actual government bonds, the CBT is required to establish conversion factors which relate the settlement in terms of actual bonds to the benchmark asset. These factors are established by imperfect rules of thumb, however, and create basis risk for a hedger in T-bond futures, because the amount of money required to settle the contract, and the profits or losses on the contract, depend upon the bond used as the delivery vehicle. The delivering short-side trader can choose to settle the contract with the bond that maximizes his profits. When future interest rates are stochastic, and many bonds are eligible as delivery vehicles, neither the bond which actually will be chosen for delivery nor the conversion factor can be determined with certainty at the time the contract is established.

This paper examines the extent to which conversion factor risk can affect the variability of returns on a futures contract. We estimate yield curves for each month in the 1978-1982 period and calculate the historical variability of shifts in the yield curve. Based on the estimated volatility of the innovations in the term structure, we conduct Monte Carlo simulations in which the optimal delivery bond is determined for each (simulated) end-of-period yield curve. The profits that accrue to futures contracts and to unhedged nominal assets or liabilities are each measured. The simulation outcomes, therefore, allow us to determine the variance-minimizing position in Treasury bond futures contracts for investors who wish to hedge nominal assets or liabilities. We find that the uncertainty in profits to futures contracts induced by uncertainty about what the ultimate delivery bond will be is potentially quite large. Naive hedging strategies that ignore the impact of the delivery option on contract profits will realize only one-half of the hedging value that futures contracts potentially can provide.

Cash and Carry In Treasury Bond Futures: A Comparison of Two Data Sources

by

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This paper examines the so-called T-Bond carry transaction, where one buys cash bonds and delivers them against a short position in the futures market. In addition, it generates results using two distinct data sets.

"Cash and Carry" transactions can be viewed in several ways which are closely related but not equivalent. The most common is to search for a pure arbitrage situation in which bonds can be purchased with borrowed funds at a price discount from the futures that is sufficiently large to create a worthwhile return. There are many reasons why this viewpoint is unsatisfactory outside the delivery month and a few days just before it: the lack of longer term, fixed-rate repurchase agreement loans against the collateral of long-term Treasury securities, and the mechanical difficulties of simultaneous transactions in different markets.

Our approach is to view the T-Bond carry transaction as a secure, short-term investment and to compare its yield to that of a T-Note of the same maturity. As it happens, there are T-Notes which expire the day before the beginning of each T-Bond future delivery month which provide us with an accurate and convenient comparison. To get maximum uniformity and comparability, we always assume that delivery will be made on the first business day of the delivery month. We avoid the last three weeks before the beginning of the delivery month for two reasons: the unusual delivery options associated with T-Bonds and the fact that T-Bonds and T-Notes are quoted by price, and not by yield as are T-Bills. Thus, the process of annualizing yields based on prices multiplies any errors when short time spans are involved. For the period from July 1, 1980, through May 11, 1982, studied in this paper, we had eight futures expiration months with a maximum investment term of 22½ months.

We are certainly aware that no two investments are exactly comparable. Nonetheless, we believe that the T-Bond carry is similar to a T-Note purchase in several ways. First, there are regular intermediate payments (if the bonds are carried over coupon dates) and interest accrues according to the same formula. Second, the underlying security is excellent, far better than the highest-rated commercial paper. An exchange default also is extraordinarily unlikely. The primary differences between the T-Bond carry and the T-Note purchase are the need to carefully balance the hedge and the possibility of daily cash inflow or outflow (from marking-to-market in the futures). The problem of balancing the hedge is discussed, and the daily cash flow problem is assumed to be immaterial by postulating an investor with substantial cash flow in both directions from several sources. For such an investor cash

flow variations may be smoothed rather than made more irregular by this additional factor, just as diversification reduces the risk of any portfolio. Even in the worst case of a margin call that could not be met without selling the T-Bonds themselves (and thus destroying the balance of the hedge), the position could be unwound with only a small loss from frictional costs. (This, of course, is the central property of a balanced hedge!) From this point of view, the comparison between the bond carry and the note purchase seems to be a reasonable one.

Even if one grants that the hedged T-Bond "cash and carry" transaction is essentially riskless (once it is established), it is, on the other hand, quite complex. We would therefore expect to find the yield of the "cash and carry" to be consistently higher than the yield of the corresponding T-Note, even after adjusting for transaction costs, as compensation for this complexity (and for the risk involved in establishing the position). This paper reaches some conclusions about the size of this "cash and carry" premium, and how it might most realistically be measured.

A unique feature of the paper is a detailed comparison of the results of using two data sources covering the same time period. Our data sets are gathered by two different institutions: the Federal Reserve Bank of New York and Salomon Brothers of New York. Our results, surprisingly, are strikingly different depending on which of the two data sets is used.

V. Organized Commodity Markets

Determinants of Trading Volume In Futures Markets

by

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This paper empirically examines the determinants of volume in metal futures markets. We first develop a theoretical framework to examine the determinants of volume. Based on the assumption that trading agents can be divided into two groups—speculators and hedgers—we find that the volume can be represented as a function of inter and intra day price volatilities and a specified information set

The daily price spread is chosen as a proxy for intraday price volatility, and the standard deviation of the settlement price is used to measure interday volatibility. Micro and macro economic variables, such as open interest, inventories, unemployment, and the risk free rate made up the information set used. Linear regressions of daily and average monthly volume are estimated. The results of both the daily and average monthly equations are similar. In both cases the most important variable is price volatility, with interest rates, open interest and inflation also performing as expected.

Our primary result is that volume, in general, is a function of more than one variable. Most previous research concentrated on interday variability as the sole determinant of volume. We show that there is a theoretical basis upon which to include other variables, and our empirical results support this view.