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**The Impact of Asymmetric Information Among  
Competing Insurgent Groups:  
Estimating an 'Emboldenment' Effect**

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## **Abstract**

This paper uses asymmetric access to information to test if an insurgency is factionalized. If it is factionalized, regional variation in information should influence attack levels as groups use violence to compete over visibility, resources and support. Using plausibly exogenous variation in satellite access, we show that attacks increased after the release of information on satellite television about US commitment to remain in Iraq. Because insurgents shift attacks toward more difficult (military) targets, the relative increase in attacks is offset by fewer total fatalities. Our findings illustrate that insurgent groups may be decentralized strategic actors subject to competitive forces.

Keywords: Iraq war, asymmetric information, media and violence

JEL Classifications: F51, F52

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## I. INTRODUCTION

Internal conflicts, in the form of both civil wars and insurgencies, have gained increasing attention among policy makers and academics. This interest has heightened since the United States has fought two protracted wars against insurgencies in Iraq and Afghanistan. The Iraq war alone, which began in mid-2003 following the U.S. invasion and overthrow of the previous regime led by Saddam Hussein, has resulted in over 4,000 US military deaths, an estimated 91,000 violent Iraqi civilian deaths, and over 100 billion dollars spent to rebuild the Iraqi economy. Over this time, over 4 million Iraqis have been displaced from their homes due to violence, about 14% of the total national population (UNHCR, 2007). The long-term burden from disease, the destruction of infrastructure, and wide scale social disorder will likely add thousands more lives and billions more dollars to the total costs (Stiglitz and Bilmes, 2008; ICRC, 2008; Bernasek, 2006). These costs are particularly troubling since policy-makers and analysts generally believe that these types of conflict—civil conflicts in which armed groups challenge the authority of the government, rather than international wars between states—are likely to be the dominant form of warfare facing the United States in the future (e.g., Gates, 2008; Collier and Hoeffler, 2004).

A growing body of research has started to apply econometric tools of analysis and formal models to better understand the factors that influence the behavior of insurgent organizations, and in particular the relationship between insurgent behavior and the military strategies employed to oppose them (Miguel, Satyanath, and Sergenti, 2004; Benmelech and Berrebi, 2007; Berman, Felter, and Shapiro, 2008; Berman and Laitin, 2005; Miguel and Blattman, 2009). However, the existing literature often treats insurgencies as a single, centralized agent coordinating attacks on the government or occupation military forces. In Iraq, as is the case in many recent civil conflicts, “there appears to be no clear leader (or leadership), no attempt to seize and actually hold territory,...no single, defined, or unifying ideology [and] most important, there is no identifiable organization” (Hoffman, 2006).<sup>1</sup> Decentralization may influence how insurgents groups compete for public support and treat the civilian population, as well how the collective

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<sup>1</sup> On the increasingly decentralized and “networked” character of insurgencies, see Hoffman (2004), Kilcullen (2009) and Kilcullen (2009). According to Hoffman (2004), these types of insurgencies consist of “flat, segmented networks instead of the pyramidal hierarchies and command-and-control systems...that have governed traditional insurgent organizations.”

insurgency responds to the military strategy of pro-government forces (Bueno de Mesquita, 2008). Very little is known about the factors that influence decision-making within insurgent organizations in general: how groups allocate the timing, level, and targets of the violence they mobilize. Even less is known about the specific role competition over power and influence between insurgent groups plays in affecting the level of violence, the duration of the conflict, and the safety of the noncombatant population.

In this paper, we use variation in satellite television access across different provinces in Iraq to examine whether new information about U.S. public support for continued military involvement in Iraq changes the behavior Iraq's decentralized insurgent groups. Under a model with a centralized insurgency led by a single unified actor, information that can only be accessed regionally should not influence the level or nature of attacks between regions. In contrast, a model in which an insurgency is factionalized between multiple groups, each group has an incentive to use violence to "outbid" rival groups in the competition over visibility, scarce resources, and popular support (Bloom, 2005, McCormick, 2003). If correct, indicators of future U.S. intentions should have an effect on insurgent decision-making in the context of Iraq, where violent opposition to the US occupation has been split between multiple groups with conflicting agendas, capabilities, and communal bases of support. Under such a model, information about a decline in U.S. commitment to continued military involvement should affect the level of violence because the potential benefit for increased popular support increases. Information about US commitment may also change the willingness of insurgent groups to engage in indiscriminate attacks that result in high levels of civilian fatalities. As the competition between insurgent groups for popular support escalates, attacks on civilians become more costly. Any reduction in the expected future level of US engagement is therefore likely to have a different effect in decentralized versus centralized insurgencies.

To distinguish between these organizational models, we construct an empirical test that exploits differences in access to news about U.S. politics across Iraq's 18 provinces. Specifically, we combine data on U.S. military and Iraqi civilian fatalities resulting from insurgent violence, the release of U.S. public opinion towards the Iraq war, and access to satellite television media in Iraq. Satellite television access is a plausible source of exogenous variation in information because access in the years following

the U.S. invasion was largely based on pre-war infrastructure and regional weather conditions. Under the assumption that provinces with greater access to satellite television have greater and more rapid exposure to U.S. news, we investigate whether insurgent groups in these areas respond differentially following the release of U.S. public opinion polls.

Using a difference-in-difference estimate, we find that the frequency of attacks increased by between 5 and 15 percent in high satellite areas compared to low satellite areas in the two weeks following the release of new public opinion polls. This difference dissipates by the fourth week. The results also show that the number of U.S. military fatalities increased by between 40 to 50 percent in the week following poll releases, while the number of Iraqi civilian casualties decreased by between 20 and 30 percent. This evidence indicates that insurgent groups shift some attacks away from civilian targets and toward U.S. military targets. Because military targets are more difficult to successfully target, the relative increase in attacks is offset by fewer fatalities overall in high satellite access provinces compared to low satellite access provinces.

There are several alternative causal paths, aside from inter-group competition, which may explain the differential change in the levels and targets of attacks across provinces. First, if the timing of poll releases were related to prior trends in violence, then the observed effect would be due to U.S. media outlets conducting polls in response to rising or declining violence, and not the reverse. To rule this out, we provide some evidence, in a restricted sample, that attack levels are not significantly different in high and low satellite regions prior to poll releases. In addition, evidence suggests media outlets do not release polls based on previous trends in violence in Iraq, but rather based on competition within the domestic U.S. media market. A second concern is that satellite access in Iraq may be correlated with other important determinants of violence. For such a correlation to bias our estimates, the effect of these determinants on violence must also change differentially in response to the release of polls. To test this, we compare regions by ethnicity (Sunni versus Shia, a dominant social cleavage in Iraq) and oil production, and find no significant effect of either regional difference on attack levels before and after poll releases. While the evidence we present is consistent with a decentralized competitive networks

model of insurgent behavior, we are constrained by the limited data available on Iraqi insurgent groups. Despite this limitation, we do find consistent evidence, robust to specification, of changes in attack levels and targets in response to new information. This finding is among the first of its kind to use observable information on both area characteristics and attacks to understand the structure and decisions of insurgent organizations.

This paper is organized as follows. Section II defines insurgency as a type of conflict and describes our causal argument regarding the impact of new information about the expected future level of US involvement on insurgent decision-making. Section III describes the data and methods used, and section IV discusses the results. Section V addresses possible problems with our identification strategy, including possible reverse causation bias, factors other than satellite access that might explain the results, and looking for an insurgent response over a relatively short time-frame. Section VI presents a conclusion.

## II. EFFECT OF ASYMMETRIC INFORMATION IN INSURGENCIES

There is a great deal of debate about the classification of civil conflicts into insurgencies. Following the description in the existing literature (Fearon and Laitin, 2003), an insurgency is defined as a type of armed conflict in which one group uses irregular and guerilla military tactics to achieve the political goal of overthrowing the state.<sup>2</sup> “Counterinsurgency” refers to the political and military actions taken by either the challenged government or an outside actor to defeat a rebellion. Because insurgent groups are generally weaker in conventional military terms, insurgent tactics are designed to avoid directly engaging the counterinsurgent’s main strengths by using concealment and subversion to defeat a militarily stronger power.<sup>3</sup> Insurgent political objectives seek to challenge and delegitimize the existing government through the use of violence. According to the U.S. Central Intelligence Agency’s *Guide to the Analysis of Insurgency* (n.d.), insurgent activity is “designed to weaken government control and

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<sup>2</sup> Fearon and Laitin (2003: 75). The Central Intelligence Agency’s *Guide to the Analysis of Insurgency* defines an insurgency as a “protracted political-military activity directed toward completely or partially controlling the resources of the country through the use of irregular military forces and illegal political mobilization.”

<sup>3</sup> On insurgent military tactics, see Nagl (2002) and Krepenevich (1986).

legitimacy while increasing insurgent control and legitimacy.” Insurgent tactics often but do not necessarily include terrorism, or the deliberate targeting of civilians for the purposes of inducing fear.<sup>4</sup>

Much of the discussion of insurgencies treats these groups as single entities competing for geographic or political control against the established state. This treatment ignores an important aspect of Iraqi insurgency: the extent to which it is highly decentralized.<sup>5</sup> Unlike nationalist or secessionist insurgencies that are initiated and led by a single, unified group, the insurgency that emerged following the U.S. invasion and occupation of Iraq was fractionalized both between the separate ethno-religious communities that make up Iraq’s population and within them. The result has been organizations and networks that are local and decentralized, small in scale, and with loose or non-existent ties between them. Within Iraq’s Sunni community, these include groups affiliated with the former Baathist regime and led by former Baath party officials, intelligence operatives, and ex-military officers; nationalists who object to the U.S. occupation; Islamist and religious extremists groups; tribal-based resistance groups; and a foreign-led network affiliated with Al Qaeda (Al Qaeda in Iraq, or AQI). Divisions have also emerged within these categories. For example, the Baath party-based insurgency split into several factions, including al-Awda (The Return), the Fida’iyin Saddam, and Jaish Muhammad (Muhammad’s Army). There are also a wide range of Islamist factions such as Ansar al-Sunna, Ansar al-Islam, the 1920 Revolution Brigades, and the Islamic Army in Iraq. According to Hashim (2008: 24), the “presence of a plethora of insurgent groups in Iraq has had adverse implications for the articulation of a unified ideology and set of goals.”

In this context, what is the impact of new information about the expected future level of the U.S. commitment? Theory predicts that the effect of new information about future U.S. commitment is likely to be different in a decentralized insurgency than in a unified insurgency. Under conditions where there is

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<sup>4</sup> For a discussion on the distinctions between insurgency and other types of armed action, including terrorism, see Byman (2007). There is considerable debate about the definition of terrorism. For a detailed discussion, see Krueger and Maleckova (2006).

<sup>5</sup> On the decentralized character of the Iraqi insurgency, see Hashim (2008), Tilgham (2007), Hashim (2006), and Eisenstadt and White (2005). The total size of the insurgency has varied. According to one set of estimates, in 2005 the insurgency consisted of at least 40,000 hardcore fighters, out of a total of more than 200,000 part-time fighters and volunteers who provide intelligence, logistics and shelter. See GlobalSecurity.org (2005)

asymmetry in the information available to various insurgent groups, in a decentralized, competitive setting we predict differential responses by groups with more information about the future level of US commitment.

To understand why, consider a model of insurgent action where insurgent groups seek to maximize their power and influence over the state and society. Insurgent organizations use violence and terrorism not only to impose costs on the occupying force, but also as a tactic to build support and establish power relative to competing groups, with the goal of maximizing their influence as the influence of the occupying force declines or withdraws completely. This is similar to a situation in which multiple interest groups or political parties vie for influence or vote share. Insurgent groups similarly use violence to compete for recruits, popular support, money, and visibility – e.g., for a greater share of the market for rebellion.<sup>6</sup> McCormick (2003:488) observes that violent extremist groups “compete with each other in radical rivalries for political market share...terrorism is not merely an instrument of competition with the state, but a means of crowding out one’s political rivals.” In situations where the occupying force is unambiguously dominant, there are smaller returns to being the second or third place group, and thus less incentive to compete over relative position. If, however, the first place group (in this case, the United States military) is weaker, the expected returns from being in a stronger relative position increases, creating a greater incentive outbid rival groups for political market share through violence. This view generates the testable empirical implication that insurgent attacks should increase when the occupying country reduces its level of commitment or moves closer to the margin of withdrawal. New information that reduces the expected future level of U.S. involvement therefore leads decentralized insurgent groups to initiate a higher level of violence than they otherwise would have.

### III. DATA AND EMPIRICAL STRATEGY

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<sup>6</sup> On this “market share” view of insurgent competition, see Bloom (2005) and McCormick (2003). Based on interviews, documents, and propaganda generated by Iraqi insurgents, the International Crisis Group (2006) found that “competition between groups for greater visibility generated increasingly bloody and controversial deeds,” particularly in the early phases of the insurgency. For a critique of the evidence for this argument in the context of Palestinian terrorism, see Brym and Araj (2008).



To identify the effect of new information about the level of U.S. commitment and the likelihood of withdrawal on insurgent behavior in Iraq's multi-group setting, we combine data on the release of American public opinion polls with variation in access to U.S. media in Iraq. Specifically, we use differences in the penetration of satellite TV across the 18 provinces of Iraq and the fact that satellite television provides more direct information about the direction of U.S. policy. Under the intuition that areas with greater exposure to U.S. and international media will more be more responsive to new information about the expected future level of US commitment, we use a measure of access to satellite television as an instrument for the rapidity of information diffusion. This estimation method relies on the importance of opinion polls in providing salient information about the likelihood of U.S. withdrawal. Using a difference-in-differences strategy, we compare the effect of poll releases on insurgent behavior in regions with higher versus lower levels of satellite penetration.

We use satellite television because it is an important source of information in post-Saddam Iraq, and therefore a useful proxy for access to information about U.S. commitment. Prior to the U.S. invasion in 2003, Iraqis were banned from owning satellite television and had access only to state-run news stations. After the collapse of Baathist-run television stations, Iraqis were "starve[d] for information," and the sale of satellite dishes "skyrocketed in the months following the invasion, leading to one of the highest penetration rates in the world in just two years."<sup>7</sup> Despite high overall penetration levels, access rates vary geographically. According to a media poll by United Kingdom's Office of Intelligence and Research, while nearly all (93%) Iraqis report owning a television, only about a third (33%) have access to a satellite dish (defined as availability at home, a friend's residence, or at work). The two-thirds (62%) of Iraqis report that they have no access satellite television tend to be less educated and poorer.<sup>8</sup>

In addition, the content of satellite television is heavily dominated by foreign, and in particular U.S., content. This developed for two reasons. First, emerging television networks are heavily regulated

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<sup>7</sup> As of 2006, Iraqis with satellite television had access to over 300 satellite channels. For details on the emergence of Iraqi satellite television, see Cochrane 2006 and Bahadur 2005.

<sup>8</sup> Significantly, post-college graduates are three times more likely to have access to satellite television than those with a primary education or lower. A summary of results is available at <http://www.stanhopecentre.org/iraqmediapoll.shtml>.

by the Iraqi government. For a brief but critical period of time in 2003 and 2004, the CPA banned stations that they believed incited anti-U.S. violence, resulting in predominantly U.S.-based content.<sup>9</sup> In 2004, the Iraqi Interim Government set up a Higher Media Commission to regulate and license television stations. This Commission increased foreign- (and largely U.S.) based content and banned Arab stations deemed to be anti-U.S., such as Al Jazeera and Al Arabiya.<sup>10</sup> Second, one of the most widely available TV stations is the U.S.-sponsored Al Iraqiyah, which began satellite broadcasting in October 2003. In January 2004, the U.S. Defense Department awarded the Harris Corporation, a Florida-based communications firm, a 12-month contract to manage the Iraqi Media Network, including Al Iraqiyah, which provides access to American programming.<sup>11</sup> Al Iraqiya's detailed content on U.S. issues relative to other sources is also due to the privileged status it was afforded by Coalition forces and the CPA (Cochrane, 2006). One indicator of the dominance of U.S. media content is the opposition of Iraqi religious groups and leaders to greater satellite TV access in Iraq following the U.S. invasion, which they hold has increased the availability of Western and un-Islamic material (Bahadur 2005). The dominance of Western news and entertainment is evident of the availability of shows like ABC's *Extreme Makeover Home Edition* or the British show *Pop Idol* (Cochrane, 2006: 13).

An obvious concern with using satellite television variation is the underlying reason why satellite access varies by province. While some variation is related to the underlying wealth of the population, much of the regional variation is due to the constraints created by existing technology and infrastructure. Regions may have limited or no satellite network access for several technological reasons unrelated to either violence or socioeconomic characteristics.<sup>12</sup> The first reason relates to the efficiency of the technology under use. Due to the high capital costs of deploying a satellite network and the relatively

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<sup>9</sup> Aljazeera.Net, September 23, 2003.

<sup>10</sup> Cochrane (2006). For a discussion of popular Arab media, see Watanabe (2003). For a sample of media content, see [http://www.publicagenda.com/press/clips/cfpi4\\_clips\\_ais.pdf](http://www.publicagenda.com/press/clips/cfpi4_clips_ais.pdf), <http://alsumaria.com/en/iraq-files/us-iraq.php>

<sup>11</sup> Although Al Iraqiyah has steadily improved the quality of its programming since early 2004, the network still offers few hours of original content. Among the original programs are daily news hour shows with detailed information on U.S. media watched by many, despite skepticism about its objectivity due to its close ties with the United States.

<sup>12</sup> Much of this discussion is based on information from Blue Iraq, a company that operates a satellite network with reach throughout Iraq. Their primary market is supporting Western military and commercial reconstruction efforts throughout the country, as well as NGOs, Iraqi organizations, and private businesses. Information obtained from: <http://www.blueiraq.com/>.

limited size of the satellite market, vendors often do not update their systems as new technology becomes available that can manage a greater volume of traffic and provide more efficient performance at the same cost. The second issue relates to subscription management by carrier. A satellite network must be sized for a given capacity, with most sites transmitting at less than full capacity most of the time. To avoid service interruptions, many network carriers therefore limit the number of customers they add to their networks. Third, satellite networks are designed around specific parameters, including coverage area and customer traffic profiles. Because there were many mismatched systems - that is, systems that were sold for purposes for which they were not designed - many areas in Iraq have difficulty accessing satellite television, which deters take-up. A fourth problem relates to the interaction between satellite network technology and environmental factors. Satellite links are designed around a specific "link budget" to provide reliable communications in a variety of environmental conditions. These links require the correct interactive technology, which is often not available in Iraq. Because of these "tight margins" on satellite links and the use of inferior equipment, undersized antennas, or insufficient error correction on such links, access in some regions will be problematic in poor environmental or other extreme weather conditions. The implication of these technology constraints is that individuals with similar tastes and characteristics, who may have the same desire to adopt satellite television, will do so differently in different regions due to different costs and technological limitation. Thus, even if the access of any given individual is affected by income or a desire for information, the variation in the province level measure nonetheless reflects the relative ease of access for the region.

A second possible criticism of these measures is that insurgent groups pay little attention to media sources in planning attacks. However, reports indicate that insurgents in Iraq are particularly watchful of the media, and that the tactics used by al Qaeda in particular heavily rely on the propaganda potential of large media sources. According to Bruce Hoffman, "What I think has made the insurgency in Iraq so different from previous ones is the insurgents' enormous media savvy."<sup>13</sup> Others have documented, based

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<sup>13</sup> Quoted in Ross (2006).

on insurgent-generated media such as websites, the extent to which Iraqi insurgent groups are detailed consumers of news on U.S. politics and policy (Kimmage and Ridolfo, 2007: 88).

The crux of the identification strategy is that insurgent groups are decentralized and get information based largely on where they live, and not through a centralized network structure. This assumption also seems to be in line with the general intelligence information available on the Iraqi insurgency.<sup>14</sup> While the assumption that insurgent access to information in Iraq is decentralized appears reasonable given the information known about the insurgency, if a central coordinating body with better access to information determines violence levels, then this identification will fail to capture the causal mechanism of interest – either because there is no difference in information access across provinces or because the insurgency is able to determine the allocation of violence simultaneous to the television programming. To the extent that insurgents are small in scale and news takers, as opposed to only news makers, any differential changes in attack behavior across high- and low-access areas might reasonably be interpreted as a response to information about U.S. policies.

The data used in this estimation was compiled from a variety of sources, in part by ourselves and in part by Greenstone (2007). To measure U.S. military casualties, we use counts obtained directly from the Department of Defense (DOD), which releases information on the date, location, and type of attack of each fatal casualty.<sup>15</sup> This data excludes non-fatal casualties, which the DOD does not make public on privacy grounds. It also excludes “non-hostile” fatalities, which comprise about 19 % of all U.S. military deaths in Iraq. To measure Iraqi civilian casualties, we aggregate attacks reported by the *Iraq Body Count* (IBC) organization, which maintains an ongoing database of attacks targeted at Iraqi civilians in which at least one fatality occurred (Dardogan and Sloboda, 2006). These include attacks on all individuals classified under international law as noncombatants, including civilians, Iraqi police and security forces, and government officials and political figures. The IBC includes only those incidents in which two media

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<sup>14</sup> See note 4 above.

<sup>15</sup> Available at <http://icasualties.org/oif/HNH.aspx>. There has been substantial controversy over attempts to measure excess violent civilian deaths in Iraq since the 2003 invasion. Most disagreement, for example over a 2006 study reported in the medical journal *The Lancet* which placed this figure around 601,000, concerns attempts to estimate this number through samples of household surveys administered directly in Iraq. We avoid these problems by using direct counts of military and civilian deaths compiled by the IBC and the Department of Defense.

sources separately report a death, and provides a minimum and maximum estimated number of deaths when sources conflict.<sup>16</sup> For the purposes of this paper we use the estimated minimum number of deaths for any given attack. We use two counts of the number of attacks and cross-check for consistency. First, we aggregate the number of incidents in any given week from the combined DOD and Iraqi civilian data. Second, we use monthly data on insurgent-initiated attacks on U.S. forces and Iraqi civilians from the *Brookings Iraq Index*.<sup>17</sup>

As described above, we use the release of major public opinion polls to measure changes in information available to insurgents about the expected future level of U.S. commitment in the conflict. These polls capture American attitudes towards key issues in the war in Iraq, such as whether the U.S. should increase or decrease its force levels, whether they view the war as a success, whether they support the president's handling of the war, and whether they view the number military casualties as acceptable. These polls show a steady decline in support for the U.S. troop presence in Iraq. However, unlike other possible signals of U.S. commitment – such as media coverage or debate among U.S. leaders - the timing of the release of polls is plausibly unrelated to the conditions on the ground in Iraq, even if broad changes in public support for the war are to some degree affected by the level of violence.<sup>18</sup> There are several reasons to believe that poll releases are independent of prior trends in insurgent violence. Major media organizations want to produce regular series of polls to track public opinion, regardless of the status of the war, and as a result conduct polls in regular intervals. Media organizations are also driven by financial pressures and the desire to retain credibility in a competitive media market to report polls as soon as they have been conducted and vetted by in-house checkers.<sup>19</sup> In fact, most polls are released within one week

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<sup>16</sup> These data exclude large numbers of unidentified bodies at morgues in major cities such as Bagdad, Kirkuk, Mosul, and Tikrit. These bodies could not be linked to any specific number of attacks or causes but media accounts suggest these may be the result of Shia militia responses to Sunni groups. On the improved ability of insurgent groups to conceal killings from Iraqi authorities, see Dehghanpisheh 2007.

<sup>17</sup> Available at <http://www.brookings.edu/saban/iraq-index.aspx>.

<sup>18</sup> On the debate over whether U.S. public support for the war is driven by solely by trends in casualties, see Feaver, Gelpi, and Reifler (2005/06) and Mueller (2005).

<sup>19</sup> In fact, recent work suggests that the financial pressures frequently generate premature releases (Mann, Orren, Shorenstein 1992). After the 2004 U.S. presidential election, concern about polling methodology forced many large media organizations to establish in-house standards (Daves and Newport, 2005). See, for example, ABC News Polling and Methodology Standards, available at [abcnews.go.com/sections/us/DailyNews/poll\\_methodology.html](http://abcnews.go.com/sections/us/DailyNews/poll_methodology.html).

of being conducted, although the set-up prior to the launch takes several weeks.<sup>20</sup> This timeline makes releasing polls immediately prior to high attack period highly unlikely. Also, questions about Iraq are frequently coupled in polls with other questions on unrelated issues. We track the release of major media-sponsored polls and treat the week of releases as “high information” weeks, and weeks without poll releases as “low information.” We also verify that information about these polls was discussed on network broadcasts via satellite television using online transcripts from Al-Iraqiya.

As a way of confirming that the polls in fact contained new or surprising information, we test whether the release of public opinion polls on the war in Iraq significantly changed the predicted probability of a Democratic candidate winning the presidential election in 2008 according to data from Intrade, a prediction market that allows individuals to bet on the probability of an outcome. Data on the probability of a victory by a Democratic presidential candidate is based on the Intrade series from November 2, 2004 to November 1, 2007.<sup>21</sup> Assuming that the probability of a Democratic victory in 2008 was related to public opinion on the war in Iraq, a key issue in the election, we can observe whether the polls revealed new information about U.S. attitudes towards the war. Figure 3 shows the Intrade market series on the probability of a Democratic presidential victory, the number of trades on this prediction by week, and the release of polls. Unfortunately, only the period from November 2006 to November 2007 has enough trade volume and sufficient variation to make a judgment about the impact of new Iraq polling. For each poll released in these 12 months, we conduct an event study to test if the prices in the 14 days after the poll release have a statistically significantly (at the 0.05 level) different price than the 14 days prior to the poll release. In this period, 75 % of the Iraq polls releases resulted in a significant change in the In-trade price of a Democratic presidential victory.

To measure satellite TV access in Iraq, we use data collected by the World Food Program’s survey on “Food Security and Vulnerability Analysis in Iraq.” This survey, conducted in latter part of 2005, asked respondents about humanitarian and household issues, including whether a respondent owned a satellite

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<sup>20</sup> For example, CBS polls often are released within days of data collection. For CBS/New York Times polling methodology, see: <http://www.cbsnews.com/stories/2001/07/02/opinion/main299401.shtml>

<sup>21</sup> Intrade data is available until November 2008, but our data set on attacks and fatalities is only compiled until the end of 2007.

television dish.<sup>22</sup> We use data collected at the district level (the main sub-province administrative unit in Iraq), and then construct a weighted average of satellite access for each of the 18 provinces.<sup>23</sup>

Finally, in order to compare regions with different levels of satellite access by other characteristics that might plausibly affect violence levels, we use a broad set of social and economic variables collected in the Iraq Living Conditions Survey 2005 by the United Nations Development Program and the Central Organization for Statistics and Information Technology, Ministry of Planning and Development Cooperation in Iraq.<sup>24</sup> Descriptive variables included are population density, household size, average number of displaced persons, median household income, access to safe and stable drinking water, malnutrition rate, literacy rate, net primary school attendance, unemployment rate, and median hourly wage. We also classify each province by ethno-religious group (predominantly Sunni, predominantly Shia, predominantly Kurd, or mixed), based on population estimates constructed by the U.S. Central Intelligence Agency (CIA).

#### IV. RESULTS

We begin our analysis with a set of descriptive statistics about trends in violence levels in Iraq. Figure 1A shows the number of attacks in each province per week over time, and Figure 1B shows the number of U.S. military and Iraqi civilian casualties in each province by week over the same period. A full exploration of the structure of insurgent violence in Iraq is beyond the scope of this paper, but these figures provide contextual information on aggregate trends in violence. There was a large increase in the number of attacks and fatalities beginning in the middle of 2005. This increased dramatically until the winter of 2006-2007, when it began declining. While we do not discuss the strategic reasons for these shifts, we can describe the associated changes in technology related to the increase beginning in 2005. The bimodal distribution (as shown in the noticeably higher disjointed set of scatter points in Figure 1B)

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<sup>22</sup> Results do not differ significantly when using the UK State Department Survey asking whether respondents had access to satellite television at home, at a friend's house or at work. Results for these specifications available upon request.

<sup>23</sup> The weights first use the sample weights to construct district average access levels. We then weight each district by the fraction of the province population residing in that district.

<sup>24</sup> This survey took place in the second half of 2005 and was a follow-up to a post-invasion food security survey. For details on methods see <http://home.wfp.org/stellent/groups/public/documents/ena/wfp193132.pdf>

in fatalities is likely due to an increase in the use of bombs and indirect fire, such as mortar or rocket attacks. This also results in greater variance in attacks, which is correlated with the increase in the level of attacks (rather than simply a time-related dynamic). Higher variance periods and periods where there is a bimodality in fatalities are both associated with a higher fraction of attacks using bombs, and so may in part be technology-driven. However, higher variance may also be a strategic choice by the insurgents, under the belief that clusters of attacks are more destabilizing than spread out attacks.

The series in Figure 2 tracks the release of public opinion polls containing questions about attitudes towards the war in Iraq. As discussed, public opinion polls are arguably released at times independent of the amount of violence in the preceding weeks. While the content of the polls may be affected by violence, we measure the actual release date and observe how the change in information about the existing public support for maintaining troops in Iraq affects future levels of violence. Comparing Figures 1 and 2, there does not appear to be a clear correlation between poll release timing and the aggregate level of attacks.

The diffusion of information occurs across regions based on satellite TV access. Table 1 presents descriptive statistics about provinces with high (above 50 %) and low satellite access. There do appear to be differences between the regions. In particular, high satellite access provinces tend to have more attacks and fatalities, denser population centers, and are slightly richer. They also have larger number of displaced persons due to the war. While the regions are similar in other characteristics, such as nutrition and literacy rates, these differences are somewhat concerning. As a result, we construct a second test using only a subset of provinces that are better matched on a set of observables, including population density, literacy, unemployment rates, and malnutrition rates. In this restricted province sample, provinces in the high satellite category are Anbar, Babil, Ninawa, and Tamim. Provinces in the low satellite category are Diyala, Karbala, Najaf, and Salah ad Din. This more restricted set of provinces also excludes the Kurdish provinces (where there is minimal violence) and the province of Basrah (which was monitored by British forces during the period of analysis). The provinces with high satellite access have on average 10.88 attacks per week and the low satellite access provinces have on average 11.49 attacks,



with no significant difference between the two groups. The provinces are also not significantly different in terms of the observables listed in Table 1.

From column (3) in Table 1, it is apparent that Baghdad is an extreme outlier on a host of characteristics, including population density, frequency of attacks, and various socioeconomic indicators. As such, we exclude Baghdad from subsequent analysis. While necessary on methodological grounds, excluding Baghdad might raise other concerns about the applicability of the subsequent analysis. Baghdad does represent a substantial fraction - approximately 35 percent - of overall violence in Iraq. However, there remains a large amount of violence (65%, or about 5 people killed per day) in the rest of the country. In terms of casualties confirmed by the Department of Defense, the non-Baghdad areas of Iraq in our data account for 2,778 U.S. military deaths, still a substantial number. In addition, although Baghdad represents a major population center and a strategic target, our analysis does include other major population centers such as Mosul, Kirkuk, and Najaf, and areas that were or continue to be at the center of the Sunni insurgency such as Tikrit, Ramadi, Samarra, and Fallujah. Our analysis also includes other strategically valuable areas such as the oil-producing regions in the South.

Table 2 provides estimates of the main specification, and divides the sample into three periods. Columns (1) – (3) present estimates of attacks on a continuous variable for satellite television access, an indicator for poll release weeks, and indicators for the weeks before and after high information weeks. These indicators are all interacted with the satellite variable. All specifications include both province and week fixed effects. There is no significant difference between provinces with varying satellite access following high and low information weeks in Period 1, but there is a significant difference in Periods 2 and 3, with the coefficients implying that a 10 percent increase in satellite access increases the number of attacks by 6.5 % in Period 2 and by 13% in Period 3. The effect in Period 1 is smaller and not significant.

Columns (4) through (6) and (7) through (9) in Table 2 report the effect of poll releases on civilian and military fatalities. Following poll release weeks, there appears to be an increase in the number of fatalities incurred by U.S. military forces and a decrease in the number of Iraqi civilian fatalities in higher satellite access areas compared to lower access areas. The effect sizes suggest a large change in

fatalities, although the point estimates are relatively imprecise. A 10 percent increase in satellite television access is associated with a 20 to 30 percent reduction in civilian fatalities in the following week in Periods 2 and 3, and an increase in U.S. military fatalities by 40 to 50 percent. These estimates seem large given the change in attack levels of only 6-13 percent, but the large standard errors make the magnitude of the effects more difficult to interpret.

The post-poll change in the pattern of fatalities provides insight into the increased attacks. After the release of a poll, there is an increase in attacks and an increase in U.S. military fatalities, but a decrease in the total number of fatalities. Because U.S. targets are “hardened” and thus more difficult to kill, insurgents may not invest in doing so unless the returns are sufficiently high. The perceived increase in returns after poll releases may increase the willingness of insurgents to try to target U.S. military personnel. One possible interpretation of the decrease in overall fatalities is that insurgent groups are shifting to increased attacks on U.S. military targets - which are harder and may necessitate more attacks - and thus the additional attacks produce less total fatalities. The trade-off in fatalities is not one-to-one, which is also consistent with the idea that U.S. targets are harder to successfully attack. The results in Table 2 are therefore consistent with strategic action by insurgents to increase attacks after the U.S. public produces greater information about declining future influence.

To address concerns that regions with high and low satellite access are different in other characteristics that might plausibly be related to insurgent activity, Table 2 Panel B compares a sub-set of the provinces that are more closely matched on a set of observables. We restrict our sample to provinces with similar characteristics, including household size, average number of displaced persons, median household income, malnutrition, literacy, labor force participation, and average hourly wages, and, as noted earlier, excluding the Kurdish-majority areas and Basrah. In this restricted province sample, provinces with more than 50 percent of the population reporting access to satellite television are Anbar, Babil, Ninawa, and Tamim. Provinces reporting lower satellite access are Diyala, Karbala, Najaf, and Salah ad Din. The effect sizes in these estimates are substantially smaller and more precisely estimated. These estimates imply a larger effect on attacks than in the general sample—a 10 percent increase in

satellite access increases attack levels about 40-50 percent in the following week. The coefficients in the fatalities results also increase dramatically but remain large in percent terms.

Table 3 shows the dynamics of the insurgency's response to new information about U.S. public opinion over a period of 4 weeks, using the full province sample. Prior to poll release weeks, attacks are on average lower in high satellite regions compared to low satellite regions. In the week of the poll release, attacks are not significantly different, but, consistent with Table 2, in the week after a release higher satellite areas experience higher attack levels compared to lower satellite areas. This effect declines in the second and third week, and by the fourth week the differences between high and low satellite provinces are small in magnitude and insignificant. There is a similar qualitative trend in terms of U.S. fatalities, but the effects are smaller and less precisely estimated. In Period 2 there appears to be no significant difference between one week before and one week after the poll release. In Period 3, there is a significant difference in the week after, and, as in the attacks result, this effect dissipates by the fourth week.

Overall, the evidence from Tables 2 and 3 suggests that there is a spike in attacks following new information regarding the expected probability of future U.S. withdrawal, but that this difference between regions dissipates over subsequent weeks. This spike is consistent with strategic behavior by insurgent groups: when the returns to insurgent attacks are higher, and in particular when the returns to inflicting U.S. military fatalities are higher, Iraqi insurgent groups increase efforts to attack U.S. targets. This increase lasts for about 2 weeks, after which there is no significant difference between high and low satellite regions. A concern highlighted in these results is that the coefficient estimated in the attacks results and the civilian fatalities results suggest a similar sized (albeit insignificant) effect the week before polls are released. This effect is insignificant in all but one specification. We will explicitly address concerns about reverse causality in the next section. In addition, to test the causal channel via satellite access we estimate a similar specification using Al-Jazeera reports. Because Al-Jazeera is not available on satellite and has broad market penetration across Iraq, we would not expect to find any significant

different in high and low satellite regions. The results suggest that there is some unique information provided on satellite television which is used and not shared by competing insurgent groups.<sup>25</sup>

## V. ALTERNATE EXPLANATION AND SOURCES OF BIAS

The strategy used to identify the relationship between new information contained in U.S. public opinion polls and insurgent violence relies on several assumptions that may appear problematic. In this section we address several possible concerns.

Reverse Causation: Because we assume that “high information weeks” are independent of the underlying factors that also drive violence, our identification strategy is susceptible to concerns about reverse causation. Our analysis addresses this issue in several ways. First, although U.S. opinion towards the war to some extent reflects violence levels in Iraq, the actual release of opinion polls and their promotion in the media are likely to be independent of week-to-week changes in violence, as described above.<sup>26</sup> Second, in all specifications we use a lagged term week indicator interacted with satellite access. Third, to further support the conclusion that the results are not biased by reverse causation, we conduct a Granger causality test of attack levels on poll releases. This tests how well the level of attacks in previous periods predicts the release of polls. The results of this test provide evidence against reverse causation, as attacks do not Granger-cause poll releases.<sup>27</sup>

Third Factor Causation—Military Strategic Value: We assume that provinces that vary on the satellite access measure are comparable in terms of violence except for satellite access—that is, we make a parallel trend assumption. To the extent that provinces with high satellite television are associated with other factors that might drive violence, then this strategy will fail to identify the causal relationship. To address concerns about third factor causation, we interact the poll release variable with other province level variables that could potentially explain our effect, such as ethnic composition and the strategic

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<sup>25</sup> Results of this specification check and the details of the Al-Jazeera transcript search are presented in Appendix Table 1.

<sup>26</sup> In addition, for evidence that public opinion is not primarily driven by the level of casualties, see Gelpi, Feaver, and Riefler 2006.

<sup>27</sup> The asymptotic Chi-squared statistics (p-values), from 1-4 lags, are  $\chi^2(1)=0.72$  (0.60),  $\chi^2(2)=0.82$  (0.34),  $\chi^2(3)= 3.34$  (0.66), and  $\chi^2(4)=5.02$  (0.60), respectively.

importance of different areas (presented in Table 4). These exercises test whether the estimates of the effect of poll-related information rely on the variation in satellite access and not variation in some other province-level variable. To do this, we require a variable which may be plausibly associated with higher levels of attacks but not collinear with the satellite access variable. Intuitively, areas with some strategic value may have different responses to information about U.S. withdrawal than non-strategic areas. In Iraq, a major indicator of strategic value is the presence of oil. We therefore interact a continuous variable for the fraction of total Iraqi oil produced in the province with the poll release variable. Oil production varies substantially across Iraq, and the correlation of production level and satellite access is 0.4. There are substantially more attacks in low oil producing regions relative to high oil regions (13.1 versus 5.6), which is consistent with a higher U.S. emphasis on protecting “high oil” regions. If satellite access is really picking up the effect of strategic value, the oil variable should produce similar results to the satellite variable. Table 4 shows that there does not appear to be a significant effect across oil producing regions following poll releases, in part because the standard errors on the estimates are sizeable.

Third Factor Causation—Ethnic Divisions: A similar concern could be raised about the relationship between satellite access and the ethnic composition of regions. We therefore conduct a similar exercise using ethnic identity, measured by whether a province is “predominantly Sunni” (presented in columns 2, 5, and 8 of Table 5). If there are differences in responses to new U.S. information by ethnicity (or satellite variation is in some way driven by ethnic differences), then our causal interpretation is false. If the variation in satellite access is identifying supply-side factors for the insurgency, then ethnic composition should perform at least as well, if not better, in generating higher attack rates in the subsequent periods. Most Sunni Arabs reside in central Iraq, including the “Sunni Triangle,” an area that stretches northwest of Baghdad and encompasses Tikrit, Ramadi, Samarra, and Fallujah. At least half of Iraq’s Sunni community lives in large cities such as Baghdad or Mosul. There are more attacks in “high Sunni” areas, consistent with the Sunni population participating in and aiding insurgent-led attacks. In Periods 1 and 2, there is no significant effect of poll releases on attack rates in

Sunni areas. There does appear to be an effect in Period 3, although this effect is eliminated when controlling for satellite access.

Plausibility of a Week-to-Week Response: We assume a relatively short time-frame for the response to information about U.S. commitment, and specifically that a week with a poll release will produce an insurgent response in the following week. We attempt to minimize concerns about this assumption in several ways. First, Table 3 conducts a sensitivity analysis, varying the response time to 2 to 4 weeks. We find that after a two week window the effect diminishes over time. By the third week, there appears to be no significant difference between provinces. However, the results cannot rule out an alternative interpretation of a timing substitution response - insurgent groups may have a greater ability to shift the timing of attacks rather than increase the overall amount of attacks they can produce. This response may be more plausible on a week-to-week basis. Another explanation could be that there are a large number of groups in any given region that have the potential to participate in violence. In periods with little motivation, these groups do not mobilize frequently and as a result only a fraction of these groups are actually participating. In this scenario, information about U.S. withdrawal serves as a mobilization incentive, motivating a larger fraction of groups to participate. Thus, while each group is producing the same amount of violence, the total number of groups engaged in violence may have increased, raising the total amount of attacks. Third, substitution is limited by input factors and thus may not be the only margin along which insurgent groups adjust. There is little doubt that insurgent groups are media savvy, and, to that end, are likely to seek not only the lowest cost means of producing attacks but also the highest return for any given attack or set of attacks. This suggests the media salience of increases in American fatalities makes short-term effects more likely. Finally, the use of a one-week window is a plausible but arbitrary assumption needed to limit the scope of the study. Future research can examine different versions of this argument over longer or even shorter time frames, or how insurgent groups determine the timing of their response.

## VI. CONCLUSION

This paper addresses two important questions in the growing research literature on internal conflicts and insurgencies: how are insurgencies organized, and how do their organizational characteristics affect their behavior? Like many recent civil conflicts, the insurgency in Iraq involves a decentralized organizational structure rather than the hierarchical, command and control systems that have characterized traditional insurgent organizations. This paper presents evidence supporting the argument that, in this context, new information about a possible future decline in U.S. influence intensifies inter-group competition. Using variation in satellite television access as an exogenous source of variation in information, we find that information shocks have a dramatic causal impact on the number of violent attacks and fatalities. In the weeks after the release of public opinion polls, attacks increase by 15 percent and U.S. military fatalities increase by almost 50 percent in Iraqi provinces with greater access to international news through satellite television. However, the changes in attack targeting due to competition between groups also provides some benefits. Civilian fatalities fall by more than 25 percent, producing a decline in the overall level of fatalities resulting from insurgent violence. The increase in U.S. military deaths appears large in percent terms, but the magnitude when compared to civilian fatalities is smaller: in most periods, a 50 percent increase translates into less than one additional death per province per week. These results appear to be concentrated in the two weeks after information shocks and imply that the information diffusion rate occurs within a 4-week window.

The differential response between regions in Iraq to the release of new information suggests that the insurgency in Iraq is decentralized with high degree of inter-group competition. This evidence also suggests additional areas of research on insurgent organizational behavior, particularly in relation to the preferences of the wider noncombatant population. Several national public opinion surveys conducted in Iraq suggest that while Iraqis support the goal of expelling U.S. and coalition forces from the country and may support violence to advance that goal, many also disapprove of high levels of civilian fatalities.<sup>28</sup> This distaste may grow when such fatalities are not necessary for a victory over the United States. The

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<sup>28</sup> See Program on International Policy Attitudes (2006) and International Republican Institute (2006)

evidence is consistent with insurgent groups moving along with this change in public support. Further research might investigate the links between group competition, public support, and the withdrawal of occupation forces.

The implications of this research are potentially important from a public policy perspective: if a short term change in information changes the strategy of competing insurgent groups, then it may be possible to use both outgoing information and competition between groups to better combat violent insurgent activity. If insurgent groups are decentralized, then counterinsurgency strategies based on identifying and incapacitating a single command and control operation will be ineffective. However, incentives-based strategies may be used to take advantage of inter-group rivalry and the need to compete for public support. These conclusions should be taken with the cautionary note; given the complex nature of insurgencies and the limited empirical information available, further research is needed to better identify the causal channels through which various counterinsurgent activities affect insurgent behavior.

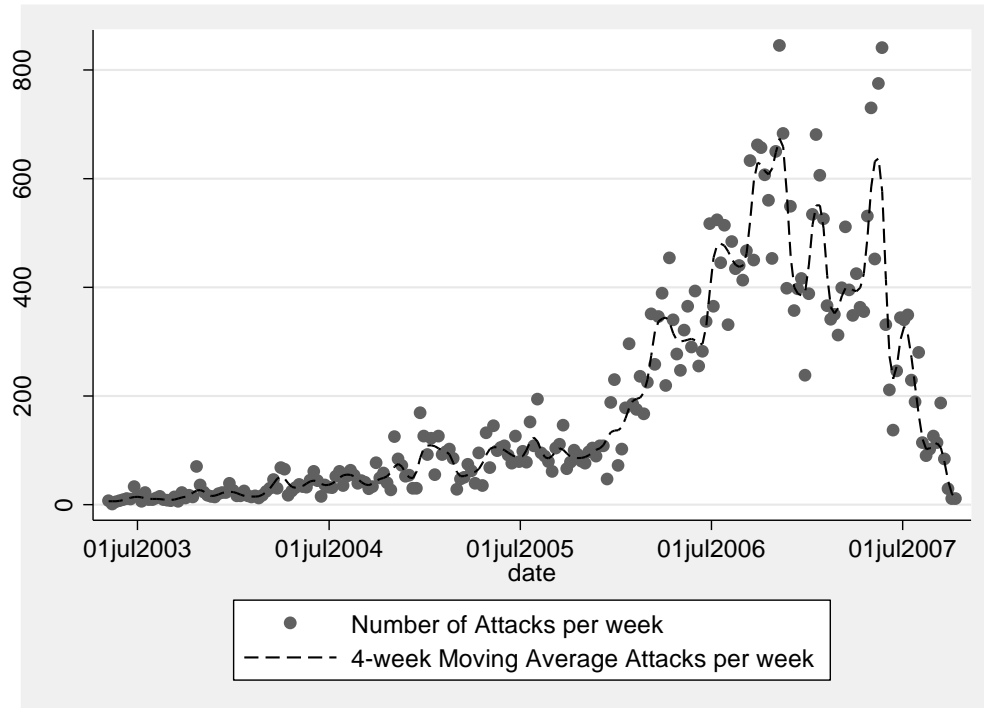


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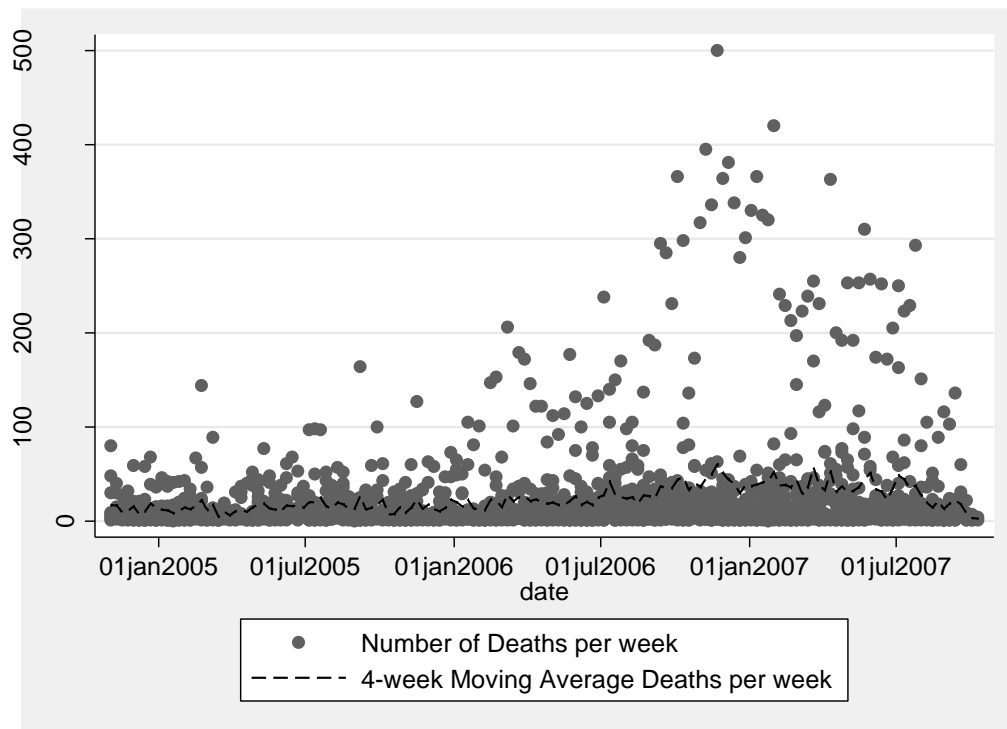
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**Figure 1. Trend in Attacks and Fatalities After U.S. Invasion of Iraq**



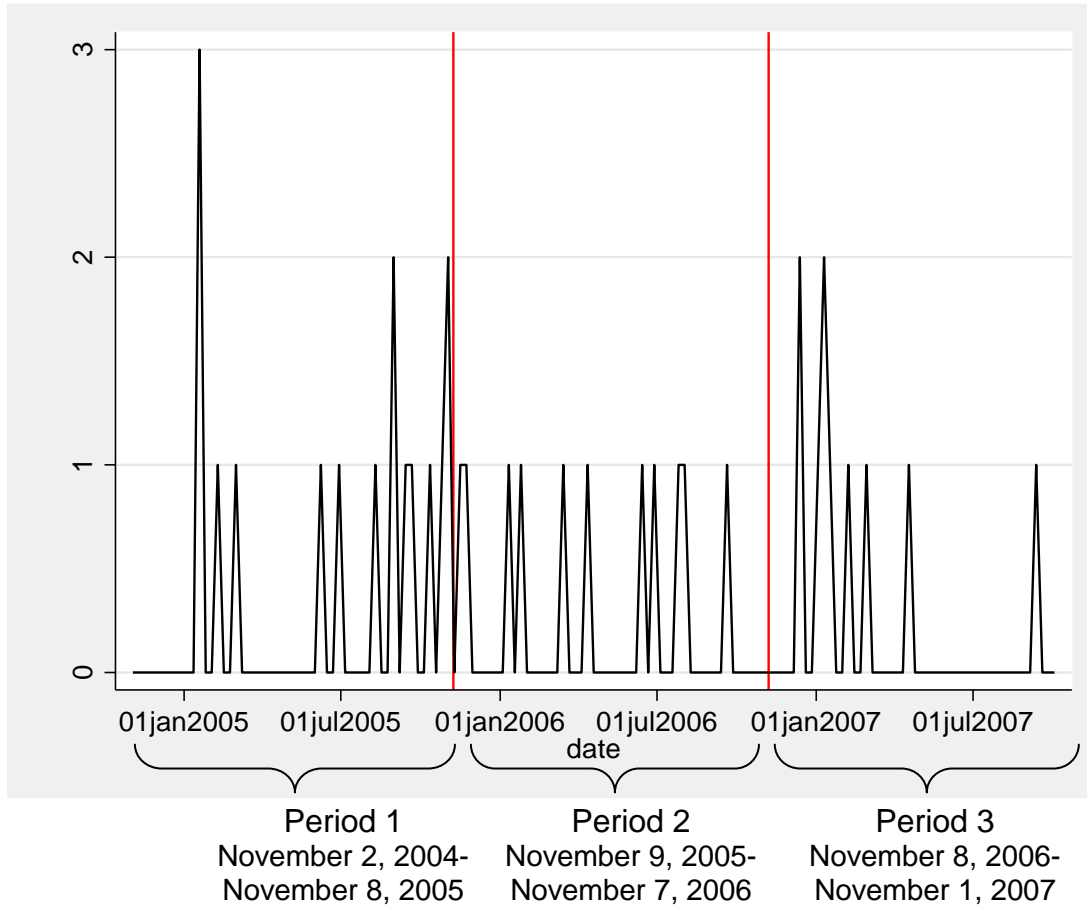
**Figure 1A. Number of Attacks in Iraqi Provinces each week**



**Figure 1B. Number of Fatalities in Iraqi Provinces each week**

Notes: The number of attacks per province-week is defined as non-criminal acts which result in the death of one or more persons. The data does not distinguish between Sunni insurgent attacks and Shia militia attacks. Attacks which result in only injuries are not included. Data and methods used to construct weekly attack counts are discussed in appendix A.

Figure 2. Number of Public Opinion Polls released per week in major media outlets



Notes: Polls included are polls available in Iraqi Satellite media outlets after release. Polls included are CNN/Gallup/USA Today polls, Fox, and CBS polls. Details on the relevant questions included are available in Appendix A. High mention poll weeks are: Jan 19, 2005; Feb 9, 2005; Mar 2, 2005; Jun 8, 2005; Jun 29, 2005; Aug 10, 2005; Aug 31, 2005; Sep 14, 2005; Sep 21, 2005; Oct 12, 2005; Oct 26, 2005; Nov 2, 2005; Nov 16, 2005; Nov 23, 2005; Jan 11, 2006; Jan 25, 2006; Mar 15, 2006; Apr 12, 2006; Jun 14, 2006; Jun 28, 2006; Jul 26, 2006; Aug 2, 2006; Sep 20, 2006; Dec 13, 2006; Jan 3, 2007; Jan 10, 2007; Jan 17, 2007; Feb 7, 2007; Feb 28, 2007; Apr 28, 2007; Sep 12, 2007

Table 1. Descriptive Statistics about Regions by Satellite Access

	(1) High Satellite Access	(2) Low Satellite Access	(3) Baghdad
Regions Included	Anbar, Babil, Erbil, Ninawa, Sulamaniya, Tamim	Basrah, Diyala Karbala, Maysan, Najaf, Salah ad Din, Wasit	-
Avg. Regional Access (Std Dev)	0.59 (0.07)	0.25 (0.09)	0.33 (-)
Avg Number of Attacks (per week)	7.82 (13.78)	6.20 (7.59)	11.24 (10.56)
Avg. Weekly Non-U.S. Fatalities	10.21 (13.13)	7.73 (9.04)	14.81 (14.15)
Avg. Weekly U.S. Fatalities	0.11 (0.28)	0.51 (1.08)	0.14 (0.59)
<i>Regional Demographics</i>			
Avg. Population Density (population per sq miles)	98.16	82.11	8,929
Pre-War Fraction Sunni	0.58	0.41	0.42
<i>Household Persons and Infrastructure Characteristics</i>			
Household Size			
% of Population Displaced Due to War	0.077	0.019	0.30
Median Household Income (in Iraqi Dinars)	116,341	101,661	100,000
Safe, Stable Drinking water	60.5	62	78
Malnutrition Rate	0.12	0.13	0.11
<i>Education and Labor Market</i>			
Literacy Rate	0.605	0.62	0.78
Net Primary School Attendance	0.77	0.70	0.79
Unemployment Rate	0.084	0.096	0.014
Median Hourly wage (Iraqi Dinar)	931.3	913.3	833
% of Households with Firearms	0.24	0.32	0.26

Notes: The number of attacks per province-week is defined as non-criminal acts which result in the death of one or more persons. The data does not distinguish between Sunni insurgent attacks and Shia militia attacks. Attacks which result in only injuries are not included. Household characteristics are from UNDP *Iraq Living Conditions Survey*.

Table 2. Estimate of the Relationship between Attack Levels and Information on US Public Opinion (Excluding Baghdad)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Period 1 (Nov 2004- 2005)	Period 2 (Nov 2005- 2006)	Period 3 (Nov 2006- 2007)	Period 1 (Nov 2004- 2005)	Period 2 (Nov 2005- 2006)	Period 3 (Nov 2006- 2007)	Period 1 (Nov 2004- 2005)	Period 2 (Nov 2005- 2006)	Period 3 (Nov 2006- 2007)
Dependent Variable	Attacks per 100,000			Civilian Fatalities per 100,000			Military Fatalities per 100,000		
Mean	10.04	28.99	32.24	11.02	14.79	16.92	0.88	0.69	0.73
<i>Panel A: Full Sample</i>									
(satellite access)*(one week before release)	0.21 (0.74)	0.81 (3.56)	1.01 (3.73)	-1.41 (2.65)	-2.65 (3.24)	-0.80 (2.91)	-0.03 (0.11)	-0.01 (0.09)	0.32 (0.54)
(satellite access)*(release week)	-0.21 (2.22)	-0.47 (3.92)	4.82 (6.03)	2.33 (2.65)	-3.86** (1.86)	0.02 (4.63)	-0.75 (0.51)	0.38* (0.22)	-0.14 (0.14)
(satellite access)*(one week after release)	1.44 (1.06)	1.91* (1.08)	4.37** (1.69)	-4.88** (1.41)	-4.77** (2.32)	-3.71* (2.20)	-0.39 (0.35)	0.37** (0.18)	0.32** (0.13)
R-squared	0.2931	0.4266	0.5124	0.1850	0.4157	0.3619	0.5412	0.7172	0.5036
Observations	332	489	446	332	489	446	332	489	446
<i>Panel B: Restricted Sample</i>									
Dependent Variable Mean	4.60	14.51	14.67	8.88	13.58	18.65	0.69	0.47	0.54
(satellite access)*(one week before release)	0.12 (2.30)	-1.15 (7.79)	2.27 (8.37)	0.38 (5.45)	3.46 (4.56)	-0.08 (9.46)	0.17 (0.50)	0.12 (0.30)	0.55 (0.54)
(satellite access)*(release week)	-1.09 (4.20)	-8.83 (11.76)	6.95 (5.15)	-3.77 (9.96)	0.97 (6.89)	14.91 (12.60)	-0.69 (0.92)	-0.20 (0.46)	0.16 (0.72)
(satellite access)*(one week after release)	1.45 (1.51)	2.43* (1.44)	7.63* (4.27)	-2.01 (5.94)	-3.28** (1.30)	-4.68** (2.21)	-0.44 (0.55)	0.71** (0.35)	0.85* (0.47)
R-squared	0.3145	0.4775	0.5317	0.3173	0.4842	0.5288	0.5595	0.6346	0.5793
Observations	208	281	243	208	281	243	208	281	243
Province FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
Week FE	Y	Y	Y	Y	Y	Y	Y	Y	Y

Notes: Standard errors clustered at the province level are reported in parentheses. Coefficients which are significant at the 0.05 (0.10, 0.01) level are marked with a \*\*(\*, \*\*\*). Dependent Variable is the number of attacks per province-week. Also included in the regression, but not reported, are lag and lead indicator variables for poll release weeks, which are 1 if it is one week before and one week after a poll release week, respectively. Control variables in specifications without province fixed effects include household size, average number of displaced persons, median household income, malnutrition rate, literacy rate, labor force participation rate, and

average hourly wage. Period 1 is November 2, 2004-November 8, 2005. Period 2 is November 9, 2005-November 7, 2006. Period 3 is November 8, 2006-November 1, 2007. The provinces included in the restricted province sample (Panel B) are Anbar, Babil, Ninawa, and Tamim, Diyala, Karbala, Najaf, and Salah ad Din.

Table 3. Dynamics of Insurgent Response to Resolve Statements and Poll Releases

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Period 1	Period 2	Period 3	Period 1	Period 2	Period 3	Period 1	Period 2	Period 3
	(Nov 2004- 2005)	(Nov 2005- 2006)	(Nov 2006- 2007)	(Nov 2004- 2005)	(Nov 2005- 2006)	(Nov 2006- 2007)	(Nov 2004- 2005)	(Nov 2005- 2006)	(Nov 2006- 2007)
Dependent Variable	Attacks per 100,000			Civilian Fatalities per 100,000			Military Fatalities per 100,000		
Mean	10.04	28.99	32.24	11.02	14.79	16.92	0.88	0.69	0.73
(satellite access)*(one week Before release)	-0.84 (1.91)	-1.82 (4.90)	5.03 (3.78)	1.63 (3.27)	-2.31 (4.04)	5.27 (4.17)	-0.36 (0.29)	0.35* (0.19)	0.03 (0.25)
(satellite access)*(release week)	3.16 (3.17)	1.96 (6.27)	6.18 (5.23)	-2.32 (5.41)	-2.82 (3.17)	2.79 (3.76)	0.68 (0.48)	0.30 (0.24)	-0.11 (0.35)
(satellite access)*(one week after release)	1.12 (2.05)	3.36** (1.60)	4.56** (2.20)	-4.18* (2.51)	-5.28** (2.69)	-5.93*** (2.53)	0.12 (0.31)	0.39** (0.18)	0.35* (0.18)
(satellite access)*(two weeks after release)	-5.65 (5.22)	3.62* (1.98)	4.53 (2.71)	-8.06 (5.62)	-9.35** (4.76)	-6.15* (3.33)	0.87* (0.49)	0.43* (0.22)	0.36 (0.24)
(satellite access)*(three weeks after release)	0.09 (6.20)	2.99 (6.44)	1.77 (6.16)	-1.70 (4.59)	-3.90 (2.79)	2.11 (2.66)	0.72 (1.94)	-0.18 (1.01)	0.11 (1.30)
(satellite access)*(four weeks after release)	-1.18 (4.89)	1.44 (4.73)	1.15 (5.17)	-0.06 (6.35)	2.24 (8.61)	2.26 (6.73)	-0.26 (0.74)	0.46 (1.33)	0.21 (1.00)
R-squared	0.2706	0.4008	0.4608	0.2623	0.3247	0.4947	0.5093	0.5779	0.4935
Observations	332	489	446	332	489	446	332	489	446
Province FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
Week FE	Y	Y	Y	Y	Y	Y	Y	Y	Y

Notes: Standard errors clustered at the province level are reported in parentheses. Coefficients which are significant at the 0.05 (0.10, 0.01) level are marked with a \*\* (\*, \*\*\*). Dependent Variable is the number of attacks per province-week. Attacks are defined as non-criminal acts which result in the death of one or more persons. The data does not distinguish between Sunni insurgent attacks and Shia militia attacks. Attacks which result in only injuries are not included. Data and methods used to construct weekly attack counts are discussed in the appendix. All regressions include an interaction term that is equal to the satellite access variable one week before poll releases. Period 1 is November 2, 2004-November 8, 2005. Period 2 is November 9, 2005-November 7, 2006. Period 3 is November 8, 2006-November 1, 2007.



Table 4. Estimate of the Relationship between Attack Levels and Province Level Characteristics in Various Time Periods

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Dependent Variable	Attacks per 100,000								
Mean	10.04			28.99			32.24		
	Period 1 (Nov 2004-2005)			Period 2 (November 2005-2006)			Period 3 (November 2006-2007)		
(oil)*(one week before the poll release week)	0.04 (6.26)		-1.15 (6.69)	2.96 (10.46)			-6.48 (8.45)		
(oil)*(poll release week)	1.19 (5.65)		4.91 (5.95)	-4.12 (10.28)			-8.74 (8.39)		-2.12 (10.29)
(oil)*(one week after the poll release week)	-0.76 (5.37)		2.94 (5.64)	3.54 (10.40)			-1.00 (8.41)		-5.27 (9.28)
(% Sunni)*(one week before the poll release week)		-0.30 (1.75)			3.57 (3.34)	3.00 (2.07)		-1.85 (3.02)	
(% Sunni)*(poll release week)		0.82 (1.79)	1.74 (2.11)		7.23** (3.48)	6.50 (4.12)		3.42 (3.11)	-4.84 (3.32)
(% Sunni)*(one week after the poll release week)		-0.45 (1.72)	2.62 (1.87)		1.67 (3.47)	3.02 (4.11)		-2.24 (3.09)	1.22 (3.30)
(satellite access)*(one week before the poll release week)			-0.42 (2.31)			-4.18 (4.78)			-1.97 (4.22)
(satellite access)*(poll release week)			10.97** (4.57)			5.07 (9.94)			10.36 (8.67)
(satellite access)*(one week after the poll release week)			4.53 (3.32)			8.19* (4.98)			13.13* (6.90)
Province Fixed Effects	Y	Y	Y	Y	Y	Y	Y	Y	Y
Week Fixed Effects	Y	Y	Y	Y	Y	Y	Y	Y	Y
R-squared	0.2353	0.4132	0.4784	0.2274	0.4201	0.4890	0.25	0.41	0.47
Observations	332	489	446	332	489	446	332	489	446

Notes: Standard errors clustered at the province level are reported in parentheses. Coefficients which are significant at the 0.05 (0.10, 0.01) level are marked with a \*\* (\*, \*\*\*). Dependent Variable is number of attacks per province-week. Attacks are defined as non-criminal acts which result in the death of one or more persons. The data does not distinguish between Sunni insurgent attacks and Shia militia attacks. Attacks which result in only injuries are not included. Data and methods used to construct weekly attack counts are discussed in the appendix . The oil variable is defined as the percent of total Iraqi oil production located in the province (source: Revenue Watch Institute). Period 1 is November 2, 2004-November 8, 2005. Period 2 is November 9, 2005-November 7, 2006. Period 3 is November 8, 2006-November 1, 2007.

## APPENDIX 1: DATA SOURCES

Data for this paper is available at [people.rwj.harvard.edu/~riyengar/](http://people.rwj.harvard.edu/~riyengar/). Questions about data and analysis may be directed to [riyengar@rwj.harvard.edu](mailto:riyengar@rwj.harvard.edu) or [jonathan.monten@yale.edu](mailto:jonathan.monten@yale.edu).

### Attacks and Fatalities

#### *US Fatalities*

Daily data on coalition deaths comes from [iCasualties.org](http://icasualties.org). We downloaded the data from <http://icasualties.org/oif/Details.aspx>, which lists each death individually. We then aggregated the data by week. A fatality is included if any of the following occur:

- a news story or obituary that reports the death of a US service member is released (this must also be confirmed by the DoD),
- Centcom or the Multi-National Force in Iraq (MNF) releases the name of a soldier who has died (Centcom releases must be confirmed by the DoD),
- the DoD itself releases the name of a soldier who has died,
- the name of a soldier not already recorded appears in the weekly updated Department of Records listing of Operation Iraqi Freedom (OIF) fatalities (<http://icasualties.org/oif/Methodology.aspx>).

#### *Iraqi Civilian Fatalities*

Our primary source for data on violent civilian fatalities comes from the [IraqBodyCount.org](http://IraqBodyCount.org) (IBC) website. The principal researchers are Hamit Dardagan and John Sloboda. It is important to note that the website has a partisan orientation—that is, anti war—but their methodology is conservative and transparent, and seeks to provide an accurate lower bound for the number of violent civilian deaths reported. The data were downloaded from <http://www.iraqbodycount.org/database/>.

Once there are two news sources reporting an incident, two measures are constructed, *reportedminimum* and *reportedmaximum*. If multiple numbers are reported, the lowest is entered as *reportedminimum*. This can be zero if “zero deaths” is reported. However, a wording like “unable to confirm any violent civilian deaths” is not a report of zero deaths and thus is not entered in either column. Moreover, when the report does not mention civilians specifically, this number is entered in the *reportedmaximum* variable but zero is entered into the *reportedminimum* variable unless the proportion of violent civilian deaths is given or a similar detail is given.) If a “family” is reported killed, this is entered as three deaths.

### Poll Release Counts

#### *Identifying Polls to Count*

##### Included Polls

- CNN/Gallup/USA Today
- Fox
- CBS

##### Excluded Polls

- PEW

#### *Relevant questions in included polls*

##### CNN/Gallup/USA Today

“Which comes closest to your view about what the U.S. should now do about the number of U.S. troops in Iraq - the US should send more troops to Iraq, the U.S. should keep the number of troops as it is now, the U.S. should withdraw some troops from Iraq, or the U.S. should withdraw all of its troops from Iraq?”

“Here are four different plans the U.S. could follow in dealing with the war in Iraq. Which one do you prefer: withdraw all troops from Iraq immediately, withdraw all troops by November, 2006 – that is, in 12 months time,

withdraw troops, but take as many years to do it as are needed to turn control over to the Iraqis, or send more troops to Iraq?"

**Satellite Access Survey**

Satellite Access is a population weighted average of the number of individuals who report owning a satellite TV dish in the World Food Program "Food Security and Vulnerability Analysis in Iraq" survey. The data is collected at the district level and was collected July-August 2005. Details can be found at <http://home.wfp.org/stellent/groups/public/documents/ena/wfp193132.pdf>.

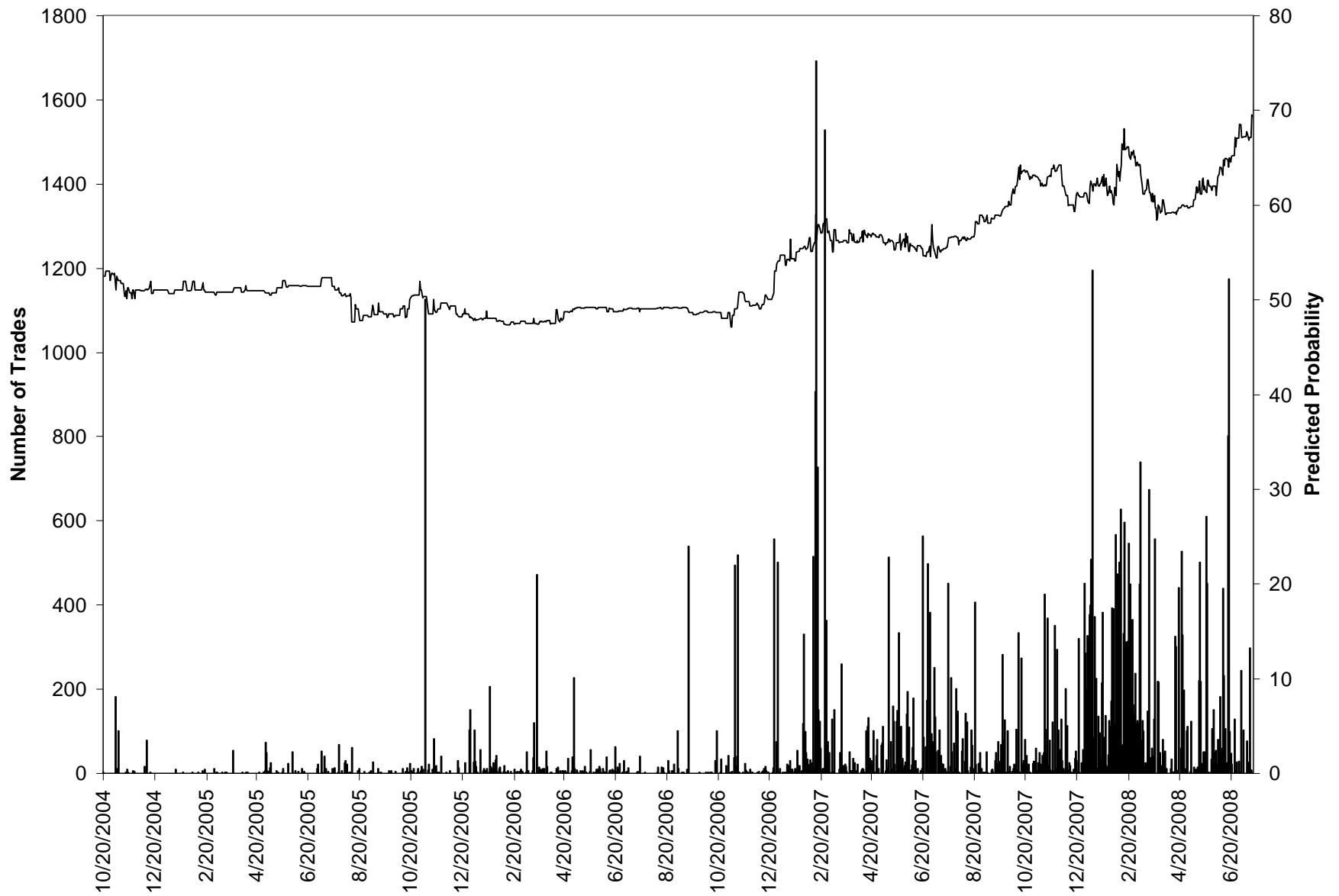


Figure 3. Volume of In-trade Market Trading and Predicted Probability of a Democratic Presidential Victory in 2008

Appendix Table 1. Falsification Exercise

Dependent Variable	Attacks					
	Pre-Election Season	Election Season	Post-Election	Pre-Election Season	Election Season	Post-Election
Mean	10.04	28.99	32.24	10.04	28.99	32.24
(satellite access)*(high mention week)	0.21 (0.74)	0.81 (3.56)	1.01 (3.73)	-0.28 (1.52)	-1.89 (1.25)	0.56 (3.96)
(satellite access)*(one week before the high mention week)	-0.21 (2.22)	-0.47 (3.92)	4.82 (6.03)	-1.19 (3.55)	-1.03 (1.38)	-0.65 (1.22)
(satellite access)*(one week after the high mention week)	1.44 (1.06)	1.91* (1.08)	4.37** (1.69)	-1.40 (1.71)	-1.55 (5.13)	-1.03 (3.21)
R-squared	US Media 0.2539	US Media 0.4263	US Media 0.4978	Al-Jazeera 0.4218	Al-Jazeera 0.5830	Al-Jazeera 0.6695

Notes: Standard errors clustered at the province level are reported in parentheses. Coefficients which are significant at the 0.05 (0.10, 0.01) level are marked with a \* (\*, \*\*\*). Dependent Variable is number of attacks per province-week. Attacks are defined as non-criminal acts which result in the death of one or more persons. The data does not distinguish between Sunni insurgent attacks and Shia militia attacks. Attacks which result in only injuries are not included. Data and methods used to construct weekly attack counts are discussed in the appendix . Al-Jazeera results are based on counts of statements in Al-Jazeera transcripts on the commitment of the US to remain in Iraq. The search script is written in Ruby using the Mechanize and Hpricot libraries. It navigates through weekly transcripts, and iterates through a sequence of search terms, each of which combines a government official's name with one or more buzz words, e.g. "bush and embolden and iraq." For each search, the broadest range of articles available through ProQuest is returned, and then the script sorts the publication dates of the articles into a weekly tally, ranging from Jan 1, 2003 to the present. For analysis purposes, the tallies are aggregated across search terms. Search Terms: "<Official's Name>" + "Resolve!" "<Official's Name>" + "embolden!" + "insurg!". Officials included in the search are: President: George W. Bush; Vice-President: Richard Cheney; Secretary of Defense: Donald Rumsfeld, Robert Gates; Secretary of State: Colin Powell, Condoleezza Rice; US Commander in Iraq: Ricardo Sanchez, George W. Casey, David Petraeus; Press Secretary: Ari Fleischer, Scott McLellan, Tony Snow, Dana Perino.

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