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Anatomy of the credit score

Shweta Arya, Catherine Eckel*, Colin Wichman

The University of Texas at Dallas, United States

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ABSTRACT

This paper addresses the question of what determines a poor credit score. We compare estimated credit scores with measures of impulsivity, time preference, risk attitude, and trustworthiness, in an effort to determine the preferences that underlie credit behavior. Data is collected using an incentivized decision-making lab experiment, together with financial and psychological surveys. Credit scores are estimated using an online FICO credit score estimator based on survey data supplied by the participants. Preferences are assessed using a survey measure of impulsivity, with experimental measures of time and risk preferences, as well as trustworthiness. Controlling for income differences, we find that the credit score is correlated with measures of impulsivity, time preference, and trustworthiness.

1. Introduction

Credit scoring has become an increasingly popular topic in recent years – in the media, in business, and at the dinner table. In these days of easy access to information, a negative credit event such as a mortgage default or bankruptcy can haunt a consumer for a considerable period of time. A credit score is a number that represents an assessment of the creditworthiness of a person, or the likelihood that the person will repay his or her debts. Credit scores are generated based on the statistical analysis of a person's credit report; credit bureaus such as Experian, Equifax, and TransUnion maintain a record of a person's borrowing and repaying activities.

The Fair Isaac Corporation (FICO) developed the formula used by all three major credit reporting agencies in the U.S. The algorithm is kept secret, but most believe that it is based upon the ratio of debt to available credit; this denominator, in most cases, is a direct function of income. The score is then adjusted for payment history, number of recent credit applications, and negative events such as bankruptcy/foreclosure, as well as changes in income caused by changes in employment or family status.

In addition to its original purpose, credit scores are also used to determine insurance rates and for pre-employment screening. Employers as well as lenders use credit reports and scores to gain insight into the records and tendencies of prospective employees, making the assumption that credit scores correlate with general trustworthiness. There is even a dating website, creditscoredating.com, that purports to match subscribers with high-score partners. With reports and scores available to the public for little or no cost, the FICO score has become a part of the dating and mating process: along with a

* Corresponding author at: School of EPPS, Mail Station GR31, University of Texas at Dallas, 800 W. Campbell Rd., Richardson, TX 75080, United States. Tel.: +1 972 883 4949; fax: +1 972 883 4881.
E-mail addresses: eckelc@utdallas.edu, eckelc@gmail.com (C. Eckel).

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criminal background check, a credit report reveals much about a person's personality and behavioral tendencies. . . or does it?

The repayment of debt is contingent upon two factors: the ability to pay the debt, and the borrower's willingness to pay. The first condition is largely determined by income, while the second is more psychological in nature. Debtors may choose to pay their balances and reduce funds available to spend on other items, or default on their loans and keep their current level of liquidity, accruing penalties and credit bruises in the process.

Our study seeks to find which, if any, underlying preferences or personality factors contribute to the credit score. We consider four factors: impatience, impulsiveness, risk tolerance, and trustworthiness. It seems reasonable to expect lower credit scores to be associated with greater discounting of future payoffs: that is, impatience is associated with a desire to move consumption toward the present from the future by borrowing, and higher borrowing implies a higher probability of default. Impulsive individuals are likely to have difficulty resisting the temptation to borrow for present consumption, and more likely to fail to pay their debts. Poor credit scores could also be caused by a lack of trustworthiness, as the less trustworthy fail to meet their obligations. And finally, credit scores could be impacted significantly by financial risk-taking, as those who gamble accumulate debt that they have difficulty repaying.

In this study we estimate credit scores using an online FICO estimator, based on information reported by the subjects. These estimated credit scores are compared with incentivized measures of risk attitudes, trustworthiness, and time preference, and a survey measure of impulsivity. Our purpose is to determine the behavioral correlates of credit behavior reflected by credit scores. We find that measures of impatience, trustworthiness, and impulsivity have an impact on the credit score.

2. Related literature

There is little prior research on the determinants of credit scores, and few studies explicitly link credit scores to the above mentioned correlates of behavior. A number of studies, however, examine the role of preferences in consumer financial decisions.

Preferences that are elicited using incentivized tasks are correlated with self-reported credit-related decisions by several researchers. Harrison et al. (2002) find no relationship between individual discount rates and borrowing behavior in a sample of Danish adults, while Dohmen et al. (2006) find a significant relationship between present-biased preferences and self-reported financial difficulties. Both studies rely on self-reported financial information. Eckel et al. (2007) show that patience and risk tolerance are positively related to consumer decisions to borrow for the purpose of investing in post-secondary education. That study utilizes a sample of about 1000 Canadian adults, and elicits risk and time preferences along with information about the decision to borrow for post-secondary education.[1]

Meier and Sprenger (2010) show that individual time preference is a determining factor in credit card borrowing. They elicit time preferences from a sample of about 600 low- and moderate-income individuals, and (with their permission) directly access their credit reports and tax returns. Preference data are then correlated with administrative data, providing a distinct improvement on previous studies. They find that, while an individual's elicited discount factor is not significantly related to credit card borrowing, their present bias is an important explanatory factor, with stronger present bias associated with greater borrowing, controlling for a variety of demographic and situational variables. Our study is closely related to theirs, except that we add incentivized measures of risk attitudes and trustworthiness, but replace the incentivized present-bias measure with a survey assessment of impulsiveness.

Several studies have shown a relationship between trust or trustworthiness and credit decisions. The earliest of these is Karlan (2005), who found that trustworthiness in the trust game (developed by Berg et al., 1995) predicts loan repayment in a Peruvian group lending microfinance program (see also Karlan, 2007). Cassar et al. (2007) examine the effect of various elements of social capital, including interpersonal trust and trustworthiness (in the trust game used here), on microfinance loan repayment (in a "microfinance game") among two groups of subjects in South Africa and Armenia. They fail to find a significant effect of trustworthiness in the game on loan repayment in South Africa, but observe a very strong positive relationship in Armenia.

Ausubel (1999) reports the results of a large-scale field experiment testing the effects of different credit card offers. He draws three conclusions from the study. First, respondents to credit card solicitations were significantly higher credit risks than non-respondents. Secondly, solicitations offering inferior terms attracted higher-risk borrowers. Third, even after controlling for all of the information available to the credit card company, consumers who accepted such unfavorable terms exhibited a higher likelihood of default. This suggests that characteristics that are not considered by the credit card companies may play an important role in predicting those who will default on their credit commitments. We argue that these may consist of preferences and personality factors, such as time and risk preferences, trustworthiness, and impulsiveness.

These variables may be related to each other: Martins et al. (2004) show that impulsivity is related to risk taking by gamblers. The study was conducted on 78 female and male pathological gamblers who were compared on a profile of risk taking behaviors which included suicide attempts, illegal activities meant to finance gambling, sexual risky behavior, and alcohol abuse.

[1] In a related paper, Eckel et al. (2004) show that short-term elicited discount rates are highly correlated with long-term (5-year) discount rates, though the long-term rates involve less discounting of future payoffs on average.