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**Article**

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# Impatience and Savings

David Laibson\*

When making decisions with immediate consequences, economic actors typically display a high degree of impatience. Consumers choose immediate pleasures instead of waiting a few days for much larger rewards. Consumers want “instant gratification.”

However, people do not behave impatiently when they make decisions for the future. Few people plan to break their diets next week. Instead, people tend to splurge *today* and vow to exercise/diet/save *tomorrow*. From today’s viewpoint, people prefer to act impatiently right now but to act patiently later.

Data from neuroscience experiments provide a potential explanation for these observations: short-run decisions engage different brain systems from long-run decisions. Using functional magnetic resonance imaging (fMRI), Samuel McClure, George Loewenstein, Jonathan D. Cohen, and I have shown that decisions that involve at least some short-run tradeoffs recruit both analytic and emotional brain systems, whereas decisions that only involve long-run tradeoffs primarily recruit analytic brain systems.<sup>1</sup> These findings suggest that people pursue instant gratification because the emotional brain system — the limbic system

— values immediate rewards but only weakly responds to delayed rewards.

Whatever the underlying biological mechanism, the taste for instant gratification can be incorporated into models of human behavior. Several strands of my work have attempted to do this. Chris Harris and I have proposed models in which actors place a special premium on immediate pleasures.<sup>2</sup> I also have developed models that assume that people have biologically conditioned motivational states: when familiar cues are presented, consumers experience a drive to consume the goods that they consumed in the presence of those cues in the past.<sup>3</sup> For example, a cigarette smoker will urgently want a smoke when he enters his favorite bar (where he has smoked before).

The drive for immediate gratification has many empirical consequences that my coauthors and I have studied. Marios Angeletos, Andrea Repetto, Jeremy Tobacman, Stephen Weinberg, and I have run computational simulations of consumers with a taste for instant gratification (specifically, we studied quasi-hyperbolic discount functions).<sup>4</sup> We find that such consumers quickly spend whatever liquid wealth they have and are only able to save in illiquid assets. These consumers live from hand to mouth in their checking accounts, but hold large stocks of illiquid assets like home equity and defined contribution pension plans. When making long-run choices — for example,

when deciding how to invest during flush times — these consumers buy illiquid assets that offer a high rate of return and pay out slowly over many decades. When making short-run decisions, however, these consumers are willing to pay a high price for immediate gratification.

Repetto, Tobacman, and I show that the taste for instant gratification explains why households hold illiquid assets and also frequently borrow with credit cards that involve relatively high interest rates.<sup>5</sup> We also estimate the strength of the taste for immediate gratification.<sup>6</sup> We find that consumers have a short-run discount rate of 30 percent and a long-run discount rate of 5 percent. In other words, delaying a reward by a year reduces its value by 30 percent, but delaying the same reward an additional year only generates an additional 5 percent devaluation.

Consumers with a taste for immediate gratification will avoid immediate disutility. Such consumers will repeatedly delay finishing unpleasant tasks like enrolling in a 401(k) plan. James J. Choi, Brigitte Madrian, Andrew Metrick, and I have found signs of procrastination in a survey of employees.<sup>7</sup> Over two thirds of respondents say that they save too little, and none say that they save too much. Among the self-reported undersavers, over one third say that they plan to join the 401(k) plan or raise their savings rate in the next two months. Using administrative records, we find that

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almost none follow through in the next four months.

It is typically difficult to determine whether households save optimally. Even asking a respondent — as we did above — yields ambiguous evidence, since it is not clear what it means to say, “I save too little.” But in some cases, savings incentives are strong enough to make very sharp predictions about optimal 401(k) contribution rates. Choi, Madrian and I have analyzed employees who receive employer-matching contributions in their 401(k) plan and are allowed to make discretionary, penalty-free, in-service withdrawals.<sup>8</sup> For these employees, contributing below the match threshold is an unambiguous mistake. Nevertheless, half of employees with such clear-cut incentives *do* contribute below the match threshold, foregoing match payments that average 1.3 percent of their annual pay. In our sample, making this mistake correlates with other types of procrastination. Finally, providing these “undersavers” with specific information about the free lunch they are foregoing fails to raise contribution rates.

Such savings problems suggest that economists should think about the effectiveness of existing savings institutions. In particular, economists should ask why new employees take so long to enroll in 401(k) plans. Madrian and Dennis Shea started this literature by showing that defaults play a critical role.<sup>9</sup> Their original paper shows that the typical employee sticks with the default option — whether the default is enrollment or non-enrollment — for years after joining a new firm. Follow up papers have replicated these findings in a large number of firms.<sup>10</sup>

In a typical company with a standard default of *non-enrollment*, only about one third of employees enroll on their own during the first six months of employment. Even after a year, only half of employees enroll in the 401(k) plan.

Under the *automatic enrollment* system, new employees are automatically enrolled in the 401(k) and may opt out of the plan. If employees do nothing they are enrolled at a default savings rate (typically 2 or 3 percent of their wages) and their investments are allocated to a default portfolio (typically a money market, although increasingly, automatic enrollment systems are using lifecycle funds as the default). Under automatic enrollment, about 90 percent of employees accept default enrollment, and about 75 percent of these enrollees accept the default savings rate *and* the default asset allocation.

The consequences of passivity and status quo bias affect a wide range of 401(k) outcomes. Choi, Madrian, Metrick, and I find that 401(k) plan participants follow the path of least resistance in every investment decision that they make.<sup>11</sup> For example, the match threshold is the maximal (employee) contribution rate at which the employer provides a match (at the margin). Most employees who enroll in 401(k) plans contribute up to the match threshold. When an employer raises the match threshold, employees who join the plan *after* the change exploit the higher match threshold, but employees hired *before* the change typically take three years to raise their savings rate.

Evidence on company stock also supports the conclusion that savers are remarkably passive.<sup>12</sup> In 401(k) plans with the option to invest in company stock, nearly half of the assets are invested in company stock. Moreover, this pattern of investment was unaffected by the prominent bankruptcies of Enron, Worldcom, Global Crossing, and many other firms in the aftermath of the collapse of the technology bubble. Employees who lost their entire life savings in the Enron debacle were frequently discussed in the media at the time of the Enron bankruptcy, but American workers have not generalized

that message. Company stock allocations never budged. The high allocation to company stock is linked to the fact that many employer-matching contributions are automatically invested in company stock. These matched contributions stay in employer stock, even when employees have the option to reallocate the money. In contrast, when an employer asks its employees to choose their own portfolio allocation, employees invest a much lower share in company stock.

Asking employees to make their own decisions — by discouraging reliance on a default action or removing the default altogether — also provides a good system for 401(k) enrollment.<sup>13</sup> For example, one firm asked new employees to tell the firm their enrollment decision — including their enrollment savings rate and asset allocation — within 30 days of their hire date. Naturally, the employees can change their mind later, but they are supposed to make an initial decision within 30 days. Enforcement works the same way that the choice of a medical insurance plan works at most companies: employees who do not make the decision are reminded to do so. We call this an *active decision* enrollment system, since employees are encouraged to decide for themselves. We find that such active decision enrollment produces very good results. A few months after hire, employees hired under an active decision regime have a 70 percent enrollment rate in the 401(k). Moreover these employees seem to be making smart savings choices. In particular, the distribution of savings rate at three months of tenure under an active decision regime matches the distribution of savings rates at three years of tenure under a standard enrollment regime. However, active decisions are unlikely to work as well as defaults when people are relatively uninformed about the decision they are being asked to make.<sup>14</sup>

The power of defaults implies that policymakers and 401(k) plan designers should pick defaults very carefully, even though they are non-binding. My coauthors and I have developed a framework for analyzing this problem.<sup>15</sup> We calculate the socially optimal 401(k) enrollment regime. Three different 401(k) enrollment procedures endogenously emerge from the model. We derive conditions under which the optimal enrollment regime is: automatic enrollment (that is, default enrollment); standard opt-in enrollment (that is, default non-enrollment); or an active decision (that is, no default and compulsory choice). The active decision regime is socially optimal when consumers have a large degree of variation in their savings needs and a strong tendency to procrastinate. In this case, a single default will not work well for all consumers and households won't enroll on their own without a deadline. Default enrollment is optimal when consumers have relatively similar savings needs and a moderate tendency to procrastinate. In this case, a one-size-fits-all default is not a problem because households do not differ greatly in their savings needs. Moreover, households will not wait too long to opt out of the default if it is not right for them.

My collaborators and I continue to study the foundations of instant gratification, the consequences for savings behavior, and the implications for the design of optimal savings institutions.

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<sup>13</sup> J. J. Choi, D. Laibson, B. Madrian, and A. Metrick, "Active Decisions," *NBER Working Paper No. 11074*, January 2005.

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