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THE EFFECT OF NEWS ON BOND PRICES: EVIDENCE FROM THE UNITED KINGDOM, 1900-1920

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ABSTRACT

We study the relationship of non-quantitative news to bond prices. We select a set of major news events based solely on their significance as judged by historians, and examine the corresponding bond price movements. We find strong evidence that news has some influence on bond price movements, but we find no evidence that news can explain more than a small fraction of those movements.

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In traditional economic models, asset prices are determined by expectations of economic variables, and so changes in asset prices are caused by the arrival of pieces of news that change these expectations. Thus, the models predict that large changes in asset prices must be due to the arrival of important news.

The high volatility of asset prices has lead some observers to doubt, however, whether most price movements are really due to the arrival of news. A dramatic example is the stock market crash in October 1987, a price decline whose magnitude seems difficult to justify by changes in economic fundamentals. Recent theoretical work has proposed models in which asset prices move for reasons other than the arrival of news. For example, DeLong, et. al. (1990) develop a model in which "noise traders" react to signals that do not reflect fundamental values, creating excessive volatility in stock prices. Similarly, Cutler, Poterba and Summers (1990) argue that the existence of "feedback traders," who base their expectations of future returns on past returns, may explain asset market dynamics.

Unfortunately, there is no straightforward experiment that can confirm or disprove the model in which asset price fluctuations are determined only by news. An ideal test might involve regressing changes in asset prices on revisions in expectations of economic fundamentals; the model would be confirmed if those revisions explained (almost) all of the variation in prices. Yet, such a test cannot be implemented for two important reasons.

First, this ideal test requires data on actual revisions of expectations of economic variables. Such data do not exist. Further, constructing an appropriate proxy for changes in expectations is difficult because one needs to use both quantitative information — "data" in the econometricians' usual sense — and non-quantitative information such as political and international events. One commonly used measure of expectations is a projection from an estimated model of the economy such as a vector autoregression.[1] This measure is inherently unsatisfying in any test of the relationship between news and asset prices, however, because it ignores all of the non-quantitative information that affects expectations.[2] Second, even if one can find forecasts of economic variables that incorporate quantitative *and* non-quantitative news, the ideal test cannot be implemented because it is virtually impossible to identify and

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[1] See, for example, Plosser (1982) and Evans (1987).

[2] The importance of non-quantitative news is demonstrated by Elmendorf (1991) who shows that commercial forecasts have much greater predictive power for interest rates than vector autoregression extrapolations do. Further, it is difficult to study high frequency movements in asset prices using data on fundamentals that are available only at low frequencies. Projections from vector autoregressions change only when new national income (or similar) data are released.

include all of the variables that could be relevant for asset prices.[3]

Thus, it is not clear how one can directly test the hypothesis that asset price fluctuations are determined only by news. It *is* possible to test the hypothesis that news explains none of the fluctuations in asset prices. This hypothesis is so implausible, however, that its rejection adds little to our understanding of the world.

Since the ideal test cannot be implemented and the extreme hypotheses are not interesting, the relevant empirical question becomes "How much of the volatility of asset prices appears to be explained by news?" One approach to this question is to attempt to relate particular asset price movements to particular news items. These attempts are often unconvincing, however. Given a specific price movement, it is usually possible to find some piece of news that can be used to explain it; conversely, given an important piece of news, it is often possible to tell some story *ex post* about why it did or did not produce a price movement. Both of these phenomena are quite familiar to any regular follower of the evening business news, and some explanations appear very stretched. In any case, an *ex post*

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[3] Commercial forecasts are very valuable in studying the effects of particular variables on asset prices, however. See, for example, Roley (1983), Engel and Frankel (1986), Frankel and Froot (1987), and Elmendorf (1991).

rationalization of a known price decline is hardly a persuasive confirmation of an asset pricing model.

Our goal in this paper is to link news to asset prices in a systematic way. We select a set of major news events based solely on their significance as judged by historians, and examine the corresponding bond price movements. This technique is similar to the *ex post* rationalizations discussed above but is superior in two critical ways. First, we avoid observer bias in selecting the news events, and second, we consider many news events and many large movements in prices.

Our procedure does not constitute a formal test of the hypothesis that news causes all bond price movements. Rather, we make a serious effort to find relevant news and to see what fraction of movements it can explain. We find strong (and unsurprising) evidence that news has some influence on bond price movements, but we find no evidence that news can explain more than a small fraction of those movements. Because there is no definitive source for news, any empirical work like ours is open to the challenge that the really important news has not been observed by the econometrician. But we believe that, given the thoroughness of our search for news and the low explanatory power of the news that we identify, the burden of proof should rest with those who believe in the strict fundamentals hypothesis.

Our approach is related to those of Niederhoffer (1971) and Cutler, Poterba and Summers (1989). Niederhoffer studied daily stock market returns and used the size of newspaper headlines as a measure of the importance of news. Cutler, Poterba and Summers also studied daily stock returns; they reviewed the major newspaper stories associated with large price movements, and also looked at price movements on the most important news days listed in an almanac. By contrast, we analyze bonds, which have less volatile prices and are conceivably less subject to fads than stocks, and we examine weekly rather than daily price movements, which reduces any error due to misjudgment of the timing of news events or the speed with which they were digested by the market.[4]

The paper is organized as follows. Section 1 discusses

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[4] Several other studies have found that much of the volatility of asset prices cannot be attributed to news. For example, Shiller (1987) searched for the cause of large stock price movements by surveying investors about their thoughts and behavior during the time of those movements. He concluded that "no news story or rumor ... was responsible for investor behavior" in October 1987 or during previous large price declines. Roll (1984) compared the variance of orange juice futures prices on days with newspaper stories relevant to the orange market with the variance on days without such stories. He concluded that most price volatility was not explained by either these stories or the relevant quantitative variables. Roll (1988) shows that only one-third of the monthly variation in individual stock returns appears to be due to fundamental economic factors. For further work of this sort, see Frankel and Meese (1987) and French and Roll (1986).

the bond price data and news data collected for this study. Section 2 discusses our methodology in more detail. In Section 3, we see how well news can explain bond price fluctuations in our data set. The final section summarizes our results and offers some conclusions.

1. The Data

Bond Prices

This paper studies weekly prices of British government consols from 1900 to 1920. World War I and the series of international crises leading up to it are a rich source of non-quantifiable news. Further, the path of interest rates before, during, and after wars is particularly interesting in its own right. Conventional economic theory holds that temporary government spending should raise both real and nominal interest rates (Barro, 1987); data for the United States do not appear to support this proposition (Evans, 1985), but very long-run data for Britain do (Barro, 1987).

In the early 20th century Britain had the largest and most liquid capital market in the world.[5] We use government bonds in our analysis because they bear no individual company risk. We use consols because their long time horizon means that their prices should be relatively unresponsive to transient money market conditions and short-term policies. News items that matter only for the short run are the most difficult ones to capture with our techniques. Our analysis excludes data from August through December 1914 when the market was closed entirely, and data from December 1914 through November 1915, when there was a binding floor on the consol price.

We study the holding period return on consols, which equals the percentage change in the price of consols adjusted for any coupon payments during the period. Specifically, the holding period return in percent for week t, h_t, is defined by:

$$h_t = 100 * \left[\frac{c_t + (p_t - p_{t-1})}{p_{t-1}} \right] ,$$

where p_t is the price of consols at the end of week t and c_t is the coupon payment (if any) received during week t. The consol price that we use is the average of the bid and asked prices when

[5] In 1913, Britain held 4.5 billion pounds of foreign assets, exceeding the combined overseas holdings of France, Germany, Holland, and the United States. Further, the world markets for money and gold were centered in London (Floud, 1981 and De Cecco, 1984).

the market closed each Friday, or the previous day's price if the market was closed on Friday. The quarterly coupon payment on consols was equal to 0.69 pounds through 1902 and 0.63 pounds thereafter, and the coming change in the coupon was known before our sample period began.

We can define an implicit nominal interest rate on consols as the ratio of the annual coupon payment to the consol price.[6] Figure 1 shows that this rate rose during most of the 1900 to 1920 period, with particularly sharp increases when the market reopened in December 1914 and immediately after the end of World War I in 1918. As Barro (1987) notes, there is a relatively slow rise from 1900 to 1914. This may have been due to the increased likelihood of war, or (as argued by Hicks, 1967) to the reduction in the riskiness of foreign markets which facilitated the flow of British capital abroad.

Because our goal is to study the response of consol prices to unexpected events, we want a measure of the *unanticipated* change in consol prices, not the total change. The holding period return may have a nonzero expected value, but because we study primarily the variance of the returns, this is not a problem. Could there be predictable components of the holding return

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[6] The consol price is adjusted for coupon payments in this calculation. Naturally, weekly changes in this implicit interest rate are very highly correlated with weekly holding period returns.

aside from its mean? If a single piece of news affected consol prices slowly over time, the holding returns would be positively serially correlated. On the other hand, if there was an initial overreaction to news, the holding returns would be negatively correlated. But if news was absorbed fully within a week, the holding returns should show no serial correlation.[7]

To examine the serial correlation of the holding return, we regress the holding return (measured in percent) on a constant and its own lagged value, with the following result (with standard errors in parentheses):

$$h_t = \underset{(0.02)}{0.01} - \underset{(0.031)}{0.029} * h_{t-1} + \epsilon_t \ .$$

We cannot reject the null hypothesis is that deviations in the holding period return from its mean are not serially correlated,

[7] Even under this condition, our data on holding period returns might display a negative autocorrelation due to measurement error or bid-ask spreads.

which implies that news is absorbed fully within a week.[8] Thus we conclude that there is no predictable component of the holding return, and we take the holding period returns as our measure of unexpected changes in consol prices.

News

We draw our list of important news events from two sources: Steinberg's *Historical Tables* (1973) and Langer's *An Encyclopedia of World History* (1972). The dates from Steinberg include political, military, and economic events. The dates from Langer include international political events, developments in the war, and domestic British news.[9] To reduce any subjective bias in selecting events, we use every date listed in these sources with the following exceptions. We delete any

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[8] There is some evidence of autocorrelation of the residuals in this equation. The Durbin-Watson statistic is not meaningful because the regression includes a lagged dependent variable, but Durbin's h-statistic equals 2.0. This statistic follows a standard normal distribution, so we can reject the hypothesis of no autocorrelation of the residuals at the five percent level. The estimated first-order autocorrelation is only 0.005, however, so it is not an important issue for our purposes.

[9] We experimented with including news from a third source, Steiner (1977), which includes only international events that occured before the war. The results were quite similar to those presented here.

events that were obviously known in advance (coronations, for example), as well as conferences and other similar events spanning more than one week (because it is unclear when they actually produced news). For battles lasting more than one week, both the starting and ending dates are treated as news. Events falling on a Friday are problematic, as it is hard to know whether the news arrived in London in time to affect the market that week. We assign those events which we think would have been known in London before the close of business on Friday to that week, and other events to the following week.

The lists of newsworthy dates from the two sources have many dates in common but differ on many dates as well. Of the 870 weeks in our sample that were not during World War I, Steinberg lists 255 with important news and Langer lists 159, with an overlap of only 83. We divide the sample of weeks into three categories: weeks which both sources cite as historic (which we call "news weeks"), weeks which are cited by only one source (which we call "uncertain weeks") and weeks which are cited by neither source (which we call "non-news weeks").

2. Methodology

The fundamental motivation for our empirical work is the view that if news is the primary cause of bond price fluctuations, then bond prices should exhibit much larger changes during weeks with important news than weeks without important news. We use two methods to compare the volatility of bond prices among "news weeks" with the volatility of bond prices among "non-news weeks." Each method provides tests of the hypothesis that news explains none of the fluctuations in bond prices. In almost every case, this hypothesis is rejected at overwhelming significance levels. But, as we argued in the introduction, this rejection is not surprising, so we do not focus on it. We concentrate instead on the relative magnitudes of bond price movements during news and non-news weeks, in an attempt to determine whether news can plausibly explain all of those movements.

Our first procedure is to compare the variance of holding period returns among news weeks with the variance among non-news weeks. If news is the primary cause of bond price movements, one would expect to find that the variance across news weeks is much higher than the variance across non-news weeks. Our second procedure is to divide all weeks into six categories based on the amount of news (the three-way division discussed above) and on whether there is a "large" or "small" holding period return. A "large" holding period return is one that is more than two standard deviations away from the mean;

a "small" change is anything else.[10] We then count the number of entries in each cell of this two-way contingency table and see what pattern emerges. If bond price movements are largely driven by news, one would expect extreme price movements to be associated with the largest pieces of news, and these pieces of news should be the easiest to identify. A further advantage of this contingency table analysis is that it uses information from all of the higher moments of the distribution of returns, while the simple variance comparison looks only at the second moment.

An ideal implementation of these two procedures would remove first those changes in bond prices which can be linked to quantified data like the money supply, price level, industrial output, retail sales, and the balance of trade. Unfortunately, such data are not available for our sample period. However, previous authors who have studied periods for which good quantitative data are available have found that such data explain only a small part of asset price volatility (see, for example, Cutler, Poterba and Summers, 1989, and Roll, 1988). Finally, it should be noted that our tests provide information only on the question of whether the timing of bond price movements can be explained by news about fundamentals; they do not say anything about whether the size of the resulting movements is justified. For an example of

[10] Our qualitative results are not sensitive to the choice of two standard deviations.

the difference in these concepts, see Campbell and Shiller (1988), who find that stock returns are too volatile but that "they correlate very well [in annual data] with their theoretical values".

3. Results

Tables 1 through 4 present the results of these two procedures for four time periods in our sample. Table 1 examines the weeks from 1900 to the beginning of World War I; Table 2, the 1900 to 1920 period excluding the war; Table 3, the entire 1900 to 1920 period; and Table 4, the war itself.

The top half of each table shows the variance of the holding period return on consols for news weeks, uncertain weeks, and non-news weeks. In addition to the variances themselves, we also calculate the ratio of those variances for different groups of weeks. If returns are distributed normally, then under the null hypothesis that the variance in two sets of weeks is equal, their ratio follows an F distribution with (n-1, m-1) degrees of freedom, where n is the number of weeks corresponding to the variance in the numerator, and m is the number of weeks corresponding to the variance in the denominator.[11] If the variance ratio is significantly larger than one, we can reject the null hypothesis that the variances are the same. But our focus, as we have said, is not on this test but on the magnitude of the variance ratio.

The bottom half of each table presents a contingency table based on the amount of news and the absolute value of the holding period return on consols. To test the null hypothesis that the existence of important news is uncorrelated with the size of the holding period return, we compare the observed distribution of weeks in each contingency table with the expected random distribution.[12] Once again, however, our focus is not on this test but on the probability of a large return in news weeks relative to non-news weeks.

Turning to Table 1, we examine the period from 1900 to 1914. As expected, holding period returns on consols are more

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[11] See, for example, DeGroot (1986, page 504). The returns may not, in fact, be distributed normally, but it is not clear what the alternative test should be, and in any case, the null hypothesis is usually rejected by a wide margin.

[12] Let E_i be the expected number of dates in cell i, O_i the observed number, r the number of rows in the table, and c the number of columns. The test statistic is equal to $\Sigma_i(O_i-E_i)/E_i$ and follows a χ^2 distribution with (r-1)*(c-1) degrees of freedom. (See, for example, Maddala, 1977, pages 46-47.) In a three-by-two table, the five and ten percent critical values for the reported statistics are 5.99 and 4.61, respectively.

volatile during weeks with important news events. The volatility of returns is 74% higher for weeks that both of our sources cite as containing news than for weeks cited by neither source, and 72% higher than for weeks cited by only one source. The volatility for weeks cited by both sources is .50%, as compared to .41% over those cited only by Langer and .36% for those cited only by Steinberg; thus, combining these two sources increases our ability to distinguish the most important news weeks. Although we can easily reject the null hypothesis that the variance of returns over weeks where both sources agree that there was news is equal to the variance over weeks during which both sources agree that there was no news, the fraction of variance explained by our news series seems fairly small. If the ten percent of the weeks with the most important news have less than twice the variance of returns as the other ninety percent of the weeks, it appears that a large fraction of the total return variance is not caused by news.

Examination of the contingency table at the bottom of Table 1 provides a different perspective on the same result. During the weeks listed by both of our news sources, there is a fourteen percent probability of a two-standard deviation movement in consol prices, almost three times the probability of a similar price movement during weeks not reported by either source or weeks reported by only one source. Because the holding period returns during news weeks have a larger variance than the holding period returns during other weeks, it is not surprising that more of those returns fall outside of two standard deviations of the distribution of holding period returns for all weeks. If returns are distributed normally during news weeks, then the mean and variance of those returns implies that twelve percent of them should lie outside two standard deviations of the distribution of returns of all weeks. Because the actual number was only slightly larger, at fourteen percent, we can conclude that weeks in which news arrived are no more likely to experience large returns than would be expected given their higher return variance.

Table 2 presents the results for 1900 to 1920 excluding World War I. As in Table 1, the variance of holding period returns for weeks named by both sources is approximately two-thirds larger than the variance for weeks named by neither source. In contrast to Table 1, however, in Table 2, the variance of returns for weeks named by only one source is roughly the same as the variance for weeks named by both sources. What is the cause of this striking difference? Steinberg identifies 24 percent of the weeks between 1900 and the outbreak of the war as containing important news, and 67 percent of the weeks between the end of the war and the end of 1920. By contrast, Langer identifies 18 percent of the weeks in the first period as containing important news, and 17 percent of the weeks in the second period. It seems clear that the latter period was more newsworthy (and indeed the variance of returns was .31 in the pre-war period and 1.19 in the post-war period), but that one of our sources applies an absolute standard when judging news, while the other applies a relative standard. Thus, weeks that appear as news in only one of the sources are weighted more heavily toward the post-war period, and so have higher variance, than weeks that appear in both sources.

The contingency table at the bottom of Table 2 shows that both "news weeks" and "uncertain weeks" have a higher probability of prompting a large movement in consol prices than do "non-news weeks." Once again, however, the probability of having a large price movement is not very different than would be expected given the variances of returns over these periods. Ten percent of "news weeks" experienced large returns, compared to an expected eight percent; seven percent of "uncertain weeks" experienced large returns, compared to an expected nine percent.

Table 3 adds the war period to the sample in Table 2. Over the entire 1900 to 1920 period, the variance of consol holding period returns for weeks that one of our sources classified as containing important news is twice the variance of those returns for weeks that neither source classified in that way.

Similarly, the variance of returns for weeks in which both sources thought there was news is over three times the variance of returns for weeks where neither source thought there was news. Further, "news weeks" were over four times as likely to experience large bond price movements as "non-news weeks," although the ten percent probability of a large movement in news weeks is lower than the fifteen percent probability that would be expected given the mean and variance of those returns.

The dramatic difference between Tables 2 and 3 is due to the wartime combination of frequent, important news and volatile bond prices. Sixty-one percent of the weeks during World War I included news that was listed by both of our news sources, while only ten percent of the weeks during peacetime did. Similarly, the ratio of the variance of holding period returns for weeks during World War I to the variance of returns in all other weeks is over 3.5. This combination is not surprising, of course. The duration and outcome of a war have an important impact on government spending and other economic variables, so interest rates should be particularly responsive to war reports (which arrived virtually daily) that altered expectations about the course of the war. At the same time, we are not sure that it is proper to attribute all of the wartime variability in bond prices to the higher density of news. It is possible that this variability was also increased by exceptional conditions in the financial markets, such as unusually thin markets.

Table 4 presents results for the war period alone.[13] The table clearly shows the high density of news during the war, as over ninety percent of the weeks contained important news according to at least one of our sources. The table also suggests that factors other than news might have raised the variance of holding returns during the war, as even the weeks for which our sources did not cite important news experienced more variable returns than similar weeks before and after the war. Because there are so few weeks without news, however, this interpretation is merely speculative. In any case, the variance of holding returns is larger for "news weeks" and "uncertain weeks" than it is for "non-news weeks," confirming the results for the other subsets of our sample displayed in the previous tables.

4. Conclusion

Our goal in this paper has been to link bond price movements to news in a systematic way. The results in Tables 1 through 4 show that news has a statistically and economically

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[13] Recall that the consol market was closed or restricted from August 1914 through November 1915, so this table covers the three years from November 1915 to November 1918.

significant impact on bond holding period returns. The variance of returns is higher for weeks in which important news arrived than for weeks in which it did not, and the probability of a very large return (in absolute value) is higher in weeks with important news than in weeks without such news. But the interesting question, as we have emphasized, is not whether news about fundamentals can explain *any* of the variability of bond returns, but rather *how much* of that variability it can explain. We believe that the results in Tables 1 through 4 imply that much of the variability of bond prices cannot be explained by news.

This interpretation of the results can be summarized in two ways. First, the difference in the variance of returns between "news weeks" and "non-news weeks" is smaller than we would have expected if news were the dominant cause of price movements. Consider the period between the turn of the century and the outbreak of World War I. If all 760 weeks in that period had experienced the same volatility in bond prices as the 71 weeks in which the biggest news arrived, then the total variance of returns for that period would have been only 67 percent higher than the variance actually observed.[14] Put another way, the

[14] Table 1 shows that the 71 news weeks experienced bond returns that were 74 percent more variable than those experienced by the 510 non-news weeks, and 72 percent more variable than those experienced by the 179 uncertain weeks. Thus, the proportional increase in variance hypothesized here equals

contribution to price variance of one of the top 71 news weeks was equal to the contribution of only 1.7 non-news weeks. Unless the hundreds of weeks disregarded by our sources contained news events only slightly less important than the 71 events that they reported, it seems implausible that all of the variance of returns on the non-news weeks was caused by news that we have overlooked.

Second, the share of the largest price movements that are correlated with identifiable news is smaller than we would have expected if news were the dominant cause of those price movements. The fraction of news weeks that experienced bond returns more than two standard deviations away from the mean was no higher than would be expected given the slightly larger variance of returns in those weeks. Further, of the twenty-five largest price movements during the 14 years before World War I, seven occurred during weeks that both of our sources cited as containing news, six occurred during weeks cited by only one source, and twelve occurred during weeks cited by neither source. Of the five largest bond price movements during that period, none occurred during news weeks, one occurred during an "uncertain week," and four occurred during non-news weeks.

These arguments become somewhat weaker when World War I is included in the analysis, as the war produced extremely

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.74*(510/760) + .72*(179/760), or .67.

volatile interest rates and frequent news. Consider the entire 1900 to 1920 period as reported in Table 3. If all 1025 weeks in that period had experienced the same volatility in bond prices as the 177 weeks in which the biggest news arrived, then the total variance of returns for the period would have been 136 percent higher than the variance actually observed.[15] For this period, the contribution to price variance of one of the top news weeks was equal to the contribution of 2.7 non-news weeks. Despite the surge of news and bond price volatility during the war, however, these numbers do not seem very large. Also, there may have been other differences in financial markets during that period that contributed to higher price volatility. In sum, we doubt that this period supports the general conclusion that news is a good explanation for most bond price volatility.

Our conclusion that news explains only a small part of price variability is consistent with the findings of previous authors, although we study a different asset, sample period, and frequency of observation. For example, Cutler, Poterba and Summers (1989) investigate stock returns on a very select group of "news days," including only 49 days out of 47 years. They found that the variance of stock price returns on news days was only 6.4 times the variance of those returns on all other days, a

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[15] The proportional increase in variance hypothesized here equals 2.26*(548/1025) + .53*(300/1025), or 1.36.

difference that they judged to be small.

As we noted in the introduction, it is impossible to directly test the hypothesis that asset price fluctuations are determined only by news. In this paper we have implemented an indirect test that is only an imperfect substitute. In particular, we have defined "news" to be those events that historians consider to be important, and it is difficult to know whether contemporaneous financial market participants viewed those events in the same way. Clearly, our news series include some events that were deemed irrelevant at the time, and exclude some events that were deemed important at the time. But good statistical procedure avoids Type II error as well as Type I error; economists should not reject the strict "only fundamentals matter" hypothesis of asset pricing too quickly, but neither should they accept it indefinitely when it finds little support in the data. While the type of evidence presented in this paper cannot formally prove or disprove this hypothesis, we take our findings as adding further weight to the case that fundamentals explain only a small part of asset price volatility.

REFERENCES

Barro, Robert J., "Government Spending, Interest Rates, Prices, and Budget Deficits in the United Kingdom, 1701-1918," *Journal of Monetary Economics* 20 (1987), 221-247.

Campbell, John Y., and Robert J. Shiller, "Stock Prices, Earnings and Expected Dividends," Mimeo, January 1988.

Cutler, David M., James M. Poterba, and Lawrence H. Summers, "What Moves Stock Prices?," *The Journal of Portfolio Management* 15 (Spring 1989), 4-12.

Cutler, David M., James M. Poterba, and Lawrence H. Summers, "Speculative Dynamics and the Role of Feedback Traders," *American Economic Review* 80 (May 1990), 63-68.

De Cecco, Marcello, *The International Gold Standard: Money and Empire*, New York: St. Martin's Press, 1984, 104-106.

DeGroot, Morris H., *Probability and Statistics*, Reading, Mass.: Addison-Wesley, 1986, 504.

De Long, J. Bradford, Andrei Shleifer, Lawrence H. Summers, and Robert J. Waldmann, "Noise Trader Risk in Financial Markets," *Journal of Political Economy* 98 (August 1990), 703-738.

Elmendorf, Douglas W., "Actual Budget Deficit Expectations and Interest Rates," Mimeo, July 1991.

Engel, Charles, and Jeffrey Frankel, "Why Interest Rates React to Money Announcements: An Explanation from the Foreign Exchange Market," *Journal of Monetary Economics* 18 (November 1986), 31-39.

Evans, Paul, "Do Large Deficits Produce High Interest Rates?," *American Economic Review* 75 (March 1985), 68-87.

Evans, Paul, "Interest Rates and Expected Future Budget Deficits in the United States," *Journal of Political Economy* 95 (February 1987), 34-58.

Floud, Roderick, "Britain 1860-1914: A Survey", in Floud, Roderick and Donald McCloskey, ed., *The Economic History of Britain Since 1700*, Vol. 2, Cambridge: Cambridge University Press, 1981, 16.

Frankel, Jeffrey A. and Kenneth A. Froot, "Using Survey Data to Test Standard Propositions Regarding Exchange Rate Expectations," *American Economic Review* 77 (March 1987), 133-153.

Frankel, Jeffrey A. and Richard Meese, "Are Exchange Rates Excessively Variable?," in Stanley Fischer, ed., *NBER Macroeconomics Annual*, Cambridge: MIT Press, 1987, 117-152.

French, Kenneth and Richard Roll, "Stock Return Variances: The Arrival of Information and the Reaction of Traders," *Journal of Financial Economics* 17 (September 1986), 5-26.

Hicks, John R., *Critical Essays in Monetary Theory*, Oxford: Clarendon Press, 1967, 83-102.

Langer, William L., ed., *An Encyclopedia of World History*, Boston: Houghton Mifflin, 1972.

Maddala, G.S., *Econometrics*, New York: McGraw-Hill, 1977, 46-47.

Niederhoffer, Victor, "The Analysis of World Events and Stock Prices," *Journal of Business* 44 (April 1971), 193-219.

Plosser, Charles I., "Government Financing Decisions and Asset Returns," *Journal of Monetary Economics* 9 (May 1982), 325-351.

Roley, V. Vance, "The Response of Short-Term Interest Rates to Weekly Money Announcements," *Journal of Money, Credit and Banking* 15 (August 1983), 344-354.

Roll, Richard, "Orange Juice and Weather," *American Economic Review* 74 (December 1984), 861-880.

Roll, Richard, "R^2," *Journal of Finance* 43 (July 1988), 541-566.

Shiller, Robert J., "Investor Behavior in the October 1987 Stock Market Crash: Survey Evidence," National Bureau of Economic Research Working Paper No. 2446 (November 1987).

Steinberg, S. H., *Historical Tables*, London: MacMillan, 1973, 220-233.

Steiner, Zara S., *Britain and the Origins of the First World War*, New York: St. Martin's Press, 1977, 258-263.

Table 1

HOLDING PERIOD RETURNS ON NEWS AND NON-NEWS DATES
1900-1914 (pre-World War I)

A. Variance Comparison

	Number	Variance (percent)	Variance Ratio Across Weeks (significance)		
			News/ Non-news	News/ Uncertain	Uncertain/ Non-news
News Weeks	71	.50	1.74 (.00)	1.72 (.02)	1.01 (.45)
Uncertain Weeks	179	.29			
Non-news Weeks	510	.29			
All Weeks	760	.31			

B. Contingency Table (Absolute Value of Returns)

	Large Return Weeks	Small Return Weeks	All Weeks	Probability of a Large Return
News Weeks	10	61	71	.14
Uncertain Weeks	9	170	179	.05
Non-news Weeks	23	487	510	.05
All Weeks	42	718	760	.06

Note: The χ^2-statistic for the null hypothesis that large returns are not correlated with news is 11.05, with a significance level of .00.

Table 2

HOLDING PERIOD RETURNS ON NEWS AND NON-NEWS DATES
1900-1920 (excluding World War I)

A. Variance Comparison

	Number	Variance (percent)	Variance Ratio Across Weeks (significance)		
			News/ Non-news	News/ Uncertain	Uncertain/ Non-news
News Weeks	83	.54	1.63 (.01)	0.95 (.60)	1.72 (.00)
Uncertain Weeks	248	.57			
Non-news Weeks	539	.33			
All Weeks	870	.42			

B. Contingency Table (Absolute Value of Returns)

	Large Return Weeks	Small Return Weeks	All Weeks	Probability of a Large Return
News Weeks	8	75	83	.10
Uncertain Weeks	18	230	248	.07
Non-news Weeks	16	523	539	.03
All Weeks	42	828	870	.05

Note: The χ^2-statistic for the null hypothesis that large returns are not correlated with news is 11.42, with a significance level of .00.

Table 3

HOLDING PERIOD RETURNS ON NEWS AND NON-NEWS DATES
1900-1920 (including World War I)

A. Variance Comparison

	Number	Variance (percent)	Variance Ratio Across Weeks (significance)		
			News/ Non-news	News/ Uncertain	Uncertain/ Non-news
News Weeks	177	1.12	3.26 (.00)	1.53 (.01)	2.12 (.01)
Uncertain Weeks	300	.73			
Non-news Weeks	548	.34			
All Weeks	1025	.59			

B. Contingency Table (Absolute Value of Returns)

	Large Return Weeks	Small Return Weeks	All Weeks	Probability of a Large Return
News Weeks	18	159	177	.10
Uncertain Weeks	21	279	300	.07
Non-news Weeks	13	535	548	.02
All Weeks	52	973	1025	.05

Note: The χ^2-statistic for the null hypothesis that large returns are not correlated with news is 20.16, with a significance level of .00.

Table 4

HOLDING PERIOD RETURNS ON NEWS AND NON-NEWS DATES
1915-1918 (World War I only)

A. Variance Comparison

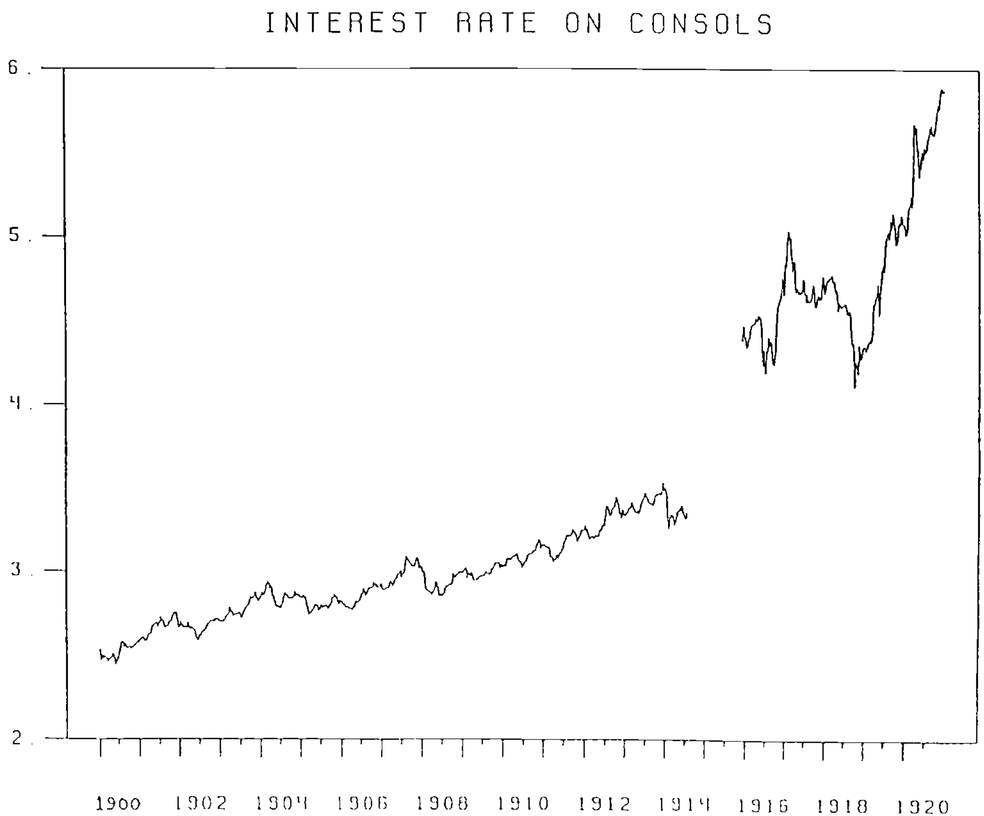
	Number	Variance (percent)	Variance Ratio Across Weeks (significance)		
			News/ Non-news	News/ Uncertain	Uncertain/ Non-news
News Weeks	94	1.64	1.77 (.20)	1.10 (.36)	1.61 (.24)
Uncertain Weeks	52	1.49			
Non-news Weeks	9	.92			
All Weeks	155	1.54			

B. Contingency Table (Absolute Value of Returns)

	Large Return Weeks	Small Return Weeks	All Weeks	Probability of a Large Return
News Weeks	7	87	94	.07
Uncertain Weeks	2	50	52	.04
Non-news Weeks	0	9	9	.00
All Weeks	9	146	155	.06

Note: The χ^2-statistic for the null hypothesis that large returns are not correlated with news is 1.38, with a significance level of .50.

Figure 1



INTEREST RATE ON CONSOLS
6
5
4
3
2
1900
1902
1904
1906
1908
1910
1912
1914
1916
1918
1920