Credit Card Balance Analysis

The number one money-maker for credit card companies is interest charged on outstanding balances. Credit cards charge far higher rates of interest than most other types of loans for at least two reasons. (i) In contrast to mortgages, home equity loans, and home equity lines of credit, credit card loans are unsecured. For example, credit card companies cannot simply possess your home if you default on your loans. (ii) Credit card companies have limited amounts of credit-related information about their customers. This lack of information raises the risk of loan default and pushes up the price of the loans.

Interestingly, the biggest threat to credit card companies is the loss of money lent to cardholders. That is, if the card holder decides not to pay their debt (or declares bankruptcy), there is little a credit card company can do to get their money back. Often, legal and other fees make it more expensive to try to collect the money than to write the debt off as a loss.

Card holders with a low monthly balance are neither profitable nor a risk to companies. Card holders with moderate monthly balances pose the ideal loan scenario for credit card companies. Card holders with a large monthly balance, however, pose a high risk of default and will likely cost the company money. Because of the potential to make or lose a great deal of money, credit card companies are interested in predicting the credit card balance of cardholders *before* issuing them a card and determining characteristics of a cardholder that lead to high balances.

The `credit` dataset is a collection of information on card holders for a certain credit card company. Description of the variables are as follows:

Variable	Description
Income	Card holders annual income in thousands.
Limit	Card holders credit limit.
Rating	Credit rating - similar to a FICO credit score but used internally by the company.
Cards	Number of open credit cards (including the current card) of the card holder.
Age	Age of the card holder.
Education	Years of education.
Gender	Gender of the card holder.
Student	Card holder is a full-time student.
Married	Card holder is married.
Ethnicity	Card holders ethnicity.
Balance	Current credit card debt.

The specific research questions that you are tasked with addressing are the following:

1. Are the collected variables able to adequately predict a person's credit balance?
2. Do people generally get "more responsible" (in terms of lower balances) with money as they age?
3. The company generally has a policy to increase the credit limit when a person's income goes up (in hopes they spend more on the card and they can get the interest). The policy states that limit should increase by 10% of the income increase. Under this policy, what is the expected difference in credit balance when a person's income goes up by 10,000?

3b Based on your results, what should the companies policy be for increasing credit limit for increases in income?