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Clouded judgment: The role of sentiment in credit origination☆

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ABSTRACT

Using daily fluctuations in local sunshine as an instrument for sentiment, we study its effect on day-to-day decisions of lower-level financial officers. Positive sentiment is associated with higher credit approvals, and negative sentiment has the opposite effect of a larger magnitude. These effects are stronger when financial decisions require more discretion, when reviews are less automated, and when capital constraints are less binding. The variation in approval rates affects ex post financial performance and produces significant real effects. Our analysis of the economic channels suggests that sentiment influences managers' risk tolerance and subjective judgment.

1. Introduction

Corporate outcomes depend on daily financial decisions, many of which are made by managers outside the executive suite and away from the headquarters. Because these decisions nearly always involve personal judgment, they may be affected by the agent's psychological factors, such as fluctuations in mood and emotional state, broadly referred to as sentiment.

Given the inherent subjectivity in corporate decisions, understanding the role of sentiment is important. At the firm level, sentiment may increase or hinder an agent's productivity and alter the assessment of investment projects. For example, Graham, Harvey, and Puri (2015) provide survey evidence that up to one-half of managers rely on their 'gut feel' in investment decisions. At the aggregate level, sentiment may propagate across agents and generate spillovers across markets (Baker, Wurgler, and Yuan, 2012). For example, Shiller (2015) attributes the recent financial crisis to positive sentiment in the financial sector which skewed managerial expectations and overextended financial firms.

Despite the potential importance of these effects, clean evidence on the role of sentiment in corporate decisions is difficult to obtain. First, day-to-day financial decisions are usually unobservable. Second, even if they could be traced, it is difficult to evaluate their outcomes without knowing the opportunity set—namely, the options that were

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considered but rejected. Third, while sentiment is one of the most volatile personal traits, it is hard to measure at the time of the agent's decision and to separate from the confounding economic factors.

Our paper provides micro evidence on the role of sentiment in the day-to-day decisions of lower-level financial officers. To address identification challenges, we focus on a large number of regular, well-understood decisions at financial firms, namely, credit approvals. In this setting, the decision is standardized, the opportunity set is observable, and the ex post outcome is clear. With over $1 trillion in annual transaction volume, this is an economically important market with significant real effects.

As a source of exogenous variation in sentiment that matches the frequency of financial decisions, while being uncorrelated with information, we exploit daily variation in local sunshine across over 2,000 counties in 1998–2010. This identification strategy is grounded in prior evidence on the effect of sunshine on an agent's mood from psychology (Schwarz and Clore, 1983), experimental economics (Bassi, Colacito, and Fulghieri, 2013), and financial markets (Hirshleifer and Shumway, 2003; Goetzmann, Kim, Kumar, and Wang, 2015).

Our main finding is that positive sentiment, attributable to daily variation in local sunshine, leads to higher credit approvals, and negative sentiment generates the opposite effect. Using hourly data on cloud cover for each county-day, we find that the approval rate for credit applications increases by 52 basis points (or 0.80%) on perfectly sunny days and drops by 113 basis points (or 1.41%) on overcast days. These estimates account for county∗month fixed effects which absorb monthly variation in economic fundamentals unique to each county, such as investment opportunities, competition, and managerial skills and incentives. Thus, our estimates reflect changes in managerial decisions relative to the baseline average observed over the same month, for the same set of firms, and in the same geographic location. These estimates also control for the observable fundamentals of loan applications reviewed on a given county-day, including household income, leverage, and demographics.

The variation in credit approvals in response to the sentiment primer has significant real effects. A rough estimate of the extra credit approved on one perfectly sunny day relative to one fully overcast day is about $150 million nationwide or $91,000 per county-day. These estimates are very similar whether we use raw or seasonally adjusted measures of local sunshine as a source of variation in sentiment.

In the cross-section of loans, the effect of sentiment increases when financial officers have more discretion. For example, sentiment has a stronger effect on the approvals of applications by low-income and medium-income households, which require more judgment. In contrast, the effect of sentiment disappears when the decision is clear-cut and when pre-approvals are common—namely, for high-quality applications from households earning over $100,000 per year.

In the cross-section of firms, the effect is stronger for smaller, local firms. At such firms, approval decisions are typically less automated, and all of the managerial actions are confined to the firm's small geographic domain, thus allowing for a more precise estimation of sentiment proxies. In contrast, the sentiment effect drops by up to one-half for large, national firms where managerial decisions are more standardized and where nonlocal influence is more likely.

In the time-series analysis, we find that the economic importance of sentiment varies across business cycles. For example, the effect of daily variation in sentiment on officers' decisions more than doubles during the credit boom in the early 2000s. This evidence suggests that sentiment has a stronger effect on managerial decisions when capital constraints are less binding and when monitoring is loose.

Next, to disentangle the effect of managerial discretion from variation in loan characteristics, we provide evidence on the relation between daily sunshine and loan pricing—an important decision variable determined by computerized algorithms. This outcome variable seeks to capture all of the loan's hard data, both public and private, but requires little discretionary input from the officer.

We find no relation between daily sunshine and loan pricing. This evidence demonstrates that the empirical link between the sentiment proxy and credit extension is confined to discretionary outcome variables and does not show up in automated decision outcomes for the same financial products. This dichotomy shows that the relation between sentiment and daily approvals is not driven by an omitted risk characteristic of the underlying loan, which would likely affect both discretionary and automated decisions that use the same input data. Another important conclusion is that higher approval rates on sunny days are not offset by higher interest rates and represent a measurable shift in credit outcomes.

Next, we evaluate the ex post performance of loans approved on sunny and cloudy days. The evidence shows that loans approved on sunny days experience significantly higher defaults. In particular, a one standard deviation reduction in the deseasoned cloud cover on the day of the loan approval is associated with a 2.7% higher loan default rate, controlling for observable loan characteristics. While the variation in weather captures only a fraction of the daily variation in agents' moods, these estimates show that correlated mood changes produce significant real consequences.

In our final analysis, we consider several non-mutually exclusive channels through which the variation in sunshine may affect officers' decisions. The first channel—risk tolerance—suggests that managers in a good mood show higher risk tolerance and approve a greater fraction of risky loans. Loewenstein, Weber, Hsee, and Welch (2001) theoretically demonstrate that an individual's mood affects risk-taking behavior, and several recent studies find support for this hypothesis in an experimental setting. In a controlled experiment, Bassi, Colacito, and Fulghieri (2013) find that subjects report more positive mood states on sunny days and, when presented with a choice of lottery payoffs, exhibit higher risk tolerance. In another experiment, Kramer and Weber (2012) find that an individual's tolerance to financial risks increases with the amount of sunlight and connect their findings to the link between emotional state and risk aversion.