

Restructuring Household Finances to Prepare for Home Ownership: A Class Exercise

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Abstract

The purpose of this paper is to demonstrate an interactive pedagogical case study in which college students are required to examine their potential for home ownership after graduation given their own current and anticipated household financial condition. In Part One of this paper, the basic requirements and nomenclature of the home loan process are presented. Part Two shows how lenders typically employ the front ratio and back ratio as part of the loan approval process. Part Three expands the analysis by presenting a planning worksheet example and survey by which college students may apply these principles to their own household finances in order to prepare for eventual home ownership. The form is designed to be a data collection device. Part Four concludes with suggestions for future research.

I. The Home Loan Application Process

Home ownership is still perceived generally as a major accomplishment for most Americans. This case study assumes that most college students share the ambition to one day purchase a home. So, the first part of this interactive case study introduces the college student to the home loan application process.

Loan underwriting is the core of the mortgage approval process. The loan application approval rests upon two primary factors: (1) the credit standing of the borrower and (2) the value of the home. The issue of credit worthiness is the most important factor bearing on the lender's decision to make a home loan for a prospective borrower who will occupy the property as his or her personal residence. The reason that credit worthiness is so important is that, should the lender have to foreclose, the home produces no income (the lenders primary goal in the loan process). Therefore, the lender is most interested in making a determination of the borrower's ability and willingness to pay. Since the appraisal process is not a part of this paper, we will assume in each of the following examples that the home in question has "appraised up." Of course, the appraised value of the home must be greater than or equal to the proposed sale price and more than the loan amount in a typical (non-sub-prime) loan arrangement.

The borrower's credit score is used by the loan underwriter to estimate the borrower's willingness and/or ability to pay. That is, in the view of the underwriter, past history is a fair predictor of future performance. The Fair Isaacs Company has captured a large portion of the credit score market with its proprietary formulas which produce a unique credit score for each individual. High scores are usually considered to be above 700 and low scores below 600. Such scores are available, for a fee, from the website <http://www.myfico.com/>. Free credit scores often available on the internet are usually a vendor simulation of the Fair Isaacs score. These scores are free to the consumer and can be useful in the analysis. Information is available at <http://www.ftc.gov/freereports> . Credit scores include the impact of the individual's past use or abuse of credit. The score is obtained by comparing the number of credit accounts, the related balances and monthly payments, delinquencies, defaults and bankruptcies.

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To determine the borrower's ability to pay, lenders look at income, wealth, and financial obligations. Monthly household income is determined on a before-tax basis. This figure includes pay from employment, public support, retirement benefits and even alimony and child support. Lenders are prohibited by law from penalizing the borrower for reporting income from alimony, child support or public assistance. Therefore, the loan underwriter will base the loan decision, at least in part, upon the stability of the household income. Underwriting standards typically require that borrower's who apply for the most favorable credit terms be able to show they have worked in the same firm, or sometimes in the same field, for at least two years.

II. Using the Front Ratio and the Back Ratio

One traditional rule used by lenders, builders and real estate agents to estimate the price of a home the buyer could afford was the "Two-and-a-half Times Rule." Suppose a buyer reported annual household income of \$46,000. He or she could afford a home priced at \$115,000: $\$115,000 = \$46,000 \times 2.5$. This rule has been in use for many decades.

Starting in the 1980s, lenders began to employ two rules, both using several variables, the most important of which was the buyer's monthly gross income. The front ratio, or "front end ratio" stipulates that no more than 28% of the borrower's monthly gross income can be devoted to the payment for the home mortgage. Included in this payment are principal, interest, escrows for property taxes and hazard insurance and payment for any required private mortgage insurance (Dasso, et al, 1995; McWhinney, 2005). The model is self calibrating because it adjusts for the buyer's down payment to estimate the maximum affordable home price:

$$MXP_f = MGI(f)/(LTV(k) + TXI/12 + PMI/12) \quad [1]$$

Where:

MXP_f = the maximum affordable home price using the front ratio

MGI = monthly gross income reported by the borrower household

f = front ratio of 28%, stipulated as .28

LTV = loan-to-value ratio

k = monthly mortgage loan constant (the rate factor based on fixed loan terms)

TXI = annual estimate property taxes and hazard insurance, expressed as a percentage of MXP_f

PMI = annual payment for private mortgage insurance

Suppose, for example, that two years after graduating, Mr. and Mrs. Jay report a gross household income of \$96,000 per year, which works out to \$8,000 per month. Interest rates are at 6.5% for a 30 year fixed rate mortgage (constant = .006321), lenders require a down payment of 5%, PMI costs .78% of the OLB (Original Loan Balance) and insurance and taxes amount to 3.2% of the home value annually(divide by 12 for monthly payment). The front ratio method indicates that the couple can afford a home priced at around \$240,300:

$$\begin{aligned} MXP_f &= \$8,000(.28)/[(.95 \times .006321) + .032/12 + .0078/12] \\ &= \$2,240/[(.006005 + .002667 + .00065)] \\ &= \$2,240/.009321 \\ &= \$240,309 \end{aligned}$$

The example indicates that PITI (Principal, Interest, Taxes, and Insurance) plus PMI does not exceed \$2,240 per month, which is 28% of \$8,000, the gross monthly household income reported by the couple.

OLB	\$228,293	= .95 x \$240,309
PMT	\$1,443.04	= \$228,293 x .006321
TXI	\$640.82	= (\$240,309 x .032)/12
PMI	\$148.39	= (\$228,293 x .0078)/12
Result	(\$1,443.04 + \$640.82 + \$148.39)	≤ \$2,240

The back ratio restricts total monthly debt service to all creditors to a maximum of 36% of household monthly gross income net of other debt obligations. Although the numerator of this model is different from that used in the front ratio, previously shown, the denominator for both models is the same:

$$MXP_b = [MGI(b) - ODO]/(LTV(k) + TXI/12 + PMI/12) \quad [2]$$

Where:

MXP_b = the maximum affordable home price using the back ratio

MGI = monthly gross income reported by the borrower household

b = back ratio of 36%, stipulated as .36

ODO = other debt obligations per month apart from PITI and PMI

LTV = loan-to-value ratio

k = monthly mortgage loan constant

TXI = annual estimate property taxes and hazard insurance, expressed as a percentage of MXP_b

PMI = annual payment for private mortgage insurance

Suppose now the same couple has combined college loan debt of \$50,000 paid on a twenty year monthly plan at 5% (pmt = \$329.97), two car payments of \$350 per month each, and total credit card payments of \$175 per month. Using the same information as before, but employing a back ratio of 36%, the couple can afford a home priced just under \$180,000:

$$\begin{aligned} &= [(\$8,000 \times .36) - \$329 - \$700 - \$175]/[(.95 \times .006321) + .032/12 + .0078/12] \\ &= [\$2,880] - \$1,204/.009321 \\ &= \$1,676/.009321 \\ &= \$179,809 \end{aligned}$$

The figure \$2,880 is the maximum total debt obligations, TDO, which can be supported by household income using the back ratio of 36%. Subtracting other debt obligations, ODO, from TDO, results in the maximum PITI plus PMI which is supportable by household income. Since, $\$1,676 = \$2,880 - \$1,204$, then this couple can afford a house payment, which includes PITI and PMI, of not more than \$1,676 per month. The proof, shown below, indicates that total debt obligations (TDO) do not exceed \$2,880 per month. The back ratio is more complicated than the front ratio, so the example becomes more complex:

OLB	= \$179,809 x .95	= \$170,818
PMT	= \$178,818 x .006321	= \$1,079.74
TXI	= (.032 x \$179,809)/12	= \$479.49
PMI	= (.0078 x \$178,818)/12	= \$116.23
TDO	= (\$1,079.74 + \$479.49 + \$116.23) + \$1,204	= \$2,879.46

When presented in class, the example above introduces students to time value of money, the structure of mortgage loans, as well as the costs of property taxes, hazard insurance and private mortgage insurance. Requirements concerning the loan-to-value ratio and equity down payment are also presented. The instructor may use various combinations of formula, spreadsheet, tables and financial calculator keystrokes to guide the students through the ratios and their proofs. The impact of the interest rate, the term of the loan and additional debt burden can also become major educational tools.

III. Survey of Household Finances

In the example above, using the back ratio to incorporate the impact of other monthly installment debt diminishes the maximum affordable home price by nearly 25%:[1.0 – (\$179,809/\$240,309)]. This impact is especially significant for the college student, because a major component of other monthly installment debt is the payment required to retire student loan debt. While academic research has not yet examined the relationship between home-loan default and student loan debt (LaCour-Little, 2008), the market place has taken notice of this issue. The Mortgage Bankers Association now co-sponsors a website, www.studentloanrx.com, which is designed to help students manage their finances (Purisky, 2005). The survey which appears below allows the college student to examine his or her household finances to prepare for home ownership. The assumptions built into the calculations on the survey are explained in the paragraph which appears just under the title.

To qualify for a home loan with the most favorable terms, first-time borrowers are typically required to show at least two years of steady work. During this two year period, the household will likely be renting. The result of this survey of household finances is actually the maximum monthly rent the student should pay for an apartment during the first two years after college or before the home purchase qualification. By working through the calculations in the form, the student can determine immediately, what impact his other debt obligations are likely to have on his ability to rent suitable lodgings and subsequently purchase a home.

For illustrative purposes, the survey presented in Exhibit I is completed using information drawn from the example presented above. The back ratio method is shown, but the front ratio method is easily adapted to provide a survey to determine potential home purchase price for borrowers that have budgeted for a low or zero debt entry in the home market.

IV. Collecting the Data for Future Research

A blank “Survey of Household Finances” appears as Exhibit II at the end of this paper. It is provided to the academic community as a training device for the classroom and as a means of collecting data for future research. Notice that the blank form includes two pieces of

demographic information: the age of the college student and the marital status, both projected as of the future graduation date. Other demographics could be added.

What do we want to know? First, we want to examine the average amount reported on Line J, which represents the projected maximum rent the graduate should expect to pay and still conform to lender standards to eventually qualify for a home loan. If Line J, on average, is very small, say a few hundred dollars, this would seem to indicate that students are quite overburdened with debt by the time they graduate from college. Second, we would like to assemble a prescriptive financial model which, when used by college counselors or posted on the web, would indicate to the college student just how much student loan and college related debt he or she should expect to sustain and still qualify to buy a home perhaps as soon as two years after having graduated. Although it is true that about 68% of households in the U.S. own their home, the rate for households whose head is aged less than 35 is only about 40% (Vlasenko, 2008).

There is a conflict between paying for college and paying for a home. On one hand students seek a college degree to pursue the American Dream: a career and perhaps a home and a family. On the other hand, having obtained the college degree, at least a portion of college graduates cannot afford a home because the monthly payment to retire student loans stands in the way. For those households attempting simultaneously to pay for a home and payoff student loan debt the default potential is significant. In fact, default rates for student loans are similar to the default rates reported for subprime home loans (Herr and Burt, 2005; Kesterman, 2006).

EXHIBIT I. EXAMPLE USING THE SURVEY OF HOUSEHOLD FINANCES

The purpose of this survey is to direct the respondent’s attention to a future time when he or she may wish to purchase a home. It is often necessary to properly structure household finances several years in advance of such a purchase. Structuring household finances in ways suggested by this form will never guarantee that the respondent will actually qualify for a home loan. This survey ignores the impact of credit scores and closing costs.

Here are the assumptions upon which this survey is based. All household income and debt information supplied by the respondent is assumed to be correct or correctable by the respondent. The survey ignores the impact of the income tax deductibility for mortgage interest, PMI and property taxes. The monthly savings set aside to accumulate a down payment is assumed to earn no interest during the two year period when the household is renting. The factor found in the column below, .009321, is based on the assumptions that 30-year fixed rate loans are available at 6.5% per year (constant = .006321), lenders require a down payment of 5%, PMI costs .78% of the OLB and property taxes and insurance amount to 3.2% of the home value annually. Annual estimates of PMI and TXI are adjusted to obtain their monthly equivalents. So, .009321 = (.95 x .006321) + .032/12 +.0078/12.

Expected MONTHLY gross household income after graduation:	\$	8,000 A
Multiply by the back ratio		<u>.36</u>
Enter result. This is the maximum total debt obligation	\$	2,880 B
Other monthly debt obligations expected (student loan, car, etc) after graduation:	-	<u>1,204 C</u>
Subtract and enter result here. This is the maximum PITI + PMI	\$	1,676 D
Divide by factor	÷	<u>.009321</u>

Result is MXP _b , the maximum home price using the back ratio	\$ 179,809 E
Multiply by .05	<u>.05</u>
Down payment required to buy the home	\$ 8,990 F
Divide by 24 months	<u>÷ 24</u>
Monthly amount to save for down payment	\$ 375 G
Enter the maximum total debt obligations from Line B, above	\$ 2,880 B
Enter the monthly amount to save for down payment from Line G, above	<u>- 375G</u>
Subtract Line G from Line B	\$ 2,505 H
Enter other monthly debt obligations from line C, above	<u>- 1,204 C</u>
Subtract Line C from Line H. Enter the result	\$ 1,301 J

Line H is the maximum monthly obligation, net of down payment savings, the household can sustain in order to structure finances to prepare for the future home purchase and qualify for the related home loan using the back ratio of .36.

Line J is the maximum monthly rent the household can sustain during the two years of renting, working and saving for the future home purchase. Note: Consideration of personal income and other taxes should be made as well to properly plan the future purchase.

EXHIBIT II. SURVEY OF HOUSEHOLD FINANCES (BLANK)

The purpose of this survey is to direct the respondent's attention to a future time when he or she may wish to purchase a home. It is often necessary to properly structure household finances several years in advance of such a purchase. Structuring household finances in ways suggested by this form will never guarantee that the respondent will actually qualify for a home loan. This survey ignores the impact of credit scores and closing costs.

Here are the assumptions upon which this survey is based. All household income and debt information supplied by the respondent is assumed to be correct or correctable by the respondent. The survey ignores the impact of the income tax deductibility for mortgage interest, PMI and property taxes. The monthly savings set aside to accumulate a down payment is assumed to earn no interest during the two year period when the household is renting. The factor found in the column below, .009321, is based on the assumptions that 30-year fixed rate loans are available at 6.5% per year (constant = .006321), lenders require a down payment of 5%, PMI costs .78% of the OLB and property taxes and insurance amount to 3.2% of the home value annually. Annual estimates of PMI and TXI are adjusted to obtain their monthly equivalents. So, .009321 = (.95 x .006321) + .032/12 + .0078/12.

Age of respondent upon graduation from college: _____ years
 Upon graduation I will be: Married _____ Single _____

Expected MONTHLY gross household income after graduation:	\$ _____ A
Multiply by the back ratio	<u>_____ .36</u>
Enter result. This is the maximum total debt obligation	\$ _____ B
Other monthly debt obligations expected (student loan, car, etc) after graduation:	_____ C
Subtract and enter result here. This is the maximum PITI + PMI	\$ _____ D
Divide by factor	<u>÷ .009321</u>

Result is MXP _b , the maximum home price using the back ratio	\$	E
Multiply by .05		<u>.05</u>
Down payment required to buy the home	\$	F
Divide by 24 months	÷	<u>24</u>
Monthly amount to save for down payment	\$	G
Enter the maximum total debt obligation from Line B, above	\$	B
Enter the monthly amount to save for down payment from Line G, above		<u>G</u>
Subtract Line G from Line B	\$	H
Enter other monthly debt obligations from line C, above		<u>C</u>
Subtract Line C from Line H. Enter the result	\$	J

Line H is the maximum monthly obligation, net of down payment savings, the household can sustain in order to structure finances to prepare for the future home purchase and qualify for the related home loan using the back ratio of .36.

Line J is the maximum monthly rent the household can sustain during the two years of renting, working and saving for the future home purchase. Note: Consideration of personal income and other taxes should be made as well to properly plan the future purchase.

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