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Commitment savings in informal banking markets ☆

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ABSTRACT

I study the provision of commitment savings by informal banks to sophisticated hyperbolic discounters. Since a consumer is subject to temptation in the period that he signs a contract, banks might exploit his desire for instant gratification even as they help him to commit for the future. Without banking, savings decisions and welfare are not monotonic in the degree of time-inconsistency. Consequently, commitment savings will lower welfare for moderately time-inconsistent agents. If loan contracts are enforceable, pure commitment savings will disappear. This will further lower welfare if the lender is a profit-maximizing bank, but raise welfare if the lender is a welfare-maximizing NGO. Finally, I consider the coexistence of a bank and NGO. There will be zero takeup of NGO-provided commitment savings if there is competition from a moneylender. But the NGO's offer will raise the agent's reservation utility, thus reducing the surplus that can be extracted by the moneylender.

1. Introduction

This paper addresses some questions related to informal banking under time-inconsistency. First, if an individual values commitment savings, under what conditions will such a product be offered by a bank? Second, when does voluntary adoption of commitment raise the individual's welfare? And third, what are the implications for equilibrium contracts if a welfare-minded NGO enters a region served by a profit-minded monopolist?

Hyperbolic discounters, who in any period place an emphasis on instant gratification, can make inefficient financial decisions. Suppose an individual would like to save up for a nondivisible good or investment. His savings decision today depends on his future selves' willingness to continue saving. If he fears that his future selves will not follow through, he might abandon saving altogether. In this context, it is well understood how access to commitment devices, or contracts that restrict future choice sets, can improve welfare. In particular, consider commitment savings, which I define as a contract that makes savings balances illiquid until a specified date. Illiquidity, by raising future selves' incentives to save, gives the current self a reason to save as well.

The fact that markets will respond to a demand for commitment does not itself inform us about equilibrium contracts and individual welfare. I show that, depending on time preferences and the contracting environment, traditional commitment savings might not be offered or adopted, and that if adopted, it can lower welfare relative to autarky. In this paper, I follow O'Donoghue and Rabin (1999b) and subsequent papers in assuming that an agent's welfare is what his lifetime utility would be *if* he were time-consistent (equivalently, it is his discounted utility from the perspective of a hypothetical "period 0", just before he actually starts making decisions).[2]

The model isolates some key mechanisms through which predictions about contracts and welfare are made. Consider a sophisticated quasi-hyperbolic discounter who, in any period, discounts the sum of future utilities by a factor $\beta < 1$. His preferences are time-inconsistent since, in any period, he places greater value on immediate consumption than his past selves would like him to. Much of the intuition in this paper comes from the analysis of the strategic interaction across different incarnations of the same agent. In particular, the period 1 self makes decisions that must take into account the optimal response of the period 2 self. The fact that banking decisions are made by period 1, who is himself subject to temptation even as he tries to curb the temptation of his future selves, allows us to see how markets might fail to maximize welfare.

As a starting point, I show that, in the absence of banking, the agent's savings patterns and welfare are not monotonic in the degree of time-

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[2] This can be interpreted as, say, the preferences parents have over their children's lives. This approach is also reasonable if we are interested in thinking about how people might vote on future changes in policy such as new banking structures and new forms of contract enforcement. Given that an agent's intertemporal preferences vary over his lifetime, this welfare criterion does not legitimize myopia in a particular period while rejecting the same preferences later in life.

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inconsistency. Suppose he is saving for a nondivisible good in periods 1 and 2, to be consumed in period 3. If he became more time-inconsistent (i.e. β dropped), the changes in his behavior would be driven by two considerations. First, in period 1 he would wish to transfer more of the savings burden to period 2. Second, in period 2, he would face a greater temptation to simply consume his accumulated assets rather than continue saving. At high values of β, the second consideration would not be binding and a drop in β would result in slower, or more imbalanced, saving. At lower values of β, the second consideration enters into play. Even though the period 1 self would like to save less, he will find himself saving *more* than before in order to induce period 2 to continue saving. Therefore, as β drops, the agent's period 1 savings will fall, then rise, and ultimately, when period 2 becomes sufficiently uncooperative, drop to 0.

The characterization of autarky equilibrium establishes that a commitment contract is sometimes valuable. If period 2 does not have access to period 1's deposits, he has an improved incentive to save. At the point of adopting a contract, the hyperbolic discounter has two objectives. He wants to improve the behavior of his future selves, but to also limit the sacrifices required of his current self. A profit-maximizing bank will seek to capitalize on both objectives.

Section 6 introduces a monopolist bank. There are two possible cases: (a) only commitment savings contracts can be offered (if the bank cannot adequately enforce repayment on loans), or (b) both commitment savings and loan contracts are feasible. Under a commitment savings contract, welfare will rise if it enables the agent to save when he otherwise could not. However, if the agent adopts commitment saving when he was already saving in autarky, his welfare will fall. To see why this is the case, consider the autarky outcome when the agent is slightly hyperbolic. In period 1, he is saving less than the welfare maximizing amount (but not as little as he would like). Now, access to commitment allows him to save even less by giving period 2 a greater incentive to make up the balance. This serves to make savings patterns more imbalanced than in autarky.

If the bank is able to enforce lending contracts, commitment savings will no longer be offered. The bank will offer a loan instead. This will cause the agent's welfare to drop relative to both autarky and commitment savings. Borrowing is not inherently bad since it allows the nondivisible to be purchased while creating commitment through a fixed repayment schedule. However, pulling nondivisible consumption into the present creates such a large surplus for the hyperbolic discounter that the bank can extract high future repayment in exchange for the instant gratification.

In Section 7, I carry out the same exercise for a welfare-maximizing NGO. The NGO, unlike the bank, will not charge fees for commitment savings. However, it will deny access to those agents whose welfare would be hurt by commitment. If repayment is enforceable, it too will offer loans instead of commitment savings, but at better terms and with different loan sizes than the bank. In sharp contrast to the bank, the NGO achieves the first-best welfare through lending, since it can ensure that the nondivisible is purchased while preventing overborrowing, enforce commitment through the repayment schedule, *and* return surplus to the agent.

Section 8 examines equilibrium contracts when an NGO and bank coexist. This is of interest to both practitioners and experimental researchers investigating nonprofit entry in areas dominated by a monopolist. When both entities offer the same product, the NGO must expand its offers to serve those who would otherwise turn to the bank. While this erodes some of the welfare gains that an NGO could achieve if it operated alone, it eliminates the monopoly rents that a bank could earn. It is also reasonable to consider the coexistence of a bank that can lend and an NGO that cannot, since NGOs often lack the information and enforcement power that local moneylenders possess. In this case, the NGO's commitment savings product will not be adopted by any agent. This is because a moneylender can always design a loan contract that is preferable from period 1's perspective. However, the NGO's offer improves the individual's outside option, which reduces the amount of surplus the bank can extract from him. Zero take-up of commitment savings, therefore, does not imply that it was ineffective.

Finally, Section 9 discusses the results in the context of empirical research in development economics. While a number of the results have relevance beyond informal banking, the motivating setting for this paper is a low-income region where people lack access to the more complicated financial instruments and contract enforcement technologies of industrialized nations.[3] Several recent empirical papers have examined the provision and takeup of commitment savings in developing countries. This paper aims to provide a theoretical complement by generating predictions about the relationship between time preferences, adoption of banking services, and welfare. The results have implications for the design of commitment savings contracts and allow us to put some structure on empirical hypotheses. This is pertinent in light of concerns about market provision of commitment and ambiguous welfare effects of microfinance.[4]

2. Related literature

Starting with Phelps and Pollack (1968) and subsequently popularized by Laibson (1997), several papers have studied the theoretical properties of hyperbolic discounting.[5] Harris and Laibson (2001), Krusell and Smith (2003), and Bernheim et al. (2013) all develop techniques for solving consumption-savings problems. Two papers in particular share some of the intuition of Section 4, which analyzes how period 2 incentives affect period 1 behavior[6]: In the context of addictive goods, O'Donoghue and Rabin (1999a) argue that sophisticated hyperbolic discounters are driven by two forces—a "pessimism effect" (If I am more likely to indulge later, I might as well indulge now) and an "incentive effect" (if I indulge now, I am more likely to indulge later, so I should restrain now). Diamond and Koszegi (2003) study how the option of early retirement affects savings decisions for hyperbolic discounters.

There is now a significant body of empirical work that points to consumer demand for commitment. Ashraf et al. (2006) find, through a field experiment, that agents most interested in commitment savings display relatively greater time inconsistency and are aware of their preferences. Additional evidence on the advantages of commitment savings is provided by Benartzi and Thaler (2004), Brune et al. (2013), and Dupas and Robinson (2013). There is also growing evidence that commitment embedded in other forms of informal banking plays a significant role. For example, roscas (rotational savings and credit associations) can serve as effective commitment devices.[7] Of more direct relevance to this paper is the idea that microfinance too can be viewed as a form of commitment. This is discussed in Banerjee and Duflo (2011) and Bauer et al. (2012). Basu (2008) argues that simultaneous saving and borrowing in microfinance can be rationalized as a form of commitment. Fischer and Ghatak (2010) show that a particular feature of microfinance contracts – frequent repayment – allows hyperbolic discounters to access larger incentive compatible loans than under infrequent repayment.

Finally, a number of papers study contracts between firms and time-inconsistent agents. Amador et al. (2006) and Bond and Sigurdsson (2009) look at the tradeoffs between commitment and flexibility

[3] For a broader discussion, see Conning and Udry (2007).

[4] On the first point, see Ashraf et al. (2006) and Bryan et al. (2010). On the second, see Morduch (1998), Banerjee et al. (2013), and Armendariz and Morduch (2010).

[5] Hyperbolic discounting is one of a few different ways to model problems of temptation and self-control. Other approaches include Gul and Pesendorfer (2001), Fudenberg (2006), and Banerjee and Mullainathan (2010) .

[6] However, in the papers described, the "period 2" decision is discrete, unlike in this model.

[7] Theoretical arguments are laid out in Ambec and Treich (2007) and Basu (2011). See Gugerty (2007), Tanaka and Nguyen (2009), and Dagnelie and LeMay-Boucher (2012) for related evidence.