Instruction manual

Scenario:

The mortgage loan is assumed to be repaid by equal monthly payments over the amortization period. Lump sum prepayments, not exceeding a percentage of the nominal annual payment, are allowed at the end of every year (every 12 payments, in addition to the regular monthly payment).

The mortgage interest rate, compounded semi-annually, is guaranteed for the initial term of the mortgage. Payments are calculated assuming that the rate will apply for the entire amortization period and assuming no lump sum repayments will be made. The rate will be renegotiated at the end of the mortgage term, when the mortgage is renewed.

The homebuyer would invest some disposal income at the end of every month into a side fund and use it to make as much annual lump sum prepayments as possible. The side fund is not allowed to go negative. The side fund earns interest at a fixed rate compounded semi-annually.

The monthly amount the homebuyer can invest in the side fund is assumed to increase with inflation once a year.

Program will use the following information (with examples):

- Loan amount (500,000)
- Mortgage amortization period (25 years)
- Mortgage term (5 years)
- Mortgage rate (.06)
- Expected renewal mortgage rate (.06)
- Maximum annual lump sum prepayment (40% of the regular nominal annual payment)
- Initial monthly deposit into the side fund (200)
- Interest earned on the side fund (.04)
- Inflation (2%)

The homebuyer can use the program to answer the following questions:

1- When will the mortgage be fully repaid?
2- What minimum initial monthly deposit into the sinking fund is required in order to fully repay the mortgage by a given target date (for example, after 20 years)?
3- What is the highest renewal mortgage rate for which the homebuyer would still be able to fully repay the loan by the end of the amortization period by making the same monthly payments and using the side fund to make annual lump sum prepayments?

How to input and Calculate:

1. Before each question, input all information at right top, then click the button “Apply ID” and “Apply Renewal Rate”. :p
2. For question 1, click the button “Calculate” which at the same row with “# of month the loan fully repay:”.
3. For question 2, input your target date in the cell located at O34, then click the button “Calculate” which at the same row with “Target Date:”.

4. For question 3, click the button “Calculate” which at the same row with “Highest Renewal Rate:”.

Instruction of the buttons (Introduce the buttons from top to bottom):

1. Apply Initial deposit into the form. The input cell of initial deposit cannot apply in the form automatically.
2. Apply the all mortgage rates in the form. The input cell of Mortgage rate and Expected Renewal rates cannot apply in the form automatically.
3. Calculate the Initial deposit that allow the loan fully repay at the target date. The calculation process is using Bisection.
4. Calculate the Highest Renewal Rate that allow the loan can still fully repay. The calculation process is using Bisection.
5. Track the # of month the loan fully repay. The process is check the Loan Balance column from top to down, the process will stop when the Balance less than 0.