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An Approach to Estimation of the Treasury Yield Curve in Near Real Time*

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This paper carries a two-fold objective, namely to come closer to real time model building and to achieve this through out-of-sample forecasting of the Treasury yield curve. The Federal Reserve Open Market Committee does a fine job of hitting their announced target for the Federal Funds Rate, an overnight short-term rate, but not such a good job in realizing their goal to have an accurate effect on the longer term rates that constitute the yield curve and thereby affect economic decision making. This problem is presently viewed as a "conundrum".[1]

The present research is undertaken, not only to estimate the yield curve, but to take advantage of availability of some particular data that may be useful in building a daily system for this task. The approach that we advocate is quite different from purely theoretical concepts of expectations and use of one single equation or even a statistical confidence region to describe the whole yield curve. Our concept is to use empirical expectations on a daily basis and to estimate the whole yield curve by statistical determination of strategic points on our yield curve, corresponding to each of several Treasury maturities, needing a separate equation for each maturity. We are hypothesizing that instruments of each maturity have their own relationship to the operational rate. We begin by developing our approach through examination of one point on the yield curve, namely that for the ten-year Treasury, since that rate is often cited in analysis of the residential real estate boom of recent years in connection with correspondence between mortgage rate activity the yield on the ten-year Treasury note. Their simple correlation is 0.97 from monthly data 1963-2005.

Let us consider, for motivation, a simple chart of the ten-year Treasury yield, together with the Federal Funds rate. This chart plots time series of daily data on the two rates of unusual interest, since 1990. The message implied by this chart is the particular lack of close correspondence between the Federal Reserve federal funds (operative) rate and the ten-year Treasury yield.

[1] "Any puzzling question or problem," Webster's New World Dictionary, second college edition, William Collins & World Publishing Company, 1978.

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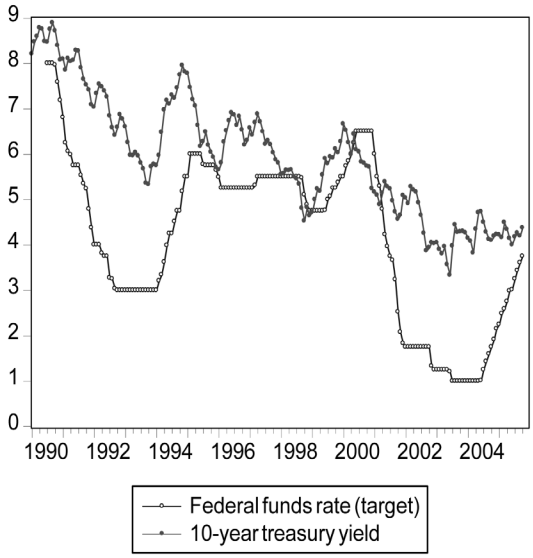
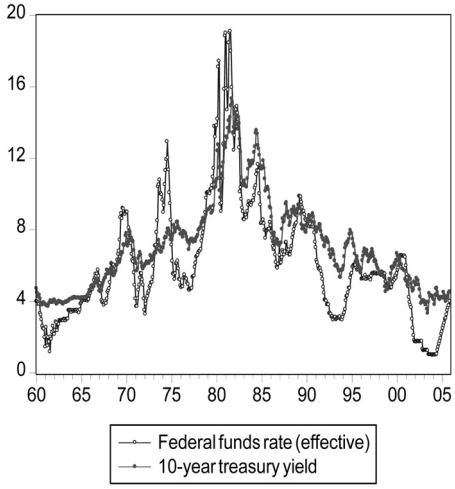


The first problem is the lack of correspondence between the two rates, following the Gulf War of 1990-91. After the military victory, the FOMC repeatedly lowered the Federal Funds rate and did a good job in realizing that target, but it is obvious from the chart that the longer term yield did not respond fully enough to avoid the jobless recovery.

Looking into this problem for monetary policy alone, we note another instance of lowering the Federal Funds Rate after 2001, but the ten-year Treasury yield did not follow suit, and, what is worse, the raising of the Federal Funds Rate after 2004, did not send the ten-year Treasury rate up in the hopes of "cooling" the boom in residential real estate. There is a distinct lack of relevance for policy that is primarily dependent on the Federal Funds Rate alone or even broader monetary policy alone. In the period after 1994, the horizontal Federal Funds Rate played a bystander role, while a felicitous combination of fiscal and monetary policy got powerful expansion underway that could advantageously exploit the IT revolution in raising US productivity.

While the first chart showed the relationship (if any) between the Federal Funds rate and the ten-year Treasury yield since 1990, a longer perspective, since 1960, in the movement of the same two rates, the Federal Funds rate and the 10-year Treasury yield, shows a lack of close correspondence through all kinds of movement in the Federal Funds rate, both up and down. The relatively smooth evolution of the federal Funds rate, swinging up and down, shows hardly any relationship, certainly not of a stabilizing ability, of the operative rate in terms of the rate that could be expected to influence decision making for the economy. There is not much movement on the upside or the downside of the 10-year Treasury yield.



Estimation of the Yield Curve

Our approach is to determine separate meaningful statistical relations between the Federal Funds rate, on the one hand, and the rates on other variables that have significant statistical relationships with the operative rate, on the other hand. We attempt to estimate a point on the yield curve, corresponding to the 10-year Treasury yields, all in daily frequencies of observation. Between January 6, 1998 and November 10, 2005, covering 2048 data points of active trading days, we estimate the following equation.

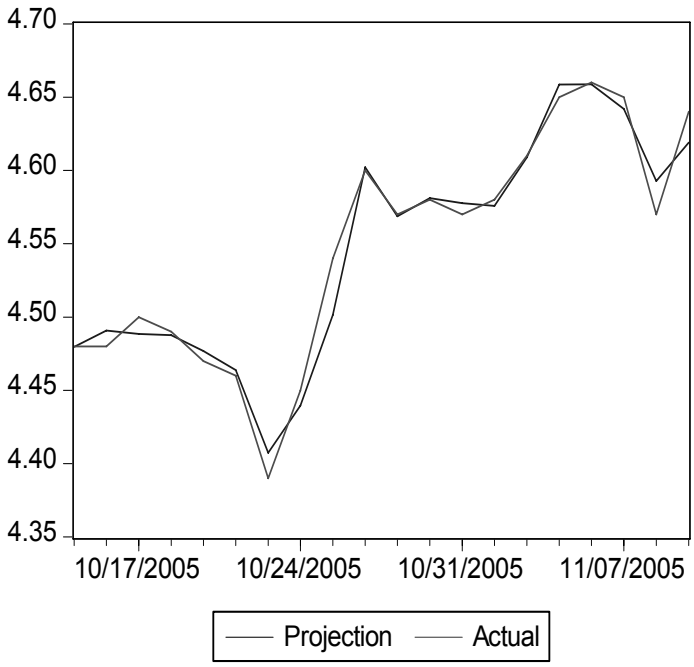
D(DF28) = const. - .0217 D(DF01A) + .0316 D[DF28(-1) – DF233(-1)]
+ 1.0065 D(DF28FUTURE) - .0018D(DF152 + DLOG(DF144)$_*$100)
+ .0027 DLOG(DF36FUTURE)$_*$100

The variable definitions in this equation are:

D(DF28) = daily change in 10-year Treasury yield
D(DF01A) = daily change in Federal Funds rate
DF233 = yield on inflation protected 10-year Treasury (TIPS)
DF(28) – DF233 = inflation expectations
D(DF28FUTURE) = daily change in 10-year Treasury futures (before trading begins)
DF36FUTURE = Dow-Jones industrial futures (before trading begins)
DF152 = 6- month Euro-dollar deposit rate (from UK, before US trading begins)
DF144 = US dollar/UK pound (from UK, before US trading begins)

The equation attempts to account for today's movements of the ten-year Treasury yield in terms of prior knowledge of the targeted Federal Funds rate, yesterday's yield spread of the (unprotected-against-inflation) ten-year Treasury versus that of the (protected version), the early morning futures change in the ten-year Treasury yield, the morning yield on Euro-dollar deposits adjusted for exchange rate and the percentage change in the morning future quotation for the Dow-Jones index.

For each business day over a two-week span, we estimate the yield in the ten-year Treasury and the deviation of this estimate from the day's realized value. Over the period October 13, 2005 – November 9, 2005 our average error, without regard to ± sign, amounts to 9/10 of one basis point. For the moment, this indicates to us that we can track the ten-year Treasury yield by things that are known in advance; in other words that we "explain" the failure of the Federal Funds rate, to indicate where the rate that should guide real investment decisions is moving in close-to-real-time. We are not surprised that the policies that implement the Federal Reserve's monetary decisions are not necessarily providers of good assurance that such policies alone are enough to bring forth desired economic performance.



20 Working Days Forecasts (Out of Sample) of the 10-year Treasury Yield

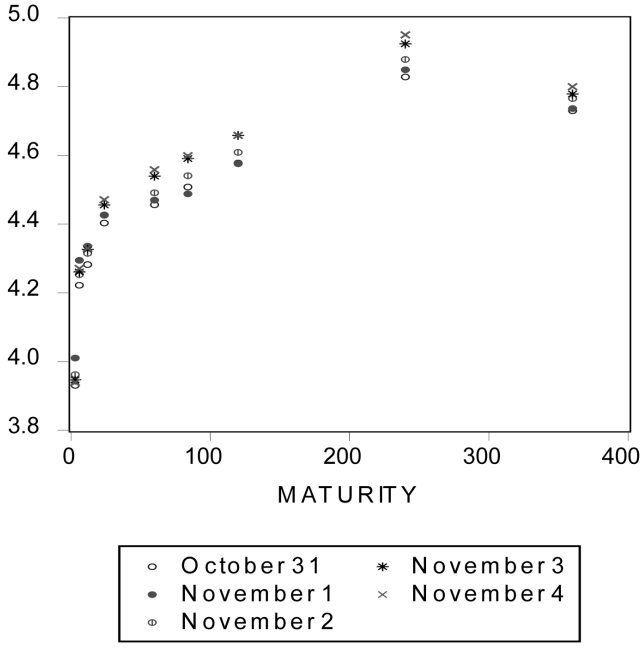
obs	Extrapolation	Actual	Error	Absolute error	Extrapolation	Actual	Actual
			(basis points)	(basis points)	Change	Change	Absolute
					(basis points)	(basis points)	Change
10/13/2005	4.480	4.48	-0.03	0.03		3.00	3.00
10/14/2005	4.491	4.48	1.08	1.08	1.11	0.00	0.00
10/17/2005	4.489	4.50	-1.15	1.15	-0.23	2.00	2.00
10/18/2005	4.488	4.49	-0.24	0.24	-0.09	-1.00	1.00
10/19/2005	4.477	4.47	0.68	0.68	-1.08	-2.00	2.00
10/20/2005	4.464	4.46	0.38	0.38	-1.30	-1.00	1.00
10/21/2005	4.407	4.39	1.73	1.73	-5.65	-7.00	7.00
10/24/2005	4.440	4.45	-1.04	1.04	3.23	6.00	6.00
10/25/2005	4.502	4.54	-3.85	3.85	6.19	9.00	9.00
10/26/2005	4.602	4.60	0.23	0.23	10.07	6.00	6.00
10/27/2005	4.569	4.57	-0.13	0.13	-3.36	-3.00	3.00
10/28/2005	4.581	4.58	0.11	0.11	1.24	1.00	1.00
10/31/2005	4.578	4.57	0.77	0.77	-0.34	-1.00	1.00
11/1/2005	4.576	4.58	-0.42	0.42	-0.19	1.00	1.00
11/2/2005	4.609	4.61	-0.10	0.10	3.32	3.00	3.00
11/3/2005	4.659	4.65	0.86	0.86	4.96	4.00	4.00
11/4/2005	4.659	4.66	-0.12	0.12	0.01	1.00	1.00
11/7/2005	4.642	4.65	-0.81	0.81	-1.69	-1.00	1.00
11/8/2005	4.593	4.57	2.28	2.28	-4.90	-8.00	8.00
11/9/2005	4.619	4.64	-2.10	2.10	2.62	7.00	7.00
average	4.54	4.54	-0.092	0.906	0.73	0.95	3.35

The Shape of the Yield Curve

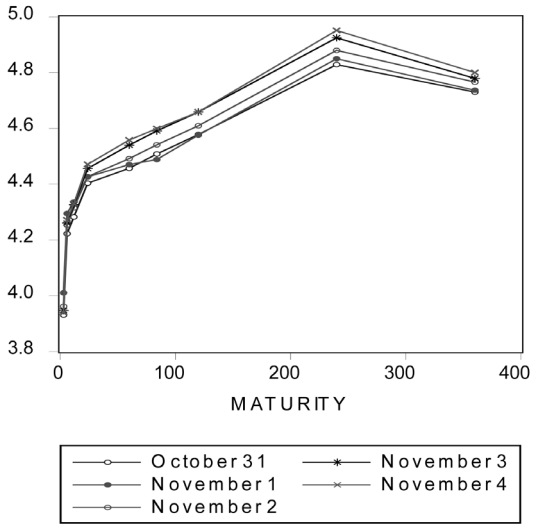
Economic analysts often cite the slope of the yield curve for indications of where monetary policy effects are taking the economy. They see such things as inverted, horizontal, steep or other shapes of the yield curve as signs of particular changes in overall economic performance, sometimes on the basis of two yield readings.

Our concept of the yield curve is somewhat different. We are not trying to depict a particular curve, and we form paths that are measured, on a horizontal scale, of distance between the relative positions of 3 months, 6 months, one year, 5 years, 10 years, 20 years, 30 years ahead. We maintain perspective by designating points from separately estimated equations for the 90-day rate, the 120-day rate, the one-year rate, the 5-year rate, the 7-year rate, the 10-year rate, the 20-year rate, and the 30-year rate. If the scale is in days, the 30-year rate will be located, on the horizontal maturity axis at 30X265 days, away from the 1-day rate.

In our example, we seek the best equation estimates, not only for the 10-year Treasury, but one each for the 90 day, 120 day, one year, 5 year, 7 year, 20 year and 30 year Treasury, respectively. We thus estimate as many equations as there are maturities and insert predetermined values for the individual explanatory variables in each equation. The individual equation estimates will generate separate values for each maturity on a given day. An example of a yield curve constructed in this way is given in the accompanying graph; the band of estimates represents the different projections on a string of given days for the several maturities.



In this way of looking at a yield curve we have a band of yield curves. In October and November, 2005, our equations were showing steeply rising yield curves, phasing into more gently rising portions of curves from the different maturities, but a falling portion of the yield curve in moving from evaluating the estimate of the yield from a twenty-year maturity Treasury, and a different part of the yield curve for the thirty-year maturity. It is clear that the yield curve constructed in this way shows, here, a rising curve until the position between twenty and thirty-year maturity, where there is a declining branch. This is, in a sense, a partial inversion.



Another way of looking at the performance of a ten-year maturity equation for a yield value is to compute daily projections for that maturity, over a series of days and compare the actual with the computed values.

The declining portion of our yield curve occurs probably because the 30-year Treasury was not issued during part of the recent period when the federal budget surpluses were significant and expected (wrongly) to last for some time. Their issuance was eventually restored, but on a somewhat hesitant basis. That may well explain their low percent yields in comparison with those of shorter maturities.

Approaching Real Time Frequency

Nine model equations are re-estimated during the day to obtain estimates for the end of the day figures for yields on treasuries with different maturities. Data on treasury futures, Dow-Jones index futures, exchange rate and eurodollar deposit rate change during the day. These changes may be incorporated into the model, and a set of new yield forecasts for the end of the day may obtained to produce the new yield curve as desired, even at real time if data are downloaded automatically.

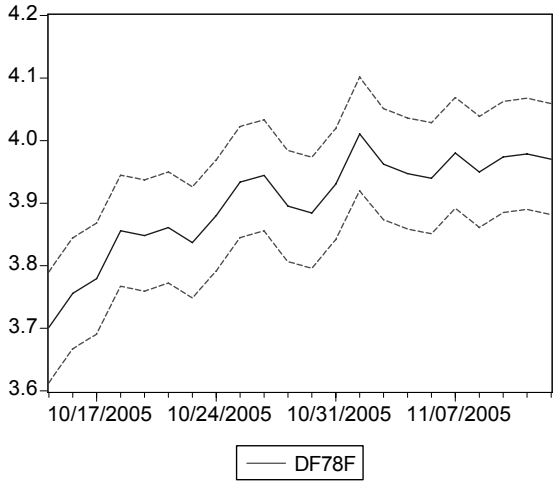
Appendix: Estimated equations and single-equation forecasts (one-day ahead)

3-months

Dependent Variable: D(DF78)
Method: Least Squares
Date: 11/16/05 Time: 12:05
Sample (adjusted): 10/13/1997 11/10/2005
Included observations: 2109 after adjustments
Newey-West HAC Standard Errors & Covariance (lag truncation=7)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.000334	0.000896	-0.372535	0.7095
D(DF01A)	0.094081	0.040830	2.304245	0.0213
D(DF24FUTURE)	0.245835	0.029338	8.379371	0.0000
DLOG(DF36FUTURE)*100	0.001205	0.000944	1.276718	0.2018

R-squared	0.119779	Mean dependent var	-0.000555
Adjusted R-squared	0.118524	S.D. dependent var	0.047221
S.E. of regression	0.044334	Akaike info criterion	-3.392223
Sum squared resid	4.137436	Schwarz criterion	-3.381499
Log likelihood	3581.099	F-statistic	95.48151
Durbin-Watson stat	1.951747	Prob(F-statistic)	0.000000



Forecast: DF78F
Actual: DF78
Forecast sample: 10/13/2005 11/14/...
Adjusted sample: 10/13/2005 11/11/...
Included observations: 21

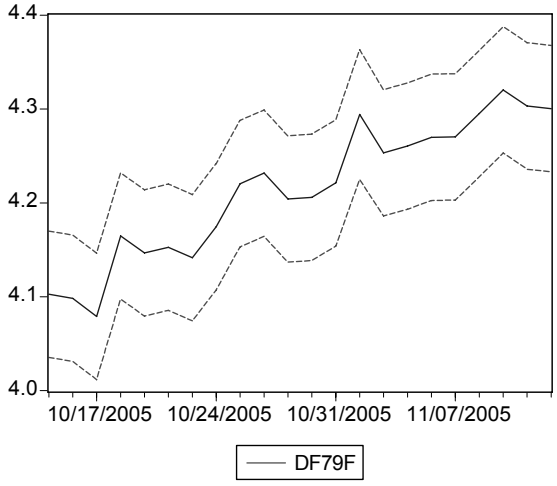
Root Mean Squared Error	0.034283
Mean Absolute Error	0.028028
Mean Abs. Percent Error	0.718403
Theil Inequality Coefficient	0.004392
Bias Proportion	0.085310
Variance Proportion	0.170992
Covariance Proportion	0.743697

6-months

Dependent Variable: D(DF79)
Method: Least Squares
Date: 12/15/05 Time: 08:17
Sample (adjusted): 10/13/1997 11/10/2005
Included observations: 2109 after adjustments
Newey-West HAC Standard Errors & Covariance (lag truncation=7)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.000182	0.000729	-0.249072	0.8033
D(DF01A)	0.094282	0.031887	2.956794	0.0031
D(DF24FUTURE)	0.362198	0.026228	13.80962	0.0000
DLOG(DF36FUTURE)*100	0.001137	0.000710	1.602152	0.1093

R-squared	0.326769	Mean dependent var	-0.000484
Adjusted R-squared	0.325809	S.D. dependent var	0.040949
S.E. of regression	0.033623	Akaike info criterion	-3.945335
Sum squared resid	2.379675	Schwarz criterion	-3.934611
Log likelihood	4164.355	F-statistic	340.5704
Durbin-Watson stat	1.955927	Prob(F-statistic)	0.000000



Forecast: DF79F
Actual: DF79
Forecast sample: 10/13/2005 11/14/...
Adjusted sample: 10/13/2005 11/11/...
Included observations: 21

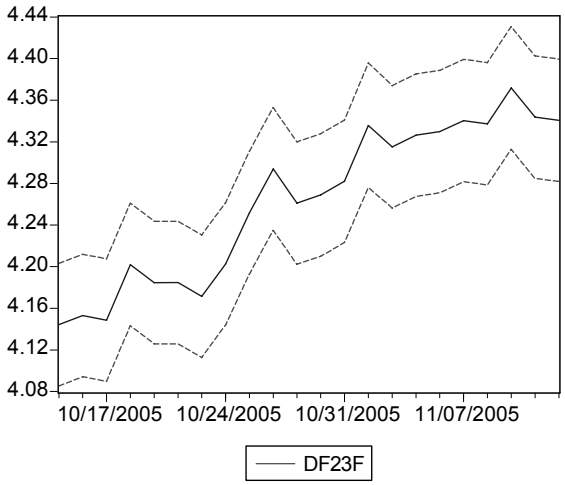
Root Mean Squared Error	0.027583
Mean Absolute Error	0.018348
Mean Abs. Percent Error	0.436172
Theil Inequality Coefficient	0.003273
Bias Proportion	0.042409
Variance Proportion	0.010171
Covariance Proportion	0.947420

1-year

Ddeependent Variable: D(DF23)
Method: Least Squares
Date: 12/15/05 Time: 09:00
Sample (adjusted): 10/13/1997 11/10/2005
Included observations: 2109 after adjustments
Newey-West HAC Standard Errors & Covariance (lag truncation=7)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.000174	0.000613	-0.284557	0.7760
D(DF01A)	0.037358	0.022237	1.680000	0.0931
D(DF24FUTURE)	0.563072	0.028970	19.43643	0.0000
DLOG(DF36FUTURE)*100	0.001573	0.000687	2.288482	0.0222

R-squared	0.595907	Mean dependent var	-0.000569
Adjusted R-squared	0.595331	S.D. dependent var	0.046219
S.E. of regression	0.029402	Akaike info criterion	-4.213639
Sum squared resid	1.819679	Schwarz criterion	-4.202915
Log likelihood	4447.282	F-statistic	1034.732
Durbin-Watson stat	2.055853	Prob(F-statistic)	0.000000



Forecast: DF23F
Actual: DF23
Forecast sample: 10/13/2005 11/14/...
Adjusted sample: 10/13/2005 11/11/...
Included observations: 21

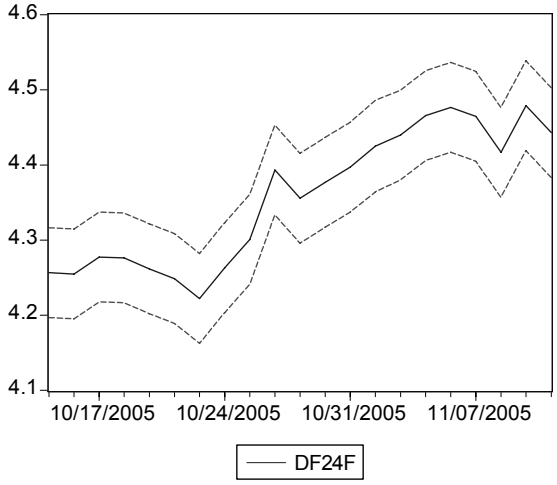
Root Mean Squared Error	0.018682
Mean Absolute Error	0.012927
Mean Abs. Percent Error	0.303587
Theil Inequality Coefficient	0.002191
Bias Proportion	0.065476
Variance Proportion	0.025916
Covariance Proportion	0.908609

2-years

Dependent Variable: D(DF24)
Method: Least Squares
Date: 12/15/05 Time: 10:12
Sample (adjusted): 10/13/1997 11/10/2005
Included observations: 2109 after adjustments
Newey-West HAC Standard Errors & Covariance (lag truncation=7)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-6.71E-05	0.000592	-0.113295	0.9098
D(DF01A)	0.040675	0.023817	1.707796	0.0878
D(DF26FUTURE)	0.809485	0.024955	32.43747	0.0000
D(DF152+DLOG(DF144)*100)	-0.001153	0.000913	-1.262261	0.2070
DLOG(DF36FUTURE)*100	0.003191	0.000674	4.735016	0.0000

R-squared	0.754516	Mean dependent var	-0.000673
Adjusted R-squared	0.754050	S.D. dependent var	0.060190
S.E. of regression	0.029850	Akaike info criterion	-4.182891
Sum squared resid	1.874721	Schwarz criterion	-4.169487
Log likelihood	4415.858	F-statistic	1616.709
Durbin-Watson stat	2.139749	Prob(F-statistic)	0.000000



Forecast: DF24F
Actual: DF24
Forecast sample: 10/13/2005 11/14/...
Adjusted sample: 10/13/2005 11/10/...
Included observations: 21

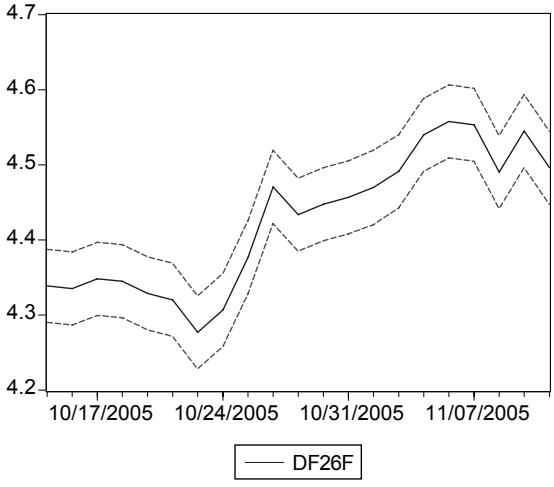
Root Mean Squared Error	0.014277
Mean Absolute Error	0.011469
Mean Abs. Percent Error	0.264107
Theil Inequality Coefficient	0.001638
Bias Proportion	0.046661
Variance Proportion	0.000991
Covariance Proportion	0.952348

5-years

Dependent Variable: D(DF26)
Method: Least Squares
Date: 11/16/05 Time: 12:08
Sample (adjusted): 10/13/1997 11/10/2005
Included observations: 2098 after adjustments
Newey-West HAC Standard Errors & Covariance (lag truncation=7)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.000105	0.000476	-0.220458	0.8255
D(DF01A)	0.013944	0.018877	0.738696	0.4602
D(DF26FUTURE)	0.908758	0.024453	37.16336	0.0000
D(DF152+DLOG(DF144)*100)	-0.001634	0.000815	-2.003677	0.0452
DLOG(DF36FUTURE)*100	0.002525	0.000559	4.513465	0.0000

R-squared	0.852057	Mean dependent var	-0.000848
Adjusted R-squared	0.851774	S.D. dependent var	0.063075
S.E. of regression	0.024284	Akaike info criterion	-4.595639
Sum squared resid	1.234242	Schwarz criterion	-4.582177
Log likelihood	4825.826	F-statistic	3013.587
Durbin-Watson stat	2.209713	Prob(F-statistic)	0.000000



Forecast: DF26F
Actual: DF26
Forecast sample: 10/13/2005 11/14/…
Adjusted sample: 10/13/2005 11/10/…
Included observations: 21

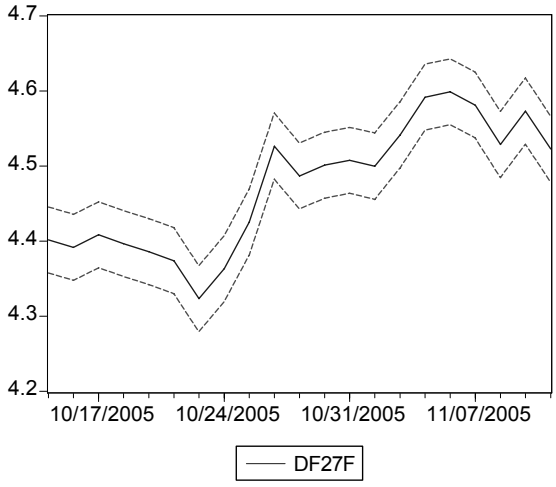
Root Mean Squared Error	0.011669
Mean Absolute Error	0.009120
Mean Abs. Percent Error	0.207515
Theil Inequality Coefficient	0.001318
Bias Proportion	0.016326
Variance Proportion	0.013836
Covariance Proportion	0.969839

7-years

Dependent Variable: D(DF27)
Method: Least Squares
Date: 12/15/05 Time: 10:12
Sample (adjusted): 1/06/1998 11/10/2005
Included observations: 2048 after adjustments
Newey-West HAC Standard Errors & Covariance (lag truncation=7)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	9.28E-05	0.000427	0.217254	0.8280
D(DF01A)	-0.009915	0.012714	-0.779858	0.4356
D(DF28(-1)-DF233(-1))	0.026800	0.009229	2.903903	0.0037
D(DF28FUTURE)	1.077279	0.029908	36.02038	0.0000
D(DF152+DLOG(DF144)*100)	-0.001591	0.000874	-1.821440	0.0687
DLOG(DF36FUTURE)*100	0.002611	0.000566	4.610149	0.0000

R-squared	0.877560	Mean dependent var	-0.000493
Adjusted R-squared	0.877261	S.D. dependent var	0.062555
S.E. of regression	0.021916	Akaike info criterion	-4.800303
Sum squared resid	0.980767	Schwarz criterion	-4.783825
Log likelihood	4921.511	F-statistic	2927.120
Durbin-Watson stat	2.227331	Prob(F-statistic)	0.000000



Forecast: DF27F
Actual: DF27
Forecast sample: 10/13/2005 11/14/...
Adjusted sample: 10/13/2005 11/10/...
Included observations: 21

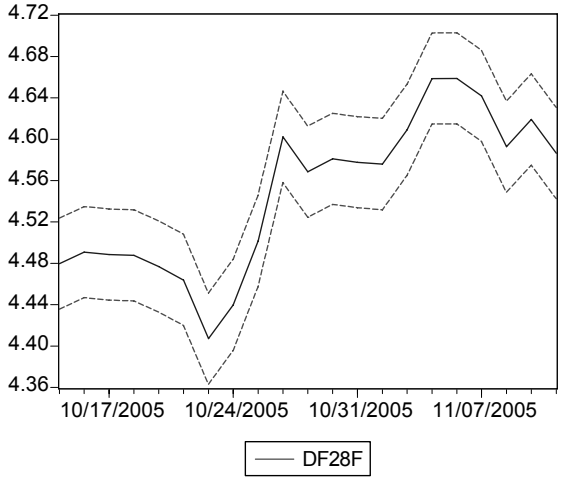
Root Mean Squared Error	0.011877
Mean Absolute Error	0.009034
Mean Abs. Percent Error	0.202735
Theil Inequality Coefficient	0.001327
Bias Proportion	0.002022
Variance Proportion	0.005739
Covariance Proportion	0.992239

10-years

Dependent Variable: D(DF28)
Method: Least Squares
Date: 11/16/05 Time: 12:09
Sample (adjusted): 1/06/1998 11/10/2005
Included observations: 2048 after adjustments
Newey-West HAC Standard Errors & Covariance (lag truncation=7)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	5.95E-05	0.000451	0.132053	0.8950
D(DF01A)	-0.021731	0.009212	-2.359027	0.0184
D(DF28(-1)-DF233(-1))	0.031556	0.009778	3.227395	0.0013
D(DF28FUTURE)	1.006484	0.027424	36.70021	0.0000
D(DF152+DLOG(DF144)*100)	-0.001824	0.000869	-2.100366	0.0358
DLOG(DF36FUTURE)*100	0.002677	0.000559	4.785864	0.0000

R-squared	0.861816	Mean dependent var	-0.000474
Adjusted R-squared	0.861478	S.D. dependent var	0.059109
S.E. of regression	0.021999	Akaike info criterion	-4.792681
Sum squared resid	0.988271	Schwarz criterion	-4.776203
Log likelihood	4913.706	F-statistic	2547.078
Durbin-Watson stat	2.133467	Prob(F-statistic)	0.000000



Forecast: DF28F
Actual: DF28
Forecast sample: 10/13/2005 11/14/...
Adjusted sample: 10/13/2005 11/10/...
Included observations: 21

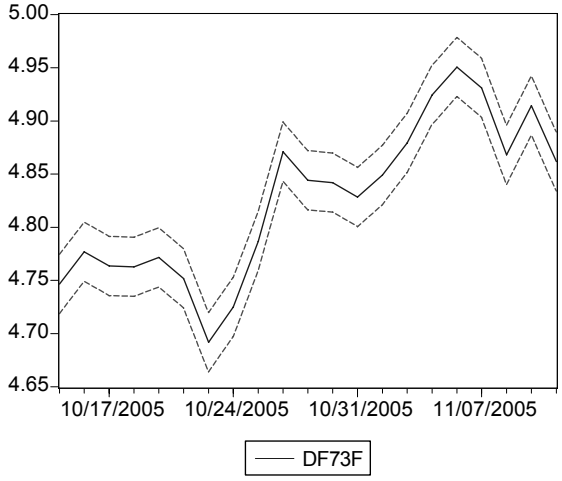
Root Mean Squared Error	0.014984
Mean Absolute Error	0.010351
Mean Abs. Percent Error	0.227983
Theil Inequality Coefficient	0.001647
Bias Proportion	0.003316
Variance Proportion	0.003028
Covariance Proportion	0.993656

20-years

Dependent Variable: D(DF73)
Method: Least Squares
Date: 11/16/05 Time: 12:11
Sample (adjusted): 1/06/1998 11/10/2005
Included observations: 2048 after adjustments
Newey-West HAC Standard Errors & Covariance (lag truncation=7)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-3.57E-05	0.000252	-0.141633	0.8874
D(DF01A)	-0.017960	0.006270	-2.864572	0.0042
D(DF28(-1)-DF233(-1))	0.007357	0.006107	1.204672	0.2285
D(DF30FUTURE)	0.981588	0.012809	76.63496	0.0000
D(DF152+DLOG(DF144)*100)	-0.000675	0.000507	-1.331128	0.1833
DLOG(DF36FUTURE)*100	0.000881	0.000294	2.993076	0.0028

R-squared	0.930930	Mean dependent var	-0.000474
Adjusted R-squared	0.930761	S.D. dependent var	0.052779
S.E. of regression	0.013888	Akaike info criterion	-5.712659
Sum squared resid	0.393853	Schwarz criterion	-5.696181
Log likelihood	5855.763	F-statistic	5504.449
Durbin-Watson stat	2.303569	Prob(F-statistic)	0.000000



Forecast: DF73F
Actual: DF73
Forecast sample: 10/13/2005 11/14/...
Adjusted sample: 10/13/2005 11/10/...
Included observations: 21

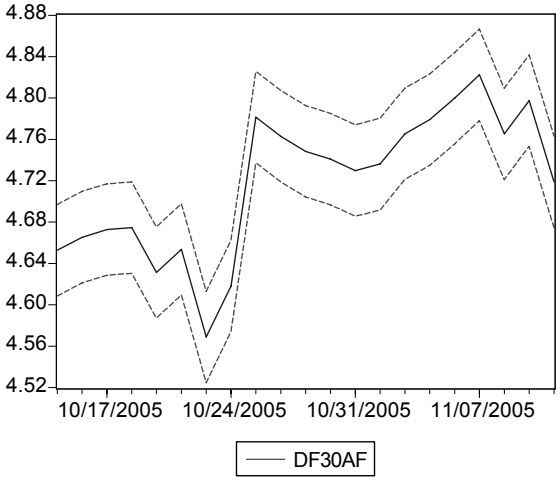
Root Mean Squared Error	0.011348
Mean Absolute Error	0.009077
Mean Abs. Percent Error	0.188811
Theil Inequality Coefficient	0.001175
Bias Proportion	0.041917
Variance Proportion	0.003739
Covariance Proportion	0.954344

30-years

Dependent Variable: D(DF30A)
Method: Least Squares
Date: 11/16/05 Time: 12:10
Sample (adjusted): 1/06/1998 11/10/2005
Included observations: 2048 after adjustments
Newey-West HAC Standard Errors & Covariance (lag truncation=7)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-9.82E-05	0.000364	-0.269974	0.7872
D(DF01A)	-0.022936	0.009461	-2.424402	0.0154
D(DF28(-1)-DF233(-1))	0.016516	0.009416	1.754113	0.0796
D(DF30FUTURE)	0.868430	0.016335	53.16489	0.0000
D(DF152+DLOG(DF144)*100)	-0.000813	0.000718	-1.132757	0.2574

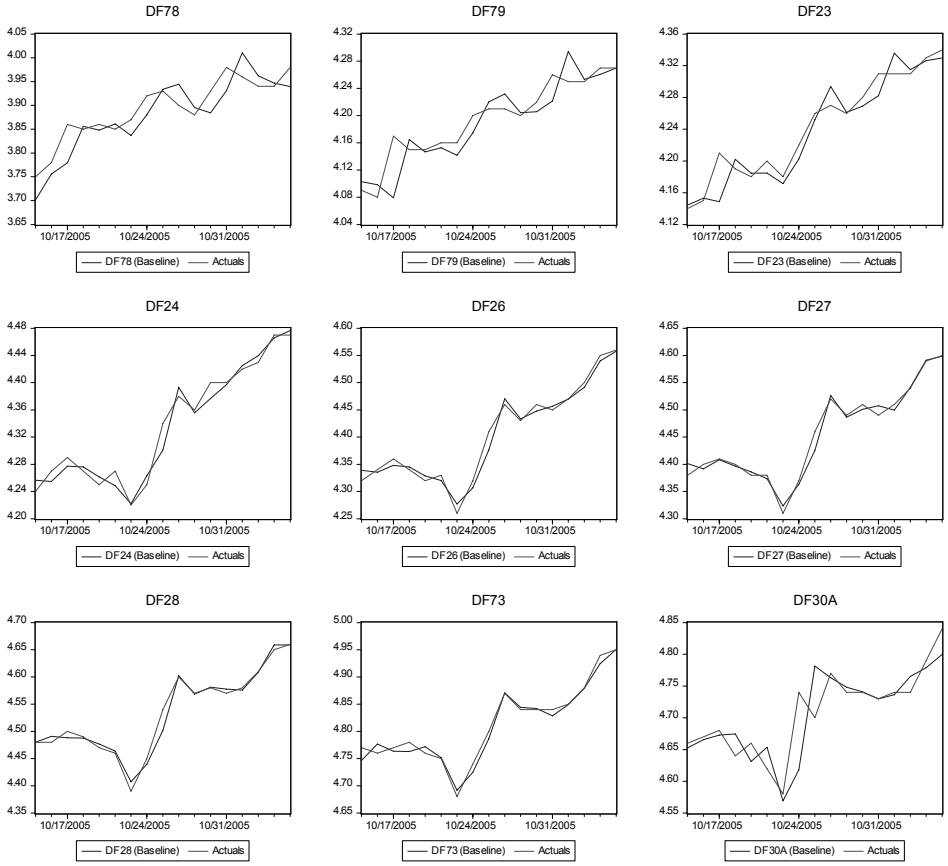
R-squared	0.805893	Mean dependent var	-0.000488
Adjusted R-squared	0.805513	S.D. dependent var	0.050051
S.E. of regression	0.022073	Akaike info criterion	-4.786509
Sum squared resid	0.995361	Schwarz criterion	-4.772777
Log likelihood	4906.385	F-statistic	2120.537
Durbin-Watson stat	2.347743	Prob(F-statistic)	0.000000



Forecast: DF30AF
Actual: DF30A
Forecast sample: 10/13/2005 11/14/...
Adjusted sample: 10/13/2005 11/10/...
Included observations: 21

Root Mean Squared Error	0.036754
Mean Absolute Error	0.023009
Mean Abs. Percent Error	0.487704
Theil Inequality Coefficient	0.003894
Bias Proportion	0.003389
Variance Proportion	0.006772
Covariance Proportion	0.989839

Model Baseline Solution (10/13/2005 -11/04/2005, one-day ahead)



maturity	mean absolute error (in sample) (basis points)
3-months	3.14
6-monts	1.98
1-year	1.43
2-year	1.22
5-year	1.04
7-year	0.90
10-year	0.76
20-year	0.91
30-year	2.51

List of Variables

Endogenous variables

DF78	Yield on U.S. Treasury Securities Adjusted to Constant Maturity\3-Month\UNITS Percent\SOURCE: Federal Reserve (H.15, Selected Interest Rates)
DF79	Yield on U.S. Treasury Securities Adjusted to Constant Maturity\6-Month\UNITS Percent\SOURCE: Federal Reserve (H.15, Selected Interest Rates)
DF23	Yield on U.S. Treasury Securities Adjusted to Constant Maturity\1-Year\UNITS Percent\SOURCE: Federal Reserve (H.15, Selected Interest Rates)
DF24	Yield on U.S. Treasury Securities Adjusted to Constant Maturity\2-Years\UNITS Percent\SOURCE: Federal Reserve (H.15, Selected Interest Rates)
DF26	Yield on U.S. Treasury Securities Adjusted to Constant Maturity\5-Years\UNITS Percent\SOURCE: Federal Reserve (H.15, Selected Interest Rates)
DF27	Yield on U.S. Treasury Securities Adjusted to Constant Maturity\7-Years\UNITS Percent\SOURCE: Federal Reserve (H.15, Selected Interest Rates)
DF28	Yield on U.S. Treasury Securities Adjusted to Constant Maturity\10-Years\UNITS Percent\SOURCE: Federal Reserve (H.15, Selected Interest Rates)
DF73	Yield on U.S. Treasury Securities Adjusted to Constant Maturity\20-Years\UNITS Percent\SOURCE: Federal Reserve (H.15, Selected Interest Rates)
DF30A	Yield on U.S. Treasury Securities Adjusted to Constant Maturity\30-Years\UNITS Percent\SOURCE: Calculated by DRI-WEFA by adding an extrapolation value provided by the Federal Reserve to the 20 year Constant Maturity rate (DF73) published inthe H.15 press report.\Prior to 6/1/2004 this series was calculated from the Long Term Treasury Constant maturity rate (DF301).

Predetermined Variables

DF24 FUTURES	2-year treasury futures (Source: Bloomberg, obtained from Decision Economics)
DF26 FUTURES	5-year treasury futures (Source: Bloomberg, obtained from Decision Economics)
DF28 FUTURES	10-year treasury futures (Source: Bloomberg, obtained from Decision Economics)
DF30 FUTURES	30-year treasury futures (Source: Bloomberg, obtained from Decision Economics)
DF36 FUTURES	Dow-Jones (Industrial) futures (Source: Bloomberg, obtained from Decision Economics)
DF01A	Federal Funds Rate Target\UNITS Percent Per Annum\SOURCE: Federal Reserve Bank of New York
DF144	DAILY NOON BUYING RATES\UNITED KINGDOM\UNITS US DOLLARS PER POUND\SOURCE: FEDERAL RESERVE, H.10 (FOREIGN INTEREST RATES)
DF152	EURODOLLAR DEPOSITS, 6-MONTH\UNITS PERCENT PER ANNUM\ SOURCE: FR, H.15 (SELECTED INTEREST RATES)
DF233	Yield on U.S. Treasury Securities Adjusted to Constant Maturity, Inflation Indexed\10 Year\UNITS Percent\SOURCE: Federal Reserve (H.15, Selected Interest Rates)