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## Optimal capital structure and investment decisions under time-inconsistent preferences

Yuan Tian \*

**Abstract** Based on a continuous-time model of quasi-hyperbolic discounting, this paper provides an analytically tractable framework of entrepreneurial firms' capital structure and investment decisions under time-inconsistent preferences. Inefficiency in both investment and default is caused due to time inconsistency, if we view the time-consistent benchmark as efficient. Compared to the standard trade-off theory in corporate finance, we clarify that debt financing under time-inconsistent preferences brings a new trade-off between the alleviation effect on investment inefficiency and the aggravation effect on default inefficiency. The impact of time-inconsistent preferences depends on the entrepreneurs' belief regarding their future time-inconsistent behavior (i.e., sophisticated or naive). Concretely, we find that naive entrepreneurs always choose higher leverages, while sophisticated ones are more likely to choose lower leverages, compared to the time-consistent benchmark. Therefore, time inconsistency can explain the observed leverage puzzle (i.e., why firms choose different leverages even with similar fundamentals). Moreover, we demonstrate that time-inconsistent preferences delay investment and hasten default, due to the interaction among the three effects: option value effect, payoff value effect, and leverage effect. In particular, naive entrepreneurs invest later and default earlier than sophisticated ones, leading to a shorter operating period. These results support the empirical findings in entrepreneurial finance.

**Keywords:** Capital structure; Investment; Default; Quasi-hyperbolic discounting; Time inconsistency

**JEL classification:** D92; G02; G11; G32

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