Chapter 4. Mortgages

S4.1. On December 1 of 2004 I bought a home. I took a 30 year, $350,000 fixed mortgage at an APR of 5.6%. At the same time, I bought a car. I took a 4 year car loan of $30,000 at an APR of 8.0%. For both loans, the first payment was due on January 1 of 2005.

A. What are my monthly payments?

Using the Basic tab of the spreadsheet Ch4Mortgages.xls, I find that the home mortgage monthly payment is $2009.28. My car loan isn't a mortgage, but the mathematics of the amortization of the car loan are the same as if it were a mortgage, so I can use the same spreadsheet for the car loan; the car loan monthly payment is $732.39. The sum of these two payments is $2,741.67.

B. What are my outstanding balances on January 1 of 2007, just after I make my monthly payments?

Remember that this spreadsheet shows monthly balances immediately after the monthly payments are made. For the home mortgage, this is $340,055.78. For the car loan, this is $15,569.06.

C. Just after making the above payments, I am offered a refinancing deal: Since my home equity has risen to $600,000 and interest rates have dropped, I can refinance my home and pay off my car with a new loan. This will be a 30 year fixed rate loan, starting on January 1 of 2007 (first payment due on February 1 of 2007) at an APR of 4.86%. The up-front costs of this new loan add up to $3,000. How much must I borrow and what will my new monthly payment be?

I must borrow $340,055.78 + $15,569.06 + $3,000 = $358,624.84. My monthly payment will be $1,894.61.

D. Suppose I want to borrow more of my equity for whatever reason. How much more can I borrow if I want my new monthly payment to be the same as the total of my old monthly payments?

Ch4Mortgages.xls is not set up to solve this problem directly; many on-line calculators will solve it directly. To use ChrMortgages.xls, just keep increasing the principal until the payment equals $2,741.67. This is, to the nearest dollar, $518,963. Again to the nearest dollar, the extra I can borrow is $518,963 - $358,625 = $160,388.

Notes: There are caveats to be aware of in the above transactions. First, although the original car loan would have been paid off in 4 years, it now is part of the mortgage loan and doesn't get fully paid off for another 30 years. Second, the original home mortgage loan would have been paid off 30 years after buying the home. The new loan won't be paid off until 32 years after buying the loan. While refinancing loans at lower interest rates usually makes sense (if the up-front refinancing costs aren't prohibitive), you should always be wary of taking on increased debt and/or extending loan periods. This doesn't mean "don't do it;" it just means don't be seduced into burying yourself in debt for the rest of your life.