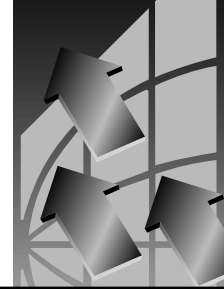




C M E

OPEN INTERESTS

Picking Your Spots on the ED Strip: A Graphical Guide to “Quick and Dirty” Hedging For Treasury Notes



Eurodollar futures offer a liquid, effective means of hedging US Treasury notes. The typical user hedges his note position by employing ED futures to construct – often with painstaking precision – an offsetting position in a synthetic Eurobond that mimics the note’s cash flows.

But pressures of time and circumstance sometimes force users to sacrifice accuracy in the interest of speed and brute potency. Suppose then that we are caught with an unhedged Treasury note position in a fast-moving market – smashing the alarm box instead of aiming for exactitude. **Which spot on the ED strip do we grab first?**

The following tables and accompanying charts answer this question for Treasury notes at several on-the-run maturities, both in terms of overall goodness of performance...

Treasury Issue	Best Quick Hedge	Second Best	Third Best	Summary Graph on Page
On-the Run 2-Yr	2-Yr Bundle	3-Yr Bundle	Red1	4
On-the Run 3-Yr	3-Yr Bundle	4-Yr Bundle	2-Yr Bundle	5
Current 4-Yr	4-Yr Bundle	5-Yr Bundle	3-Yr Bundle	6
On the Run 5-Yr	4-Yr Bundle	5-Yr Bundle	3-Yr Bundle	7
Current 7-Yr	5-Yr Bundle	7-Yr Bundle	4-Yr Bundle	8
On-the Run 10-Yr	7-Yr Bundle	5-Yr Bundle	Blue1	9

...and by transactional device (i.e., individual ED contracts versus packs or bundles).

Treasury Issue	Best Individual ED Contract	Best ED Pack	Best ED Bundle
On-the Run 2-Yr	Red1	White	2-Year
On-the Run 3-Yr	Red2	Red	3-Year
Current 4-Yr	Green1	Green	4-Year
On the Run 5-Yr	Green1	Green	4-Year
Current 7-Yr	Green4	Green	5-Year
On-the Run 10-Yr	Blue1	Blue	7-Year
Summary Graph on Page	10	11	

How “Quick and Dirty” Works: Some Examples

On 31 July 1997, 6% of 31 July 2002 is the on-the-run 5-year note. The dollar value of a one-basis-point change in its yield (DV01) is \$42,780 per \$100 million face value. Results appearing in the upper table on this page indicate that the most effective quick-dirty hedge is the 4-year ED bundle, for which DV01 is \$400 (= 16 contracts X \$25/contract). Thus, the appropriate hedge ratio is

107 (= \$42,780/\$400) 4-year bundles.

Suppose we buy \$100 million face value of the note and sell 107 4-year ED bundles at close on 31 July, then sell the note and purchase 107 bundles at the close on 1 August. The price of the note has fallen $-24/32$ nds, giving us a loss of $-\$750,000$ (apart from the one day of coupon accrual that we earn). At the same time, the price of the 4-year ED bundle has fallen -16.5 ticks, benefitting our short position by $\$706,200$ (= $107 \times -16.5 \times \400). Thus,

- our net loss with a 4-year bundle hedge is $-\$43,800$.

Using the same reasoning and similar arithmetic, we find the second best on-the-fly hedge tactic is to sell 86 5-year bundles, and the third best is to sell 143 3-year bundles. If for whatever reason we wish to hedge with a stack of one single ED contract, then the results in the lower table on Page 1 say our best choice is to sell 1711 (= $\$42,780/\25) of Green1.

- With the 5-year bundle as hedge, our net loss would be $-\$29,750$.
- With the 3-year bundle as hedge, our net loss would be $-\$52,875$.
- And by stack-hedging with Green1, we would transform our $-\$750,000$ loss on the Treasury note into a net gain of $\$62,725$.

Some Rules of Thumb

For notes in the 2-year to 4-year maturity sector, the best “quick-dirty” hedge on average is the ED bundle nearest to the note’s term to maturity.

For 5-year to 10-year maturities, the best “quick-dirty” hedge is the ED bundle nearest to the note’s duration.

In most cases, the second best alternative is to grab into the middle of the ED strip for a 4-year or 5-year bundle.

Though stack hedging with individual ED contracts is never the first choice, it ranks among the top three for 2-year notes (Red1) and 10-year notes (Blue1).

Whenever the yield curve shifts, with the long end of the curve pivoting around the short end, then longer-dated ED hedges should outperform their shorter-dated counterparts. The examples above illustrate this point. Although the 4-year ED bundle provides the best protection on average for the Treasury 5-year note, both the 5-year bundle and the Green1 stack hedge gave superior performance on 1 August 1997. Why? Because the yield curve steepened sharply that day, with long-term rates rising more than short-term rates.

Conversely, *whenever the yield curve shifts, with the short end of the curve pivoting around the long end, then shorter-dated ED hedges should outperform their longer-dated counterparts.* In such circumstances, the holder of a 4-year Treasury note, for example, will find that the 3-year ED bundle (normally his third-best alternative) is likely to give better hedge protection than the 4-year ED bundle (normally his first choice).

One might assume that “quick-dirty” ED hedges work best in the 2-year maturity sector, if only because that’s where many term TED traders focus their activity. As the charts on Pages 10 and 11 reveal, this assumption is incorrect:

In terms of price-change correlation, *ED futures provide noticeably greater protection for 3-year to 10-year maturities, and especially for 5-year notes.*

Caveat Emptor

The tactics described here are recommended for their single-stroke transactional convenience, for their blunt-edged effectiveness, and because they permit Treasury note hedgers to exploit the depth and liquidity of the CME Eurodollar futures market.

Use them because they work, but never forget that *they are suitable only as emergency first aid for very short holding periods.* Indeed, given their shallow roots in finance theory, they are wholly inappropriate for sharp-pencil strategic trades (unlike the carefully weighted strips of ED contracts that typically appear in term TED trades). In particular they take no account of the dynamics of the bank credit spread (the spread between Treasury yields and LIBOR); their tacit assumption is that LIBO rates will move tick for tick with Treasury yields.

Nor do they take explicit account of the relationship between forward rates and spot yields. In effect, the trader who hedges, e.g., a Treasury 5-year note with a single stacked ED contract, is trading the spread between a 5-year Treasury spot yield and a forward 90-day bank rate. More generally speaking, he is trading a spot long-term segment of the term structure against a remote short-term segment.

Nor do they compensate explicitly for the nonconvexity bias embedded in prices of ED futures contracts, especially those with very long terms to expiry.

For the Record

The objective in this study is to identify those one-shot transactional devices in the ED strip – bundles, packs, or individual contracts – that afford the greatest, most reliable short-term price protection for on-the-run Treasury notes.

Operationally, “greatest” means those ED futures packages whose price changes are most highly correlated with (clean) price changes in Treasuries. To prevent outlier price moves from exerting disproportionate influence upon our conclusions, we use nonparametric Spearman rank correlation instead of the more familiar Pearson correlation.

“Reliable” means estimating these correlations over a span of history long enough to comprise several market environments – bullish, bearish, stable, volatile. Thus, we use daily (close-to-close) price changes for the three-and-a-half years from 4 January 1994 to 16 June 1997.

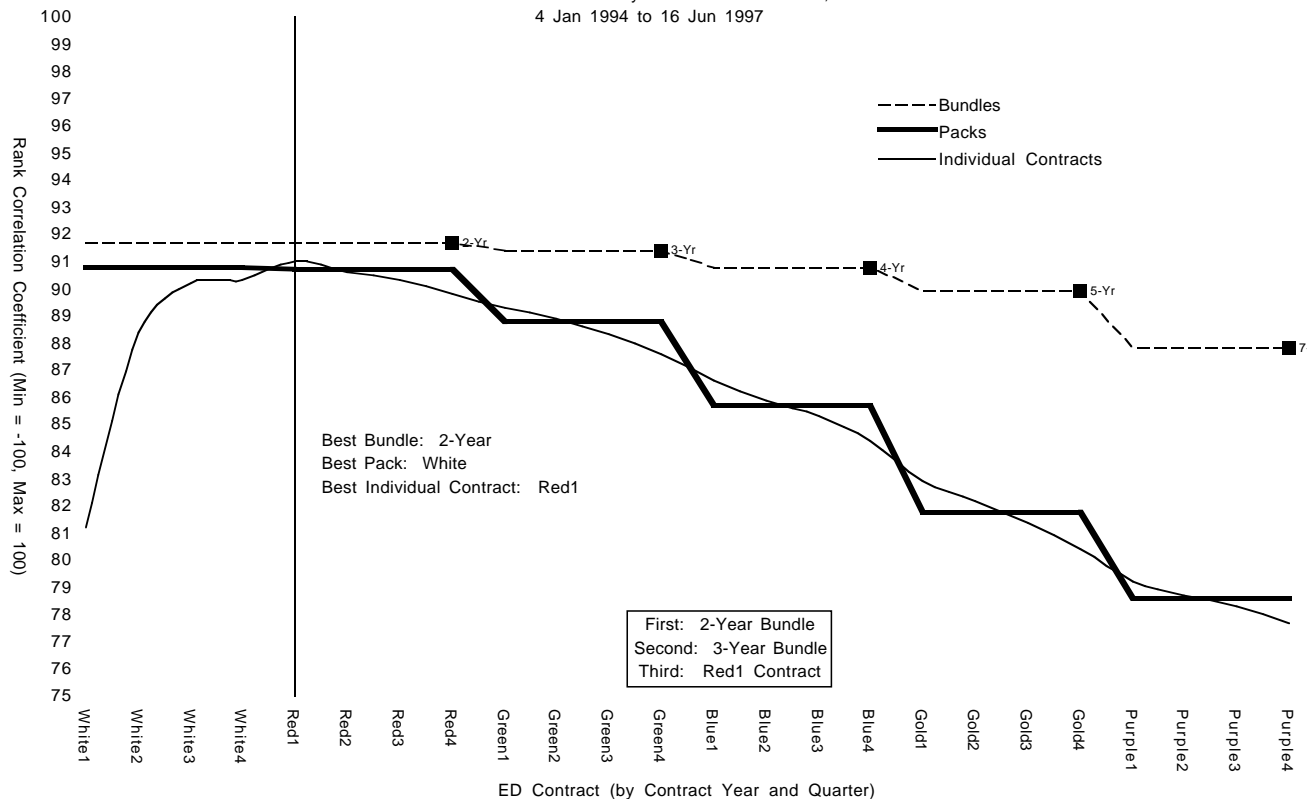
The convention we follow in identifying members of the ED futures strip is to assume that market participants roll out of the current quarterly delivery cycle into the deferred cycle on the last business day of the month before the current cycle’s expiration. Thus, for example, on the last business day of August 1997 we would shift Red1 status from the Sep 98 contract to the Dec 98 contract, and so on for all other delivery months.

Note that the CME lists two sets of bundles in tandem for approximately one month out of every quarter: Specifically, around one month prior to expiration of the front-month Eurodollar contract (e.g., the Sep-Dec-Mar-Jun cycle), the Exchange simultaneously lists a second set of deferred bundles (e.g., the Dec-Mar-Jun-Sep cycle). In effect, the roll convention we assume in this study splits the difference between these tandem listings.

For his advice and encouragement, I thank Peter Barker, who bears no responsibility for any errors herein.

Treasury 2-Years: Best Match in the ED Strip

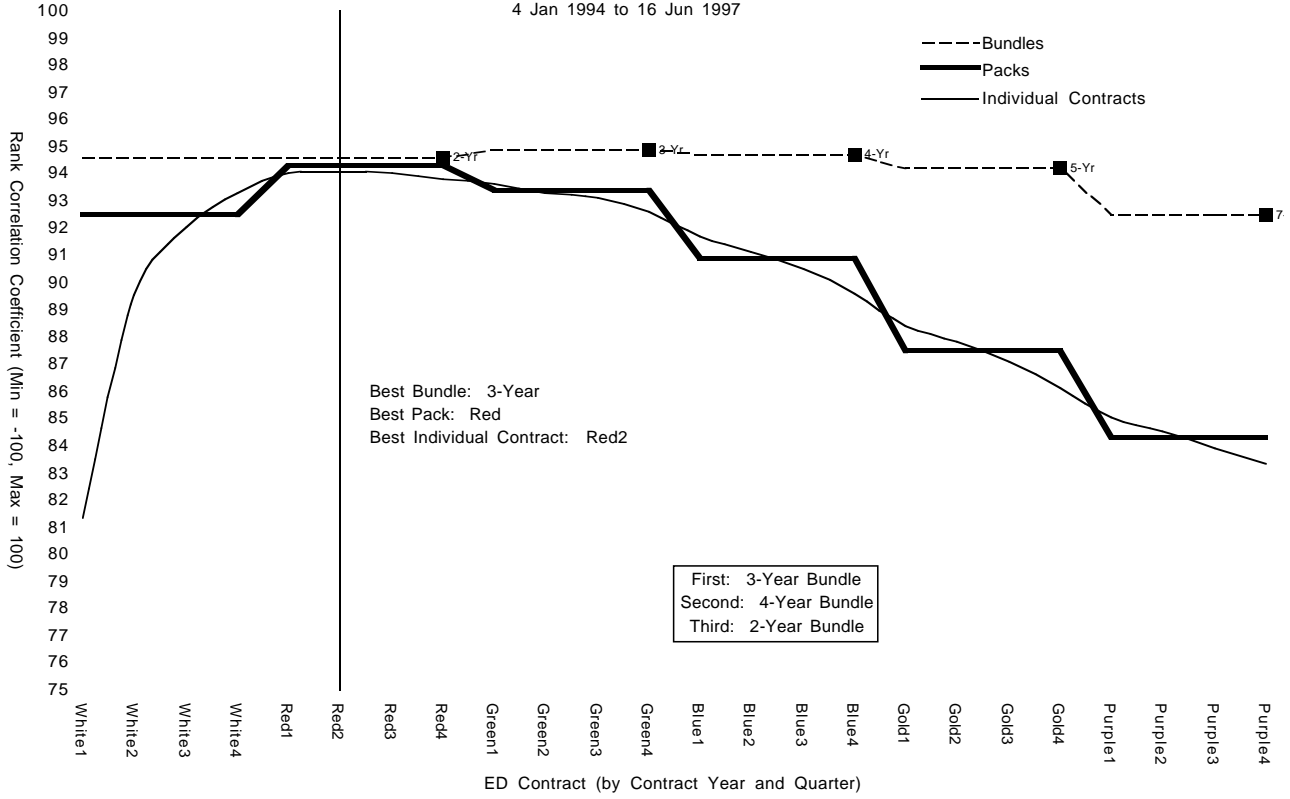
Spearman Rank Correlation of Daily Price Changes,
On-the-Run Treasury 2-Year vs ED Futures,
4 Jan 1994 to 16 Jun 1997



Data Sources:
 Chicago Mercantile Exchange
 US Treasury Dept.

Treasury 3-Years: Best Match in the ED Strip

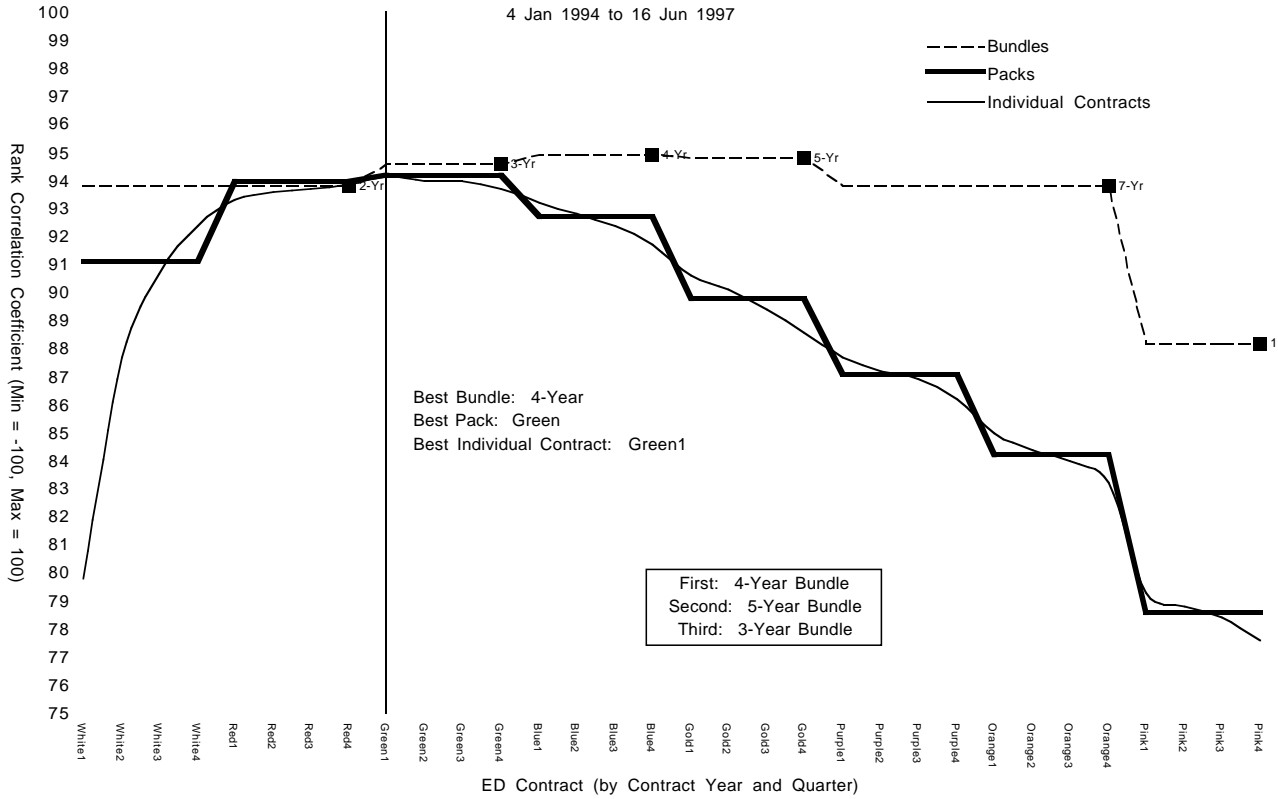
Spearman Rank Correlation of Daily Price Changes,
On-the-Run Treasury 3-Year vs ED Futures
4 Jan 1994 to 16 Jun 1997



Data Sources:
 Chicago Mercantile Exchange
 US Treasury Dept

Treasury 4-Years: Best Match in the ED Strip

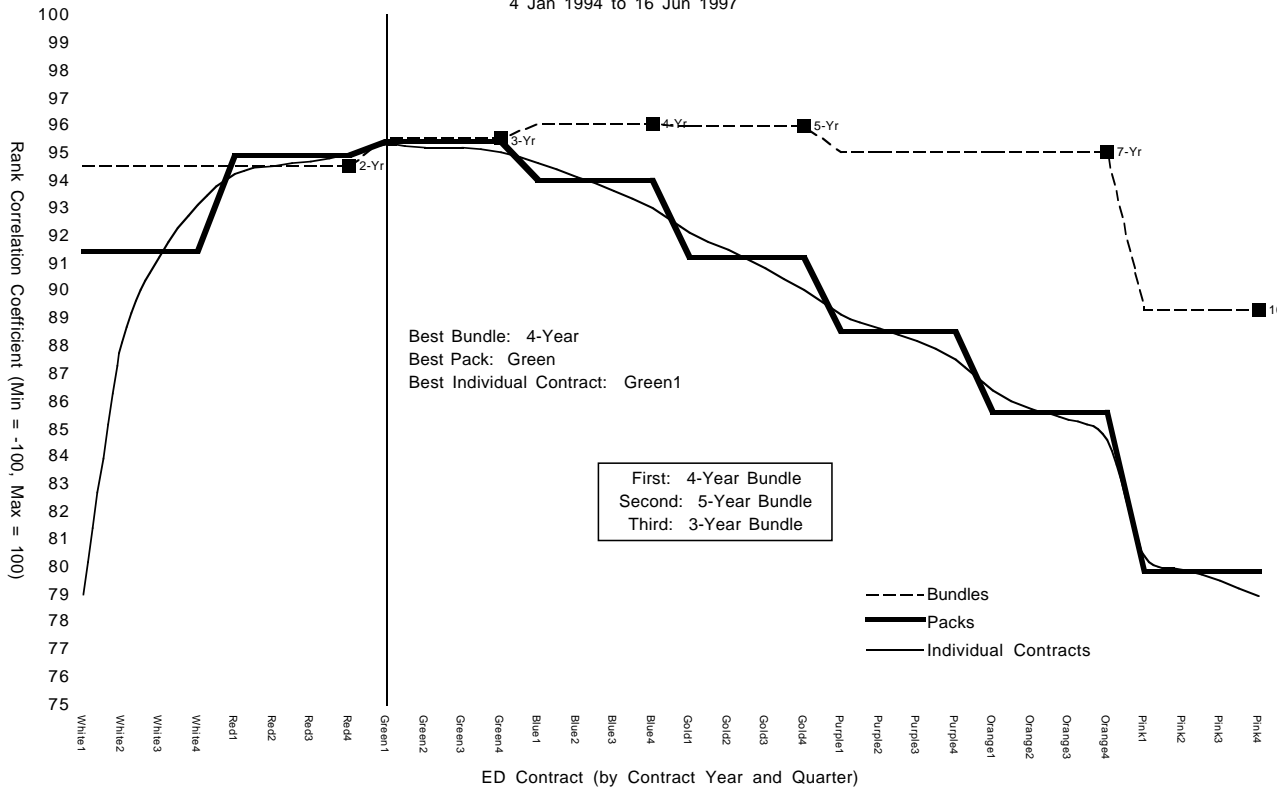
Spearman Rank Correlation of Daily Price Changes,
Current Treasury 4-Year vs ED Futures
4 Jan 1994 to 16 Jun 1997



Data Sources:
 Chicago Mercantile Exchange
 US Treasury Dept

Treasury 5-Years: Best Match in the ED Strip

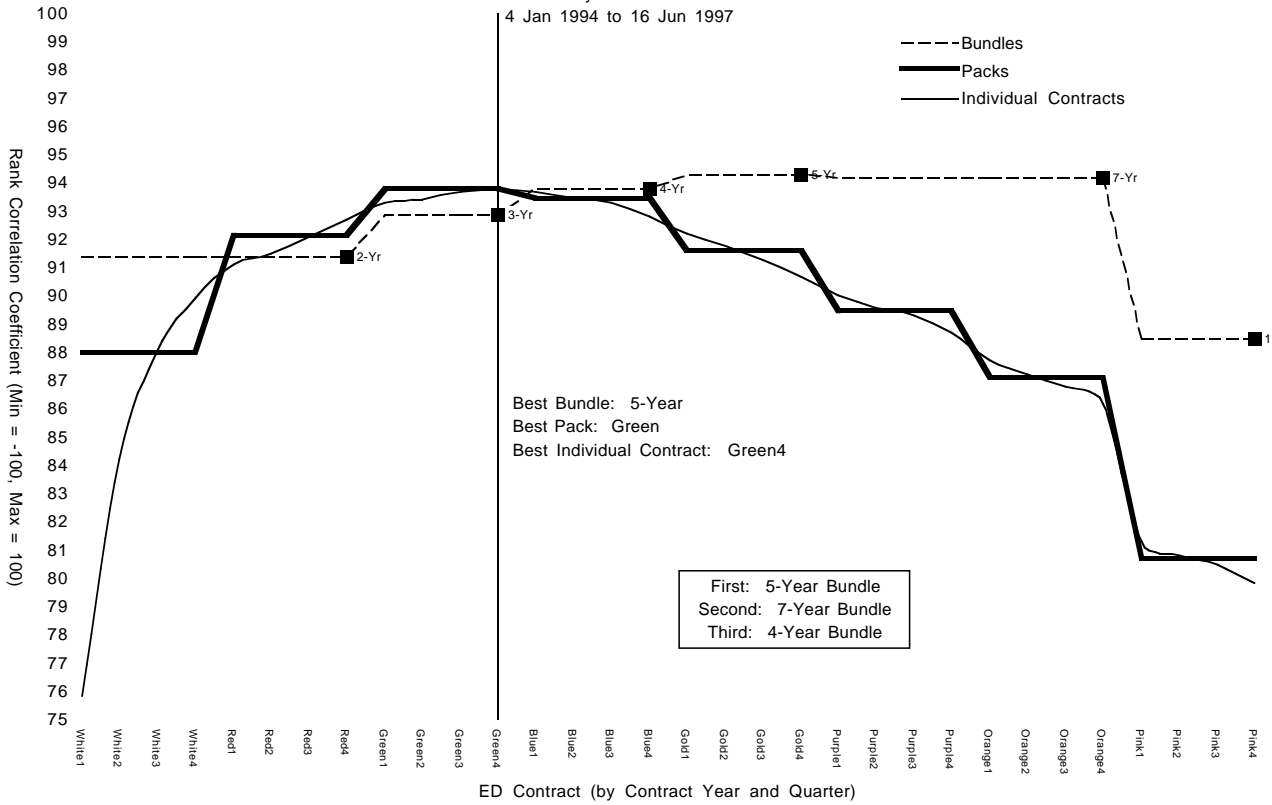
Spearman Rank Correlation of Daily Price Changes,
On-the-Run Treasury 5-Year vs ED Futures
4 Jan 1994 to 16 Jun 1997



Data Sources:
Chicago Mercantile Exchange
US Treasury Dept

Treasury 7-Years: Best Match in the ED Strip

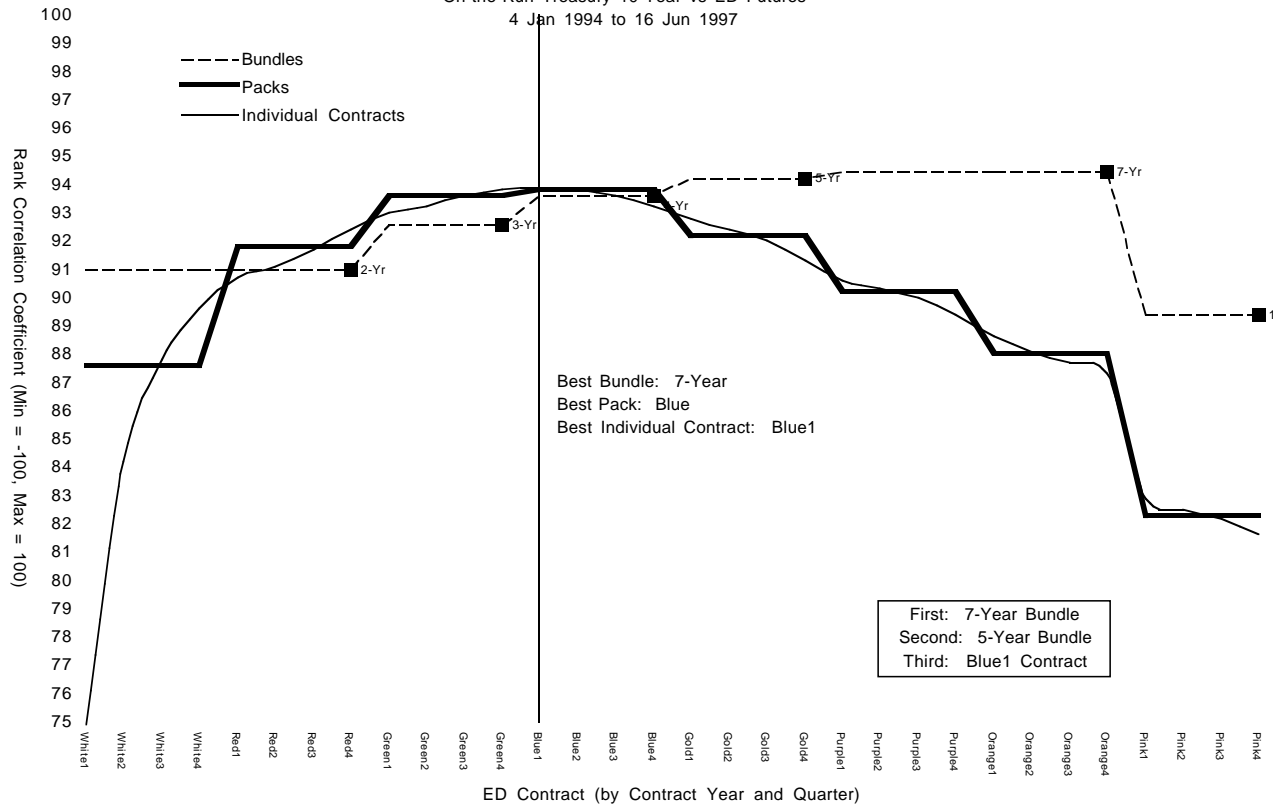
Spearman Rank Correlation of Daily Price Changes,
Current Treasury 7-Year vs ED Futures
4 Jan 1994 to 16 Jun 1997



Data Sources:
 Chicago Mercantile Exchange
 US Treasury Dept

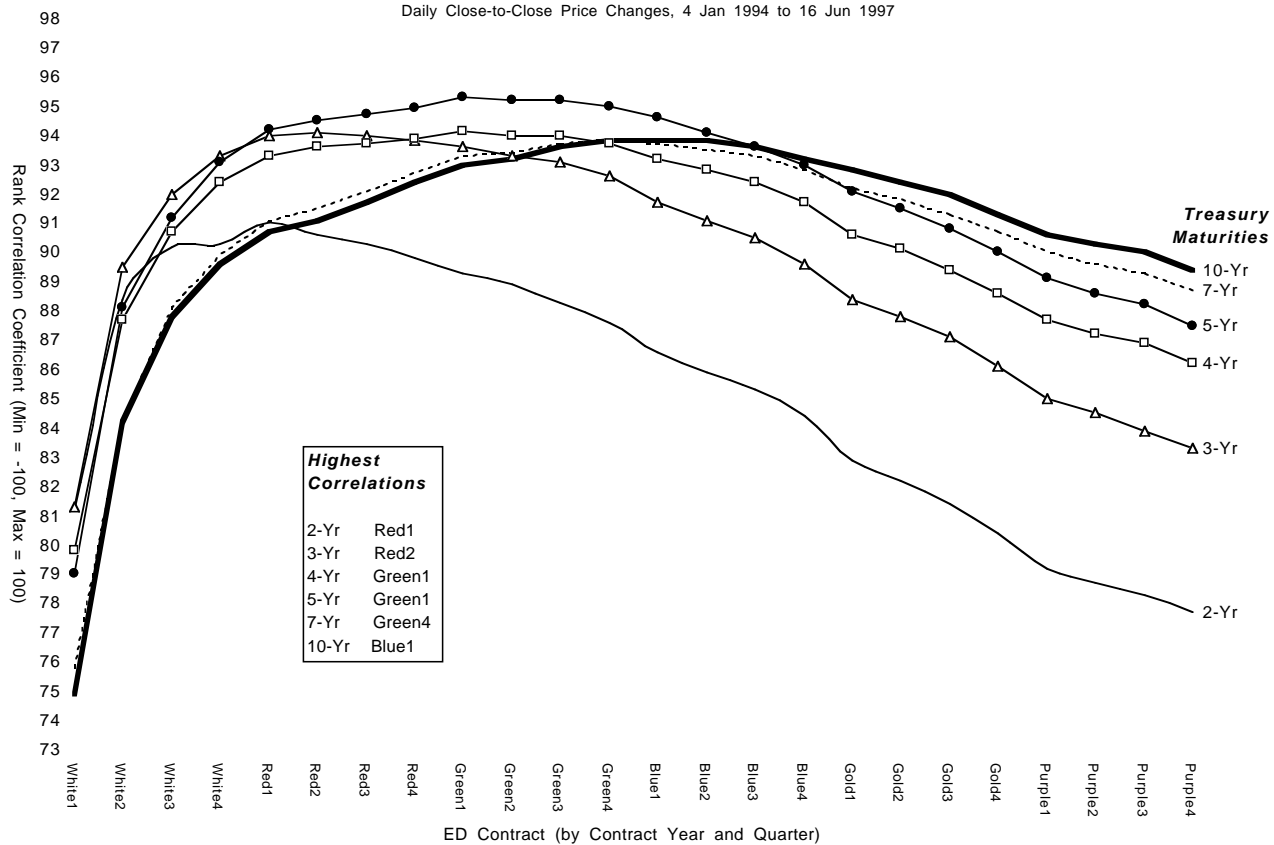
Treasury 10-Years: Best Match in the ED Strip

Spearman Rank Correlation of Daily Price Changes,
On-the-Run Treasury 10-Year vs ED Futures
4 Jan 1994 to 16 Jun 1997



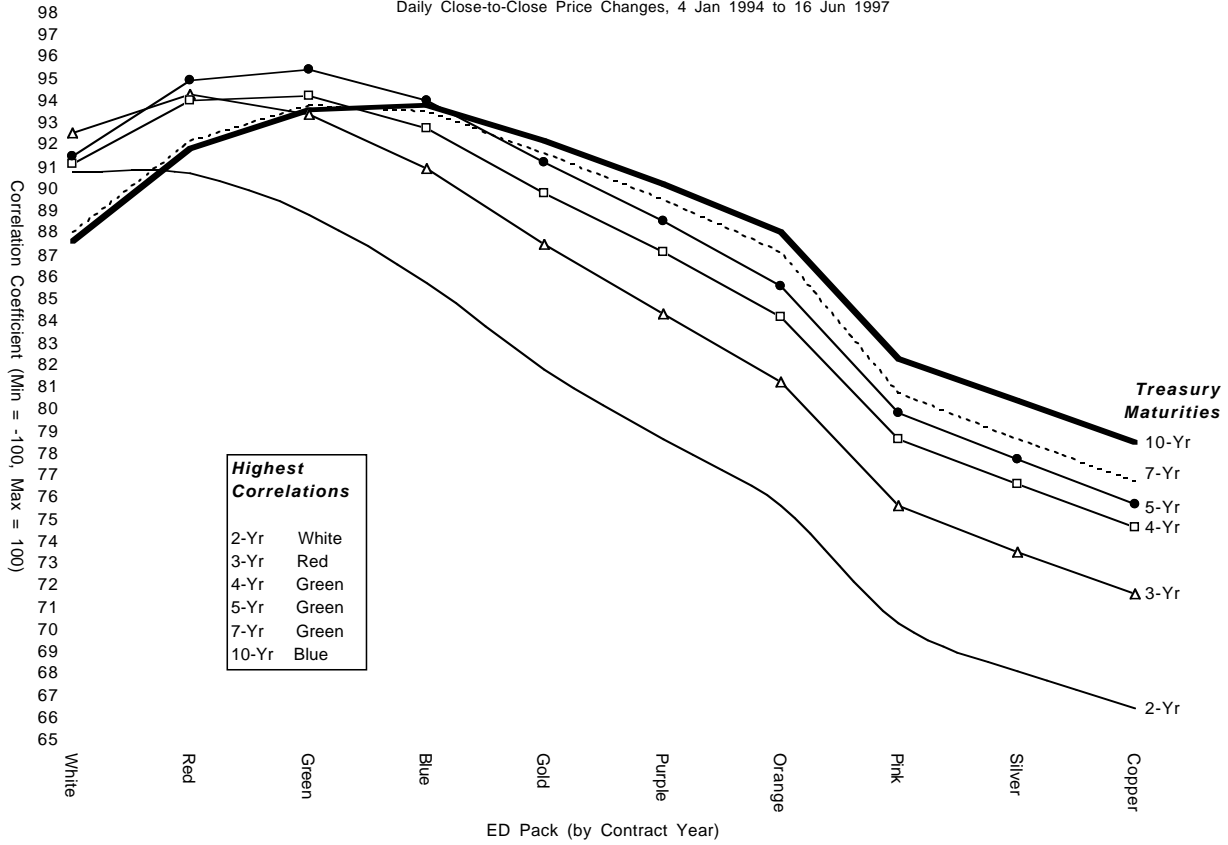
Data Sources:
 Chicago Mercantile Exchange
 US Treasury Dept

**Individual ED Futures Contracts:
Spearman Rank Correlations With On-the-Run Treasury Issues**
Daily Close-to-Close Price Changes, 4 Jan 1994 to 16 Jun 1997



Data Sources:
Chicago Mercantile Exchange
US Treasury Dept

ED Packs:
Spearman Rank Correlations With On-the-Run Treasury Issues
 Daily Close-to-Close Price Changes, 4 Jan 1994 to 16 Jun 1997



Data Sources:
 Chicago Mercantile Exchange
 US Treasury Dept

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