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Optimal illiquidity

John Beshears,
Harvard Business School and NBER,
TIAA Institute Fellow

James Choi,
Yale School of Management and NBER,
TIAA Institute Fellow

Christopher Clayton,
Harvard University

Christopher Harris,
Cambridge University

David Laibson,
Harvard University and NBER

Brigitte Madrian,
Brigham Young University Marriott School of Business and NBER,
TIAA Institute Fellow

How much liquidity should be built into a socially optimal savings system? On the one hand, flexibility allows households to consume in ways that reflect their idiosyncratic preferences—i.e., households can respond to taste shocks and taste shifters. However, liquidity allows households with self-control problems (and other types of biases or errors) to overconsume.

If illiquidity is optimal, how should it be implemented? Possible forms of illiquidity include a perfectly illiquid retirement claim (like a typical defined benefit pension or Social Security) or a partially illiquid account (like an IRA or 401(k) plan). In theory, an optimal system might combine different types of illiquid accounts.

In the domain of practical policies, there is a partial consensus on these questions. Almost all developed countries have some form of compulsory savings that is *completely* illiquid (e.g., Social Security in the United States).

But that's where agreement ends. For example, in most developed countries, defined contribution (DC) savings accounts are usually completely illiquid before age 55 (Beshears, et al., 2015). By contrast, in the United States, certain types of withdrawals from DC accounts are allowed without penalty, and, for IRAs, withdrawals may be made for any reason if a 10% penalty is paid. Liquidity allows significant preretirement "leakage": for every $1 contributed to the accounts of United States savers under age 55, $0.40 simultaneously flows out of the 401(k)/IRA system, not counting loans (Argento, Bryant, and Sabelhaus, 2014). Until now, no normative model has been used to determine whether such leakage is good or bad from the perspective of overall social welfare. Nevertheless, most policy analysis bemoans leakage (e.g., Tergesen, 2017 and Hewitt Associates, 2009).

Our paper evaluates the optimality of an N-account retirement savings system with a combination of liquid, partially illiquid, and/or fully illiquid accounts. The illiquidity is obtained with linear penalties for early withdrawals. Within this framework, we focus on two special cases: systems with two accounts and systems with three accounts. However, we show that such two- and three-account systems come extremely close to delivering the welfare obtainable from a fully general optimized (non-linear) mechanism. We do this by characterizing an upper bound for social welfare in the non-linear mechanism and show that our two- and three-account systems nearly obtain this bound.

We study preferences that include both normatively legitimate taste shifters and normatively undesirable self-control problems. The self-control problems are modeled as the consequence of present bias (Phelps and Pollak, 1968, Laibson, 1997): i.e., a discount function with weights $\{1,\beta\delta^2,...,\beta\delta^t\}$, where the degree of present bias is $1-\beta$. Present bias is the propensity to overweight the present relative to the future. Our model is an aggregate version (with interpersonal transfers) of the flexibility/commitment framework of Angeletos, Werning, and Amador (2006).

We divide our analysis into the cases of homogeneous present bias and heterogeneous present bias. In the homogeneous case, we assume that all agents have the same degree of present bias—in other words, the same value of β. Under homogeneous β, our model implies that partially illiquid accounts with early withdrawal penalties $\pi \simeq 1-\beta$ play an economically significant role in improving social welfare.

We then relax the homogeneity assumption, and assume that agents have *heterogeneous* present bias. In this heterogeneous-preference case, we find that fully illiquid accounts play an important role in improving welfare. Specifically, the social optimal is well-approximated by a three-account system with a perfectly liquid savings account, a partially liquid savings account (with an early withdrawal penalty of approximately 13%), and a completely illiquid savings account. Even more strikingly, the social optimum is also well-approximated by an even simpler two-account system with a completely liquid savings account and a completely illiquid savings account. In both the two- and three-account systems, the completely illiquid savings account receives a substantial mandatory contribution from the household—enough to almost smooth consumption between working life and retirement even if all other wealth is consumed during working life. The completely illiquid savings account caters to the households with the low–β values agents (high degree of present bias). Fully illiquid savings generates large welfare gains for these low–β, and these welfare gains swamp the welfare losses of the high–β agents (who are made only slightly worse off by shifting some of their wealth from completely liquid accounts to completely illiquid accounts).

To the extent that there is a role for partially illiquid accounts in the heterogeneous–β economy, we find that they should have low early withdrawal penalties—in most calibrations, the penalty is slightly above 10%. This implies that the partially illiquid accounts look much like a typical 401(k) account. Moreover, these partially illiquid accounts display a high level of leakage in equilibrium. In other words, early withdrawals (i.e., preretirement withdrawals) are commonplace. This leakage is a double-edged sword: it results in part from legitimate taste shocks and in part from self-control problems (i.e., low β). The costs of the partially illiquid account to low–β types (who end up paying most of the early withdrawal penalties) and benefits to high–β types (who are net recipients of these penalties) are nearly off-setting, although the net effect for all of society is slightly positive.

In summary, three findings emerge from the analysis of our stylized two-period model (which allows for mechanisms that admit interpersonal transfers and incorporates heterogeneity in present bias):

1. The constrained-efficient social optimum is well-approximated by a two-account system, with one account that is completely liquid and a second account that is completely illiquid. Little welfare gain is obtained by moving beyond this simple two-account system.
2. If a third account is added, its optimized early withdrawal penalty is only slightly above 10%.

3. In equilibrium, the leakage rate from this (partially illiquid) third account is high. We report a range of equilibrium leakage rates, depending on the calibration. With optimal allocations to all three accounts—completely liquid, partially illiquid, and completely illiquid—equilibrium leakage rates from the partially illiquid account range from 73% to 99%. By contrast, when we calibrate the model to match actual *empirical* allocations to the completely illiquid account (e.g., treating Social Security as the empirical analog of the model's completely illiquid account), the implied equilibrium leakage rate from the partially illiquid account drops to 46%.

These properties have analogs in the retirement savings systems in the U.S. The United States has fully liquid accounts (e.g., a standard checking account), fully illiquid accounts (e.g., Social Security), and a partially illiquid defined contribution system with a 10% penalty for early withdrawals (e.g., an IRA or a 401(k)). This partially illiquid DC system has a leakage rate of approximately 40% (see Argento, Bryant, and Sabelhaus, 2014).

Despite these similarities, it is inappropriate to conclude that our findings demonstrate the social optimality of the U.S. system. Most importantly, our theoretical model is highly stylized. First, we assume only two periods (e.g., working life and retirement). Second, we assume a particular form of multiplicative taste shifter and a limited set of distributions of that taste shifter. Third, we assume that households are naive with respect to their present bias. We study a limited set of distributions of the present bias parameter, β. Fourth, we study a limited set of distributions of this parameter. Fifth, we assume a particular conceptual formulation of self-defeating behavior (present bias).

Much more robustness work is needed to interrogate the three main findings that we summarized above—in common with Moser and Olea de Souza e Silva (2017)—that more mandatory savings would be socially optimal. It is not yet clear whether these results will continue to hold as future research enriches and expands this type of analysis.

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