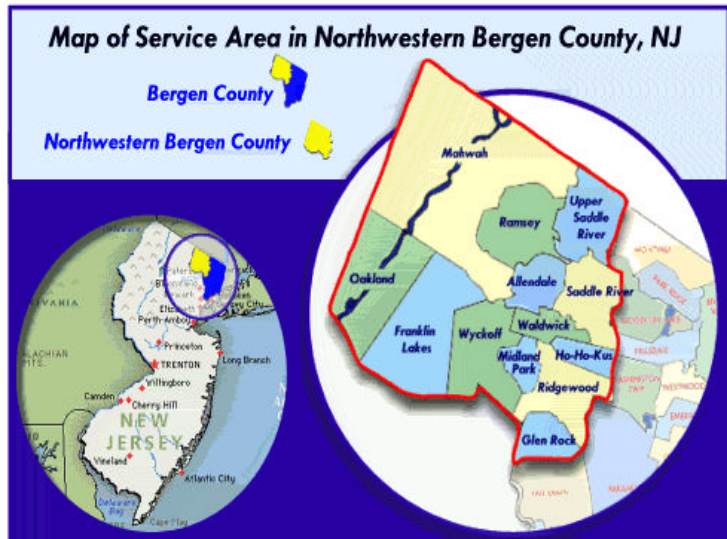


Problem Set 2: Housing Affordability

Objective: The objective of this assignment is to introduce students to the process of purchasing a home from a lender's perspective. This includes but is not limited to preparing amortization tables and qualifying the buyer.

Assignment: Please download the spreadsheet *Affordability_Fall2003.xls* from my website and answer the following questions. Please highlight your answers in **yellow** and turn in a hard copy of your results together with your spreadsheet on a disk. Please print your name clearly on the disk and scan the disk for viruses. ***This is an individual assignment.***

Description of the Neighborhood: Midland Park, located in Northern New Jersey, has a population of 6,966. Married households comprise 63% of all households while 72% of the households have children. The median household income is \$76,627. Originally settled by the Dutch, this fine, moderately priced community has many quaint old colonial homes. Midland Park is an involved community of young & old alike, providing year-round recreational facilities with especially interesting programs for people of all ages. It offers a broad educational curriculum in its high school, plus an extensive adult education program. There is an active senior citizens group, a free public library, and a long list of adult organizations, both social and civic, as well as eight churches representing many denominations and offering diverse activities of their own. It is within a short distance of major highways and within an easy commute to NYC. In fact, on a clear day you can see the New York City skyline from Prospect Street. Bus lines are available for commutation to the Port Authority in New York City. NJ Transit provides train service to New York City. Midland Park does not have its own station; however, the town is in close proximity to those that do.



Loan Information: Loan rates are found in the worksheet labeled "Loan Rates". These rates are current (as of July 3, 2003 when this case was constructed) and are the rates that you will use in this assignment. The

current and historical loan limit on the size of single-family home mortgages that Fannie Mae and Freddie Mac buys from banks is located in the worksheet named “FNMA Conforming Loan Limits”. Mortgages that fall within these government sponsored enterprises (GSE) purchase limits are called **conforming loans** and are cheaper for consumers¹ because banks and thrifts can readily sell them to Fannie Mae and Freddie Mac or swap them for mortgage-backed securities. The GSEs are able to provide a lower cost largely because their government affiliation allows them to borrow at a lower rate than other finance companies. Fannie Mae and Freddie Mac sell large amounts of bonds and other debt securities and use the proceeds to finance their purchases of home mortgages. Loans that exceed the Fannie Mae/Freddie Mac loan limits are known as non-conforming or **Jumbo loans**.

Other Loan Criteria of the Lender: Like other lenders, your financial institution requires that buyers must purchase private mortgage insurance (PMI)² if they put down less than 20% of the purchase price of the home. Currently PMI is .0050 or ½ of 1% of the outstanding loan balance. The buyers are required to maintain their PMI until their loan balance is less than 80% of the contract sales price of the home. (Note: Unless the borrower terminates PMI when the 80% balance is reached, the borrower continues to pay PMI). Any loan whose contract loan amount exceeds the Fannie Mae/Freddie Mac loan limits is considered a Jumbo loan. Borrowers are required to set up an escrow account, which includes principal, interest, property taxes, and insurance, for 3 months.³ This escrow amount is included in the total closing costs, which is discussed below. The bank requires that all points and fees be paid in cash (this is part of the total closing costs) rather than rolled into the mortgage e.g., the bank will not finance the points and fees by increasing the mortgage amount. The bank uses the following ratios in qualifying the homebuyer:

Housing Expense-to-Gross Income Ratio: 28%

Long Term Debt-to-Gross Income Ratio: 36%

where

Monthly housing expenses: The sum of monthly payments for principal, interest, property taxes, hazard insurance, private mortgage insurance (if required), and condo or homeowner’s fees (if required).

Monthly Debt Payments: The sum of monthly payments on long-term debt, including the debt service payments on your potential home (including private mortgage insurance), car payments, student loan payments, and other personal loans requiring a periodic payment. Include your minimum monthly payment required on credit card balances carried over from

¹Mortgages bought by Fannie Mae and Freddie Mac typically have a rate about 0.30 percentage points lower than loans they are not eligible to buy.

²For more information on private mortgage insurance, please visit the industry’s website at <http://www.privatemi.com/>

³The rationale for this escrow account is in the event that a homebuyer loses his or her job. Time is required to find a new job.

month-to-month; but do not include credit card balances that you pay off entirely each month. Also, do not include your current mortgage payment if you are selling that property.

Gross Income: household's total monthly income before taxes. Alimony and child support payments, whether incoming or outgoing, should be reflected in the estimate.

In evaluating the income/salary of the borrower(s), the **bank you work for WILL NOT count any bonus money** due to its uncertain nature and frequency of payment (usually a lump sum payment rather than monthly payments).⁴ In terms of necessary documentation, the bank requires 3 years of income tax returns, together with one year of receipts for the payment of utilities (phone, water, and electric/gas).

Closing costs: Closing costs are one-time fees paid at closing for the loan and expressed as a percentage of the mortgage amount. This **includes points and origination fees paid to the lender and transfer fees required to complete the transaction.** Assume that the total closing costs (including points and origination fees) are 3% of the contract loan amount. Note: You should ask your lender for a copy of the "Good Faith Estimate of Closing Costs" which itemizes fees commonly charged in your area. These fees include but are not limited to appraisal fees (\$305 average), credit report (\$37), application fee (\$288), document preparation fee (\$186), and flood certification (\$18) among others. Closing costs to the buyer typically do not include the realtor's commission, which is paid by the seller, in general.

The Homebuyers: Jack Hendler and his wife, Jill, are recent graduates of the Stern School of Business at New York University. Both have an undergraduate degree in Finance. John has worked full-time for Pfizer for the past 3 years and earns \$65,000 per year. Penelope works for J.P. Morgan and earns \$65,000 a year of which \$45,000 represents her base pay. She has worked at JPM for 2 years. J.P. Morgan has informed her that there will be no bonuses for the next year. The couple has 1 child. They have \$55,000 in savings of which they wish to spend no more than \$50,000 for a downpayment + closing costs on a house. The couple has one car, a Toyota, which they just purchased on a 4-year lease. Lease payments are \$200 per month. They also have a \$3,000 balance on their credit card on average that they carry over from month to month and for which they typically make payments of \$100 per month. In addition to this, they both have student loans outstanding. Payment on the student loans is \$1,000 per month of which John and Penelope each pay \$500. The outstanding balance on their student loans combined is \$5,000. Each has an

⁴Lenders typically include the bonus in the household income if: 1) The bonus is part of a collective bargaining agreement and must be paid; or 2) The bonus is included in the computation of income by the employer or if there is a history of bonuses. If there is a history of bonuses but the applicant does not know if a bonus is planned, nor does the employer divulge its plans for a bonus nor the projected bonus amount, the lender typically uses an average of past two years' bonuses to calculate income. A bonus history for compliance purposes is to be considered one year or more. However, the bonus is NOT included in household income if the bonus is totally discretionary by the employer, there is no previous bonus history, and the wages of the applicant are the basic source of income.

outstanding balance of \$2,500 on their student loan. This is the first marriage for both of them. They have no other debts outstanding.

The Hendlers have already seen several houses in Midland Park. The description of each house is given in the “Listings” worksheet. Since they have a child and want a home office, they are looking for a house that has at least 3 bedrooms and one bath. They have come to your firm for financing and would like you to help them find a suitable house.

1. Home Prices in the Neighborhood: Homes that have sold recently in Midland Park are found in the worksheet labeled “Home Prices Midland Park,NJ”.

- a. Constructing New Variables from the Data: Since Jack has taken a course in statistics, he would like to use a regression model in helping him to price the house. Prior to doing a regression, he first transforms the data of sold properties by constructing the following new variables:

Days from Present variable: using the DAYS360 function in Excel (i.e.=DAYS360(B3,C3)+1). This variable provides an indication of recent market activity since house prices might not remain constant over time.

Dum_Cape: Is a dummy or indicator variable⁵. The variable is equal to 1 if the house that sold is a Cape Code otherwise the variable is set equal to zero (i.e., =IF(Q3="Cape",1,0). This variables indicates whether buyers tend to put a premium on this style of house.

Dum_Colonial: Is a dummy or indicator variable. The variable is equal to 1 if the house that sold is a Colonial otherwise the variable is set equal to zero This variables indicates whether buyers tend to put a premium on Colonial houses.

Dum_Colonial: Is a dummy or indicator variable. The variable is equal to 1 if the house that sold is a Ranch otherwise the variable is set equal to zero This variables indicates whether buyers tend to put a premium on Ranch style houses.

Dum_Basement: Is a dummy or indicator variable. The variable is equal to 1 if the house that sold has a basement otherwise the variable is set equal to zero This variables indicates whether buyers put a premium on houses that have a basement.

- b. Estimating the Sales Price vis-à-vis Regression: Using the regression subroutine in Excel (Tools → Data Analysis... → Regression. If the Data Analysis option is not shown, go to Tools → Add Ins... → check the box corresponding to Analysis ToolPak) perform a regression of Sales Price (dependent Y-variable) on the following X

⁵Recall from statistics that you cannot have as many dummy variables for styles of houses as the number of housing styles that exist in your data set. You must have n-1 dummy variables if you have n housing styles so that the matrix is of full rank.

independent variables: DOM (days on the market), Days from Present, Bedrooms, Baths, Taxes, Lot Square Feet, Dum_Cape, Dum_Colonial, Dum_Ranch, and Dum_Basement. What is the estimated sales price of 141 Spruce Street (set days on market equal to 55 and days from present equal to zero)? What is the impact on the sales price the longer the house remains on the market? How good a job does our regression model do in predicting the price of the house?

- c. Discount over List Price: To obtain a quick overview of the relationship between the list price and the sales price for the Midland Park real estate market, calculate the following ratio for each property:

$$\text{Premium or Discount} = (\text{Sale Price}/\text{List Price}) - 1 = (\text{Sale Price} - \text{List Price})/\text{List Price}$$

Next, calculate the mean discount as well as the median discount, the maximum (use the max command in Excel) and the minimum (use the min command in Excel). On average, how good a job do realtors in this market do at pricing a seller's house for sale? Please discuss.

2. Amortization Table (Base Case): If the Hendlers put down a 10% of the purchase price (1 - Loan to Value Ratio) and want a 30 year fixed rate mortgage, what will their monthly payments be if they were to purchase the house at 141 Spruce Street assuming that they put in an offer equal to the list price?
- Using Excel, construct a 360-month amortization table showing the beginning balance, debt service payment, interest payment, principal payment, and ending balance. Also show what their total monthly payment to the lender will be if this amount differs from their monthly debt service payment.
 - Next, graph the interest payments and principal payments using the charting function in Excel. Explain why interest is declining and principal is increasing over time.
 - On another graph, plot the outstanding mortgage balance over time. Explain why the outstanding mortgage balance is declining over time.
3. Annual Percentage Rate (APR): Given the facts in question #2, what is the true borrowing cost? Recall that the lender's IRR is equal to the true borrowing cost. Hint: you might have to put in a guess value such as .001 in order to calculate the IRR. Remember that this IRR is a monthly IRR and as such, you will need to multiply it by 12 in order to obtain the APR. Since there are points and loan origination fees, your APR should exceed the contract interest rate.
4. Amount of Money Required by Borrowers (Base Case): What is the total amount of money including closing costs that the Hendlers must come up with (i.e., the amount of equity)?

5. Qualification of Buyers: What are the total long-term debt payments per month for the Hendlers given the facts in question #2 above? What is the monthly housing expense e.g., principal, interest, property taxes, and property & casualty insurance per month? Assume that total assessed value will initially equal the purchase price of the property. Based on your bank's housing expense-to-total gross income ratio and the long-term debt-to-total gross income ratio, do Jack and Jill Hendler qualify for the mortgage?
6. Determining if Buyers can Qualify for a Bigger House: Since the Hendlers want the most house for their money, you decide to see whether they might be able to qualify for a bigger house. More specifically, you run the numbers on 85 Vreeland Avenue and 173 Highland Avenue. You calculate the numbers based on two scenarios. The first scenario assumes that they don't pay off any debts. As such, this scenario is similar to that in question #5. In the second scenario, you assume that either Jack or Jill pays off his or her student loan. Do the Hendlers qualify for either one of these more expensive homes? If so, can they qualify without either one of them paying off their student loan? Please discuss.
7. Creative Financing using a 5/1 Hybrid Arm: The Hendlers are debating if they should consider take out a 5/1 hybrid loan since the monthly payments are lower (at least initially). Under this type of loan, the contract rate of interest is fixed for the first 5 years. It is "as if" they have a fixed rate loan (with the monthly payment calculations the same as taking out a 30 year fixed rate loan) for 5 years. After five years, the loan converts to an adjustable rate mortgage wherein the rate adjusts annually based either on the COFI or treasury rate depending on the index that they choose. Their line of reasoning is that not only would the interest rate be relatively lower but also they can refinance/roll over the mortgage at the end of 5 years into a fixed rate mortgage. What is the total mortgage payment per month for the first 5 years under this scenario based on the house located at 85 Vreeland Avenue and assuming that they will pay the list price? What are the total long-term debt payments per month? What is the monthly housing expense? What are the total housing expense-to-gross income ratio and the long-term debt-to-gross income ratio? Do the Hendlers qualify for the mortgage? Please discuss.
7. Buying Down the Loan: Jack and Jill let both sets of parents know about their plans to buy a house. Both fathers claim that the more creative the financing, the more creative the default. As such, they suggest that Jack and Jill buy down the loan for 5 years to a contract interest rate of 4% in lieu of taking out a 5/1-hybrid loan. Their rationale is that at the end of 5 years, both Jack and Jill should be earning a higher salary and should thus be in a better position to cover the mortgage payments. This is essentially a graduated payment mortgage with one-step or gradation. How much must Jack and Jill pay to the lender in order to buy down the loan for 3 years⁶? Do the Hendlers qualify for the mortgage based on the initial payments from the buydown? In particular, what is the total housing expense-to-gross income ratio and the long-term debt-to-gross income ratio based on the initial payments from the buydown?

⁶The tax law currently allows an individual to gift up to \$10,000 per individual per year.

8. Decision: What house and what type of financing: What houses do Jack and Jill qualify for and which house best suits their needs? What type of financing would you suggest that they use? Please explain.

Reminder: This is an individual assignment. Please turn in a hardcopy of your printout with the answers highlighted in **yellow**. Also, turn in your disk with your name printed clearly on the disk. Please scan your disk for viruses.