PHD239FCPS2-tugendhaft

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1 Question 1

1.1 Discussion

The values between Table 1 and Table 2 are somewhat close. The expected returns (both excess and simple) are higher for the Fama Bliss data. Notice how compared to the Table 10.2 in Campbell, Lo, and MacKinlay, we do not see the mean of the excess return stay low as we increase the maturity (even dropping to negative value for 10 year maturity). The values in the Fama Bliss table and the GSW table are roughly similar for the change in yield and the yield spread. Qualitatively the standard errors are roughly similar to CLM for these variables as well, but the values of the spreads are much larger in both Fama Bliss and in GSW. Notice that the log-average of the simple returns are very large compared to the excess returns. This is in part because the simple returns are not excess and so are not subtracting out the 1-period rate. Also, we take the log of the expectation, rather than the expectation of the log. This will have a Jensen's inequality effect making it quite large.

1.2 GSW Data

	mean	std
ER1	0.806119	2.851435
ER2	1.379145	6.638273
ER4	2.446897	14.350482
ER10	4.999132	34.818921
simple1	4.318373	NaN
simple2	5.081052	NaN
simple4	6.966407	NaN
simple10	14.756975	NaN
Deltay1	-0.022109	0.258775
Deltay2	-0.023322	0.287689
Deltay4	-0.024112	0.303944
Deltay10	-0.023344	0.291642
Spread1	0.563239	0.510723
Spread2	0.843088	0.661417
Spread4	1.314076	0.865454
Spread10	2.221273	1.226506

Table 1: Replication of CLM table 10.2 with the GSW data

1.3   Fama Bliss Data

	mean	std
ER1	1.701242	2.990819
ER2	1.790743	6.609411
ER4	3.486300	14.622464
ER10	7.749852	35.017027
simple_1	5.215623	NaN
simple_2	5.476980	NaN
simple_4	8.027341	NaN
simple_10	17.587629	NaN
Deltay_cons_mat_1	-0.021945	0.269744
Deltay_cons_mat_2	-0.023772	0.287331
Deltay_cons_mat_4	-0.025008	0.308958
Deltay_cons_mat_10	-0.023686	0.293430
Deltay_noncons_mat_1	-0.106807	0.266265
Deltay_noncons_mat_2	-0.042620	0.285408
Deltay_noncons_mat_4	-0.046300	0.309219
Deltay_noncons_mat_10	-0.047435	0.293115
Spread1	0.526059	0.488605
Spread2	0.809867	0.659358
Spread4	1.309329	0.863121
Spread10	2.104153	1.232829

Table 2: Replication of CLM table 10.2 with Fama Bliss data. Note that Deltay_cons_mat is defined as $y_{n,t+1} - y_{nt}$ and Deltay_noncons_mat is defined as $y_{n-1,t+1} - y_{nt}$

2 Question 2

2.1 Part a

Table 3: Notice that we have three statistically significant principal components at a 95% confidence level, PC2, PC4 and PC5. This is in some respect not surprising as there is a large literature that the yield curve can be approximated by 3 principal components.

	beta	Newey West SEs	Hansen Hodrick SEs
Constant	2.868678	0.597521	0.663920
PC1	0.027992	0.067111	0.072990
PC2	1.485705	0.511651	0.561618
PC3	-1.355838	2.826389	2.968536
PC4	18.794667	6.986720	7.525361
PC5	106.135898	25.483055	21.744231

2.2 Part b

Table 4: Below are R^2 values for both the restricted and unrestricted regressions. It seems that for the early maturities, there is some gain in explanatory power in using the unrestricted model (specifically for the excess return for the 2, 3 and 4 year maturities), but for the longer maturities there is essentially no gain from using the unrestricted specification instead of the restricted specification. These R^2 values are much lower here than in Cochrane and Piazzesi, indicating that the forward rates perform better than the principal components at explaining bond returns.

	Restricted	Unrestricted
rx2	0.112126	0.181680
rx3	0.150365	0.183723
rx4	0.184087	0.200403
rx5	0.211169	0.217747
rx6	0.230296	0.231772
rx7	0.241255	0.241404
rx8	0.244828	0.246682
rx9	0.242398	0.248140
rx10	0.235518	0.246484

3 Question 3

0.05000	0.07524	0.09165	0.11129	0.12612	0.14418
nan	0.04524	0.06165	0.08129	0.09612	0.11418
nan	nan	0.03165	0.05129	0.06612	0.08418
nan	nan	nan	0.02129	0.03612	0.05418
nan	nan	nan	nan	0.00612	0.02418
nan	nan	nan	nan	nan	-0.00582

Table 5: Ho-Lee interest rate tree

4 Question 4

4.1 Part a)

The initial price of the non-prepayable mortgage is $98.91

4.2 Part b)

The initial price of the prepayable mortgage is $98.02

4.3 Part c)

The initial price of the principal only security is $83.19

4.4 Part d)

The initial price of the interest only security is $14.82