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The Effects of War Risk on U.S. Financial Markets

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Abstract

This paper measures the effects of the risk of war on nine U.S. financial variables using a heteroskedasticity-based estimation technique. The results indicate that increases in the risk of war cause declines in Treasury yields and equity prices, a widening of lower-grade corporate spreads, a fall in the dollar, and a rise in oil prices. This "war risk factor" accounted for a considerable portion of the variance of these financial variables over the ten weeks leading up to the onset of war with Iraq.

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Introduction

Financial markets commentary over the first several months of 2003 repeatedly pointed to the potential for war with Iraq and increased military tensions with North Korea as primary explanations of daily movements in U.S. asset prices. However, almost all of the "evidence" offered was based on the anecdotal accounts of market participants, and few market observers offered precise estimates of the effects. One reason for the lack of formal estimates is the difficulty of measuring the effects of the risk of war, given that this risk is an unobservable variable. Indeed, it is much easier to determine *when* news about the outlook for war took place than it is to quantify that news.

This paper attempts to empirically measure the effects of "war risk" on U.S. financial markets using a heteroskedasticity-based estimator similar to that explored in Rigobon and Sack (2002, 2003).[1] The advantage of this type of estimator is that it allows one to identify the impact of war risk without having to quantify the risk itself. In fact, implementing this estimator only requires that we are able to determine a set of days on which the variance of war-related news was elevated. These days can be easily identified based on developments that significantly affected the outlook for war—for example, days on which President Bush addressed the nation regarding war, or Secretary Powell presented evidence on Iraq to the U.N. Security Council, or chief U.N. arms inspector Hans Blix released reports on Iraq. Determining this set of days is sufficient to estimate the effects of the level of the war risk factor on various asset prices.

The results indicate that the risk of war had significant effects on a number of financial variables over this period. In particular, increases in the risk of war caused considerable declines in Treasury yields and equity prices, a widening of corporate yield spreads, a fall in the dollar, and a rise in oil futures prices. However, we do not find a significant response of liquidity premiums for on-the-run Treasury securities or of gold prices. Taken together, the evidence indicates that greater war risk has been associated

[1] The procedure of identification through heteroskedasticity was first introduced by Philip Wright (1928) and has been recently rediscovered by Sentana and Fiorentini (2001) and Rigobon (2003). The first application of these estimators to U.S. financial markets can be found in Rigobon and Sack (2003), although the method used in this paper more closely follows the estimator developed in Rigobon and Sack (2002). Ellingsen and Soderstrom (2001), Bohl, Siklos, and Werner (2003), and Evans and Lyons (2003) employ similar estimators.

with a shift by investors away from some risky assets, but not with a widespread flight into all safe assets or into the most liquid assets.

The results also indicate that the war risk factor explains a considerable portion of the variance of these financial variables (the ones with significant responses) over the ten-week period leading up to the onset of the war with Iraq. Thus, it appears that this was a period of remarkable intensity of war-related news, and that any attempt to explain asset price behavior over this period must take this factor into consideration.

A Heteroskedasticity-Based Estimation Method

Two primary difficulties arise in attempting to measure the effects of war risk on financial markets. First, the risk of war is an unobservable variable, in that the war-related news on any given day cannot be precisely quantified. Second, other factors are continuously influencing asset prices in addition to the risk of war. We will employ an estimator that addresses both of these considerations.

To add some structure to the problem, we assume that the daily changes in a set of financial variables can be characterized by a system of linear equations. For simplicity, we will derive the estimator using two variables at a time. The changes in those two financial variables, denoted $\Delta x = [\Delta x_1 \quad \Delta x_2]'$, are assumed to be determined as follows:

$$A \cdot \begin{bmatrix} \Delta x_1 \\ \Delta x_2 \end{bmatrix} = B \cdot \begin{bmatrix} z_1 \\ z_2 \\ z_3 \\ \cdots \end{bmatrix} + \begin{bmatrix} \eta_1 \\ \eta_2 \end{bmatrix}. \qquad (1)$$

According to equation (1), movements in the financial variables are driven by a set of common factors, $z = [z_1 \quad z_2 \quad z_3 \quad \ldots]'$, and a set of idiosyncratic shocks, $\eta = [\eta_1 \quad \eta_2]'$.[2] The common factors include changes in monetary and fiscal policy, macroeconomic developments, news regarding the possibility of war, and any other variables that have a direct influence on a number of financial variables. Some of these factors might be (partially) observable, while others are not. The focus of this paper is on measuring the

[2] We assume that the factors and idiosyncratic shocks have zero mean, given that they influence *changes* in the financial variables.

impact of the risk of war, which we will denote z_1. Given the difficulties in quantifying this factor, we take it to be completely unobservable.

Equation (1) allows for contemporaneous spillovers between the financial variables (the matrix A). We will instead concentrate on the reduced form of this system of equations:

$$\begin{bmatrix} \Delta x_1 \\ \Delta x_2 \end{bmatrix} = D \cdot \begin{bmatrix} z_1 \\ z_2 \\ z_3 \\ \dots \end{bmatrix} + \begin{bmatrix} \mu_1 \\ \mu_2 \end{bmatrix}, \tag{2}$$

where $D = A^{-1} \cdot B$ and $\mu = \begin{bmatrix} \mu_1 & \mu_2 \end{bmatrix}' = A^{-1} \cdot \eta$. The matrix D in equation (2) captures the direct impact of the common factors on the financial variables (after accounting for their influences on one another). We will denote the elements of this matrix as follows:

$$D = \begin{bmatrix} 1 & d_{12} & d_{13} & \dots \\ d_{21} & d_{22} & d_{23} & \dots \end{bmatrix}, \tag{3}$$

where d_{ij} represents the impact of the *j*th factor on the *i*th financial variable. The first column of the matrix D captures the impact of the war risk factor on the two financial variables. The impact of this factor on the first variable is normalized to unity, and its impact on the second variable is captured by the coefficient d_{21}, which is the parameter that this paper attempts to estimate (for a number of different financial variables).[3]

If the common factors were all observable, then equation (2) could simply be estimated using an OLS regression. However, many of the common factors are likely to be unobservable. Indeed, as noted above, a primary difficulty in estimating the impact of war risk is that one cannot easily quantify this variable. This presumably is the case for a number of other factors as well.

We therefore rely on a heteroskedasticity-based approach to estimate the impact of the war risk factor. The approach only requires that we can determine a set of dates on which the variance of war risk was elevated (discussed in more detail below), which we will refer to as "war news" days. Of course, it is likely that news about the risk of

[3] This normalization is necessary because the scale of the war risk factor otherwise is not determined.

war trickles out on other days as well, but the intensity of the war-related news is taken to be much higher on the war news days.

Determining a set of such days is sufficient to identify the effects of the level of the war risk factor on all financial variables. The identification comes from the assumption that it is *only* the variance of the war risk factor that changes on those days. Other factors are still assumed to be present, but with the same intensity as on other days. In addition, we impose the assumption that the war risk factor is orthogonal to the other factors, which seems quite plausible.

Under these assumptions, consider what happens to the variance-covariance matrix of the two financial variables, Ω. This matrix is determined by:

$$\Omega \equiv E\left(\begin{bmatrix} \Delta x_1 \\ \Delta x_2 \end{bmatrix} \cdot \begin{bmatrix} \Delta x_1 \\ \Delta x_2 \end{bmatrix}' \right) = D \cdot \Sigma_z \cdot D' + \Sigma_\eta , \tag{4}$$

where Σ_z and Σ_η are the variance-covariance matrices of z and η, respectively. We can compute this variance-covariance matrix for the set of war news days, denoted Ω_H, and likewise for a set of other days (ones that contain less war-related news), denoted Ω_L. Under our identification assumptions, the change in the variance-covariance matrix between these sets of days, $\Delta\Omega = \Omega_H - \Omega_L$, must be driven entirely by the change in the variance of the war risk factor, or the (1,1) element of the matrix Σ_z. More specifically:

$$\Delta\Omega = \Delta\sigma^2(z_1) \cdot \begin{bmatrix} 1 & d_{21} \\ d_{21} & d_{21}^2 \end{bmatrix}, \tag{5}$$

where $\Delta\sigma^2(z_1)$ is the shift in the variance of the war risk factor.

As equation (5) makes clear, the shift in the variance-covariance matrix of the financial variables on the days of high war variance is shaped by the relative responsiveness of the financial variables to that factor. As a result, we can derive several estimates of the parameter d_{21}, as follows:

$$\hat{d} = \Delta\Omega_{22} / \Delta\Omega_{21} \tag{6}$$

$$\hat{d} = \Delta\Omega_{21} / \Delta\Omega_{11} \tag{7}$$

where $\Delta\Omega_{ij}$ denotes the *(i, j)* element of the matrix $\Delta\Omega$.[4] The results from these two estimators would be equal if the assumptions imposed held perfectly—namely, that the factors other than war risk are homoskedastic over our two sets of dates, and that the structure of the model is linear.

As shown in Rigobon and Sack (2002), these estimators can be implemented by an instrumental variables (IV) approach. Define the instrument to be the change in the first financial variable, Δx_1, on all war news days, and the negative of its change, $-\Delta x_1$, on an equal-sized set of other days:

$$\omega_1 = \{\Delta x_{1,t}, \forall t \in H\} \cup \{-\Delta x_{1,t}, \forall t \in L\}, \qquad (8)$$

where H and L denote the set of war risk days and other days, respectively. Consider regressing the change in the second financial variable, Δx_2, on the change in the first financial variable, Δx_1, over both sets of dates using this instrument. The standard IV estimator is

$$\hat{d} = (\omega_1' \cdot \Delta x_1)^{-1} \cdot (\omega_1' \cdot \Delta x_2), \qquad (9)$$

which equals

$$\hat{d} = \frac{Cov_H(\Delta x_1, \Delta x_2) - Cov_L(\Delta x_1, \Delta x_2)}{Var_H(\Delta x_1) - Var_L(\Delta x_1)}, \qquad (10)$$

where the subscripts H and L indicate the set of days over which the variances and covariances are taken. The coefficient (10) is identical to the estimator (7).

Likewise, consider an alternative instrument defined in the exact same way, only using the second financial variable:

$$\omega_2 = \{\Delta x_{2,t}, \forall t \in H\} \cup \{-\Delta x_{2,t}, \forall t \in L\}. \qquad (11)$$

With this instrument, the IV estimator becomes

$$\hat{d} = \frac{Var_H(\Delta x_2) - Var_L(\Delta x_2)}{Cov_H(\Delta x_1, \Delta x_2) - Cov_L(\Delta x_1, \Delta x_2)}, \qquad (12)$$

which is identical to the estimator (6) above.

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[4] Note that a third estimator, equal to $\sqrt{\Delta\Omega_{21} / \Delta\Omega_{11}}$, is also available. However, we do not focus on this estimator, since it is just the geometric average of the first two.

It can be shown that both ω_1 and ω_2 are valid instruments for this regression under the assumptions that have been imposed. Thus, we can also estimate the regression by combining the two instruments, $\omega_3 = \omega_1 \cup \omega_2$, to arrive at a third estimator. This estimator might be advantageous if one of the sets of instruments is relatively weak.[5]

Overall, an advantage of implementing the heteroskedasticity-based estimator in this manner is that all of the properties of the IV estimator apply, including the asymptotic distribution of the parameter estimate. We now turn to the application of these estimators.

Application to War Risk

To implement this estimation method, one must first identify a set of dates on which the variance of war risk was elevated. By reading newspapers and various financial market commentary, we collected a list of 17 dates on which war-related events appeared to be the primary determinant of asset price movements, which is shown in Table 1.[6] As argued above, it is difficult to precisely quantify the war-related news on these days. Indeed, on some days it is even difficult to determine the sign of the news. However, it is clearly the case that the volatility of war-related news was higher on these days relative to the other days in that period. For a set of days with low variance of the war risk factor, we choose days as close as possible to, but not included in, those listed in Table 1.[7]

Using these sets of dates, we apply the above estimators to nine U.S. financial variables that are potentially influenced by the risk of war. In the analysis, we estimate the effects of the war risk factor using two variables at a time, as described above, where

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[5] The strength of the instruments depends on their correlations with the independent variable Δx_1. In one case, this correlation equals the change in the variance of Δx_1. In the other case, it equals the change in the covariance between Δx_1 and Δx_2.

[6] To be sure, there are other important events regarding the possibility of war, such as the day that President Bush first called on the world to confront Iraq in front of the U.N. General Assembly (9/12/02), the day that resolution 1441 passed the U.N. Security Council (11/8/02), and the day following the first attacks against Iraq (3/20/03). However, those events were largely anticipated and therefore did not represent *news* about the risk of war. In fact, financial markets moved very little on those days.

[7] Choosing low-variances days that are close to the high-variance days helps to minimize any changes in variance arising from the other factors.

the first (normalized) variable is always taken to be the two-year Treasury yield.[8] The results are reported in Table 2. In presenting the results, we show the impact of a change in z_1 by –0.25. Thus, all reported coefficients represent movements induced by an increase in war risk that is large enough to cause a 25 basis point drop in the two-year yield.

The table shows the coefficients obtained under all three of the instruments determined above and their significance levels. As can be seen, the coefficients obtained using the different instrument sets are typically close to one another, suggesting that the structure that we have assumed is not strongly violated in the data. On the instances when the coefficients differ considerably, the estimator based on the ω_2 instrument is typically less precise, and the estimator obtained using the combined instrument set (ω_3) accordingly tends to be closer to that based on the ω_1 instrument. In interpreting the results, we will focus on the point estimates found using the ω_3 instrument.

The primary finding of this paper is that many of the financial variables considered are significantly affected by the risk of war.[9] An increase in the risk of war of the magnitude considered results in a jump in the price of the year-ahead oil futures contract by about 77 cents, as one might expect. The increase in war risk also appears to weigh on the prices of risky assets in U.S. financial markets. In particular, equity prices fall nearly 4 percent, and corporate yield spreads rise. Investment-grade (BBB) bond spreads widen 5 basis points, which is statistically significant but small in magnitude, while yield spreads for lower-quality issuers increase more considerably, with the high-yield spread increasing 34 basis points. In terms of the Treasury yield curve, greater war risk pushes down the ten-year yield by about the same magnitude as the two-year yield, with 11 basis points of that reflecting a decline in break-even inflation (measured by the difference between the yields on the nominal ten-year Treasury note and the inflation-

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[8] It is possible to implement this type of estimator using a larger number of variables at once, which results in additional overidentifying restrictions. However, because we have a limited number of observations to estimate the change in the variance-covariance matrix, we took this more restricted approach.

[9] The Treasury yields reported are par off-the-run yields from an estimated yield curve; the corporate yields are indexes computed by Merrill Lynch, and the corporate yield spreads are measured relative to the Treasury yield curve; the on-the-run premium is also computed relative to this yield curve; the prices of oil futures and gold are taken from Bloomberg; and the dollar is a broad trade-weighted index calculated by the Federal Reserve Board.

indexed ten-year Treasury note). Lastly, the increase in war risk induces some weakening of the dollar.

Somewhat surprisingly, though, war risk does not appear to significantly affect the price of gold or the liquidity premium on the on-the-run ten-year Treasury note. One could interpret these last findings as indicating that increases in the risk of war have not generated a widespread flight by investors towards safe and liquid assets. This interpretation raises the possibility that the negative effects on the prices of equities and corporate bonds, Treasury yields, and the dollar partly reflect a perception among investors that the prospect of war (and the associated increases in energy prices) poses downside risk to the U.S. economy, rather than a shift in investors' risk preferences. Of course, the focus of this paper is on the measurement of the effects of war risk, rather than assessing the reasons for those effects.

It is worth speculating a bit at this point about the interpretation of the war risk factor. News about the war on any given day is presumably multidimensional; it might include information about the likelihood of war, its potential success and duration, and whether it will be carried out unilaterally or by a broader coalition. Under our approach, this information is combined into a single factor, so that the results capture the impact of the most important aspects of the war-related news.[10] Judging from financial market commentary on the days listed in Table 1, it appears that increases in the war risk factor are most closely associated with greater uncertainty about the timing of the war and a greater likelihood that the conflict will last for an extended period.[11] However, it is worth repeating that an advantage of our estimator is that one does not have to make such a determination.

The results from Table 2 can be used to assess the importance of the risk of war relative to other factors affecting asset prices. The first two columns of Table 3 show the variance of each variable computed over the war news days and that computed over the

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[10] Our approach could be refined if one were willing to make assumptions about the variances of the individual components of the war risk factor. However, we believe that imposing such assumptions is infeasible.

[11] Two dates immediately following the beginning of the war provide relevant examples. On March 21, the war risk factor appears to have declined (with the two-year Treasury yield rising 7 basis points) on the perception that the war would be short and successful. On March 24, by contrast, the war risk factor appears to have increased sharply (with a 12 basis point drop in the two-year yield) in response to perceived military setbacks over the preceding weekend.

set of other days.[12] As can be seen, the variance of each of the financial variables increases considerably on the war news dates, as one would expect under our assumptions. According to the set-up above, the greater amount of war-related news on the specified days increases the variance of Δx_j by $d_{j1}^2 \cdot \Delta\sigma^2(z_1)$. Given the normalization for the first financial variable, this increase is equal to $d_{j1}^2 \cdot \Delta Var(\Delta x_1)$. Thus, using the difference in the variance of the two-year Treasury yield in the two samples as the measure of $\Delta Var(\Delta x_1)$, we can obtain an estimate of the shift in the variance of each financial variable that is attributable to the increased volatility of the war risk factor on the specified days, shown in the third column.

As can be seen, the shift in the variances of the financial variables arising from the war risk factor can be considerable. These shifts can be used to compute a lower bound on the portion of the variance of a given financial variable that is attributable to war-related news. In particular, the shift in the war-induced variance has to be smaller than the level of the war-induced variance on the war news days, and would only be the same if there were *no* war-related news on the other (low variance) days. Thus, the portion of the variance of the *j*th financial variable that is due to war-related news must be greater than $d_{j1}^2 \cdot \Delta Var(\Delta x_1) / Var(\Delta x_j)$. This measure, reported in column 4, is quite high for some of the variables considered, indicating that the risk of war accounted for a sizable portion of the variance of many of the variables (those with significant coefficients) on the war news days.

Moreover, because the war news days are much more volatile than the other days in the sample, the war news factor accounts for a considerable portion of the movements in the financial variables throughout this period. Indeed, consider the behavior of each financial variable for the ten-week period spanned by our dates, from January 6 to March 17. This period includes 47 business days, of which 17 represent the war news dates specified above. Assuming that the daily changes in a given financial variable are serially independent, we can compute the variance of the cumulative change in that variable over this ten-week period, and then determine how much of this variance can be

[12] These variances are measured simply by the average size of Δx^2 in the two samples.

attributed to the increase in the volatility of the war risk factor on the 17 days specified. The results, shown in the final column, indicate that the war risk factor still accounts for a sizable portion of the variances of many of these variables even looking over the entire ten-week period.

Conclusions

This paper provides empirical evidence that the risk of war that accumulated over the first several months of 2003 had a significant impact on a number of U.S. financial variables. This period obviously involved considerable volatility of the perceived risk of war. The basis for our methodology is that one can determine a particular set of days during this period on which the news about the outlook for war was particularly prominent. We show that determining this set of dates is sufficient to estimate the impact of the war risk factor, even if that factor itself cannot be measured.

The findings accord well with much of the anecdotal evidence offered by financial market participants over this period. Of course, the more formal estimation approach taken here has the advantages of quantifying those effects and determining whether they are statistically significant. The results indicate that increases in war risk caused a rise in oil prices, a fall in Treasury yields and equity prices, a widening of corporate yield spreads, and a decline in the dollar. By contrast, we do not find that the risk of war had a significant impact on the price of gold or on the liquidity premium on the on-the-run ten-year Treasury note.

Overall, the risk of war appears to have been a remarkably important factor in determining movements in U.S. financial variables over the ten-weeks leading up to the onset of war with Iraq. Indeed, of those variables that were found to have a significant response, the risk of war accounted for a considerable portion—with a lower bound of between 13 and 63 percent—of the variances of their cumulative movements over that period.

References

Bohl, Martin T., Pierre L. Siklos, and Thomas Werner (2003), "Did the Bundesbank React to Stock Price Movements?" Mimeo.

Ellingsen, Tore and Ulf Soderstrom (2001), "Classifying Monetary Policy," Mimeo, Stockholm School of Economics.

Evans, Martin D. D. and Richard K. Lyons (2003), "How is Macro News Transmitted to Exchange Rates?" NBER Working Paper no. 9433.

King, Mervyn, Enrique Sentana, and Sushil Wadhwani (1994), "Volatility and Links between National Stock Markets," *Econometrica* 62, 901-933.

Rigobon, Roberto (2003), "Identification through Heteroskedasticity," forthcoming, *Review of Economic Statistics*.

Rigobon, Roberto and Brian Sack (2002), "The Impact of Monetary Policy on Asset Prices," NBER Working Paper no. 8794.

Rigobon, Roberto and Brian Sack (2003), "Measuring the Response of Monetary Policy to the Stock Market," forthcoming, *Quarterly Journal of Economics*.

Sentana, Enrique and Gabriele Fiorentini (2001), "Identification, Estimation and Testing of Conditionally Heteroskedastic Factor Models," *Journal of Econometrics* 102, 143-164.

Wright, Philip (1928), *The Tariff on Animal and Vegetable Oils*, New York: Macmillan Company.

Table 1

Dates of High Variance of War Risk

Date	Event	War Risk
1/9/03	U.N. inspectors report finding no chemical weapons	Decreased
	Reports that N. Korea will abandon nuclear arms program if U.S. reaffirms non-hostility agreement	Decreased
1/10/03	N. Korea announces withdrawal from nuclear non-proliferation treaty	Increased
1/16/03	Reports that Saddam Hussein might consider exile	Decreased
	U.N. weapons inspectors find empty chemical warheads	Increased
1/17/03	Saddam Hussein gives speech stating that Iraq is ready for war	Increased
1/27/03	Blix report: "Iraq appears not to have come to a genuine acceptance of the disarmament"	Increased
1/29/03	President Bush gives State of Union Address	Unclear
	Secretary Powell says U.S. would assist Saddam Hussein if he sought exile	Decreased
1/30/03	President Bush comments on continued lack of Iraqi cooperation	Increased
2/5/03	Secretary Powell makes U.N. presentation in effort to build a broad coalition	Unclear
2/10/03	Reports that Iraq will unconditionally allow surveillance flights	Decreased
2/12/03	Secretary Powell says impasse has reached "moment of truth"	Increased
	U.S. intelligence says N. Korea can reach U.S. with nuclear missle	Increased
2/13/03	Rumors that President Bush set deadline to attack without resolution	Increased
2/14/03	Blix report interpreted as reducing chance of immediate war	Decreased
3/5/03	Secretary Powell makes tough comments on Iraq	Increased
3/7/03	Reports that bin Laden close to being captured	Decreased
3/10/03	Turkey rejects U.S. use of military bases	Unclear
3/13/03	CNN reports that Iraq might surrender before conflict begins	Decreased
3/17/03	President Bush expected to announce an ultimatum with a short deadline for war	Increased

Table 2

Estimated Impact of Increase in War Risk

(Normalized to cause a 25 bp drop in two-year Treasury yield)

Variable	**Units**	**Eqn. (6) IV w/ ω_1**	**Eqn. (7) IV w/ ω_2**	**IV w/ ω_3**
Ten-year Treasury Yield	pp chg	-0.26 (11.66)	-0.26 (11.70)	-0.26 (11.85)
Break-even Inflation (10-year Treas. note)	pp chg	-0.13 (3.95)	-0.04 (1.07)	-0.11 (3.45)
Liquidity Premium (10-year Treas. note)	pp chg	-0.01 (0.79)	-0.03 (0.61)	-0.01 (0.81)
S&P 500	pct chg	-3.85 (2.96)	-5.67 (2.44)	-3.76 (2.90)
BBB Yield Spread	pp chg	0.06 (3.79)	0.04 (2.57)	0.05 (3.79)
High-yield Yield Spread	pp chg	0.32 (4.97)	0.38 (5.00)	0.34 (5.40)
Oil Price (12-month futures contract)	$ chg	0.72 (2.25)	1.10 (1.70)	0.77 (2.44)
Gold Price	$ chg	4.17 (0.82)	41.95 (0.90)	1.30 (0.26)
Dollar (broad index)	pct chg	-0.42 (2.18)	-1.39 (2.14)	-0.44 (2.22)

Last three columns show estimates of $d_{j,1}$, or the impact of the war risk factor on each financial variable (multiplied by –0.25). Absolute t-statistics are shown in parenthesis

Table 3
Variances of Financial Variables

Variable	Var. on L days	Var. on H days	Predicted Change in Var.	-- % Explained --	
				Var. on H days	Var. on all days
Two-year Treasury Yield	.00096	.00594	--	--	--
Ten-year Treasury Yield	.00096	.00632	.00535	84.7	62.8
Break-even Inflation	.00109	.00153	.00088	57.1	31.0
Liquidity Premium	.00003	.00004	.00000	4.7	2.7
S&P 500	1.554	3.293	1.126	34.2	19.7
BBB Yield Spread	.00022	.00042	.00022	52.8	15.5
High-yield Yield Spread	.00190	.01160	.00935	80.6	52.0
Oil Price	.060	.124	.047	38.2	19.2
Gold Price	18.88	32.83	.13440	0.4	0.2
Dollar	.019	.067	.015	22.9	13.5

See Table 2 for additional details about the variables used.