Investors systematically deviate from rationality when making financial decisions, yet the mechanisms responsible for these deviations have not been identified. Using event-related fMRI, we examined whether anticipatory neural activity would predict optimal and suboptimal choices in a financial decision-making task. We characterized two types of deviations from the optimal investment strategy of a rational risk-neutral agent as risk-seeking mistakes and risk-aversion mistakes. Nucleus accumbens activation preceded risky choices as well as risk-seeking mistakes, while anterior insula activation preceded riskless choices as well as risk-aversion mistakes. These findings suggest that distinct neural circuits linked to anticipatory affect promote different types of financial choices, and indicate that excessive activation of these circuits may lead to investing mistakes. Thus, consideration of anticipatory neural mechanisms may add predictive power to the rational actor model of economic decision-making.