Fuelling Rebellion
Maritime Piracy and the Duration of Civil War[1]

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Abstract

Studies in the past suggest that resource wealth helps fund rebel movements, and that strength of a rebel group influences how long armed conflict might last. Yet, association among these three variables—resources, rebel strength and conflict duration—remains unclear. Lootable resources are found to lengthen civil wars while rebel strength has the opposite effect. If resources increase the fighting ability of rebels then why do they not shorten conflicts? To understand this relationship, we study incidents of maritime piracy, which unlike other resources, are more clearly exploited by rebel groups rather than the state, and offer new insight on how this might affect the persistence of civil war. We argue that the effect of piracy on conflict duration is conditional upon the strength of rebel groups. As evidence, we first construct an index that captures the intensity of piracy, and thus resource extraction, across countries and over time. We then present a test of the relationship between piracy, rebel strength and conflict duration. The findings suggest that use of piracy by weaker rebel groups shortens conflict but prolongs it when exploited by stronger rebel groups. We think our conditional analyses allow us to discern insurgencies driven at least in part by greedy rebels and therefore better illuminate the causal process by which resource wealth prolongs civil war.

Introduction

Civil wars last longer than they used to (Collier et al. 2003; Fearon 2004).[2] Perhaps this reflects a change in how states respond to insurgencies. More plausibly this is because rebels are no longer constrained by their former superpower patrons. Now, local resources provide the means with which to support an insurgency. The illicit selling of diamonds in Sierra Leone and timber in Cambodia supply rebel leaders with the independent ability to pay fighters, purchase weapons, and procure other needed materials. Acquiring resources, then, enables rebel survival and thus motivates both insurgents and the government. When coupled with difficult terrain and distance from state power, rebel movements are difficult to suppress.

Evidence increasingly ties lootable resources to the duration of armed civil conflict. Fearon (2004), for example, finds contraband-funded wars to last 2.6 times longer than other wars while Lujala (2010) observes extractable resources located within conflict zones to increase conflict length by over 100%. Still, scholarly differences persist as to the exact causal impact such resources have on rebellion. Indeed, lootable resources can affect conflict through several underlying mechanisms. But two rebel-centered processes concern us here. First, as we have already noted, resource wealth helps fund rebel movements. And, since rebel capabilities shape conflict outcomes, access to resource wealth improves an insurgent's chances of victory (Buhaug, Gates, and Lujala 2009).[3] Second, the uneven distribution of resource wealth produces grievance, which then motivates rebellion. State resource development and extraction that degrades the local environment and transfers wealth inequitably legitimates insurgent efforts directed against government forces. Conflicts last longer as both sides seek control over valuable resources.

Existing data used to test theoretical conjectures on the relationship between lootable resources and conflict struggle to distinguish one explanation from the other. Oil wealth, for instance, plausibly associates with both grievance and rebel financing. In the Niger Delta, petroleum extraction has polluted waterways, damaged aquatic ecosystems, and endangered local communities. Moreover, the wealth derived from oil and gas production in Nigeria does not flow to residents of the Delta but appears to enrich the coffers of multinational corporations and elites in Lagos and Abuja. The bunkering of oil can also enrich insurgents, supporting their anti-state campaigns. Rebellions in and around the Delta are seemingly driven, then, by both resource inequity and illicit insurgent appropriation. What's needed is a lootable resource that credibly captures financing but not grievance. Wealth derived from maritime piracy seemingly offers just such a resource.[4] Attacks against ships deliver goods that rebels can trade for critical supplies and cash.

Rebellions also may change over time. What began as a movement contesting injustice and discrimination evolves into a profitable enterprise centered on the illicit production and trading of existing and accessible resources. Funds derived from lootable resources are still used to supply and compensate rebel fighters to ensure a persistent and effective fighting force. But funds also flow into the strongboxes of rebel leaders. Rebellion transitions from grievance to

[2] Fearon (2004) concludes that separatist and resource-driven rebellions are difficult to end. Today, these types of conflicts constitute a larger share of ongoing civil wars.

[3] Interestingly, as we discuss further below, rebel strength associates with shorter conflicts and not longer ones.

[4] Distinguishing grievance-and greed-based explanations is challenging empirically, in particular for cross-national analyses, but also in subnational research designs, as Eck (2015) illustrates. Piracy attacks could potentially also induce grievances if loot from piracy is unevenly distributed, or if piracy imposes costs on other economic activity, such as fishing.

greed. That is, rebel leaders have a financial incentive for continued fighting and despite possessing the bargaining leverage to resolve and settle conflict they refuse to relinquish the resource prize.

We offer several advances on existing research and shed new light on rebel-centered explanations for insurgency. Theoretically, we see revenue from maritime piracy more clearly exploited by rebel groups rather than the state and consequently our research offers new insight into the persistence of civil war.[5] We argue that piracy affects conflict duration, but that the effect is conditional upon the strength of rebel groups. Empirically, we present a test of the relationship between resource wealth and conflict duration that uses an unexploited rebel revenue source. Data on maritime pirate attacks vary both spatially and temporally, unlike information on alternative resources, such as diamonds, timber, and hydrocarbons. The finer data detail permits greater leverage in explaining civil war duration. Our study explores the interaction of lootable resources and rebel strength. Past studies indicate that lootable resources lengthen civil war while rebel strength has the opposite effect. If resources increase the fighting ability of rebels then why do they not shorten conflicts? We think our conditional analyses allow us to discern insurgencies driven at least in part by greedy rebels and therefore better illuminate the causal process by which resource wealth prolongs civil war. Finally, we create a lootable resource measure centered on maritime piracy. Rather than a simple count of attacks, we construct an index that captures the intensity of piracy, and thus resource extraction, across countries and over time.

We begin by reviewing extant research on the relationship between resources and armed civil conflict, focusing especially on rebel-centered causal explanations. We then describe how maritime piracy can function as a funding arm of rebel groups and provide several examples. Next, we define our data and methods. Finally, we present our empirical results and offer some concluding thoughts. Our analyses corroborate previous work that shows resource wealth associated with longer conflicts and rebel strength associated with shorter conflicts. But we also observe longer conflicts when strong rebels have access to lootable resources. We think this finding is consistent with greed-driven rebellion.

Rebels, Resources, and Rebellion

Civil war, while admittedly rare, has become the most prevalent type of state-based conflict we see in the international system (Erik Melander, Therése Pettersson & Lotta Themnér, 2016). In 2015, 49 of the 50 armed conflicts on-going were intra-state in orientation (India-Pakistan being the single exception). Much has been written on the underlying factors driving the onset of these insurgencies, such as poverty, political instability, ethnic polarization, terrain, and regime type (e.g., Collier and Hoeffler 2004; Fearon 2004; Hegre and Sambanis 2006; Fearon and Laitin 2003; Ross 2012; Le Billon 2013). Less research has focused on the duration of rebellion and the conditions sustaining rebel movements over time. However, resources appear to play an important supporting role.

Civil wars create commitment problems that are difficult to resolve. Deep mistrust characterizes the conflict and the state frequently has an incentive to renege on any negotiated outcome that leaves rebel groups intact. Rebels clearly recognize their precarious position and seek security concessions that guarantee their survival. Of course, rebel-fighting ability shapes government decision-making as well. Strong rebels possess bargaining leverage and therefore

[5] Piracy could affect the state's ability to protect against insurgency because it demonstrates an inability or unwillingness to eliminate criminal activity. We therefore control for state capacity in empirical models.

have the ability to either obtain concessions from government negotiators or achieve victory on the battlefield. Weak rebels, in contrast, must fight longer and harder since victory cannot come easily or quickly and government leaders see no reason to bargain.[6] Both Buhaug et al (2009) and Bagozzi (2014) find rebel strength associated with shorter conflicts.

Lootable resources, in contrast to rebel strength, appear to lengthen civil war, although perhaps only when the resources are located within the conflict zone (Fearon 2004; Buhaug et al 2009). Still, it's a bit unclear why and how they do so. On the one hand, lootable resources improve the financial position of insurgents, tipping the relative balance of material capabilities from the state to an armed group. Such local resources provide insurgents with necessary assets to build larger and more committed fighting forces, which according to Buhaug, Gates, and Lujala (2009), should produce a negotiated settlement. On the other hand, extractable resources enable rebels to survive and profits from the sale of illicit goods presumably incentivizes continued rebellion. Neither side in a civil conflict sees resource division as a viable solution to the quarrel. The state fears legitimizing efforts to seize a country's natural resources and rebels see concessions eroding their ability to fight (Rustad and Binningsbo 2012). More durable conflicts are the result.[7]

The conflicting effects rebel strength and lootable resources have on conflict duration present a puzzle. If resources enhance rebel strength, then why do they not facilitate settlement through more efficient bargaining? Likewise, government forces should crush rebels that lack resources producing shorter conflicts rather than longer ones. Perhaps, as Le Billon (2013) argues, the lootability of a resource plays a role in shortening or extending conflict. Alluvial diamonds and the illicit production of narcotics provide resources that can be easily extracted and transformed into usable currency or traded for critical supplies. Rebels with access to, or control over, such resources seemingly possess bargaining leverage with government leaders. Oil wealth, in contrast, requires extensive infrastructure to access and is therefore seen as less lootable than other resources.[8] Consequently, the benefits of oil wealth are less consistent for rebels. Indeed, the resource is more difficult to obtain and not as easily converted to usable revenue (Le Billon 2013, 74). Control over oil wealth, then, since it is more precarious and uncertain, frustrates bargaining, resulting in longer and more costly conflicts.[9]

Alternatively, some rebellions may simply transition from grievance to avarice. Collier has popularized the notion of rebellion as organized crime. The revenue generated through illicit economic activities enriches rebel leaders and inhibits settlement, which seemingly describes rebellions in Congo-Brazzaville, Colombia, and Liberia. Charles Taylor, for example, during his time as warlord and president is rumored to have pocketed billions of dollars from Liberia's resource wealth in diamonds, timber, rubber, and iron ore (NY Times May 30, 2010). It's not that greed drives rebellion onset. Collier et al (2003, 79) admit as much when they write: "most entrepreneurs of violence have essentially political objectives, and presumably initially undertake criminal activities only as a grim necessity to raise finance." But, conflict may persist long after it could have ended because rebel leaders profit personally from continued fighting.

[6] Conceivably governments do not see weak rebels as a real challenge and thus the persistence of political conflict reflects government inaction.

[7] Le Billon (2013, 33) relates an account by a Neur fighter in the Sudan whereby once rebels discovered oil wealth under their land, they would fight much longer. Is the effect of oil, then, to lengthen conflict by forestalling negotiations or does rebel control of oil wealth send a signal of material strength that facilitates cooperation?

[8] Watts (2007) challenges the argument that oil wealth is less lootable than other types of resources.

[9] Ross (2012, 6) insists "revenue instability aggravates regional conflicts, making it harder for governments and rebels to settle their differences."

Empirical evidence shows gemstones and hydrocarbons within the conflict zone to prolong civil wars (Lujala 2010). However, as noted previously, rebel access to resources could either signal greed or grievance and thus the direct effect of resources on conflict duration remains over-determined.

To be sure, rebel exploitation of valuable natural resources runs the risk of squandering local support (Le Billon 2013). It's one thing for resources to fund the material requirements of insurgency. It is likely quite another for rebel leaders to benefit individually from resource arrogation. Both the state and insurgents battle for popular support. The unfair allocation of resource wealth motivates dissent and rebellion, rendering insurgency legitimate and justifiable. Rebels that behave as mere thieves show themselves to be no different from the governing elites that unjustly distributed the benefits of resource wealth in the first place (Le Billon 2013). Yet, once again, the effects of resource control remain contradictory. Rebels that share resource wealth widely retain popular support, which increases bargaining leverage leading to negotiated settlements and shorter conflicts. Rebels that hoard resources presumably alienate local communities, driving them politically towards the government. Weaker rebels associate with longer conflicts but fortifying state power should only decrease the chances of rebel victory.

We think the effect of resource wealth on civil war duration flows through, or is conditional on, rebel strength. Strong rebels with access to resources derived from maritime piracy fight longer wars. Pirate attacks provide sizable financial gains that incentivize continued rebellion. Since strong rebels possess the bargaining leverage to settle conflicts with governing elites, the failure to do so suggests unwillingness rather than inability. Greed sustains the conflict. Further, rebel weakness facilitates longer civil wars because government leaders do not see such movements as viable political challenges to regime authority. However, weak rebels that engage in piracy elicit government attention. That is, piracy imposes financial and reputational costs on the state, which increases the salience of the rebel movement. The result is increased government effort to suppress the rebellion.

Piracy as a Rebel Resource

We see two possible links between piracy and rebels. Rebels can themselves use piracy to support their operations, or alternatively, develop mutually beneficial connections with pirate organizations. We present empirical illustrations to help document the use of piracy as a tactic to procure resources for insurgency.[10] For example, the Movement for the Emancipation of the Niger Delta (MEND) has carried attacks against off-shore oil facilities as a way to raise funds for rebel leaders (Rinkel, 2015). Rebels demanded sizeable ransoms for kidnapped oil company employees and this tactic resulted in large payoffs to Delta militants (Kamal-Deen, 2015). Oil bunkering has also become a fundraising method for Nigerian rebels (Brock, 2013). Indeed, since 2010, pirates have siphoned approximately $100 million from tankers passing through the Gulf of Guinea.

Reports of connections between militants and pirates in Somalia and Southeast Asia also appear credible. "There is an increasing nexus between pirate organizations, al-Shabaab, and AQAM, Alexander (2013: 69) writes. "It is known that funding from ransom is used to assist in

[10] We do not claim that piracy is a plausible form of revenue generation for all rebel groups, but rather should be used primarily by groups controlling territory in the proximity of coastlines. In empirical models, we present specifications in which we include only conflicts within a 100km of the coast. Our results hold for these conflicts but not those at greater distance (models 5 and 6).

financing terrorist organizations." Tsvetkova (2009: 49) agrees and concludes that ransom payments made to Somali pirates found there way to al-Shabaab. Haradheere was a known pirate den at the height of the Somali piracy epidemic, which was seized by al-Shabaab militants in 2010. Supposedly a 20% cut on all ransoms was negotiated by al Shabaab elites (Kambere, 2012). Pirate groups operating in Southeast Asia adopted similar tactics (Kemp, 2014; Liss, 2014). Liss (2014), for example, notes pirate attacks by insurgent groups like Abu Sayyaf and the Moro Islamic Liberation Front in the Philippines, and Hastings (2012: 689) reports Aceh militants directly engaging in kidnappings for ransom.

Rebels require resources to fund their insurgent activities, such as paying fighters, buying weapons, and retaining civilian loyalties. Piracy certainly represents a viable strategy for many militant groups to raise such critical capital. Hijacking cargo ships or siphoning oil from seized tankers can produce payoffs in excess of several million U.S. dollars (UNODC, 2013). In fact, the petroleum cargo from one seizure in the Malacca Straits in 2014 was worth nearly $2 million U.S. dollars. Simpler attacks at port, which are more common, typically involve petty theft of ship-stores and equipment (Murphy, 2009). Such individual armed robberies on ships can result in payoffs of $10,000-15,000 per attack. Together, these illustrations imply that piracy can function as a profitable venture for rebel groups.

In addition, research on political violence frequently notes linkages between criminals and militants. To raise funds, rebels exploit criminal networks and illicit markets, which according to Peters (2013:81) "sustains insurgencies from a financial standpoint" (see Reno, 1999, 2009; Felbab-Brown & Forest, 2012). But, such connections are difficult to examine systematically since information about criminal activity is not readily available (Kalyvas, 2015). Nonetheless, anecdotal evidence from West Africa, Somalia, and Southeast Asia appears to support collusion between insurgents and pirates. Militants in Nigeria, Somalia, and Indonesia all reportedly rely on piracy and black markets to sustain their insurgencies.

Piracy, Rebel Strength, and the Duration of Civil War

Extant research indicates that rebel strength shortens conflict while lootable resources lengthen it. This is intriguing because we expect that resources would increase rebel strength, which in turn should increase the hazard of conflict termination. Buhaug, Gates and Lujala (2009:555) argue that it might be because "natural riches influence the duration through other channels." They briefly discuss 3 possible explanations: (1) Low intensity conflict may be the objective of rebel groups to allow mining of illegal gemstones, and therefore the presence of resources reduces the incentive for rebel groups to move towards peaceful settlement; (2) Rebels may focus on revenue collection (looting) rather than engaging the state; (3) It is possible that natural resources provide opportunities for weak, cash strapped movements to emerge. Although the above arguments seem testable by interacting measures of rebel strength and lootable resources, the authors do not empirically examine the posited conjectures. Rather, they indicate that cases of strong rebellion in resource rich areas are rare. Yet, 150 observations (12 conflict episodes) in their dataset have moderate to strong rebel groups located in areas of lootable resources, which represents % of their data, and thus not as rare as they suggest.

A bargaining model suggests that conflicts terminate when belligerent actors agree on an outcome and groups are allocated resources in accordance with their capabilities. Bargaining ends when one of the groups in conflict either gains a decisive victory over the other or when both negotiate to resolve the issue peacefully since the cost of continuing a war is too high.

However, a decisive victory is the result of a decisive engagement, which weak rebels seek to avoid (Arreguin & Toft, 2005). Furthermore, employing military force against a weak rebellion remains costly for a state and consequently governments often resort to using less expensive police forces or militias to address a simmering insurgency. In Nepal, for example, the government mobilized the military against the Maoist rebellion only in 2001, after insurgents had attacked a military installation for the first time. The rebellion had existed for over five years and the group had attacked numerous local police stations, but the state largely ignored the insurgents until the attack on the military. Therefore, when rebels are weak, we see an equilibrium of low intensity conflict, where both state and rebels avoid decisive engagements because of the high costs involved. However, resources like piracy are associated with higher costs for governments. Attacks on foreign cargo ships and transport vessels could negatively affect revenue from trade as well as a regime's reputation. Therefore, engaging in piracy, even by weak rebels, can lead states to suppress an insurgency despite the high costs. Bangladesh in 2006 is an example when incidents of maritime piracy and the insurgency movement led by the Purbo Banglar Communist Party-Janajuddha faction peaked at the same time. While it remains unclear whether the rebel movement engaged in piracy, most clashes did occur near piracy prone areas and piracy incidents in Bangladesh correlate with incidents of rebellion. The Bangladesh government quickly mobilized and suppressed the nascent insurgency within two years, while the rebellion was very weak. In the following year, incidents of maritime piracy decreased dramatically to less than 25% of that in 2007. While most governments might have ignored a rebellion, such as the one that emerged in Bangladesh because the group was insufficiently strong to be much of a threat to the regime, the accompanying pirate attacks imposed both financial and reputational costs on the Bangladesh government The regime response eliminated the nascent insurgency and piracy appears to have decreased as well.

As rebel groups grow stronger, they start to bargain harder by challenging the legitimacy of the government and establishing themselves as a credible force. To signal their credibility they often choose larger and more salient targets, such as military installations. Uncertain of the true military capability of the rebels, governments can either agree to their demands or engage them to find their true capabilities. Decisive engagements follow. In other words, as rebels grow stronger, conflict durations tend to grow shorter. One reason decisive engagements lead to decisive outcomes is the insupportable cost of such engagements. But when strong rebel groups have access to lootable resources, two possible routes can lead to the persistence of armed conflict. First, rebels turn greedy as they exploit lucrative gains from lootable resources. Rather than focusing on the political objective of winning over the incumbent regimes, they deviate towards maintaining the armed conflict status quo. Second, resources provide fuel for more conflict. Even when groups engage in decisive engagements, rebel groups with access to resources are less likely to agree to negotiated settlements. In other words, resources cause rebels to agree to nothing less than victory. While these two routes are different, they are not necessarily mutually exclusive.

Table 1 illustrates our basic conjectures. Strong rebels with access to resources sustain conflict since insurgency has become lucrative. Weak rebels without resources also produce longer conflicts through evasion. Rebels do not seek engagement with government forces and the state finds rebel suppression costly and unnecessary. Weak rebels that engage in piracy attract state attention and fade quickly. Strong rebels without access to pirate resources also resolve conflict more quickly either through efficient negotiation or decisive victory on the battlefield.

[Table 1 here]

Data and Method

In this study, we argue that incidents of maritime piracy prolong the duration of armed conflicts. To examine the hypothesis, we use data on maritime piracy events collected by the International Maritime Bureau from 1993 to 2014. Since the unit of analysis of this study is country year, we first create an index of piracy intensity for all countries based on the number of annual piracy events, distance from the border of origin country, and the nature of each piracy event, as explained in the next section. We then use an event history model of conflict episodes to determine the effects of the piracy index on the duration of armed conflicts.[11] We use Kreutz (2010) conflict termination dataset to determine the duration of each conflict episode that starts at the beginning year of a conflict-dyad and ends when the conflict terminates in one of the many outcomes like victory, negotiated settlement or low level conflict.[12] In the survival data, we use a dummy variable to indicate the onset and continuation of a conflict event by 0 and the end of conflict by 1.

The dependent variable is the conflict duration in the survival dataset covering years from 1993 to 2014. If the conflict is ongoing in the year 2014, the episode is considered right censored. The event history model estimates the hazards of conflict ending while also accounting for the censored cases (Box-Steffensmeier and Jones 2004). We use semi-parametric cox proportional hazard models as our primary estimation method. The standard errors in the models are clustered on countries since a country may have more than one ongoing conflict episode in a given year.[13]

The Index of Piracy Intensity

Piracy occurs in coastline countries in various forms. While some countries experience minor piracy incidents that involve theft of goods from stationary vessels, others experience more intense piracy that involve armed attacks on moving vessels at distances much farther away from the coastline. Conceptually, we associate piracy intensity with the cost of goods or amount that the pirates are able to loot in each event, as this eventually contributes to the war effort and the conflict duration. However, precise data on the amount of goods or cash stolen by the pirates are hard to find and often kept secret (Chalk 2009, Oceans Beyond Piracy 2012).

Therefore, we measure piracy intensity indirectly based on two factors. First, the risk or cost that pirates are willing to take in launching an event tells us something about the loot that they are seeking to acquire. Projecting piracy far away from coastlines is riskier and costly than the ones close to shorelines. Similarly, use of firearms and attack on moving vessels are associated with higher risks and costs. Therefore, piracy events that take place at greater distance from shorelines, use firearms and involve attacks against moving vessels are indicate higher

[11] We use the UCDP definition of armed conflict event, which is 25 or more battle related deaths in a country per year.

[12] Low-level outcomes are ongoing conflicts but battle related deaths do not cross the threshold of 25 battle deaths per year.

[13] An example is Sudan prior to 2006, where two different conflicts were ongoing in the regions of South Sudan and Darfur.

intensity. Second, organized piracy events are more intense compared to clandestine theft events. In addition to the three measures discussed above, frequency of piracy at a location is another factor that might reveal how organized these events are. Yet, frequency alone is not the critical factor to assess the level of organization since this is confounded by other factors like the number of vessels in an area. The three factors mentioned above, ability to project piracy at greater distance, use of firearms and attacks on moving vessels, in conjunction with frequency explain far more about the level of organization than counting frequency alone.

We therefore model these four measures to assess the intensity of piracy: (1) number of annual piracy incidents linked to a country, i (2) distance of each piracy incident from the nearest origin country in ordinal scale, d_i. This measure that takes the value of 1 if the events are within 22 km or within the territorial waters of the country; 2 if it is outside the territorial waters but within an exclusive economic zone (less than 373km); and 3 if the event takes place in international waters, which is beyond the EEZ of the origin country, (3) whether or not the piracy involved violence, v_i, a dummy variable and (4) whether or not the vessel was steaming at the time of piracy, s_i, which is also a dummy variable.

$$\text{Piracy Intensity} = \sum_{i=1}^{n} (d_i + v_i s_i)$$

Using the four measures, we create an additive piracy intensity scale which weighs frequency and distance separately from violence and steaming. For instance, Somalia in 2007 had 49 incidents of piracy out of which only 16 incidents involved attacks on steaming vessels using violence. Out of these, 10 incidents occurred within its territorial borders, 15 within the EEZ and 24 outside the EEZ. The piracy index for Somalia for the year therefore is 1(10)+2(15)+3(24)+16=128, which ranks Somalia 17th in our dataset. In comparison, Bangladesh in 2006 had similar numbers of piracy incidents, 47, but had only 5 incidents that involved both violence and steaming vessels. Since all were within the country's territorial waters of 22 km, the piracy index for Bangladesh in 2006 is 53, placing it 39th. Out of 1028 country-year observations, there are 11 country years that are above the intensity level 200, 7 that are between 100 and 200, 217 that are between 6 and 100, and 793 that are below 6.

The piracy index and many other variables used in this model vary by country-year.[14] Theoretically, we expect the likelihood of conflict ending to be influenced by piracy events in the previous year. Therefore, we lag by one year the piracy index and other similar variables in model in order to account for the causal order and endogeneity, as explained in Box-Steffensmeir and Jones (2004: 112).[15]

Control variables

Rebel strength for each conflict episode is coded using Cunningham, Gleditsch and Salehyan (2009). The variable provides strength of rebel forces in conflict episodes in relation to government forces, whether they are very weak, weaker, parity or stronger than government forces. The authors use various measures, such as rebels' command structure, mobilization capacity, ability to procure arms, fighting capacity, and level of territorial control to assess rebel strength compared to government forces. This variable has been used to examine the duration of

[14] Using these variables directly or in lagged form in the Cox hazard does not violate the proportional hazard assumption.

[15] Ufelder (2007:1005) similarly uses all independent variables in his Cox model in lagged form.

conflict (Buhaug, Gates and Lujala 2009), mediation outcomes (Clayton 2013) and endurance of peace agreements (Lounsbery and De Rouen 2016). Similar to these papers, we code "rebel strength" as at least moderate for all conflict episodes that have rebel groups stronger than the "very weak" category. Nearly half the conflict cases in our dataset have at least moderate strong rebel forces, while the other half are "very weak."

We control for a number of variables that affect conflict duration. A number of studies indicate that state capacity in terms of military strength influences the duration of conflict. Brandt et al. (2008, 430) and DeRouen and Sobek (2004) find that increase in government military capacity increases the likelihood of a civil war ending. To determine the military capability of a state, we use *military expenditure* as a percent of GDP from the SIPRI database.[16] The variable measures all central level expenses on armed forces on a yearly basis and is used in the model in lagged form.

Another factor influencing conflict duration is the number of *battle related deaths* (Brandt et al 2008:428). We use this variable from the UCDP Battle-related Deaths Dataset, Version 5.0-2015. We also control for *ethnic fractionalization* that ranges from 0 to 0.93 to indicate the level of ethnic fractionalization of a country each year (Alesina et al 2003). We indicate whether or not a country is a *democracy* with a binary variable. Countries are coded as democracies using the mean of freedom house and polity scales from Hadenius & Teorell (2007). We also control for population, taken from the Penn World tables (Feenstra et al., 2015). Finally, we include in the model the variable *incompatibility*, which is taken from the UCDP armed conflict dataset and denotes whether a conflict is territorial or government in orientation. This is coded as 1 if the conflict is territorial and as 2 if the fighting is over government.

Data analysis

Following Kreutz (2010), there are 207 conflict episodes covering the period of 1993 to 2014. Among these, 168 conflict episodes end before 2014 and 38 episodes are right censored.[17] Figure 1 below shows the bivariate analysis of piracy intensity and conflict duration as conditioned by rebel strength. For clarity, only conflict episodes with piracy intensity greater than 5 are included in the figure. The only conflict episodes that have rebel strength higher than "parity" are in landlocked countries, which are not included in the figure below.

[Figure 1 here]

We find that in general, conflict episodes that have slightly higher piracy intensity and with relative stronger rebel forces (weaker and parity) have longer conflict durations. A simpler depiction of the above figure sketched in two dimensions provides a more intuitive understanding. Figure 2 below shows the distribution of conflict episodes in four quadrants of piracy intensity and rebel strength. In the figure, lists of conflict episodes in each quadrant show the country and year when the episodes ended and the number of years the episode lasted in parentheses.

[16] See www.sipri.org

[17] Conflict in Libya is coded to have started in September 2014 and ended in the same year and therefore not right censored.

On average, the duration of conflict episodes in the top-right quadrant, which is high-piracy intensity and relatively stronger rebel groups, is longer than those in the bottom-left quadrant, which is low piracy intensity and the weakest rebel groups. This descriptive result suggests that piracy level and rebel strength have an interactive relationship with conflict duration.

[Figure 2 here]

However, rebel strength in this analysis is coded as the maximum rebel strength for any years in a conflict episode. To further explore the relationship between piracy intensity, rebel strength and conflict duration, we run Cox Hazard models of all conflict episodes from 1993-2014 using data for each year of the conflict episodes, while also controlling for other possible confounding factors. The results of the model are presented in table 1 (models 4 and 5). Coefficients in the models that are positive suggest that the variable increases the hazard of conflict ending, whereas negative coefficients suggest that the variable prolongs the duration of conflict.

In model 1, piracy intensity has a -0.004 coefficient value, which is the hazard ratio of exp(-0.0049)=0.995. This suggests that an increase in piracy intensity of level 1 lowers the hazard of conflict ending by 0.005 percent. In more substantive terms, increasing the piracy level of a country in conflict from, say the level of the Philippines in 2009 (intensity=1) to that of Somalia in the same year, which is 662, would lower the hazard of conflict ending by 0.005*662=3.32 percent in the following year, assuming all other factors are held constant. However, the direct effect of piracy intensity is not robust and it is not statistically significant when we include additional control variables, such as in model 3. Yet, the direction of the variable remains unchanged and it continues to retain one-tailed significance.

Next we examine the conditional relationship of piracy intensity and relative rebel strength with conflict duration. We use both a semiparametric cox hazard model and a parametric model with a Weibull distribution.[18] While semiparametric models do not assume a specific distributional shape, they must meet strict proportional hazard assumptions. We find two variables, battlefield related deaths and population (log), violate the proportional hazard assumptions, and therefore we include a time interaction in model 3.[19] However, the parametric model is free of such an assumption as the Weibull function pre-supposes the shape of the hazard to be monotonically increasing (or decreasing). Model 4 uses the Weibull function for estimation. We find that the interaction terms in models 3 and 4 are significant and the coefficient sin both models are -0.013.

[Table 2 here]

To find the substantive interpretation of our primary results, we turn to the hazard plot from the interaction term from model 4. The four colored lines figure 3(a) show the predicted

[18] Using a Gompertz distribution, which assumes that the shape of hazard for conflict ending increases monotonically with time does not change the substantive results.

[19] We first test the proportionality assumption by interacting with time (and also using Schoenfeld Residual graphs), and then use the interaction terms for variables that are statistically significant at $p<0.05$. Including the interaction term accounts for the non-proportional hazard (Box-Steffensmeier and Jones 2004, p.136).

plot of the interaction term when piracy intensity is low (2) or high (60) and when relative rebel strength is very weak or at least moderate. Low piracy intensity (2) corresponds to that of countries like India in 1993 and high piracy intensity (60) corresponds to that of Somalia in 2001, above which are country-years in Nigeria, Indonesia and Somalia. As suggested by figure 3(a) and 3(b), we find that when piracy intensity is low (2), differences in relative rebel strength do not contribute to substantively different cumulative hazards. But when the piracy level is high (60), as shown in 3(a), the hazard that conflict with very weak rebels will end is much higher compared to cases with low piracy. In contrast, conflicts with strong rebel groups and higher piracy intensity (60) have a much lower hazard of conflict ending. In other words, an increase of about one standard deviation in piracy intensity (mean=9.8, sd=52.7) leads to a substantive difference in the probability of conflict termination. When rebel groups are very weak, incidents of piracy lead to a 100% increase in the likelihood that conflict will end in five years, compared to when the rebel groups are stronger. This effect is interesting since we control for government military force, which is also statistically significant and has positive coefficient, suggesting that higher military force contributes to higher hazard of conflict ending. As expected, we find that in the event of piracy and when rebel groups are weaker, governments seem to be acting quickly to end the conflict.[20]

In figure 3(b), we increase piracy intensity to 400. All else equal, we find that conflicts with piracy intensity of 400, like Somalia in 2012, are nearly four times less likely to end in five years compared to conflicts with a piracy intensity value of 2. This difference is significant in substantive terms.

[Figure 3 here]

Finally, as a robustness check we include models 5 and 6 where we exclude observations based on distance of the conflict from the coastline. For each conflict episode and year, we measure the average distance between all conflict events in UCDP GED (Sundberg and Melander 2013, GED v41) and the coastline of the country in conflict. We use ArcGIS to calculate distances between all UCDP GED conflict events and the coast and then calculate averages for each conflict episode-year. Restricting our sample to conflicts with events in the proximity of the coast helps ensure that piracy was a feasible method of resource generation for rebels. We therefore expect that the interaction relationship depicted in model 4 should work for all conflicts that are closer to coastal areas, but disappear for conflicts that are farther away from the coast. As shown by model 5 in table 1, we find the interaction term to be significant for all conflicts with violent events less than 100 kilometers from the coastline, but not for those that are more than 100 kilometers away from coastline. These results hold even though the number of observations is small compared to the N in model 6.

Robustness Check

One challenge our study faces is isolating the causal effects of piracy and rebel strength from state capacity. Despite controlling for some aspects of state capacity in our model, the obvious case of Somalia seemingly suggests that weak state capacity may be the reason for longer conflict durations, stronger rebels and higher levels of piracy. Yet, we find that our results hold even when we exclude the case of Somalia (see Appendix 1) or lag the rebel strength variable by

[20] Results are similar when piracy intensity is set to 0.

one year.[21] More importantly, we discussed the mechanism elsewhere in the paper that when rebels are stronger, they are more likely to end the conflict in a rebel favorable outcome of negotiated settlement. But when they are strong and use piracy, they have an incentive to continue fighting and are less willing to negotiate. Alternatively, when rebels are weak and engage in piracy, conflicts are more likely to end in with outcomes more favorable to the government. We examine this competing risk of outcomes using data from Kreutz (2010) and distinguish rebel or government favorable outcomes, following Fortna (2015, 523-24) and Gurses (2015).[22] Table 2 shows the results of several competing risk models. Since our concern here is with civil war outcomes, a competing risks duration model is appropriate, following Brandt et al. (2008) and Balch-Lindsay, Enterline, and Joyce (2008). A competing risks duration model allows us to analyze the odds of a civil war ending in each of the two possible outcomes, relative to the odds of that war continuing for another year. The two possible outcomes are mutually exclusive and exhaustive: a civil war can end in one and only one of these outcomes. Positive coefficients suggest a higher risk of ending with one outcome compared to the other, and a negative coefficient suggests otherwise. We find in model 2 of the table that a conflict is more likely to end with a rebel favorable victory when they are strong. But when rebel strength is conditioned by piracy, the negative coefficient suggests that rebel victory is less likely. This suggests that when conditioned by piracy, conflicts with stronger rebels either end in government favorable victory or continue to carry on. But since conflicts with stronger rebels are less likely to end in government favorable outcome, the negative coefficients for the interaction term in model 3 suggests higher likelihood of a prolonged conflict.

To further examine the effect of piracy on the outcome, we split the data into cases that are less than 500 km from the sea shore and those that are more than 500 km away. We expect that the interaction term should be significant in model that includes cases that closer to sea, but not the other model that farther away. Results in model 4 and 5 in the table confirms our expectations as we find that the interaction term has negative coefficient and is statistically significant at $p<0.05$ for model 4, but the term is not significant in model 5.[23] These results suggest that strength of a rebel group when conditioned by piracy prolongs the duration of a conflict.

[Table 3 here]

Conclusion

In this article, we develop a theoretical argument to suggest that maritime piracy in conjunction with rebel strength influence the duration of armed conflicts. While past research suggests that rebel strength shortens the duration of conflict, we argued that the conditioning effect of piracy on rebel strength causes a different effect on duration. Piracy incidents in countries with weaker

[21] Lagging rebel strength would suggest that piracy is not causing the rebels to be stronger but that stronger rebel groups are capitalizing on piracy, leading to prolonged conflict.

[22] Outcomes of government victory and low intensity conflicts are coded as government favorable outcomes. While the former is obvious, a low intensity conflict is government favorable since a conflict goes below 25 battle-related deaths as governments are able to suppress rebel group activity. Similarly, a rebel favorable outcome is coded when the outcomes are either rebel victory, which are rare, or negotiated settlement.

[23] Lowering the distance less than 500 causes difficulty for the model to converge due to smaller observations.

rebels shorten the conflict, as states are quick to suppress these rebellion associated with these high profile piracy events directly affecting international trade. However, when piracy is perpetrated by stronger rebels, conflicts tend to be longer, as it is harder for states to suppress the rebellion and rebels are less likely to agree to negotiated settlement offers. We present as evidence analysis of crossnational cases of piracy and armed conflicts from 1993-2014.

The article's findings have important implication for policymakers and international community that seek to build peace in war torn countries. Curbing piracy not only helps boost economic activities, it also helps to bring an armed conflict in the country to an end more quickly. This study also opens up avenues of research in future, examining the role of other forms of lootable resources on the duration and termination of armed conflicts. For instance, other lootable resources like drug or gems should similarly help to fund rebel movements. While drugs or gems might not have direct impact on international trade like piracy, funding from these lootable resources, similar to piracy, can motivate rebels to avoid compromise and continue the conflict.

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Table 1: Expected Relationships Controlling for both Rebel Strength and Maritime Piracy

	Strong Rebels	**Weak Rebels**
Maritime Piracy	Prolonged conflict (greedy rebels)	Short conflict (government suppression)
No Maritime Piracy	Short conflict (settlement)	Prolonged conflict (evasion)

Figure 1: Conflict Duration, Piracy Intensity and Rebel Strength, with & without Somalia

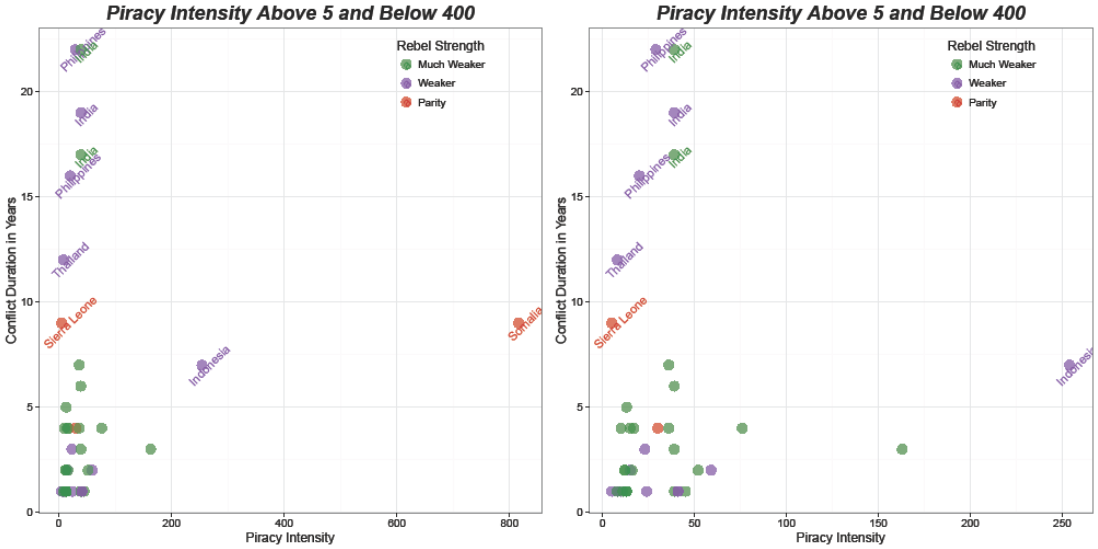
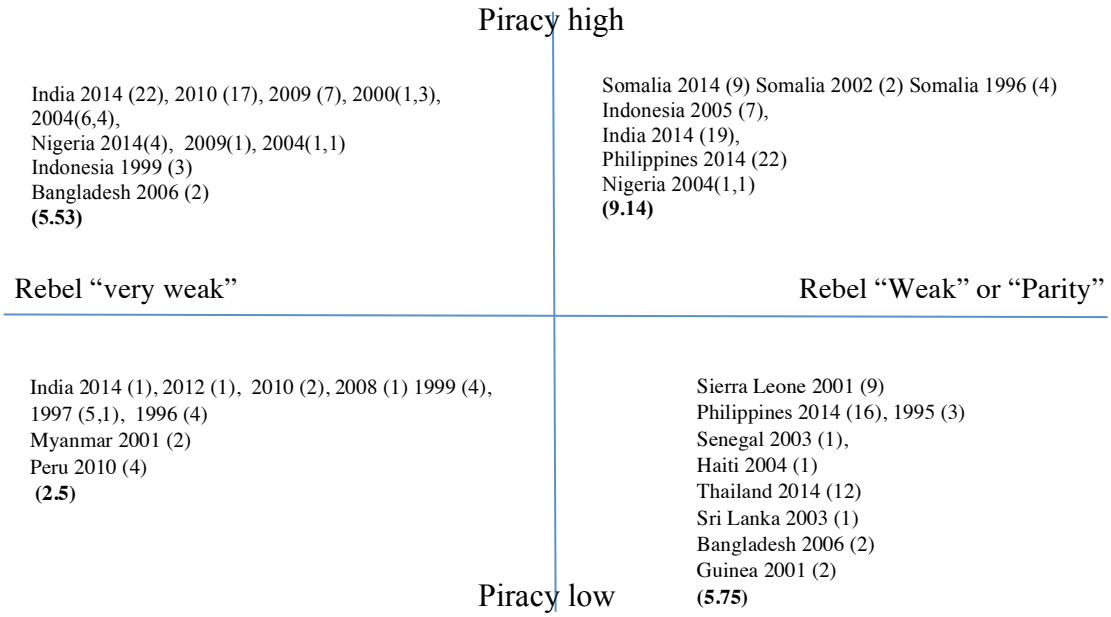


Fig 2 Piracy, rebel strength, and conflict duration



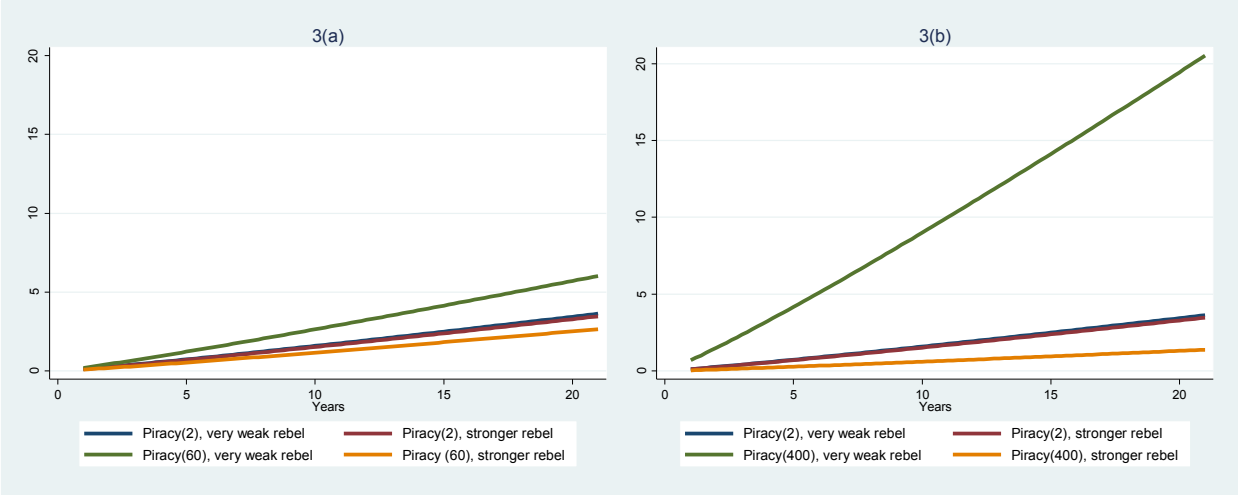
Note: The four quadrants in the figure above show the distribution of piracy intensity and rebel strength. In each quadrant, there are countries with the year when the conflict episodes ended or were censored, with number of years of conflict within parentheses. Only conflict episodes in countries with piracy intensity higher than 5 are reported (40 countries).

Table 2 Piracy, rebel strength and conflict duration

VARIABLES	(1) Cox	(2) Cox	(3) Cox	(4) Weibull	(5) Coast<100	(6) Coast>100
Piracy intensity	-0.004*	0.002	0.008**	0.009***	0.005	0.012
	(0.002)	(0.004)	(0.004)	(0.003)	(0.004)	(0.014)
Rebel str (relative)	0.119	0.158	0.039	-0.018	-0.144	-0.028
	(0.188)	(0.190)	(0.173)	(0.192)	(0.397)	(0.192)
Piracy X Rebel str		-0.008*	-0.013***	-0.013***	-0.012***	-0.017
		(0.004)	(0.004)	(0.004)	(0.003)	(0.015)
Incompatibility	-0.454**	-0.453**	-0.690***	-0.684***	-0.621	-0.625***
	(0.208)	(0.206)	(0.204)	(0.216)	(0.569)	(0.220)
Coup			-0.233	-0.198	-1.150**	0.156
			(0.423)	(0.392)	(0.567)	(0.426)
Battle Deaths	-0.001**	-0.001*	-0.001***	-0.000	0.001	-0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Democracy	-0.568**	-0.593**	-0.568**	-0.578**	0.082	-0.254
	(0.229)	(0.236)	(0.270)	(0.278)	(0.409)	(0.322)
Ethnic Frac			0.257	0.124	3.688***	-0.692
			(0.468)	(0.482)	(1.042)	(0.433)
Military Pers			0.064**	0.053**	0.113**	0.033
			(0.027)	(0.026)	(0.048)	(0.030)
Population (log)			-0.243**	-0.416***	-0.402*	-0.413***
			(0.103)	(0.105)	(0.224)	(0.119)
Constant				6.350***	2.731	7.074***
				(1.708)	(3.954)	(1.925)
Battle D X_t			0.0001***			
			(0.001)			
Population X _t			-0.020**			
			(0.008)			
Ln_p				0.105	0.341**	0.024
				(0.065)	(0.137)	(0.067)
Subjects	206	206	184	184	46	148
Failure	168	168	158	158	38	120
AIC	1191	1192	1098	159	23	131
BIC	1215	1221	1153	214	60	183
Observations	797	797	737	737	167	570

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Figure 3 (a) (b) Substantive Result from model 4 table 1



Note: Cumulative Hazard reported in the y axis

Table 3: Competing risk model the effect of piracy and rebel strength on how conflicts end

VARIABLES	(1) Gov Fav	(2) Rebel Fav	(3) Rebel Fav	(4) Rebel Fav Conflicts <500 km	(5) Rebel Fav Conflicts >500km
Intensity	-0.014*	0.007	0.035***	0.032***	-12.398***
	(0.008)	(0.005)	(0.005)	(0.008)	(1.076)
Rel Rebel Str	-0.900***	1.212**	1.237*	1.745	0.552
	(0.304)	(0.602)	(0.734)	(1.139)	(0.907)
Intensity#Rebel Str			-0.030***	-0.023***	3.649
			(0.008)	(0.007)	(6.932)
incompatibility	-0.405	-0.412	-0.104	-0.004	-0.317
	(0.263)	(0.455)	(0.486)	(0.793)	(0.640)
coupall	-1.268	0.683	0.712	0.677	0.254
	(1.012)	(0.690)	(0.740)	(0.674)	(0.955)
bdbest	-0.001	-0.000	-0.000	-0.000	-0.000
	(0.001)	(0.000)	(0.000)	(0.001)	(0.000)
Democracy	-1.012**	-0.278	-0.803	-0.207	-17.712***
	(0.429)	(0.782)	(0.873)	(1.047)	(0.893)
Ethnic Frac	-0.392	2.007*	2.022*	5.327***	0.910
	(0.714)	(1.109)	(1.133)	(1.680)	(1.536)
milpers	0.007	-0.076	-0.101	0.020	-0.376
	(0.036)	(0.097)	(0.155)	(0.116)	(0.437)
logpop	0.022	-0.479**	-0.470**	-0.398	-0.317
	(0.126)	(0.199)	(0.235)	(0.431)	(0.457)
Subjects	184	184	184	110	83
Failed	94	27	27	12	15
Competing	90	157	157	98	68
Observations	737	737	737	425	312

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Supplement

Table A1: Models with Somalia removed

VARIABLES	(1) _t	(2) _t	(3) main	(5) _t	(7) <100 miles	(9) >100 miles
intensity	-0.002	0.002	0.009**	0.009***	0.005	0.015
	(0.003)	(0.004)	(0.004)	(0.003)	(0.004)	(0.014)
sreb	0.118	0.154	0.023	-0.030	-0.149	-0.070
	(0.189)	(0.191)	(0.173)	(0.192)	(0.397)	(0.194)
c.intensity#c.sreb		-0.007*	-0.008*	-0.009**	-0.010***	0.022
		(0.004)	(0.004)	(0.004)	(0.004)	(0.022)
incompatibility	-0.438**	-0.443**	-0.660***	-0.663***	-0.504	-0.630***
	(0.211)	(0.208)	(0.205)	(0.218)	(0.587)	(0.220)
coupall			-0.653	-0.617	-1.267**	-0.272
			(0.551)	(0.512)	(0.551)	(0.692)
bdbest	-0.001*	-0.001*	-0.001***	-0.000	0.000	-0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
dem	-0.559**	-0.576**	-0.570**	-0.580**	0.070	-0.269
	(0.231)	(0.235)	(0.268)	(0.277)	(0.405)	(0.326)
al_ethnic			0.335	0.193	3.675***	-0.689
			(0.475)	(0.486)	(1.034)	(0.439)
milpers			0.070**	0.058**	0.112**	0.034
			(0.027)	(0.026)	(0.048)	(0.029)
logpop			-0.267***	-0.437***	-0.410*	-0.430***
			(0.103)	(0.105)	(0.218)	(0.117)
Bdbest X time			0.000***			
			(0.000)			
logpop X time			-0.021**			
			(0.009)			
Constant				6.632***	2.770	7.397***
				(1.702)	(3.866)	(1.907)
Ln_p				0.101	0.338**	0.015
				(0.066)	(0.146)	(0.068)
Observations	754	754	723	723	158	565