Assessing Pacification Policy in Iraq: Evidence from Iraqi Financial Markets

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Abstract

At the end of January, 2006 the Iraqi government issued roughly \$2.7 billion of debt in exchange for over \$20 billion of Saddam-era commercial claims. I use variation in the price of this sovereign debt to evaluate pacification policy in Iraq. Structural change models are run in conjunction with conventional event study analysis. The techniques applied provide an additional vehicle to "objectively" inform policy in areas where data collection is difficult and policies are time sensitive. Results suggest that sectarian violence was the biggest threat to Iraqi stability in the period analyzed. I find that military operations alone did not sufficiently address Iraq's security problems. The market viewed political negotiations between the interested parties as the most effective stabilization policy. It appears, however, that negotiations among Iraqi parties have reached a dead-end. In the absence of regional (especially Iranian) cooperation the prospects for Iraq's current government seem dim.

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1   Introduction

On January 23, 2006 Iraqi sovereign debt began trading on world markets. Variation in the price of these bonds provides a metric for the success of pacification policy in Iraq. This market-based metric is particularly informative in situations where conventional data collection is difficult or impossible. Since efficient markets aggregate available information faster and more objectively than any individual or agency could, market analysis potentially reduces the implementation period of ineffective strategies. In addition to rapidly and efficiently processing information, markets provide investors large incentives to reveal private information. If investors have access to information not available to policy makers, variation in the bond market provides an important source of "intelligence" to decision makers. These considerations suggest the benefit of using market variation to aid policy decision in Iraq could be substantial since timely interventions can mean the difference between success and failure.

Despite the potential benefits to policy makers in Iraq and in other distressed environments, economists have rarely used event studies to analyze non-economic events and policies. Prominent exceptions include Willard, Guinnane and Harvey (1996) and Frey and Kucher (2000) who use market variation to identify structural breaks in the American Civil War and World War II, respectively. While pioneering in their use of markets to determine important political and historical events, these studies were not intended to directly inform policy. Recently, economists have shown increased interest in using markets to provide "real-time" policy evaluations. Leigh, Wolfers and Zitzewitz (2003) use international financial markets to forecast the outcome of the coalition invasion of Iraq. Zussman and Zussman (2006) use Israeli and Palestinian stock market data to investigate the effectiveness of ongoing anti-terrorism measures in Israel.

These recent studies indicate that policy makers can use markets to assess the effectiveness of a given strategy. Policy makers in Iraq today are primarily concerned with designing and implementing pacification strategies. The economics literature, however, mainly provides long-term policy recommendations. Krueger and Maleckova (2003) point to political frustration as the main driver of terrorists acts. Abadie (2004) finds that while terrorism does respond to political freedom, the relationship is non-linear. Abadie's analysis suggests that increased political freedom may actually lead to more instability (terrorist activity) for certain levels of political freedom. This especially seems to apply to increased freedom following the removal of dictatorial regimes. In light of the history of Iraq, this theory suggests that political emancipation alone will not end terrorism in the short run. The only short-term policy recommended by the literature is an increase in public-goods provisions (Berman(2003)). Given the security situation in Iraq today, this last option is probably not available to policy makers.

This paper uses the Iraqi bond market to test the effectiveness of policies aimed at reducing violence during the period covered by market variation (January-August, 2006). I concentrate on three pacification strategies (encouraging negotiations among the involved parties, engaging Iran and increasing

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military action against insurgents) considered by policy makers during the period. By assessing these policies in a uniquely "objective" manner, the paper highlights the potential benefits of using financial markets to inform policy in the U.S.-led "War on Terror," where conventional data collection is problematic and where policies are often time sensitive. I use a list of country-specific headlines provided by Bloomberg to run conventional event study analysis on the Iraqi bond market. I combine these results with those provided by structural change models to provide a robustness check. The use of both techniques arguably reduces the "subjectivity" of the final results.

In broad terms, I find significant evidence that sectarian violence (as opposed to non-sectarian killings) is the main problem facing Iraq during the period covered. In addition, the market favors political reconciliation among the involved parties (including Iran) over military operations against insurgents. It appears, however, that the political process in Iraq has reached a dead end.

The market came to these and other conclusions relatively quickly. The lack of market response to the killing of al-Zarqawi, the immediate response to news of political reconciliation among the interested parties (including the U.S. and Iran) and market disappointment following the formation of the current Maliki government (which I interpret as the market assessing the new government as incapable of ending the sectarian divide) all illustrate this point.

The paper proceeds as follows: section 2 provides an overview of the Iraqi financial markets used in the analysis. Section 3 provides a broad overview of coalition pacification policies in Iraq and argues for the use of markets to assess these policies. Section 4 details the empirical strategy and the results. Section 5 discusses the implications of the results for policy. Section 6 concludes.

2　Iraqi Financial Markets

2.1　History of Iraqi Public Debt

On the eve of coalition military action against the Republic of Iraq, bilateral and commercial creditors held approximately $130 billion in Iraqi debt. The Paris Club held claims to roughly $40 billion, Persian Gulf creditors $65 billion and commercial creditors $22 billion. Iraq incurred this debt prior to the 1990 invasion of Kuwait, after which Iraq defaulted on its international obligations.[1]

Following the end of major combat operations in May 2003, the U.N. Security Council issued resolution 1483 effectively prohibiting creditors from recouping their claims through the proceeds of Iraq's petroleum industry until January 1, 2008. In December 2003, President Bush appointed James A. Baker III as his personal envoy in negotiations regarding the reduction of Iraqi sovereign debt. The Bush Administration and Congress considered Iraqi debt relief a high priority, and on November 21, 2004, Paris Club members agreed to reduce Iraqi sovereign debt by 80%. The Paris Club agreement set the framework for the reduction and restructuring of Iraq's $22 billion of commercial debt.

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[1] Congressional Research Service (2005).

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On November 16, 2005 the Republic of Iraq sent invitations to holders of Saddam-era commercial debt to exchange their notes. Only creditors owed more than $35 million were given the option of receiving the new notes.[2] Each old $1000 note was exchanged for a new $200 note with a maturity of January 15, 2028 and an annual fixed coupon of 5.80%. The interim president, Ayad Allawi, stated that,

> by making debt-for-debt offers to our larger commercial creditors on terms comparable (in present value terms) to those agreed with the Paris Club last fall, Iraq is demonstrating its commitment to treating all creditors in a fair, transparent and even-handed way.[3]

All eligible claimants accepted the debt-for-debt offer, and U.S. dollar-denominated notes with an aggregate principal totaling $2,658,929,000 were issued to creditors. Trading in the newly issued Iraqi securities began on January 23, 2006. Once trading began, the JP Morgan trader for the bonds estimated that,

> as much as 90% may have gone from the original holders (banks, trading companies, engineering firms, etc., i.e., not investment funds) to investment funds. And of that [the bonds are] about evenly split between hedge funds and "real money" accounts (maybe slightly more in "real money").[4]

Although daily volumes are not available for these bonds, $4.1 billion traded hands during the first quarter (or an average of $67 million a day) and $1.623 billion during the second quarter (or an average of $25 million a day).[5] The bond data used in this paper are daily prices as reported by Merrill Lynch through Bloomberg. The appendix addresses additional data concerns.

2.2   Historical Overview of the Iraqi Stock Market

Saddam Hussein instituted a number of economic reforms following the first Gulf War (1991). These reforms included the opening of the Baghdad Stock Exchange (*Suq Baghdad li-l-Awraq al-Maliya*) in 1992. By 2003 daily volume averaged 100 million Iraqi dinar, or roughly $50,000.

Trading on the Baghdad Stock Exchange ceased following the start of coalition military operations on March 19, 2003. The market remained closed, and shareholders were prohibited from trading until the stock market, renamed the Iraqi Stock Exchange (*Suq al-Iraq li-l-Awraq al-Maliya*), reopened on June 24, 2004. By the end of 2005, 80 companies traded on the market. The market

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[2] Creditors having claims totaling less than $35 million were eligible for a cash buyback at the rate of 10.25% of principal plus accrued interest.

[3] Iraq Ministry of Finance (2005), 3.

[4] Email correspondence of the author with Ed Bartholomew of J.P. Morgan, November 20, 2006.

[5] The quarterly volumes are taken from the Emerging Markets Traders Association quarterly bulletin. The average daily volume is calculated using trading days as outlined in the Bond Market Association's Holiday Recommendation Calendar.

currently meets twice a week. During 2005, 55.600 billion shares traded hands, worth 366.800 billion Iraqi dinars ($246 million, or roughly $2.5 million per trading day). Market capitalization was 1,715 billion Iraqi dinars ($1.1 billion) at the end of 2004, and reached 3,160 billion dinars ($2.1 billion) at the end of 2005 (at the end of September 2006, market capitalization stood at 1,891 billion dinars or $1.3 billion). The stock data used are as reported on the Arabic version of the Iraqi Stock Exchange website.[6]

3   Pacification Policy and Iraqi Markets

3.1   Coalition Pacification Policy

> "We must also improve the responsiveness of our government to help nations emerging from tyranny and war... and that means our government must be able to move quickly to provide needed assistance. "[7]

The Bush administration has defined success in Iraq as a pluralistic, democratic, federal and united Iraq that is stable, at peace with its neighbors, prosperous and an ally in the global war on terrorism. To achieve success in Iraq, the United States has concentrated on "three strategic tracks –security, political, and economic– with the intent of having the Iraqis take responsibility for these tracks as soon as possible."[8]

The United States has committed considerable resources to these strategic tracks. U.S. aid allocations for Iraq appropriated from 2003 to 2006 total $28.9 billion with $17.6 billion targeted at economic and political reconstruction.[9] The remaining $10.9 billion went to increasing Iraqi security.[10] After billions of dollars, however, "the security situation has deteriorated since June, 2003 with significant increases in attacks against the coalition and coalition partners."[11]

In the political arena, the United States has overseen and guided the political process that has produced the current government of Nuri al-Maliki. The fledgling Iraqi government has so far been incapable of reining in the insurgency. Moreover, by most accounts Iran's influence has continued to grow, aggravating already inflamed sectarian divides between Sunnis and Shias. The future of the current political system is in question, with many predicting civil war.

Many of Iraq's economic indicators remain below their pre-invasion levels.[12] The insurgency, and the concomitant lack of security, have crippled the Iraqi

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[6] http://www.isx-iq.net/page/a-bulletin.htm

[7] Remarks given by President Bush on May 17, 2005.

[8] Testimony by Ambassador James Jeffrey, Senior Advisor to the Secretary of State for Iraq before the Committee on Foreign Relations, United States Senate, February 8, 2006.

[9] Congressional Research Service (2006).

[10] Congressional Research Service (2005).

[11] United States Government Accountability Office (2006).

[12] The Brookings Institute (2006), 31-43.

economy. Recently, a government official stated that, "It is difficult to overstate the impact of violence on the reconstruction program."[13]

The United States and its allies have not yet achieved the success many hoped for in Iraq. Some in the administration have been reluctant to admit any mistakes, while others have admitted "thousands of tactical errors."[14].

3.2 Events and the Bond Market

The lackluster results of many coalition policies in Iraq suggest a need for additional policy metrics. Although financial markets can provide such a metric, markets are not fool-proof arbiters. Even if a given market is efficient, there is the problem of identifying what events are moving the market on a given day (this problem will be considered in section 4). The Iraqi bond market entails at least two further problems. The first involves the efficiency of the (relatively small) Iraqi bond market. The second concerns interpreting what variation in the asset (we will concentrate on the risk spread of the Iraqi bonds) represents. Since policy makers are interested in the success of the current Iraqi government, changes in the spread would ideally represent changes in the probability of collapse of the current political system. If this is the case, then we can use variation in the spread to analyze the effects of a given event or policy on the health of the current Iraqi government.

In practice, however, there are many potential scenarios which complicate this "ideal" interpretation. A few examples include the collapse of the Iraqi economy, a severing of political and economic ties with the western world or a decision by the government to simply repudiate all Saddam-era debt. The interpretation of the risk premium is further complicated by a large foreign military presence. It may be that the risk premium primarily indicates the probability of the withdrawal of coalition forces from Iraq, not the health of the current Iraqi government.

Although these scenarios do complicate the interpretation of the Iraqi risk premium, it is hard to imagine a "successful Iraq" (from a U.S. point of view) that defaults on its debts. Qualitative evidence suggests that investors in Iraqi debt are particularly worried about the potential break-up of Iraq. A recent Citigroup report on the Iraqi bond market considers that "if investors begin to assign a higher probability to a sovereign break-up, it is likely that the risk premium for Iraqi debt would increase."[15] The link between the risk premium and political events in Iraq is also stressed by Richard Segal, chief strategist at the Argo fund management group in London. He sees "[t]he political situation as well as the [price of] oil and the level of oil exports [as] the primary determinants of the bond's price."[16] In sum, although I refer to the Iraqi risk premium without claiming that this risk premium exclusively represents a particular default

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[13]Statement by Stuart W. Bowen, Jr. Special Inspector General for Iraq Reconstruction given on June 8, 2006.

[14]Statement by Condoleeza Rice given on March, 31.

[15]Lubin (2006), 7.

[16]Bases (2006).

scenario, there is evidence that the risk premium is connected to the prospects for the current Iraqi government.

We can use the spread between Iraqi bonds and the riskless asset to calculate the probability that Iraq will not default on its debt in the next year. Figure 1 details this probability, along with the spread between the Iraqi bonds and the 20 year U.S. treasury bill.[17] Our estimates for this probability range between 94% and 95.5%. If we assume that this estimated probability is constant for the next 20 years at each point, the probability that Iraq meets its debt obligations for the next 20 years ranges between 29% and 39.8%. The monotonic relationship between the spread and the probability of default (made clear in figure 1) is well known and gives a clear theoretical basis to our later empirical strategy. Figure 2 shows the evolution of Iraqi bond prices when compared with Qatar debt. The vertical lines on these and subsequent figures indicate widely followed events in Iraq during the period covered by the bonds. The mosque at Samarra was destroyed on February 22,[18] the council of representatives met for the first time on March 16, the prime minister was nominated on April 22, the Iraqi parliament met for the first time on May 3, the current Iraqi government was formed on May 20 and al-Zarqawi was killed on June 8.[19]

3.3   Events and the Stock Market

Given the relatively small volume traded in a market that meets only twice a week, I use the Iraqi stock market price as a visual robustness check of the bond market variation. Figure 3 plots the two markets on days in which both traded. The comovement of the two series is encouraging, and argues that both markets are responding to similar fundamentals. In addition, there is anecdotal evidence from traders themselves that events that affect the security and stability of Iraq are important for stock market valuations. In a recent poll of 137 Iraqi investors and brokers in Baghdad, 99 strongly agreed, 34 agreed and 4 disagreed that the market had fallen during 2005 and 2006 due to the increase in the dangers of investing due to lack of security/stability.[20]

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[17]This probability was calculated using the theoretical framework of Ma et al. (1989). Given a recovery rate on promised payments, the following relationship holds in a perfect market:

$$\sum_{t=1}^{n-1} \frac{P^t C + P^{t-1}(1-P)g(C+1)}{(1+i)^t} + \frac{P^n(C+1) + P^{n-1}(1-P)g(C+1)}{(1+i)^n} = \sum_{t=1}^{n} \frac{C}{(1+r)^t} + \frac{1}{(1+r)^n}$$

where n = number of periods to maturity; C=coupon rate on the risky bond per period (5.8%); P=probability of the firm (here the Iraqi government) surviving from one period to the next; r=yield on the risky bond; i=yield on the risk-free asset (20 year treasury); g=proportion of the sum of the period's coupon and face value that would be paid as settlement if default occurred (20%).

[18]This was widely heralded as the start of a rapid escalation in sectarian violence.

[19]Al-Zarqawi was the head of *al-Qaeda fi Bilad al-Rafidain*, the Iraqi branch of al-Qaeda.

[20]Iraq Stock Market (2006), 2.

4 Empirical Strategy

Anecdotal evidence and comparison with the Iraqi stock market suggest that the bond prices respond to events that affect the political and economic stability of Iraq. To inform Iraqi pacification policy, however, we need to identify relevant (policy-related) events and pinpoint when the market incorporates the events into the bond's price (we will subsequently concentrate on the bond's yield spread). Identifying relevant events is greatly facilitated by the availability of a real-time country-specific news service on Iraq provided by Bloomberg. Pinpointing the yield spread change for a given event (or convincingly claiming that no change happened) is more difficult and is treated econometrically throughout the following section.

4.1 Identifying Events

In addition to using Iraq-specific "streaming" headlines as reported by Bloomberg, we use dates identified as "major milestones toward a democratic Iraq" in the May 2006 report to the United States Congress "Measuring Stability and Security in Iraq."[21] These dates include:

> 1) March 16, 2006: First Session of Council of Representatives
> 2) April 22,2006: Election of Presidency Council by Council of Representatives, Nomination of Prime Minister by Presidency Council
> 3) May 20, 2006: Naming of Cabinet by Prime Minister designee, Vote of Confidence for Prime Minister, his Cabinet, and his Program

While identifying events considered ground-breaking in the U.S. is relatively simple, defining the days when other inroads occur is more difficult. Using headlines from Bloomberg's news service on Iraq, we create four dummy variables: TERROR, SECT, IRAN and IRANIRAQ. The dummy variable TERROR is set equal to one if a leader of the Iraqi insurgency was killed or captured that day by the Iraqi or US military. SECT equals one if on a given day a headline mentions which sect was involved in the killing (e.g. 6 Sunnis killed in attack by Shia militia), the attack happened in a mosque or an Iraqi official mentions civil war in his or her declarations. IRANIRAQ is equal to one if there is news of an Iranian official visiting Iraq for negotiations, or news of U.S.-Iran talks. Finally, to investigate how international pressure on Iran is viewed by the Iraqi bond market, we set IRAN equal to one if a western official threatens Iran, or if Iran announces advances in its nuclear program.

Although Bloomberg's news service probably does not detail all the news affecting Iraq, it is used by investors around the world to help inform their investment decisions, and is likely an accurate source of news that moves the bond's price.

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[21] Department of Defense (2006).

4.2 Conventional Event Study

We begin by using standard event study methodology. Since the spread between the Iraqi and the risk free yield is a monotonic transformation of the Iraqi default probability, we run a specification of the form:

$$\Delta(IRAQ)_t = \alpha + \beta\Delta(QATAR)_t + \gamma'X + \sum_i \varphi_i D_{event_i} + \epsilon_t, \qquad (1)$$

where $\Delta(IRAQ)_t$ is the change in the difference between the Iraqi and US yields[22] between t and $t-1$, $\Delta(QATAR)_t$ is the change in the yield spread on Qatar's bond over the same period, D_{event_i} is an indicator that is equal to one if the event of interest (TERROR, SECT, IRAN or IRANIRAQ) occurs at time t[23] and X is a vector of control variables (Iraqi Oil Production,[24] the daily change in the price of oil (Basrah Light), the number of Iraqi civilians killed (CivCas) and the number of U.S. soldiers killed (MiltCas)).[25] We choose to control for Qatar yields since Qatar, like Iraq, is heavily dependent on oil exports. In addition, the Qatar yield allows us to control for the effect of regional events.

The results of equation (1) are reported in the first column of table 1. The second column contains the results of a regression similar to (1) with the percent change in Halliburton stock prices as the dependent variable and adding the percent change in the S&P 500 and $\Delta(IRAQ)_t$ as independent variables. In the third column the percent change in the Tehran TSE-50 index is the dependent variable and the Qatar DSM general index and $\Delta(IRAQ)_t$ are added as independent variables.

The signs of the point estimates for the different "dummy variables" in the Iraqi bond market regression (column (1)) are largely as expected. Most prominently, news of sectarian violence is positively correlated with the change in the Iraqi spread and news of impending negotiations with Iran is associated with a fall in the spread. These results suggest that sectarian violence is more dangerous to Iraq's future than other "random" violence (the coefficient on CivCas is approximately 0), and that negotiations with Iran significantly reduce the risk of Iraqi debt.

The results in column (2) show that a fall in the Iraqi risk premium is correlated with a rise in Halliburton's stock price. Thus, for the first two-thirds of 2006, investors considered the pacification of Iraq under the current regime as a positive for Halliburton's future profits. Although none of the coefficients on the "dummy" variables are significant at conventional levels, it appears that neither investors in the bond market nor Halliburton's stock are excited about increased casualties among American soldiers.

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[22] We use the 20 year treasury yield.

[23] Events that occur on the weekends are summed and added to the independent variable value the following Monday.

[24] Given that only weekly data exist for the oil production data, we do not present these results in this paper. The exclusion of oil production does not affect the results.

[25] Civilian casualties were collected from Iraq Body Count (http://www.iraqbodycount.org) military casualties are from the Department of Defense.

Column (3) shows that changes in the Iranian stock market are negatively correlated with the number of U.S. military casualties in Iraq. It may be that Iranian investors know that Iran is responsible for these casualties, or that investors are afraid the U.S. will hold Iran responsible for these killings. Although none of the other variables are significant at conventional levels, and we only have 80 observations on the Iranian market (compared to over 140 for the other regressions) the signs on these coefficients roughly correspond (i.e. the signs are opposite) with the bond results.

4.3   Cumulative Abnormal Returns

While the specification in equation (1) (which assumes that the news is not expected and is immediately reflected in the bond price) might be adequate for news involving terrorist deaths and news of sectarian violence (i.e. events that cannot be reliably predicted), political breakthroughs are probably anticipated by the market. The one-day change in the Iraqi spread might not capture the full effect of these breakthroughs. To address these concerns we use cumulative abnormal returns to analyze important political dates.

Cumulative abnormal returns (CAR) are the summation of abnormal returns (AR) over an event window. Studying cumulative returns allows the researcher to capture the result of a given event, even if the effect of the event is spread over time. The complication of computing the variance of the sum of abnormal returns is addressed by Salinger (1992), who shows that since $CAR_1 = AR_1$ and $CAR_t = CAR_{t-1} + AR_t$ for $t > 1$, equation (1) can be rewritten as:

$$\Delta(IRAQ)_1 = \alpha + \beta\Delta(Qatar)_t + \gamma'X + CAR_1 + \epsilon_t$$

$$\Delta(IRAQ)_t = \alpha + \beta\Delta(Qatar)_t + \gamma'X + CAR_t - CAR_{t-1} + \epsilon_t, \; 2 \leq t \leq T. \quad (2)$$

To calculate the CARs we use the "dummy" variables strategy suggested by Salinger. This entails running a regression for event k of the form:

$$\Delta(IRAQ)_t = \alpha + \beta\Delta(Qatar)_t + \gamma'X + \sum_{t=-2}^{2} \varphi_{kt}D_{k(T_k+t)} + \epsilon_t, \quad (3)$$

where $D_{k(T_k-2)}$ through $D_{k(T_k+1)}$ are coded equal to 1 for observation $T_k + t$, set equal to -1 for observation $T_k + t + 1$ and equal to 0 else. $D_{k(T_k+2)}$ is coded as normal (i.e. set equal to 1 for observation $T_k + 2$ and 0 otherwise). Salinger shows that this coding strategy implies that $\varphi_{k,-2} = CAR_{k(1)} = AR_{k(1)}$, $\varphi_{k,-1} = CAR_{k(2)}$ and so on. Moreover, Salinger shows that the standard errors reported by regression packages for each φ_{kt} are correct.

Table 2 reports the period-by-period cumulative abnormal returns calculated in this manner for March 16, April 22, May 20 and May 3 (the first three were dubbed milestones by the United States, and the fourth was heralded by Iran as one of significant political progress). Although the March 16 and April 22

milestones are surrounded by drops in the spread, the abnormal returns and the cumulative returns are not significant. An increase in the yield followed May 20, the day that Nuri al-Maliki's government coalesced. This result argues that the market was not impressed by the final shape of the Maliki cabinet. May 3, the first working day of the Iraqi parliament, was viewed as substantially reducing the risk of Iraqi default.

4.4 Structural Breaks

Standard event studies require the researcher to choose important events. As a robustness check to our previous results this section identifies structural breaks in the Iraqi bond data. This strategy, which ties the researcher's hands by "letting the data" identify the dates of interest, potentially strengthens the objective nature of our findings.

We start by detailing the days with the largest jumps or falls in the Iraqi yield, as detailed in table 3. The first 3 columns list the daily change in the yield spread with respect to three reference yields (Qatar, Egypt and the U.S.). The numbers in brackets detail the rank of the jump (from negative to positive) in the sample (147 for the U.S. spread, 143 otherwise). To be included in the table, the jump must be in the top (or bottom) ten for all three reference yields. Again, we use Bloomberg headlines to identify important events for a given day. Simplistic as this identification strategy may be, it is suggestive of what is moving the market. Table 3 suggests that news of domestic (Iraqi) political negotiations, military cooperation between U.S. and Iraqi forces, oil prices and news of Iranian involvement in Iraq all coincide with large swings in the bond market.

To identify the structural breaks we use econometric techniques as outlined in Bai and Perron (1998, 2003). We consider a multiple linear regression with m breaks:

$$y_t = x_t'\beta + z_t'\delta_j + u_t \qquad t = T_{j-1} + 1, ..., T_j \qquad (4)$$

for $j = 1, ..., m + 1$. Where y_t is the dependent variable at time t, x_t is a $p \times 1$ vector of variables whose coefficients are not subject to shifts and z_t is a $q \times 1$ vector of variables whose coefficients are subject to change. We look for mean breaks in our sample as considered in Bai and Perron (2003). Their specification is designed to pinpoint abrupt changes in the mean level of a series. In this case, z_t is an indicator variable (since we are interested in abrupt changes in the mean), x_t is zero and equation (4) reduces to:

$$Spread_t = \delta_j + u_t \qquad (5)$$

In our framework δ_j is the mean value of the yield spread in each window. The length of this window is set by the researcher. Since the period covered by the data witnessed a great deal of turbulence in Iraq, we set the trimming parameter ϵ equal to 0.10. This implies an h, or minimal window length, of

14 trading days.[26] We let the data dictate the number of breaks following the method suggested in Bai (1999) and Bai and Perron (2003). This method starts by using the WD max test to investigate if at least one break is present. If there is evidence for one break the method continues to add breaks until the $supLR_T(l+1|l)$ fails to reject the hypothesis of no additional structural changes at the 5 percent level or there is no room for more breaks.[27] We allow for heterogeneous and autocorrelated errors as outlined in Bai and Perron (2003).

Figure 4 graphs the fitted values of equation (5) along with the Iraqi-U.S. yield spread. The data identify seven break points with $\epsilon = 0.10$. The seven break points were also identified with $\epsilon = 0.05$, which suggests that the results are not sensitive to the choice of trimming parameter. Table 4 details the break dates. The first column gives the 95% confidence interval for each break date. Column (2) provides the fitted value $\widehat{\delta_j}$ for each window. The third column details headlines in the 95% confidence interval for each break point. We start by looking for headlines on the break date and move outwards. Column (3) shows that the detailed headlines are all within 3 days of a given break point.

The break points mostly correspond to news of political progress in Iraq and news involving possible negotiations with Iran. The results also suggest sectarian violence is a problem. On one hand, the break points suggest a reduction in the coalition military presence in Iraq increases the risk premium on Iraqi bonds (since news regarding coalition withdrawals is greeted by a rise in the yield at the break points). On the other, the break point which corresponds to the start of hostilities between *Hizb Allah* and Israel (and the rise in the spread) suggests that the market is sceptical of military action against Iran or Syria. The killing of al-Zarqawi is conspicuously absent from our list of "positive" break points, as is the death of any other prominent insurgent leader.

The structural breaks broadly confirm the results previously obtained through conventional event study analysis. Headlines detailing sectarian violence, political bargaining among Iraqis or Iran's involvement account for the majority of the break points. Although it must be remembered that the mapping of break dates to events is not foolproof (i.e. there is a possibility another event in the confidence interval was the "main event" that caused the break), the similar qualitative implications of both techniques are encouraging. When taken in unison, the overlapping results of both techniques provide more "objective" recommendations than any one technique could provide alone.

5   Policy Recommendations

The results presented in the previous section provide market reactions to a broad number of policies and events. These results suggest that the market

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[26] Although we experimented with setting ϵ=0.05, such a small window requires assuming a very simple error structure which is rejected by the data. In addition, it appears that such a specification overfits the data.

[27] We also run the SupF algorithm suggested in Bai and Perron (2003) as a robustness check. This test gives roughly the same results.

considers sectarian violence the greatest single threat to a "low risk" Iraq during our period. Given that sectarian violence is –by most accounts– at the heart of Iraq's current security problems, this section uses the results to analyze sectarian violence in Iraq and provide policy suggestions. Since we argue that markets provide this analysis in a timely manner, each subsection details the events (and their dates) that led to the conclusions.

5.1   Sectarian Violence

The sectarian split in Iraq (particularly the Sunni-Shia split and to a lesser extent the thorny issue of Kirkuk and Kurdistan) has caused significant problems for policy makers from the start of the U.S.-led invasion. The significant correlation of acts of sectarian violence with increases in the Iraqi default risk underlines the severity of this problem. In spite of the fact that the market seems to have reached this conclusion by early March, administration officials chose to play down the dangers of this violence. An administration official claimed as late as August 2, 2006 that sectarian violence "is not a classic civil war at this stage."[28] Although subsequent events have convinced most policy makers of the dangers of sectarian violence, the best response to this violence remains a topic of disagreement. We proceed by using the empirical results to provide a market assessment of three pacification strategies considered by policy makers during the period covered by market variation (which was one of growing sectarian in-fighting). The first consisted in encouraging political reconciliation between the involved Iraqi parties, the second called for engaging (whether through direct talks or militarily) Iran and the third called for coalition troop increases.

5.1.1   Iraqi Reconciliation

Political negotiations between Iraqis is the most direct and promising pacifica-tion strategy available to policy makers. Indeed, news of "successful" political reconciliation among Iraqis reduces the default risk. The results, however, show that not all political "breakthroughs" are greeted by a drop in the yield and suggest that real breakthroughs are hard to come by. Moreover, since al-Maliki's government took power, the risk premium of the Iraqi bonds has steadily trended higher, without any major improvement in the political climate. When taken in unison, these results suggest that political reconciliation between Iraqis has reached a dead-end.

The Sunni minority, which was for a long period the core of the insurgency, distrusts the Nuri al-Maliki government. Indeed, many Sunnis now refer to the current Iraqi government as the "Safavid project," in reference to the sixteenth century Shia state that forced many Sunnis to convert to Shiism. Many Sunnis claim that the current government is run by Iranian "agents." As this distrust grows, the prospect of a pan-Iraqi agreement becomes increasingly slim.

Shias themselves are splintered into a wide array of extra-governmental (or tacitly supported by the government) militias, which increasingly target Sunni

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[28]Statement by Donald Rumsfeld, August 2, 2006.

groups. Many of these militias reportedly have Iranian connections. Coalition officials have claimed that "they [Iran] are using surrogates to conduct terrorist operations in Iraq both against us and against the Iraqi people."[29] Our results do not reject the hypothesis of a destabilizing Iranian influence in Iraq. The al-Maliki government, caught between the Sunni insurgency and Shia militias, has been incapable of reining either in. It appears that the Maliki government has helped guide the political process in Iraq to a dead-end.

It is of particular interest to note that the market was sceptical of the Maliki government immediately after it formed. The sharp rise in the risk premium on May 22, 2006 was enough to trigger a break point. The market's response stood in sharp contrast with President Bush's statement that same day that the event was a "watershed." Subsequent events have validated the market's scepticism.

Given that the risk premium on Iraqi bonds has steadily trended higher following the formation of the Iraqi government, and the fact that no political breakthroughs caused the risk premium to significantly decrease during this period, it is difficult to imagine the current government successfully reconciling the interested parties without substantial foreign intervention. Although the current stalemate between the different Iraqi parties is probably both a product of negative foreign intervention as well as domestic strife, the market clearly thinks that Iran can help break the deadlock.

5.1.2 Iran

The risk premium on Iraqi bonds fell following the announcement of possible negotiations with Iran. In addition, U.S. casualties were significantly negatively correlated with returns on the Iranian stock market. Although these results can be interpreted as evidence of Iranian involvement in Iraq, they more importantly stress the central role of Iran in any successful stabilization policy.

Historically, U.S. administrations have shown little interest in cultivating diplomatic relations with the current Iranian regime. The current U.S. administration has continued to be reticent to engage in direct talks with Iranian officials, and remains averse to offering concessions to the regime. In spite of this historical American aversion to any concessions to Iran, political stalemate in Iraq suggests that the security situation will continue to deteriorate in the absence of Iranian cooperation.

As the extent of Iranian influence in Iraq (and the extent of its nuclear ambitions) has become increasingly clear, there have also been rumors of military action against Iran. Although the market does not appear to respond to western threats against Iran (perhaps because the market does not take these threats seriously), the start of the *Hizb Allah*-Israeli war (July 12) is defined as a break date by the data. This suggests that the market is wary of military confrontation with Iran or Syria.

Although the market considers that negotiations with Iran significantly lower the risk of Iraqi debt, an agreement between the U.S. and Iran seems remote.

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[29]Statement by Gen. George W. Casey Jr. June 23, 2006.

It also appears that military action against Iran would not help Iraq, although the evidence for this claim is weaker. In light of the difficulties of engaging Iran, some have suggested increasing military operations against insurgents and unruly militias.

5.1.3 Military Operations

The Iraqi risk premium did not significantly change following the killing of al-Zarqawi or any other Iraqi insurgent. This result argues that the killing of terrorists, insurgents and militia members is ineffective pacification policy. Although the military has undoubtedly played an important supporting role for political negotiations, and a reduction in coalition troop numbers raises the Iraqi probability of default, our results suggest that in the absence of political breakthroughs the situation in Iraq will not improve.

6 Conclusion

Markets can be used to inform policy makers where conventional policy analysis is impossible. While some level of interpretation of market evidence is always required, multiple econometric techniques allow us to weigh competing interpretations and limit the "subjectivity" of policy recommendations. Markets provide these recommendations in a timely manner. This is especially valuable in environments like Iraq where the timing of a given policy can save lives and mean the difference between success and failure.

Market results paint a tough picture for policy makers. Sectarian violence seems to be the most pressing problem for Iraq's future. Military operations against insurgents do not reduce the probability of an Iraqi default, and thus do not appear to successfully address Iraq's current problems. Although the market does believe that political reconciliation between the interested parties reduces Iraq's default probability, this political reconciliation seems to have hit a dead-end. In the absence of Iranian cooperation, the results suggest that there is little reason to be optimistic for the future of Iraq's current government.

Since the price for Iranian cooperation, if it can be obtained at all, is probably nothing less than the complete recognition of Iran's role as a nuclear and regional power, the prospects for Iranian-U.S. cooperation in Iraq are dim. Given this fact, perhaps the best option available to U.S. policy makers is to attempt to woo Syria into cooperation. Since Syria is currently a staunch ally of Iran, a U.S.-Syria alliance would help increase pressure on Iran. In addition, many policy makers believe that Syria could help stabilize Iraq. The prospects for such U.S.-Syria cooperation are somewhat brighter, although the results do not speak to the extent of Syria's involvement and influence in Iraq.

In light of the results, the current Iraqi government is unlikely to succeed without pan-Iraqi political agreement and a concomitant end to sectarian strife. This pan-Iraqi agreement seems impossible in the absence of Iranian (and perhaps Syrian) cooperation. The current U.S. administration, however, does not

appear willing to concede enough to Iran or to Syria to convince either to cooperate in Iraq. Under these constraints, our results suggest moving coalition troops out of harm's way (either by withdrawing from Iraq, or redeploying to "friendly" areas such as Kurdistan) is perhaps the best option, since their continued presence will not alone solve Iraq's problems.

Data Appendix

Given an outstanding stock of a little under $2.7 billion, there is the possibility that the Iraqi bond market is both inefficient and driven by a few individuals.

Daily bid-ask spreads are available for the Iraqi bonds. Figure 5 plots the difference between the bid-ask spread (the spread is defined as the difference between the bid yield and the ask yield) and the yield spread between Iraqi and U.S. treasuries. The dates mark the seven break dates identified when $\epsilon = 0.10$ (the vertical lines are as defined in section 3.2). Regressions of the change in the yield spread on both the level and the change in the bid-ask spread are not significant at conventional levels. In addition, there is no evidence that any given event (whether political or one of the 4 "dummy" variables) is systematically related to an abrupt change in the bid-ask spread. In sum, there is little evidence supporting the inefficiency of the Iraqi bond market.

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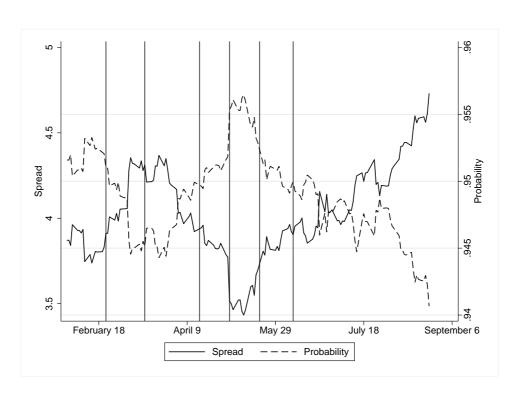
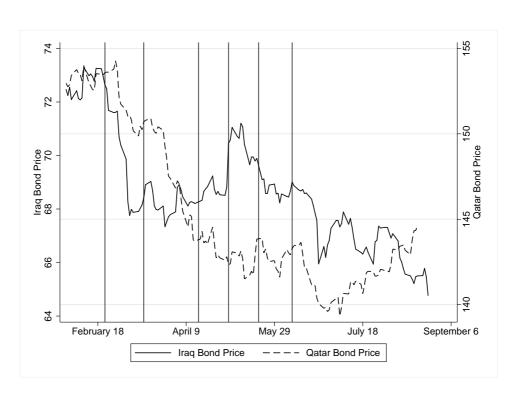Figure 1: Probability Iraq Does Not Default in the Next Year

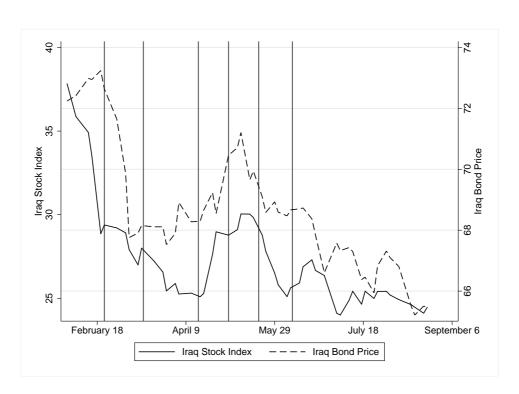Figure 2: Comovement of the Iraqi Bond and Qatar Bond Markets

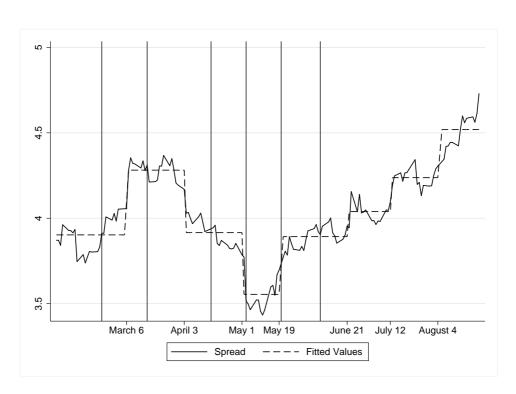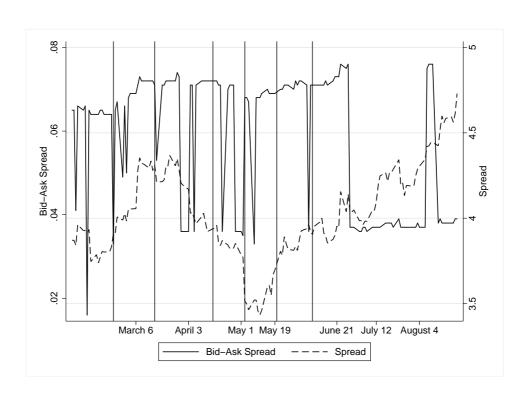Figure 3: Comovement of the Iraqi Bond and Stock Markets

Figure 4: Break Dates

Figure 5: Bid-Ask Spread, Yield Spread and Dates of Interest

Table 1: Regressions on Financial Markets

$Variable$	$\Delta Spread_{Iraq}$	$\Delta Halli$	$\Delta Stock_{Iran}$
	(1)	(2)	(3)
$\Delta Spread_{Iraq}$		-0.0475**	0.0028
		(0.0205)	(0.0136)
$\Delta Spread_{Qatar}$	1.4020***		
	(0.2043)		
$\Delta PriceBasrah$	-0.0038	0.0088***	-0.0007
	(0.0042)	(0.0011)	(0.0008)
$\Delta Stock_{Qatar}$			0.0464
			(0.0477)
$\Delta SP500$		1.8199***	
		(0.1895)	
TERROR	0.0165	0.0027	0.0015
	(0.0153)	(0.0044)	(0.0029)
SECT	0.0336***	0.0014	-0.0021
	(0.0127)	(0.0034)	(0.0023)
IRANIRAQ	-0.0495**	-0.0056	0.0028
	(0.0220)	(0.0065)	(0.0042)
IRAN	-0.0222	-0.0068	0.0016
	(0.0256)	(0.0071)	(0.0039)
MiltCas	0.0023	-0.0008	-0.0012**
	(0.0029)	(0.0008)	(0.0005)
CivCas	-0.0004	-0.0000	0.0001
	(0.0003)	(0.0001)	(0.0001)

Notes: Standard Errors in Parentheses

$\Delta Stock_{Qatar}$ represents the percent change in the Qatar DSM general stock index.

$\Delta Stock_{Iran}$ represents the percent change in the Tehran TSE-50 index.

$\Delta Halli$ represents the percent change in the Halliburton stock price.

*   Significant at the 10 % level

**   Significant at the 5 % level

***   Significant at the 1 % level

Table 2: Cumulative Returns for March 16, April 22, May 3 and May 20, 2006

Variable	$March16_{cum}$	$April22_{cum}$	$May3_{cum}$	$May20_{cum}$
	(1)	(2)	(3)	(4)
$Milestone_{T-2}$	0.0076	-0.0792	-0.0116	-0.0060
	(.0577)	(0.0577)	(0.0538)	(0.0571)
$Milestone_{T-1}$	-0.0224	-0.0979	-0.0424	0.0695
	(.0817)	(0.0817)	(0.0756)	(0.0801)
$Milestone_T$	-0.0431	-0.1330	-0.3127***	0.1194
	(.1010)	(0.1002)	(0.0927)	(0.0986)
$Milestone_{T+1}$	-0.1081	-0.1284	-0.3244***	0.2301**
	(.1163)	(0.1161)	(0.1075)	(0.1142)
$Milestone_{T+2}$	-0.1359	-0.1077	-0.3578***	0.1672
	(.1306)	(0.1306)	(0.1206)	(0.1279)

Notes: Standard Errors in Parentheses

$_{Cum}$ represent cumulative returns for a given date.

March 16: First session of council of representatives. April 22: Election of presidency council. May 3: First working session of Iraqi parliament. May 20: Naming of cabinet by prime minister.

*   Significant at the 10 % level
**   Significant at the 5 % level
***   Significant at the 1 % level

Table 3: Events Corresponding to Largest Daily Changes

Date	$\Delta Spread_{Qa}$ (1)	$\Delta Spread_{Eg}$ (2)	$\Delta Spread_{US}$ (3)	Events (4)
Good News				
5/3/2006	-0.2625[1]	-0.2235[2]	-0.2565[1]	Iraq Deputies Convene for First Working Session, AFP Reports / Iran Foreign Minister to Visit Iraq, Citing Political Progress
2/10/2006	-0.0995[5]	-0.1085[5]	-0.1885[2]	Iraq Certifies Dec. 15 Vote Results; Shiites Win Most Seats
7/25/2006	-0.1399[2]	-0.1290[3]	-0.1450[3]	Bush, Maliki Discuss Security in Baghdad: News Conference / Bush Says U.S. Will Shift Troops to Baghdad to Quell Violence
4/4/2006	-0.1085[4]	-0.1215[4]	-0.1405[4]	U.S., Iran to Meet in Baghdad for Iraq Negotiations, Iran Says / Iraq, Commercial Creditors Settle $18.4 Bln of Claims
Bad News				
5/22/2006	0.1125[140]	0.0935[138]	0.1105[141]	Bush Says Iraqi Government Formation a 'Watershed' / Blair Arrives in Baghdad as Iraq Forms New Government
5/15/2006	0.1235[141]	0.0955[139]	0.1355[145]	Oil price plunge amid worries over inflation / Iraq announces arrest of senior Zarqawi aide in Ramadi
6/23/2006	0.2235[143]	0.2245[143]	0.2125[146]	Iraq Declares Baghdad State of Emergency / Crude Oil Falls as U.S. Stockpiles Rise Above Five Year Average
3/7/2006	0.2070[142]	.1660[142]	0.2250[147]	Iraq Delays Parliament Meeting; Leaders Discuss PM Choice / Iran Sending Its Revolutionary Guard Into Iraq, Rumsfeld Says

Notes: Numbers in brackets represent rank of the jump (from negative to positive) in entire sample (147 for $Spread_{US}$, 143 else). To be included in the table, the jump must be in the top (or bottom) ten for all three reference yields (U.S., Egypt and Qatar). Event headlines are taken verbatim from Bloomberg news service headlines on Iraq.

Table 4: Events Corresponding to Break Dates with Trimming Parameter $\epsilon=0.10$

Date	95% Interval (1)	Estimates (2)	Events (3)
Break Date			
1/31/2006		3.9024*** (0.0750)	Start of Sample
3/6/2006†	[3/3,3/22]	4.2816*** (0.0309)	(3/7) Iraq Delays Parliament Meeting; Leaders Discuss PM Choice (3/7) Iran Sending Its Revolutionary Guard Into Iraq, Rumsfeld Says
4/3/2006†	[3/17,4/4]	3.9155*** (0.0775)	Iraq Coalition May Be Possible After Shiite Split, WSJ Says (4/4) U.S., Iran to Meet in Baghdad for Iraq Negotiations, Iran Says
5/1/2006†	[4/27,5/16]	3.5543*** (0.0456)	(5/3) Iraq Deputies Convene for First Working Session, AFP Reports (5/3) Iran Foreign Minister to Visit Iraq, Citing Political Progress
5/19/2006†	[5/17,5/24]	3.8921*** (0.0284)	(5/18) Prodi to Withdraw Troops From Iraq (5/20) Iraq's Maliki Forms Cabinet, with Two Posts to Fill
6/21/2006†	[6/20,7/7]	4.0387*** (0.0186)	(6/22) Senate Rejects Democrats' Proposals for Iraq Pullout (6/23) Iraq Declares Baghdad State of Emergency
7/12/2006†	[7/7,7/13]	4.2375*** (0.0215)	Hezbollah seizes Israeli soldiers (7/11) Gunmen ambush minibus, killing 10 Shiites in Baghdad
8/4/2006†	[6/22,8/4]	4.5189*** (0.1198)	(8/3) Abizaid Says Baghdad Violence Puts Iraq on Verge of Civil War (8/1) U.S. Democrats urge Bush to withdraw troops from Iraq

Tests			
$WDMAX$ 104.6179***	$SupLR_T(2|1)$ 41.9319***	$SupLR_T(3|2)$ 61.9340***
$SupLR_T(4|3)$ 49.0478***	$SupLR_T(5|4)$ 67.6500***	$SupLR_T(6|5)$ 81.0565***
$SupLR_T(7|6)$ 29.3001***	$SupLR_T(8|7)$ -22.5177	

Notes: Standard Errors in Parentheses
Event headlines are taken verbatim from Bloomberg news service headlines on Iraq.
† Break Date is also identified with $\epsilon=0.05$
* Significant at the 10 % level
** Significant at the 5 % level
*** Significant at the 1 % level