LGU neighbors, interior LGU, island LGU, IRA real per capita, poverty rate, if mayor is re-elected, mayor and vice mayor are relatives, mayor and congressperson are relatives, mayor and governor are relatives, city, Cotabato City, Isabela City, provincial capital, Basilan, Tawi Tawi, Sulu, Lanao del Sur, Year 2012, Year 2013, and Year 2014.