Bionic Turtle FRM Practice Questions

P1.T3. Financial Markets & Products

Chapter 18. Mortgages and Mortgage-Backed Securities

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Appendix (OPTIONAL)

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P1.T3.508. Residential mortgage products

Learning Objectives: Describe the various types of residential mortgage products. Calculate a fixed rate mortgage payment, and its principal and interest components.

508.1. Sally is meeting with her real estate agent in order to prepare her application for a mortgage loan. The real estate agent makes the following four statements. Each of these statements is true, or at plausible, **EXCEPT** which is clearly false?

a) The initial interest rate on a 3/1 hybrid adjustable rate mortgage (ARM) is less than the rate on a 30-year fixed rate mortgage (FRM)
b) A conforming loan meets guidelines set by agencies such as Fannie Mae and Freddie Mac and include limits on the loan size
c) A "jumbo" is a mortgage loan with an amount above the conforming (aka, agency) loan limit; interest rates on a jumbo loan may be higher or even lower than (otherwise-equivalent) conforming loans
d) In a low interest environment, an adjustable rate mortgage (ARM) is generally advised because the borrower can always decide to refinance at a later date

508.2. Which is **nearest** to the principal component of the first monthly payment on a 30-year fixed rate mortgage (FRM) with an original balance of $140,000 when the interest rate is 3.60%?

a) $39.00
b) $216.50
c) $420.00
d) $636.50

508.3. After five years (60 months), which is nearest to the outstanding scheduled principal balance on a 30-year fixed rate mortgage (FRM) with an original balance of $200,000 and a mortgage interest rate of 3.60%?

a) $152,300
b) $165,800
c) $179,700
d) $182,500

Answers:

508.1. D. False. This was a lesson of the subprime crisis: many borrowers who planned to refine ARMs were subsequently unable to do so when home prices unexpectedly declined.

Tuckman: "Given the role of the subprime crisis, some further comment is in order. Borrowing and lending in the subprime market revolved around the following strategy. A relatively low-credit borrower would take out an ARM that carried a particularly low initial rate, called a teaser, which would reset higher after two or three years. In that time, however, should the credit of the borrower improve or should housing prices increase, the borrower would be able to pay off that first mortgage and borrow through a subsequent mortgage at a fixed rate that would have been unattainable at the start. This strategy worked well until the peak of housing prices in 2006. In fact, most subprime mortgage originations occurred between 2004 and 2006. In any case, the subsequent decline in housing prices and the resetting of ARMs to higher rates led to a significant number of defaults: by May 2008 the delinquency rate for ARMs reached 25%. The resulting foreclosures put further downward pressure on housing prices. By September 2008, the average home price had declined 20% from its 2006 peak. By September 2009, about 14.4% of all U.S. mortgages were either delinquent or in foreclosure, and, in 2009–2010, between 4% and 5% of the total number of mortgages ended in repossessions. Finally, by September 2010, principal balance exceeded home price for 23% of mortgages outstanding, with the percentages in the worst-performing real estate markets even worse (e.g., California at 32.8% and Florida at 46.4%).[1]"

In regard to (A), (B) and (C), each is TRUE.

508.2. B. $216.50. As the monthly payment is $636.50 and the interest component is $420.00 = $140,000 * 0.0360/12, the principal component is $216.50 = $636.50 - $420.00.

508.3. C. $179,700. As the monthly payment is $909.29, the PV of the annuity is given by [PMT*(12/r)]*{1-[1/(1+r/12)]^n}. In this case, [$909.29*(12/0.036)]*{1-[1/(1+0.036/12)]^300} = $179,701

Discuss here in forum: *https://www.bionicturtle.com/forum/threads/p1-t3-508-residential-mortgage-products-tuckman.8474/*

[1] Bruce Tuckman, Angel Serrat, Fixed Income Securities: Tools for Today's Markets, 3rd Edition (New York: Wiley, 2011)

P1.T3.509. Mortgage-backed Securities

Learning Objectives: Describe the mortgage prepayment option and the factors that influence prepayments. Summarize the securitization process of mortgage backed securities (MBS), particularly formation of mortgage pools including specific pools and TBAs. Calculate weighted average coupon, weighted average maturity, and conditional prepayment rate (CPR) for a mortgage pool.

509.1. After five years (60 monthly payments), the outstanding balance on a mortgage is $89,850.00 when the original balance was $100,000. The mortgage is a 30 year fixed rate mortgage (FRM) and each monthly payment is $454.65. As Tuckman explains, "The prepayment option is valuable when mortgage rates have fallen. In that case, as mentioned previously, the present value of the remaining monthly payments exceeds the principal outstanding.[2]"

If we ignore transaction costs, according to Tuckman's principle, what is the highest mortgage rate at which prepayment (for example, refinance) is financially desirable?

a) 1.99%
b) 2.75%
c) 3.60%
d) 4.29%

509.2. If a pool of mortgages starts the year with a principal balance of $10.0 million and the single monthly mortality rate, SMM(n), is constant at 1.0%, which is nearest to the principal that prepays over the next twelve months (not including scheduled principal)?

a) $1,136,151
b) $1,200,000
c) $8,800,000
d) $8,863,849

509.3. In regard to mortgages and mortgage-backed securities, each of the following is true **EXCEPT** which is false?

a) In a mortgage pass-through, the cash flows from the underlying mortgages (i.e., interest, scheduled principal, and prepayments) are passed from the borrowers to the investors
b) A recourse loan is better for the borrower because it means that the borrower can seek a so-called short sale if the value of the house is less than the outstanding principal balance on the mortgage loan
c) Mortgage servicers manage the flow of cash from borrowers to investors in exchange for a fee taken from those cash flows; mortgage guarantors guarantee investors the payment of interest and principal against borrower defaults, also in exchange for a fee
d) When a borrower does default, the guarantor compensates the pool with a lump-sum payment and then, through the servicer, pursues the borrower and the underlying property to recover as much of the amount paid as possible

[2] Bruce Tuckman, Angel Serrat, Fixed Income Securities: Tools for Today's Markets, 3rd Edition (New York: Wiley, 2011)

Answers:

509.1. C. 3.60%

We simply want the interest rate, expressed in monthly compound frequency, which prices the remaining payments equal to the balance.

In this case,
N = 300, PV = -89850, PMT = 454.65, FV = 0 and CPT I/Y = 0.30 and we multiply by 12 to get the yield of 3.60%.

If the interest rate drops below 3.60%, then the present value of the stream of outstanding monthly payments increases about the outstanding balance and it becomes financially optimal (ignore transaction costs and friction) for the borrower (homeowner) to exercise the call option.

509.2. A. $1,136,151. Principal* [1-(1 - SMM)^12] = $10.0 mm * [1-(1 - 0.01)^12] = $10.0 mm * 0.113615128. Note the prepaid principal here is less than 12*1%*$10.0 million just as CRP(n) = 1 - [1 - SMM(n)]^12.

509.3. B. False. A non-recourse loan is better for the borrower. Recourse allows the lender to go after personal assets, in addition to the house. A short sale is when the lender agrees (at their discretion) to accept less than the full amount of the loan payoff; depending on the state/country laws, the lender may have recourse to pursue the remaining balance after the short sale.

In regard to (A), (C) and (D), each is TRUE.

Tuckman: "Mortgage-backed Securities: Until the 1970s banks made mortgage loans and held them until maturity, collecting principal and interest payments until the mortgages were repaid. The primary market was the only mortgage market. During the 1970s, the securitization of mortgages began. The growth of this secondary market substantially changed the mortgage business. Banks that might have had to restrict mortgage lending, either because of limited capital or risk appetite, could now continue to make mortgage loans since these loans could be quickly and efficiently sold. At the same time, investors gained a new security type through which to lend their surplus funds. Of course, one of the policy questions raised by the 2007–2009 financial crisis was whether the mortgage securitization process, for any of several reasons, had created too much systemic risk.[3]

-continued-

[3] Bruce Tuckman, Angel Serrat, Fixed Income Securities: Tools for Today's Markets, 3rd Edition (New York: Wiley, 2011)

Issuers of MBS gather mortgage loans into pools and then sell claims on those pools to investors. In the simplest structure, a mortgage pass-through, the cash flows from the underlying mortgages, that is, interest, scheduled principal, and prepayments, are passed from the borrowers to the investors with some short processing delay. Mortgage servicers manage the flow of cash from borrowers to investors in exchange for a fee taken from those cash flows. Mortgage guarantors guarantee investors the payment of interest and principal against borrower defaults, also in exchange for a fee. When a borrower does default, the guarantor compensates the pool with a lump-sum payment and then, through the servicer, pursues the borrower and the underlying property to recover as much of the amount paid as possible. By the way, in comparison with U.S. lenders, European lenders have easier recourse to borrower assets that are not part of the mortgaged property.

The Overview reported that U.S. mortgage debt was a little over $14 trillion in 2010. Of this total, $7.5 trillion had been securitized. This securitized amount is further subdivided into $5.4 trillion of agency securities, i.e., securities guaranteed or issued by such entities as GNMA, FNMA, and FHLMC, and the remainder private-label securities issued by private financial institutions. These amounts outstanding are misleading, however, with respect to new issuance. Since the 2007–2009 crisis to the time of this writing, agency securities comprised almost all of new MBS issuance.[4]"

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[4] Bruce Tuckman, Angel Serrat, Fixed Income Securities: Tools for Today's Markets, 3rd Edition (New York: Wiley, 2011)