

Giving Credit Where Credit is Due: The Psychology of Credit Ratings

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The purpose of this study is to examine the effect of personality on credit ratings, measured in terms of credit scores from actual credit reports. Personality is measured in terms of an individual's locus-of-control, which is the extent to which individuals attribute important outcomes to external forces outside of their control. Using survey data from a large, national sample of consumers, an individual's credit score is modeled as a function of financial knowledge and locus-of-control, in addition to demographic characteristics and situational factors. Findings suggest that consumers with higher levels of financial knowledge and consumers with an internal locus-of-control have higher credit scores than similarly situated consumers with low credit scores, even after controlling for income, education, and the incidence of negative external life events. In addition, the extent to which knowledge affects credit scores depends on whether an individual has an external vs. internal locus-of-control.

Keywords: Consumer Financial decisions, Credit ratings, Personality, Locus-of-control

According to Fair Isaac Corporation, the leading provider of credit scores, nearly half of all consumers have been 30 or more days late on a payment to a creditor, and about 30% have been 60 or more days overdue on a credit obligation (Fair Isaac Corporation [2003]). Consumers with a history of late payments can face negative consequences, including outright rejection of loan applications and, more commonly, higher interest rates and fees. Most lending institutions now rely heavily of automated credit scoring models such as the FICO® score in their lending and pricing decisions, and this score is an objective measure of an individual's history of payment timeliness. Clearly, individuals can only pay their bills on time if they have the funds available to do so, such as earnings, savings, or access to other liquid assets. In addition, individuals may face unforeseen or external circumstances, such as a sudden loss of income, and this may impede their ability to pay their bills on time. In addition to these socioe-

conomic factors, there is considerable evidence that financial decisions, including the use of credit, reflect individual psychological characteristics (e.g., Tokunaga [1993]; Gourville and Soman [2002]; Soman and Cheema [2002]). The purpose of this study is to examine the effect of personality on actual credit ratings, measured in terms of FICO credit scores from actual credit reports.

Psychologists regard locus-of-control as a key personality variable due to its link to motivation and performance in a wide variety of settings. According to a widely accepted principle in psychology, personality plays a greater role than situational characteristics when individuals interpret ambiguous situations (Lazarus and Folkman [1984]). Thus, consumers' locus of control is likely to affect their payment behavior above and beyond the influence of financial resources or situational circumstances. The role of financial knowledge is also important to understand because it is the variable that policymakers often seek to change. Thus, the model tested in this study measures both the direct impact of knowledge, locus-of-control, and demographic characteristics, as well as the interplay of these factors in explaining credit ratings.

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PREVIOUS RESEARCH

This study draws on previous research on consumer financial knowledge and the effects of locus-of-control on behavior.

Financial Knowledge

There have been a number of recent studies on consumer financial knowledge. According to a 2004 survey sponsored by the JumpStart Coalition, students correctly answered only 52% of the questions that measured knowledge of personal finance basics. According to another recent study sponsored by Fair Isaacs and Consumer Federation of America (Anonymous [2005]), nearly half of consumers do not understand credit scores. In addition, younger consumers, those with lower incomes and those with lower levels of education were less likely to know that credit scores are intended to measure credit risk.

Several studies have linked financial knowledge with financial behavior. Elliehausen et al. [2003] found that credit counseling improved consumers' financial behavior. Similarly, in a series of studies, Hogarth and Hilgert [2002] found that consumers who are financially knowledgeable are more likely to behave in financially responsible ways. Hogarth et al. [2003] found that consumers with higher levels of financial knowledge had better cash management, savings, and investing behaviors than less-knowledgeable consumers. Most of these studies have used subjective measures of financial knowledge to predict self-reported measures of financial behavior. The present study, on the other hand, relies on an objective assessment of financial knowledge to model an objective summary measure of financial behavior—one that is widely relied upon by the lending industry.

Locus-of-Control and Personality

The locus-of-control construct is a self-concept variable that captures an individual's general beliefs about the causes of rewards and punishments (Rotter [1966]; Rotter [1975]). Individuals with an internal locus of control, known as internals, generally expect that their actions will produce predictable outcomes and thus are more action-oriented than externals. Individuals with an external locus of control, known as externals, perceive events as being under the control of luck, chance or powerful others, and as such are less likely than internals to master the skills necessary to accomplish their goals (Zimmerman [1995]). Particularly when situations are ambiguous, an internal is more likely to view the situation as controllable (Lazarus and Folkman [1984]). Locus-of-control has been shown to be associated with academic achievement as well as psychological well-being (Lefcourt [1991]). For example, there is evidence that internal locus-of-control is positively related to job performance, measured in both subjective and objective terms (Judge and Bono [1991]; Spector [1982]).

In general, research on locus-of-control has found that internals are better off objectively and subjectively, although extremely internal individuals, particularly those lacking confidence and efficacy in their abilities, can suffer from anxiety and depression (Rotter [1975]). Research in this area has also found that locus-of-control is learned for the most

part. That is, individuals often develop an external locus-of-control as a kind of coping mechanism when subjected to circumstances outside of their control for prolonged periods of time (Basgall and Snyder [1988]).

In the financial arena, several studies have found that an individual's self-concept may influence his or her financial preferences and behavior (Hira and Mugenda [1999]; Onkvisit and Shaw [1987]; Prince [1993]). Both Tokunaga [1993] and Davies and Lea [1995] found a relationship between personality traits and debt accumulation. In addition, Perry and Morris [2005] found that individuals with an external locus of control are less likely to engage in planning, budgeting, and saving behaviors. This study tests whether there is a similar relationship between external locus-of-control and the objectively measured FICO[®] score reported on consumers' credit reports, in addition to demographic and financial characteristics.

MODEL AND HYPOTHESES

In this study, an individual's credit score is modeled as a function of objective financial knowledge, locus-of-control, demographic characteristics and situational factors. The idea behind this model is that consumers with an internal locus-of-control will devote more resources—both cognitive and financial—to the timely payment of bills. In addition, internals will be motivated to acquire more knowledge about financial principles and credit markets and to apply this knowledge to their financial decisions.

Previous studies have shown that consumers with higher levels of financial knowledge are more likely to budget, save and engage in financial planning activities (e.g., Elliehausen et al. [2003]; Hogarth and Hilgert [2002]; Perry and Morris [2005]). One might expect that individuals who engage in budgeting and saving activities would be more likely to pay their bills on time, except that these are different behaviors that may be affected by both external and person-level factors. The first hypothesis tested here examines the relationship between financial knowledge and FICOscore, while holding constant the effects of income and external events such as unemployment or medical expenses. These events or situational characteristics could potentially offset the positive effects of consumer knowledge.

H1: Controlling for demographic and situational characteristics, financially knowledgeable consumers are more likely to have high FICO[®] scores.

Previous research in this area has linked an individual's locus-of-control with budgeting, saving, and debt accumulation (Davies and Lea [1995]; Tokunaga [1993]; Perry and Morris [2005]). In particular, these authors found evidence that externals are less effective at managing their finances. The second hypothesis tests whether externals also have lower

credit scores and examines this effect while controlling for external factors.

H2: Controlling for demographic and situational characteristics, consumers with an external locus-of-control are more likely to have low FICO scores.

Previous research on locus-of-control has found that externals are less likely than internals to master the skills necessary to accomplish their goals. However, additional evidence suggests that externals depend more on external sources such as reference groups or authorities, while internals are more self-reliant (Spector [1982]). Furthermore, Kaplan et al. [2001] found that decision makers who are externals were more likely to rely on mechanical or statistical decision aids. Thus, externals may benefit more from externally provided information or education than internals. Hypothesis 3 proposes that financial knowledge moderates the effect of locus-of-control on FICO® score such that externals with higher levels of financial knowledge will have higher FICO® scores than their internal counterparts.

H3: Financial knowledge moderates the relationship between locus of control and FICO® score.

In particular, financially knowledgeable externals are more likely to have high FICO® scores than less knowledgeable externals.

METHOD

Data used to test hypotheses were collected from a national survey of consumers sponsored by the Federal Home Loan Mortgage Corporation, known as Freddie Mac. This survey was designed to better understand consumer attitudes, behaviors, knowledge, and experiences with credit and personal financial management. This survey collects detailed information on individual and household characteristics of consumers drawn from mail panels from two independent research firms. The questions asked on the survey instrument were largely based upon earlier focus group findings, other surveys, and studies related to credit. Excerpts from the questionnaire are included in the Appendix.

During the data collection process, respondent addresses were matched with actual credit files provided by Fair Isaac Corporation. These credit scores are designed to measure credit risk at a particular point in time and are based on models which use information in consumer credit reports to predict future payment behavior (Fair Isaacs 16). The higher the score, the lower the risk, although there is no single cutoff used by all lenders. Lenders use FICO® scores to inform lending decisions, although each lender may differ in terms of the level of credit risk it finds acceptable, and this may even vary for different types of loans. The groupings used

in this study are based on categories reported by FICO® that are used for risk-based pricing in the lending industry. For example, many major lending institutions consider credit scores below 620 to be indicative of high credit risk, and consumers with scores below 680 may be charged higher interest rates due to higher credit risk (Fair Isaac [2003]; Straka [2001]). This data were provided under the condition that credit score computations be reported in categories rather than as a continuous variable.

Approximately 23,000 surveys were mailed to individuals between the ages of 20 and 40, since this segment represents the largest target market for the sponsor firm's new products. The response rate was approximately 51%. The analysis reported here is based on 8,769 usable observations.

The dependent variable in the proposed model is FICO® score category. This is a five-category ordinal variable coded 1 for scores less than 579; 2 for scores between 580 and 619; 3 for scores between 620 and 679; 4 for scores between 680 and 719; and 5 for scores 720 and above. Independent variables include objective financial knowledge, locus-of-control, and a set of demographic and situational factors that are included as background variables. These background variables include: income; level of education; age; and the incidence of experienced major medical expenses, extended unemployment, or a significant reduction in income in the past two years. These demographic and situational factors are included in the model to hold these effects constant in order to isolate the impact of both financial knowledge and locus-of-control.

In previous research, consumer knowledge has been conceptualized and measured in terms of objective knowledge, subjective knowledge, and experience (Flynn and Goldsmith [1999]). In this study, financial knowledge is objective, and computed as the respondent's score (the total number of correct answers out of a series of 15 questions) on a financial knowledge quiz. Items for this quiz were adapted from other instruments used to measure financial knowledge (Hogarth and Hilgert [2002]; Mandell [1997]) and are listed in the Appendix. This measure of objective financial knowledge is defined as knowledge of general facts about financial and economic principles and credit markets.

Locus-of-control is a multiple-item measure adopted from Rotter [1975]. Responses were coded so that higher values on the summated locus-of-control scale are assigned to externals, while low values are assigned to internals.

In terms of demographic variables, income is measured on a nine-point interval scale of income categories that range from less than \$15,000 to more than \$100,000 and is defined as the total combined annual before-tax income of the respondent and his or her spouse. Level of education is measured on a six-point interval scale ranging from "some schooling" to "graduate or professional degree." In addition, respondent age in years is included as a continuous variable.

There are three situational characteristics included in the model as binary variables. These variables are coded as a 1 if

TABLE 1
Correlation analysis of key model variables.

	Income	Education	Financial Knowledge	External LOC	FICO Category
Income	1	0.28261*	0.31063*	-0.24550*	0.30595
Education		1	0.26892*	-0.15545*	0.27085
Financial Knowledge			1	-0.16139*	0.20766
External LOC				1	-0.17092
FICO Category					1

Note: *Significant at $p < .0001$.

the respondent has experienced either of the following events in the past two years, and 0 if they have not experienced one of these events: major medical expenses; an extended period of unemployment; or a significant involuntary reduction in income. These factors are known to be antecedents of personal bankruptcies (Barron and Staten [1997]; Domowitz and Sartain [1999]; Gross and Souleles [2002]), and thus, should also be predictive of credit scores.

RESULTS

Table 1 includes a correlation matrix of selected model variables, including income, level of education, financial knowledge, and external locus of control. All bivariate correlation coefficients were statistically significant at the 0.0001 level. Interestingly, there was a negative correlation between financial knowledge and external locus-of-control, and a negative correlation between income and external locus-of-control. Thus, individuals with an internal locus-of-control have higher levels of financial knowledge. Internals also have higher incomes and are more highly educated. This is consistent with other studies that have found a relationship between locus of control and learning ability (Lefcourt [1991]) and locus of control and wages (Goldsmith et al. [1997]).

Table 2 reports the results of a multinomial logistic regression analysis. This procedure is appropriate when the dependent variable is a categorical or an ordinal response variable and there are multiple independent variables. The dependent variable FICO® score category represents five ordered outcomes where 1 corresponds to the lowest FICO® score category (< 580) and 5 is assigned to the highest score category (≥ 720) and can therefore be modeled as an ordinal response variable. The overall model is significant at $p < 0.0001$, and all independent variables are significant at the $p < 0.001$ level. Table 2 lists these independent variables as well as their coefficients, standard errors, and chi-square values.

Hypothesis 1 proposed a relationship between financial knowledge and the odds of having a high FICO® score. The

coefficient on the financial knowledge variable is positive and significant, suggesting that respondents who were more knowledgeable are indeed more likely to have good credit. Thus, H1 is supported.

These findings also support Hypothesis 2, which stated that externals were less likely to have high FICO® scores. The coefficient on external locus-of-control is significant and negative. This implies that while externals have lower credit scores, internals have higher credit scores.

In addition to the main effects of financial knowledge and locus of control, Hypothesis 3 tests for an interaction effect of financial knowledge and locus of control on FICO® score category. Evidence of a significant interaction can be seen in the significance of the coefficient on the interaction term, which is the product of these two independent variables. This term is significant and positive, suggesting that higher levels of financial knowledge benefit externals more than internals. Thus, Hypothesis 3 is supported.

In addition to the hypothesized relationships, demographic variables and situational characteristics were also significant. Individuals with high credit scores had higher incomes, higher levels of education, and were older than individuals with low credit scores. Not surprisingly, individuals with high credit scores were less likely to have experienced major medical expenses, unemployment, or a reduction in income in the past two years.

The last column in Table 2 compares odds ratios associated with each independent variable. An odds ratio is the change in odds of being in a particular category of the dependent variable associated with a single unit increase in the value of the independent variable (Tabachnick and Fidell [1996], p. 607). For example, the odds ratio for income is 1.16, which means that the odds of having a high FICO® score increases by a factor of 1.18 as income goes from

TABLE 2
Results of logistic regression model of FICO® score category.

	Parameter Estimate	Std Error	Chi-Square	P-Value	Odds Ratio
Intercept 5	-3.9222	0.1855	446.9492	<.0001	—
Intercept 4	-3.1518	0.1839	293.8533	<.0001	—
Intercept 3	-2.1711	0.1822	141.9982	<.0001	—
Intercept 2	-1.4554	0.1816	64.2543	<.0001	—
Income	0.1461	0.011	177.6571	<.0001	1.157
Level of Education	0.2508	0.0155	262.6528	<.0001	1.285
Age	0.0316	0.00371	72.8345	<.0001	1.032
Medical Expenses	-0.3507	0.0463	57.2905	<.0001	0.704
Unemployment	-0.3764	0.0712	27.9445	<.0001	0.686
Income Reduction	-0.6008	0.0536	125.5996	<.0001	0.548
Financial Knowledge	0.0469	0.00841	31.0352	<.0001	1.048
External LOC	-0.0402	0.00753	28.5646	<.0001	0.961
Knowledge*LOC	0.0254	0.0069	13.603	0.0002	1.026

one category to the next. The odds ratio for having experienced an involuntary reduction in income is 0.55, which suggests that an individual who has experienced such a reduction has about half the odds of having a higher FICO® score than a person without this income reduction. According to these findings, the effects of financial knowledge and locus-of-control on the odds of having good credit are small (1.05 and 0.96, respectively). However, beyond the effects of demographic characteristics and external events, increased financial knowledge does increase the odds of having good credit, while having an external locus-of-control decreases these odds.

DISCUSSION

These findings support the proposed credit score model. Even after controlling for income, education, and the incidence of negative external events, consumers with higher levels of financial knowledge and an internal locus-of-control have higher FICO® scores than similarly situated consumers with low FICO® scores.

These results suggest that consumers with higher levels of financial knowledge have better credit, and that financial knowledge has an additional, interactional effect on credit outcomes. In particular, the extent to which knowledge affects credit scores depends on an individual's locus-of-control. The effect of financial knowledge on credit scores is higher for externals than for internals.

Since internals have higher incomes, are more highly educated, and are less likely to have credit problems, externals emerge as the market segment to target social marketing and public policy efforts. Previous research has shown that externals believe that their success is controlled by external forces, and rely more on reference groups or authorities than internals (Spector [1982]). Thus, one way to influence externals is to provide information about the behavior of others in peer or aspirational reference groups.

Previous research has also shown that decision makers who are externals are more likely to rely on mechanical or statistical decision aids (Kaplan et al. [2001]). Thus, externals should benefit from tools that will help guide decisions that affect their credit history.

Several organizations currently sponsor social marketing campaigns to encourage consumers to take active steps in managing their credit ratings. One such step is for consumers to obtain a copy of their credit report and to keep abreast of changes in their credit ratings. Engaging in these activities is likely to increase consumers' financial knowledge. The findings of this study suggest that these efforts will have the most impact on internals, although externals stand to benefit most from improved credit ratings.

There is evidence that certain psychological and educational interventions can produce long-term shifts toward internal locus-of-control (Hans [2000]). Thus, it may be possi-

ble to convince externals that credit scores are a direct result of one's own behavior and not something that comes out of a "black box." In addition, becoming more knowledgeable about financial matters can help consumers minimize the negative effects of external events such as income reductions or major medical expenses. This may be a more compelling argument for externals, since externals may place more emphasis on external events than internals.

Limitations

There are several limitations of this research that relate to the generalizability and validity of these results. The first has to do with the relationship between income and financial knowledge. It is difficult to separate these effects since individuals gain knowledge through experience; thus, individuals with higher incomes are likely to have more experience with financial services. A second important caveat is that assumptions made here about the direction of causality are questionable. This model assumes that locus-of-control, financial knowledge, and external events are antecedents of credit ratings. It is possible that these constructs are actually consequences of credit ratings. For example, having higher credit ratings may lead consumers to believe they have more control over outcomes, while having a higher credit rating may reflect more experience with financial services and therefore more financial knowledge.

Future Research

According to Baumgartner [2002], personality research in consumer behavior has been scattered and hard to fit in a coherent framework. This author also suggests that consumer researchers mirror recent work in psychology that is focused on understanding everyday goals through narratives that describe their lives. One possible direction for future research is to examine how consumer financial decisions, particularly the use of credit, reflect consumers' everyday goals and efforts to achieve these goals.

In recent years, Fair Isaacs, facing pressure from consumer groups and regulators, has released the factors underlying credit scores and the weights used to combine these factors. Due to this highly publicized action, consumers are now able to access information about how factors such as the timeliness of credit card payments in the recent past affect their credit scores. It is not clear, however, that consumers will know how to make use of this information once they have it. There is evidence in the literature on nutrition labeling that suggests that information provided in certain formats is more likely to aid consumer judgments (Viswanathan and Hastak [2002]; Ford et al. [1996]). Another important issue for future research is how consumers make judgments about their credit histories both with and without actual information from their credit reports.

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APPENDIX: CONSUMER CREDIT SURVEY VARIABLES

Financial Knowledge Quiz

(Correct Answers Are Marked With An 'X')

What will be the impact on the interest rate people pay on a loan if they...?

	Rate would be higher	No impact	Rate would be lower
a. always eventually pay off their debts, but are sometimes late on monthly bills	☒	☐	☐
b. get someone else to co-sign the loan with them	☐	☐	☒
c. have never borrowed money before	☒	☐	☐
d. offer the lender some collateral for the loan	☐	☐	☒

What will be the impact on a person's credit rating if they...?

	Rating would be hurt	No impact	Rating would improve
a. charge lots of money on several credit cards, and make the minimum payments each month	☒	☐	☐
b. have a good payment record and apply for many new credit cards	☒	☐	☐
c. skip a student loan payment	☒	☐	☐
d. never borrow money or use a credit card for anything	☒	☐	☐
e. miss a couple of loan payments but make them up, plus interest, the next month	☒	☐	☐
f. have a legal judgment over a disputed bill	☒	☐	☐

Do you think that the following statements are generally correct, or not correct?

	Correct	Not correct
a. People will be financially better off if the cost of living increases by more than income...	☐	☒
b. It is financially worthwhile to borrow money for an investment if the interest rate on the loan is less than the expected return	☒	☐
c. The cheapest way to use a credit card is to pay off the bill in full each month	☒	☐
d. Over the long run, people can expect to earn more money by investing in stocks than by putting money into U.S. savings bonds	☒	☐
e. Investing \$1,000 a year for 10 years will earn the same amount of money as investing \$2,000 a year for 5 years if the interest rate is the same for both investments	☐	☒

Locus-of-Control

How often do you feel...? (Almost never; Seldom; Sometimes; Often; Almost always)

- a. There is really no way I can solve some of my problems
- b. I am being pushed around in life
- c. There is little I can do to change the important things in my life
- d. I can do anything I set my mind to
- e. What happens to me in the future depends on me
- f. Helpless in dealing with the problems of life
- g. I have little control over the things that happen to me

Income

- What is your (and your spouse's combined) total before-tax income? Please consider income from all sources, including work, alimony, child support, rental income, investment income and any other money you may receive. (MARK ONE ANSWER ONLY)

☐ Under \$15,000	☐ \$15,000 to \$24,999	☐ \$25,000 to \$34,999	
☐ \$35,000 to \$44,999	☐ \$45,000 to \$54,999	☐ \$55,000 to \$64,999	Level of Education
☐ \$65,000 to \$74,999	☐ 75,000 to \$100,000	☐ Over \$100,000	

- What is the highest level of schooling you completed?

Some schooling	☐	Associate's degree	☐
High school diploma or equivalent	☐	Graduated college	☐
Some college	☐	Graduate or professional degree	☐

Age

In what year were you born? 19___ Negative Events

Have you experienced any of the following *in the last two years*? (Yes or No)

- Major medical expenses
- An extended period of unemployment when you couldn't find a job
- A significant involuntary reduction in income

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