JAMES A. GRAASKAMP COLLECTION OF TEACHING MATERIALS

II. CLASSES AT THE UNIVERSITY OF WISCONSIN--MADISON

G. Business 552: Residential Finance and Housing Policy

3. Problem Sets

Index

Due Noon on Friday, September 12, 1986 Name_______________

General Directions: Solutions will be graded on the basis of the four C's (Clarity, Completeness, Conciseness, and Correctness); hence, the solution set you submit should be free of errors; well organized--showing all steps of the solution and the numerical value of each interest factor used; logically concise; and of course, correct.

1. Given a mortgage loan with the following terms, find the portion of the debt service that is principal for the fith and sixth months during the 15th year of the loan and for the 15th year as a whole.

   Type of Loan: Full amoritization, monthly payments, fixed rate
   Interest Rate: 93/8%
   Term of Loan: 25 Years
   Loan Amount: $175,000

2. If the borrower pays off the loan described below as scheduled over the 30-year term, what will be the effective yield to the lender?
   Type of Loan: Full amoritization, monthly payments, fixed rate
   Interest Rate: 10.5%
   Term of Loan: 30 Years
   Points Charged: 3 1/2 points
   Prepayment Penalty: 1 1/2% of the outstanding loan balance
   Loan amount: $130,000

3. If the borrower pays off the outstanding balance of the above loan (problem 2) after seven years of timely debt service payments, what will be the lender's effective yield?

4. Suppose instead that the borrower desires a loan with the following terms. Assuming that the borrower will pay off this 10-year loan as scheduled, how many points should the lender charge to achieve a 11.25% effective yield?
   Type of Loan: Full amoritization, monthly payments, fixed rate
   Interest Rate: 9.75%
   Term of Loan: 10 Years
   Prepayment Penalty: 1 1/2% of outstanding loan balance
   Loan Amount: $130,000

5. If the following interest rate changes occur on a variable rate mortgage loan and the loan is paid off early at the end of five years, what will be the lender's effective yield?
   Type of Loan: full amoritization, monthly payments, variable rate
   Interest Rate: Initially 9.5%
   Year 2: 10.0%
   Years 3&4: 10.25%
   Year 5: 11.0%
   Loan Amount: $135,000
   Points Charged: None
   Term of Loan (fixed): 27 Years
   Prepayment Penalty: 2 1/2% of outstanding loan balance

6. Eight Years ago the seller of the sunject property took out an assumable loan from another financial institution. The new buyer would like to take advantage of the low, fixed interest rate on the assumable loan by obtaining a wraparound mortgage loan from his bank. If the buyer makes the payments on the wraparound loan as scheduled, what will be the new lender's effective yield on the wraparound loan?

<u>Assumable Loan</u>:
Type of loan: Full Amoritization, Monthly Payments, Fixed rate
Interest Rate: 6.0%
Term of Loan: 30 Years
Loan Amount: $250,000 (Originally)

<u>Wraparound Mortgage Loan</u>:
Type of Loan: Full Amoritization, Monthly payments, Fixed rate
Interest Rate: 10.0%
Term of Loan: 22 Years
Loan Amount: $325,000 (Note: this is the face amount of the new loan)

7. The Seller is asking $2,725,000 for the subject property. Stabilized NOI is $255,000. By the end of the anticipated nine year holding period, the property value is expected to have increased by 41%. The buyer requires a 9% before-tax equity yield. Available loan terms are 11% over 28 years (fixed rate, full amoritization, monthly payments). Using your knowledge* of acceptable levels of financial ratios that concern mortgage lenders ; evaluate whether or not the lender would make a loan for the amount derived from the basic Ellwood equation. Provide support for your answer (i.e., show your supporting calculations).

The Basic Ellwood Equation:

$$R_o = Y_e - M[Y_e + P(A/F, Y_e, h) - f] - app(A/F, Y_e, h)$$

* If your knowledge is limited in this area, consult your textbook.

Business 552: Residential Real Estate Finance

PROBLEM SET #3

Professor James A. Graaskamp
Spring Semester 1986

Name______________
Discussion Section 301

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1. Given an interest rate of .09, original loan balance of $50,000, and 40 loans in the mortgage pool, use the GNMA spreadsheet to answer the following questions:

   a. If the current price of the MBS is .95, then what is:

      i) the current HTG yield?
      ii) the current mortgage yield?

   b. If the market decided that the HTG yield should be 12%, then what would be:

      i) the new price of the MBS?
      ii) the mortgage yield at this new security price?

   c. Determine the following values with respect to the loan as described in part a:

      i) half life,
      ii) average life, and
      iii) pool factor, mortgage balance percentage, and overall prepayment rate as of the end of year 12.

   Attach a complete output display for the above computer run.

2. Given an interest rate of .13, original loan balance of $75,000, and 20 loans in the mortgage pool, use the GNMA spreadsheet to answer the following questions:

   a. Prepare a schedule of MBS prices and their corresponding mortgage yields for the following HTG yields:

      .08, .10, .12, .13, .14, .16, .18

      Attach a full computer output display for HTG yield = .13 only.

   b. Determine both the "duration" and the "modified duration" associated with the MBS when the HTG yield = .13.

   c. Using the modified duration computed in part b, estimate the new MBS price associated with each of the various HTG yields given in part a. How does each of these estimates compare with the actual MBS price computed in part a? Use a chart to answer this.

   d. Suppose ten years have passed. If the FHA experience has been as expected, is expected to continue to be as expected, and the market desires an HTG yield of .10, then what will be the new price of the MBS?

3. Detect and explain at least two theoretical flaws in the computer program. How significant is each of these flaws?

Business 552: Residential Real Estate Finance
Problem Set #3 - - Analysis of GNMA Section 203, 30-year MBS

Student Name: Dan Guenther *

Description of Representative Loan:

Original Loan Balance	=	$100,000.00	*		
Interest Rate	=	0.1200	*		
Term (fixed)	=	30			
Number of Loans in Pool	=	10	*	M.D.S. =	$1,028.61
Servicing Fee (fixed)	=	0.005		A.D.S. =	$12,343.35
Current Price of MBS	=	1.0000	*		
Desired HTG Yield	=	0.1100	*		

Individual Loan Amortization Schedule

Year	Beg. of Year Loan Balance	Principal Repayment	Interest Paid	End of Year Loan Balance
0				
1	$100,000.00	$362.88	$11,980.47	$99,637.12
2	$99,637.12	$408.90	$11,934.45	$99,228.22
3	$99,228.22	$460.76	$11,882.59	$98,767.46
4	$98,767.46	$519.20	$11,824.15	$98,248.26
5	$98,248.26	$585.04	$11,758.31	$97,663.22
6	$97,663.22	$659.24	$11,684.11	$97,003.98
7	$97,003.98	$742.85	$11,600.50	$96,261.13
8	$96,261.13	$837.06	$11,506.29	$95,424.06
9	$95,424.06	$943.22	$11,400.13	$94,480.84
10	$94,480.84	$1,062.85	$11,280.50	$93,418.00
11	$93,418.00	$1,197.64	$11,145.71	$92,220.35
12	$92,220.35	$1,349.53	$10,993.82	$90,870.82
13	$90,870.82	$1,520.69	$10,822.66	$89,350.13
14	$89,350.13	$1,713.55	$10,629.80	$87,636.58
15	$87,636.58	$1,930.87	$10,412.48	$85,705.71
16	$85,705.71	$2,175.75	$10,167.60	$83,529.96
17	$83,529.96	$2,451.69	$9,891.66	$81,078.27
18	$81,078.27	$2,762.63	$9,580.72	$78,315.64
19	$78,315.64	$3,113.00	$9,230.35	$75,202.64
20	$75,202.64	$3,507.81	$8,835.55	$71,694.83
21	$71,694.83	$3,952.68	$8,390.67	$67,742.15
22	$67,742.15	$4,453.98	$7,889.37	$63,288.17
23	$63,288.17	$5,018.86	$7,324.49	$58,269.31
24	$58,269.31	$5,655.38	$6,687.98	$52,613.94
25	$52,613.94	$6,372.62	$5,970.73	$46,241.32
26	$46,241.32	$7,180.83	$5,162.53	$39,060.49
27	$39,060.49	$8,091.53	$4,251.82	$30,968.96
28	$30,968.96	$9,117.74	$3,225.61	$21,851.22
29	$21,851.22	$10,274.10	$2,069.25	$11,577.11
30	$11,577.11	$11,577.11	$766.24	$0.00

Current Honest-to-God Yield	=	0.1146
Current Mortgage Yield	=	0.1147
MBS Price at Desired HTG Yield	=	1.0273
Mort. Yield at Desired HTG Yield	=	0.1103

Mortgage Pool Cash Flows

Beg. of Year Pool Balance	Interest	Scheduled Principal	Servicing Fee	1982 FHA Experience	Principal Prepayment	Total Cash Flow	End of Year Pool Balance	Mortgage Yield Cash Flows I	Mortgage Yield Cash Flows II
				1.00000		($1,000,000.00)		($1,000,000.00)	
$1,000,000.00	$119,804.72	$3,628.79	($4,962.88)	0.98874	$11,219.14	$129,689.77	$985,152.07	$118,442.58	
$985,152.07	$118,000.68	$4,042.97	($4,823.17)	0.95146	$36,992.20	$154,212.76	$944,116.81	$118,461.88	
$944,116.81	$113,058.10	$4,383.95	($4,588.09)	0.90224	$48,613.34	$161,467.30	$891,119.52	$118,483.62	
$891,119.52	$106,682.25	$4,684.40	($4,316.80)	0.85050	$50,833.65	$157,883.50	$835,601.47	$118,508.12	
$835,601.47	$100,004.41	$4,975.80	($4,036.68)	0.79771	$51,556.41	$152,499.94	$779,069.26	$118,535.72	
$779,069.26	$93,205.31	$5,258.84	($3,750.56)	0.74343	$52,653.76	$147,367.34	$721,156.67	$118,566.83	
$721,156.67	$86,241.61	$5,522.57	($3,464.60)	0.69050	$50,951.01	$139,250.59	$664,683.08	$118,601.88	
$664,683.08	$79,450.93	$5,779.91	($3,189.80)	0.64055	$47,664.32	$129,705.36	$611,238.85	$118,641.38	
$611,238.85	$73,023.52	$6,041.81	($2,935.22)	0.59573	$42,346.31	$118,476.43	$562,850.72	$118,685.89	
$562,850.72	$67,201.35	$6,331.70	($2,705.40)	0.55590	$37,208.39	$108,036.03	$519,310.64	$118,736.04	
$519,310.64	$61,959.00	$6,657.69	($2,495.39)	0.51924	$33,807.98	$99,929.28	$478,844.96	$118,792.55	
$478,844.96	$57,084.30	$7,007.32	($2,300.87)	0.48586	$30,332.68	$92,123.42	$441,504.97	$1,027,564.43	
$441,504.97	$52,582.99	$7,388.41	($2,122.64)	0.45613	$26,563.79	$84,412.56	$407,552.76		
$407,552.76	$48,485.72	$7,816.01	($1,959.64)	0.42939	$23,434.02	$77,776.11	$376,302.72		
$376,302.72	$44,710.15	$8,290.96	($1,809.32)	0.40537	$20,586.51	$71,778.31	$347,425.25		
$347,425.25	$41,216.39	$8,819.65	($1,669.89)	0.38373	$18,075.88	$66,442.24	$320,529.52		
$320,529.52	$37,957.26	$9,407.88	($1,539.44)	0.36415	$15,875.12	$61,700.83	$295,246.51		
$295,246.51	$34,888.20	$10,060.11	($1,416.23)	0.34635	$13,940.18	$57,472.27	$271,246.22		($1,027,260.63)
$271,246.22	$31,969.32	$10,781.87	($1,298.88)	0.33018	$12,160.27	$53,612.59	$248,304.08		$118,442.58
$248,304.08	$29,173.21	$11,582.07	($1,186.50)	0.31564	$10,424.43	$49,993.20	$226,297.58		$118,461.88
$226,297.58	$26,484.31	$12,476.25	($1,078.33)	0.30267	$8,786.16	$46,668.38	$205,035.17		$118,483.62
$205,035.17	$23,878.75	$13,480.87	($967.84)	0.28773	$9,455.25	$45,847.04	$182,099.05		$118,508.12
$182,099.05	$21,074.76	$14,440.76	($850.17)	0.27110	$9,690.19	$44,355.54	$157,968.11		$118,535.72
$157,968.11	$18,131.10	$15,331.72	($727.69)	0.25299	$9,528.38	$42,263.52	$133,108.00		$118,566.83
$133,108.00	$15,105.36	$16,122.09	($602.93)	0.23370	$8,919.95	$39,544.46	$108,065.96		$118,601.88
$108,065.96	$12,064.82	$16,781.59	($478.85)	0.21370	$7,812.10	$36,179.66	$83,472.27		$118,641.38
$83,472.27	$9,086.13	$17,291.61	($358.45)	0.19344	$6,274.31	$32,293.61	$59,906.35		$118,685.89
$59,906.35	$6,239.62	$17,637.36	($244.44)	0.17331	$4,398.65	$28,031.19	$37,870.34		$118,736.04
$37,870.34	$3,586.22	$17,806.04	($137.57)	0.14821	$2,905.86	$24,160.55	$17,158.44		$118,792.55
$17,158.44	$1,135.64	$17,158.44	($42.90)	0.12674	$0.00	$18,251.18	($.00)		$1,027,564.43