Commitment as Extortion?

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Abstract

Hyperbolic discounters value commitment contracts. The amount a consumer is willing to pay for commitment depends not just on what she would consume in autarky; it also depends on the commitment contract she would sign tomorrow, which itself might depend on the contract she would sign the next day, and so on. I formulate the consumer's outside option as a compound of potential future contracts. Using quite general notions of welfare, I derive conditions under which monopoly commitment contracts make the consumer better or worse off than under autarky. If autarky consumption is sufficiently decreasing over time, commitment is strictly welfare-improving, even when the monopolist can perfectly price discriminate. If autarky consumption is non-decreasing, commitment is strictly welfare-reducing. In this case, the consumer prefers not to have access to commitment, but will adopt commitment as a response to the threat of her future selves adopting it.

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1 Introduction

Time-inconsistent preferences are now widely invoked as one plausible explanation for individuals' apparent failures to make optimal forward-looking decisions, as manifest in under-saving, over-borrowing, eating junk food, failing to go to the gym, and taking ten years to write a paper. Such preferences have the appeal of being psychologically sensible and mathematically tractable, especially when time-inconsistency is modeled using hyperbolic discounting. Under hyperbolic discounting, in any period t, the individual's discount factor between periods t and $t + 1$ is greater than her discount factor between any two consecutive future periods.[1] This has the following implication: from the perspective of the individual prior to any period t, in period t she will seek too much instant gratification relative to her future.

Sophisticated hyperbolic discounters are aware of the time-changing nature of their preferences, and therefore make choices that account for their future selves' best responses. Such individuals, while seeking instant gratification in any period, would like to prevent their future selves from doing the same. They might therefore value commitment contracts that restrict their future selves' ability to make self-indulgent choices. This prediction–that individuals are willing to pay for contracts that tie their own hands in the future–is a fundamental distinguishing prediction of hyperbolic discounting. Under standard time-consistent preferences (exponential discounting), such a service would be of no value since the individual trusts her future selves to make choices that are aligned with her current preferences.

The study of commitment, especially in banking, has been the focus of much recent empirical work in development and behavioral economics.[2] Thorough analyses of the possibilities and limits of commitment are essential to understanding choices, markets, and welfare under hyperbolic discounting. Is access to commitment good for consumers? What do the answers to this

[1] I use the term 'hyperbolic discounting' to describe what is strictly speaking 'quasi-hyperbolic discounting'.

[2] For examples, see Ariely & Wertenbroch (2002), Thaler & Benartzi (2004), Ashraf *et al.* (2006), Gugerty (2007), Bryan *et al.* (2010), Bauer *et al.* (2012), and Brune *et al.* (2016).

question depend on? This is the focus of the current paper.

Consider a firm that has access to a superior commitment technology than the hyperbolic discounter does. If the cost of providing this commitment is lower than the individual's benefit from receiving it, a surplus-generating transaction between the firm and the individual is feasible. Depending on market conditions, a contract signed in period t generates profits for the firm, improved discounted utility for the period-t individual, or both.[3]

This very simple intuition is subject to nuance and caveats, as demonstrated in several recent papers, both theoretical and empirical. First, the individual might not be sophisticated, and so could have an incorrectly optimistic view of her outside option (O'Donoghue & Rabin (2001), Basu (2018)). Second, the individual might not be sufficiently financially literate to understand the complexities of long-term financial contracts. Third, the available commitment technology might be limited in scope (Laibson (1997), Ashraf *et al.* (2006)). And fourth, most legal regimes permit existing contracts to be voluntarily renegotiated if all signatories are in agreement. This means that a binding commitment contract signed in period t needs to take seriously the possibility that in period $t + 1$, the same individual and firm will renegotiate it to satisfy the $t + 1$-self's preferences. Basu & Conning (2018) studies how this limits the feasible contract space.

In this paper, I introduce a consideration that, to the best of my knowledge, has not been addressed before but has significant implications for the terms of commitment contracts and consumer welfare. To isolate the mechanism of interest, I start with the following simple setup: A hyperbolic discounter lives for n periods, earns some (possibly varying but risk-free) income in each period, and might have access to limited borrowing and savings technologies, which she employs to construct an equilibrium consumption path that will be credibly followed by her future selves. This is defined as her autarky outcome. Now, consider the emergence of a bank with access to a perfect commitment technology; i.e. it can deliver a consumption path

[3]Indeed, this contract may leave the individual in periods $t + 1$, $t + 2$, etc worse or better off than before, so this is not a statement about the welfare of the individual as a whole.

with full consumption-smoothing (as desired by the individual at the time she signs a contract). Under what conditions will the individual accept a commitment contract, what will the the price of the offered contract be, and what are the implications for her (and her future selves') discounted utility relative to autarky?

If the bank is a monopolist that knows the individual's preferences, the answer to these questions will depend on the individual's participation constraint. Suppose the bank were to make a one-time take-it-or-leave-it offer. Then, it would sell the individual a smoothed consumption path with equalized per-period marginal utilities (appropriately adjusted), that left her with the same discounted utility as in autarky. But banks generally cannot be expected to limit themselves to one-time offers. If the individual were to reject an offer in period t, the bank could offer her another contract in period $t + 1$. So, the period-t individual's outside option is not determined directly by her autarky outcome; rather, it is determined by the contract that the bank would offer her in $t + 1$. The contract that would be offered in $t + 1$ depends on the contract that would be offered in $t + 2$, and so on.

The contribution of this paper stems from the above observation.[4] The individual's outside option is a compound of future selves' outside options. I formalize this participation constraint for any general well-behaved utility function and show how this depends not just on the individual's autarky discounted utility but on the distribution of instantaneous utilities (so two individuals with identical autarky discounted utilities could fare quite differently under a bank). I derive conditions under which the individual signs a contract that makes her worse/better off than in autarky, and conditions under which the individual in *every* period is made worse/better off than in autarky.

A main result is that under quite common autarky consumption paths (for example, non-decreasing consumption), commitment contracts strictly hurt the individual in every period. This happens not through the natural channels of over-borrowing, rolling over debt, unravelling of commitment, etc (which, furthermore, while bad for aggregate notions of welfare, still improve

[4]This is discussed briefly in Basu & Conning (2018)

the utility of the individual engaging in the act of instant gratification). Instead, the effect is due to the worsening of the consumer's outside option which happens through the promise of commitment.

I provide some intuition using an example. Consider an individual who lives for four periods. She receives approximately the same income in every period and, lacking credit access, consumes her income as it arrives. Now, we use backward induction to think about the effects of a monopolist bank offering commitment contracts. If no commitment contract has been accepted before period 3 (the second-last period), in that period she would accept a straightforward loan contract (commitment is irrelevant since only one period remains). So, the period 3 self raises her her own consumption, lowers period 4's consumption, and stays just as happy as in autarky. This prospect is worse than autarky from period 2's perspective (the gain in period 3's instantaneous utility cannot offset the loss in period 4's instantaneous utility).[5] So, in period 2, the individual would now be willing to accept a contract that lowers her utility relative to autarky. By period 1, there will be compounding effects–her outside option is lowered through two channels: first, period 2's commitment path is unattractive to her (the distribution of consumption is sub-optimal from period 1's perspective); second, period 2 herself must accept an unfavorable contract due to the threat from period 3. So, period 1 is willing to accept a commitment contract with overall low levels of consumption, leaving her and future selves all worse off.

In the above example, a bank that offers commitment creates its own demand--the threat of offering the individual's future selves commitment drives the individual's current self to purchase commitment (hence the title of this paper). She would prefer not to have access to commitment at all, but if available would adopt it. Conditional on the existence of commitment, she is willing to pay for it. But if commitment did not exist, she would not be willing to pay. So, adoption does not mean that the arrival of commitment has made her better off. Commitment, instead of providing a partial amelioration of the problems posed by hyperbolic discounting, makes the individual worse off by pitting her selves against one another.

[5]See Figure 2 for clarity.

The above argument gets reversed when autarky consumption paths are sufficiently falling. Now, consider the contract offered in period 3. This leaves the period 3 self with the same discounted utility as in autarky, but actually makes period 2 better off (by moving consumption away from period 3 to period 4). In this case even a perfectly price discriminating monopolist must leave the individual with some surplus–the bank is trapped by its own future existence. These results highlight a fundamental difference between borrowing and saving–when there is a saving motive, the monopolist is forced to leave the consumer better off than in autarky; and when there is a borrowing motive, the monopolist gets to leave the consumer worse off than in autarky.

This paper has a number of lessons and implications that stem from the main point: 'Now or tomorrow' could be strictly worse/better than 'now or never'. First, in experimental studies, adoption should not be viewed as necessarily welfare-improving. Second, the time-paths of income are particularly important in determining outcomes. Third, the intuition of the paper extends beyond banking to other contexts where contracts allow costs to be deferred or pulled forward. And fourth, this analysis suggests some new directions for consumer protection beyond concerns of exploitation within contracts.[6]

2 Setup

Consider an individual who lives from periods 1 to n. (The more interesting insights below emerge when $n > 3$.) She has time-separable utility, with instantaneous utility in any period t given by $u(c_t)$, which will also be referred to as u_t. Assume the utility function is strictly increasing, strictly concave, twice differentiable everywhere, and satisfies $\lim_{c \to 0} u'(c) = \infty$ (to prevent corner solutions).

Let a consumption stream starting in t be denoted $C_t \equiv (c_t, c_{t+1}, ..., c_n)$.

[6] On this topic, see DellaVigna & Malmendier (2004), Bond *et al.* (2009), Heidhues & Koszegi (2010), Armstrong & Vickers (2012), Mendez (2012), and Basu & Conning (2018).

The corresponding stream of instantaneous utilities is denoted

$$U_t \equiv (u_t, u_{t+1}, ..., u_n) \equiv (u(c_t), u(c_{t+1}), ..., u(c_n)) \tag{1}$$

I now define some shorthands for consumption and utility streams that will be commonly invoked in the analysis below. In any period t, let the autarky consumption stream and autarky utility stream be denoted C_t^A and U_t^A, respectively. As explained in the introduction, when facing a bank the individual's outside option is not necessarily autarky as she might anticipate adopting a contract in the future. In any period t, let the individual's outside option consumption stream and utility stream be denoted C_t^O and U_t^O, respectively. The outside option describes what the individual expects to consume if she does not sign an offered commitment contract in the current period.

How will a given utility stream be evaluated from the perspective of the individual at some time $q \leq t$? Let the discounted utility of a stream U_t from q's perspective be

$$V_q(U_t) \equiv V_q(U(C_t)) \equiv \begin{cases} u_t + \beta \sum\limits_{i=t+1}^{n} \delta^{i-t} u_i & \text{if } t = q \\ \beta \sum\limits_{i=t}^{n} \delta^{i+1-t} u_i & \text{if } t > q \end{cases} \tag{2}$$

Consider a bank that has access to funds at an interest rate r. A contract offered to the individual in period t involves a specified consumption level in each period starting in t, in exchange for which the bank retains the individual's autarky consumption. Let's define a contract signed in period q from t's perspective ($q \leq t$) as $C_t^{(q)}$ and corresponding utilities $U_t^{(q)}$.

The firm's profits from a contract C_t in period are given by

$$\Pi_t\left(C_t; C_t^A\right) \equiv \sum_{i=t}^{n} \left(\frac{1}{1+r}\right)^{i-1} \left(c_i^A - c_i\right) \tag{3}$$

Finally, for notational convenience, define $\frac{\delta}{1+r} \equiv \hat{\delta}$.

3 The model

3.1 The profit-maximization problem

I first describe the generic profit maximization problem faced by a monopolist bank that faces a consumer. The bank offers the consumer a consumption path in exchange for the consumer's autarky consumption. To induce the consumer to accept, she must be left at least as well off as she would be if she were to reject the contract. The bank solves the following:

$$\underset{C_t}{max}\ \Pi_t\left(C_t; C_t^A\right) \tag{4}$$

$$\text{s.t. } V_t\left(U_t\right) \geq V_t\left(U_t^O\right) \tag{5}$$

The constraint refers to the consumer's outside option, which is as yet unspecified.[7]

This yields the period t contract, denoted $C_t^{(t)}$, with the following properties:

$$u'\left(c_t^{(t)}\right) = \beta\hat{\delta}u'\left(c_{t+1}^{(t)}\right) = \beta\hat{\delta}^2u'\left(c_{t+2}^{(t)}\right) = ... = \beta\hat{\delta}^{n-t}u'\left(c_n^{(t)}\right) \tag{6}$$

$$V_t\left(U_t^{(t)}\right) = V_t\left(U_t^O\right) \tag{7}$$

Since there is a one-to-one correspondence between c and $u(c)$, from this point onwards it will generally be convenient to describe contracts directly in terms of instantaneous utilities. So, the bank's profit-maximizing contract can be denoted simply $U_t^{(t)}$.

3.2 Characterizing the outside option

We now turn to unpacking the consumer's outside option. Suppose the consumer receives an offer from a bank in period t. She observes that her outside option is not necessarily autarky; period $t+1$ might sign a contract. What contract would $t+1$ sign? That depends in part on $t+1$'s outside

[7]The bank always prefer to sell the consumer a contract today rather than in the next period.

option, which in turn depends on $t+2$'s choices. I use backward induction to construct t's outside option.

In period $n-1$, the individual would accept the contract denoted $U_{n-1}^{(n-1)}$. This contract has a straightforward property: if $u_{n-1}^{A'} > \beta\hat{\delta}u_n^{A'}$, the bank transfers consumption from n to $n-1$ (loan); and if $u_{n-1}^{A'} < \beta\hat{\delta}u_n^{A'}$, the bank transfers consumption from $n-1$ to n (savings).

This determines $n-2$'s outside option:

$$U_{n-2}^{O} = \left(u_{n-2}^{A}, u_{n-1}^{(n-1)}, u_{n}^{(n-1)}\right) \tag{8}$$

The outside option can be decomposed into two components: (a) $n-2$'s autarky utility stream (U_{n-2}^{A}), and (b) relative to autarky, the change in $n-2$'s utility stream resulting from $n-1$'s contract which was signed relative to $n-1$'s autarky (denoted $U_{n-2}^{A(\triangle_{n-1})}$):

$$U_{n-2}^{O} = U_{n-2}^{A} + U_{n-2}^{A(\triangle_{n-1})} \tag{9}$$

$$= U_{n-2}^{A} + \left(0, u_{n-1}^{(n-1)} - u_{n-1}^{A}, u_{n}^{(n-1)} - u_{n}^{A}\right) \tag{10}$$

Correspondingly, we can decompose $n-2$'s discounted utility associated with her outside option into the discounted utility in autarky ($V_{n-2}\left(U_{n-2}^{A}\right)$) and the change in discounted utility induced by $n-1$'s contract ($V_{n-2}\left(U_{n-2}^{A(\triangle_{n-1})}\right)$):

$$V_{n-2}\left(U_{n-2}^{O}\right) = V_{n-2}\left(U_{n-2}^{A}\right) + V_{n-2}\left(U_{n-2}^{A(\triangle_{n-1})}\right) \tag{11}$$

$$= \left[u_{n-2}^{A} + \beta\hat{\delta}u_{n-1}^{A} + \beta\hat{\delta^2}u_{n}^{A}\right] + \left[\beta\hat{\delta}\left(u_{n-1}^{(n-1)} - u_{n-1}^{A}\right) + \beta\hat{\delta^2}\left(u_{n}^{(n-1)} - u_{n}^{A}\right)\right] \tag{12}$$

So, if the consumer signs a contract in period $n-2$, does the contract make her better or worse off than in autarky? Clearly, this depends entirely on the sign of the second term above. This will be discussed below. But to see how the intuition of backward induction extends over additional periods, it will be useful to illustrate the effects of the above on $n-3$.

The consumer's outside option in $n-3$ depends on $n-2$'s contract,

$U_{n-2}^{(n-2)} = \left(u_{n-2}^{(n-2)}, u_{n-1}^{(n-2)}, u_n^{(n-2)}\right)$. This contract can also be decomposed into two components: (a) the contract that would have been signed had the outside option been autarky (denoted $U_{n-2}^{(n-2)(A)}$), and (b) the change in contract terms induced by the fact that $n-2$'s outside option was changed as a result of $n-1$'s anticipated contract (denoted $U_{n-2}^{(n-2)(\triangle_{n-1})}$):

$$\begin{aligned} U_{n-2}^{(n-2)} &= U_{n-2}^{(n-2)(A)} + \left[U_{n-2}^{(n-2)} - U_{n-2}^{(n-2)(A)}\right] && (13) \\ &= U_{n-2}^{(n-2)(A)} + U_{n-2}^{(n-2)(\triangle_{n-1})} && (14) \end{aligned}$$

We can now decompose the utility stream that constitutes $n-3$'s outside option:

$$\begin{aligned} U_{n-3}^{O} &= U_{n-3}^{A} + \left(0, u_{n-2}^{(n-2)} - u_{n-2}^{A}, u_{n-1}^{(n-2)} - u_{n-1}^{A}, u_n^{(n-2)} - u_n^{A}\right) && (15) \\ &= U_{n-3}^{A} + \left(0, u_{n-2}^{(n-2)(A)} - u_{n-2}^{A}, u_{n-1}^{(n-2)(A)} - u_{n-1}^{A}, u_n^{(n-2)(A)} - u_n^{A}\right) \\ &\quad + \left(0, u_{n-2}^{(n-2)(\triangle_{n-1})}, u_{n-1}^{(n-2)(\triangle_{n-1})}, u_n^{(n-2)(\triangle_{n-1})}\right) && (16) \\ &= U_{n-3}^{A} + U_{n-3}^{A\left(\triangle_{(n-2)}\right)} + U_{n-3}^{A\left(\triangle_{(n-1)}\right)} && (17) \end{aligned}$$

In period $n-3$, the consumer's outside option can be decomposed into three components: (a) her autarky utility; (b) the change to autarky utility that would result from the contract that $n-2$ would have signed if her outside option were autarky; and (c) the additional change to autarky utility that results from the change to $n-2$'s contract that is driven by $n-1$'s contract.

Finally, $n-3$'s corresponding change in the utility of her outside option is:

$$V_{n-3}\left(U_{n-3}^{O}\right) = V_{n-3}\left(U_{n-3}^{A}\right) + V_{n-3}\left(U_{n-3}^{A\left(\triangle_{(n-2)}\right)}\right) + V_{n-3}\left(U_{n-3}^{A\left(\triangle_{(n-1)}\right)}\right) \quad (18)$$

We now have a general formulation of the consumer's outside option in period t:

$$U_t^{O} = U_t^{A} + \sum_{i=t+1}^{n-1} U_t^{A(\triangle_i)} \quad (19)$$

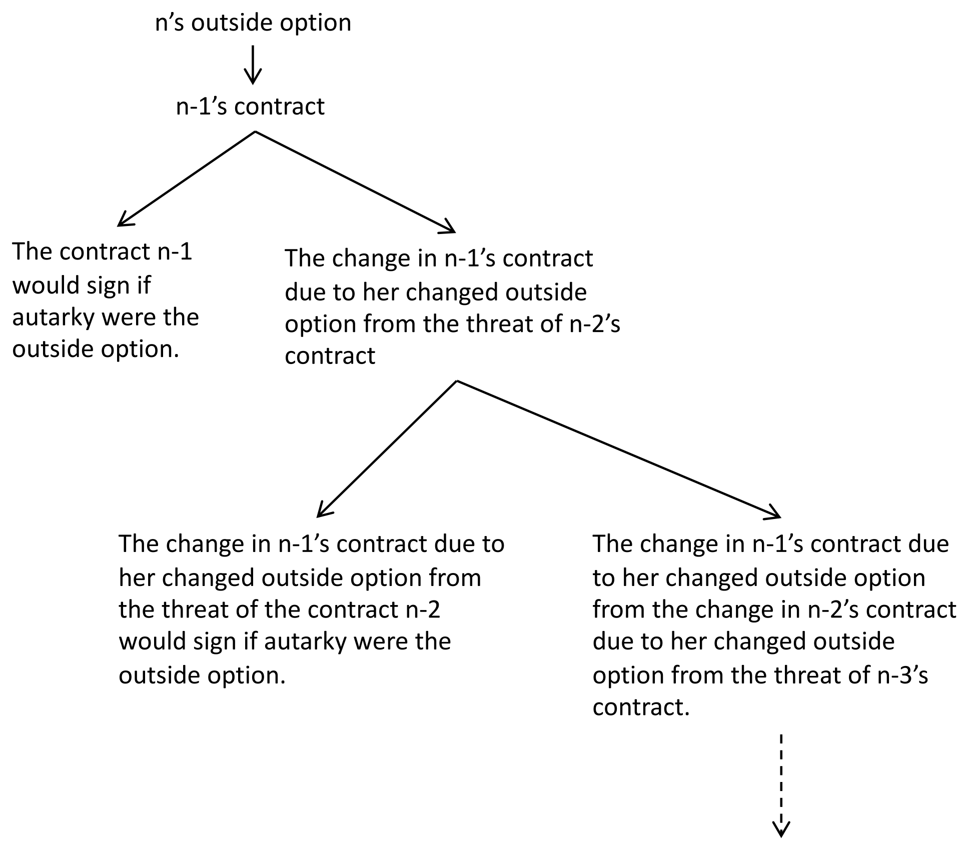

Figure 1: Decomposing the outside option

This formulation emerges out of a somewhat dense stream of interconnectedness, but is easily interpreted using Figure 1. Notice how the contracts are decomposed. So, any term $U_t^{A(\triangle_i)}$ represents the adjustment to t's autarky utility that is due to the adjustment in $t+1$'s contract that is due to the adjustment in $t+2$'s contract, and so on, that is due to the adjustment in $i-1$'s contract due to the contract that i would have signed relative to autarky.

3.3 Does commitment help the one who commits?

Does access to commitment offered by a monopolist help the consumer? In this subsection, I specifically discuss the impact of commitment on the individual from the perspective of the period in which the contract is signed. The answer to this question depends on the evolution of the outside option relative to the autarky option. I first show how a contract signed in period t affects period $t-1$'s utility.

Consider the contract that period t would sign if her outside option were autarky ($U_t^{t(A)}$). Suppose t's contract involves higher consumption in period t than under autarky. Then, this must have an adverse effect on $t-1$'s utility. The intuition is the following: From period t's perspective, the contract leaves her exactly as well off as in autarky. But this contract delivers an increase in period t utility and a reduction in future utility. From the perspective of $t-1$, the reduction in future utility cannot be offset by the gain in t's instantaneous utility, because $t-1$ places relatively greater weight on periods beyond t than t does. This is illustrated in Figure 2.

Now, observe that if this makes $t-1$ worse off, it results in a reduced outside option discounted utility for $t-1$, which functions like an income effect: as a result of this, the contract offered to her would involve lower levels of consumption in all periods relative to the contract based on her autarky utility. This has an adverse effect on $t-2$, $t-3$, and so on. Lemma 1 summarizes.

Lemma 1. $V\left(U_t^{A(\triangle_i)}\right) < 0$ *if and only if* $\hat{u}_i^{(i)(A)} > u_i^A$.

Proof. A simple inequality shows that $U_{i-1}^{A(\triangle_i)} < 0$ iff $\hat{u}_i^{(i)(A)} > u_i^A$. Now, $U_{i-1}^{A(\triangle_i)} < 0 \Rightarrow V\left(U_{i-1}^{A(\triangle_i)}\right) < 0 \iff U_{i-1}^{(i-1)(\triangle_i)} < 0 \Rightarrow U_{i-2}^{A(\triangle_i)} < 0$. The identical argument can be repeated for future periods.. □

Lemma 1 allows us to quickly establish sufficient conditions under which access to commitment will strictly hurt the discounted utility of the individual signing the contract, in period 1. Each adjusted component of period 1's autarky utility will be negative as long as $\hat{u}_i^{(i)(A)} > u_i^A$ for each $i > 1$. For this to happen, autarky instantaneous utility in each period t must be

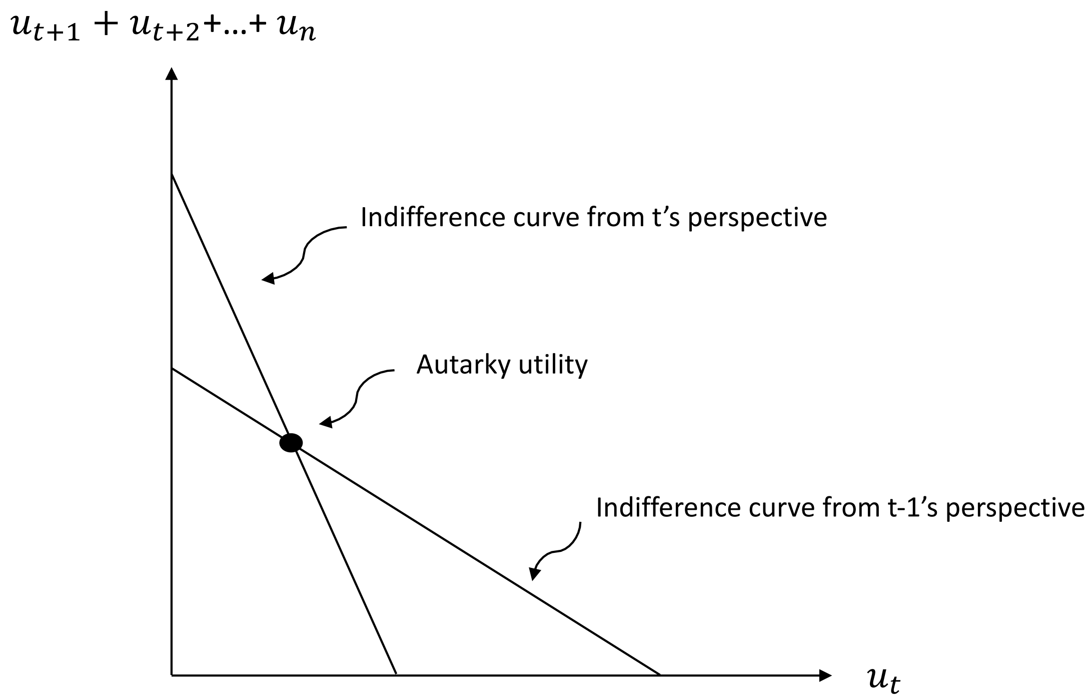

Figure 2: t-1's indifference curve is more vertical than t's indifference curve. Any contract that moves right along t's indifference curve must place t-1 on a lower indifference curve. Any contract that moves left along t's indifference curve must place t-1 on a higher indifference curve.

'sufficiently' small relative to periods $t+1$ and above. In other words, each period must have a borrowing motive. It is easy to see that this is satisfied if $u_i^{A'} \geq \hat{\delta} u_{i+1}^{A'}$, for all $i > 1$.

A similar argument can be made for the opposite. If autarky instantaneous utility in in each period is sufficiently large relative to future periods, then commitment will improve period 1's discounted utility relative to autarky. Here, we need a savings motive in each period, which emerges if $u_i^{A'} \leq \beta\hat{\delta} u_{i+1}^{A'}$, for all $i > 1$. This is summarized in Proposition 1.

Proposition 1. *(a) Commitment will make the period 1 consumer strictly worse off than in autarky if and only if* $\sum_{i=t+1}^{n-1} U_t^{A(\triangle_i)} < 0$. *This condition is satisfied if autarky utility is sufficiently increasing over time (*$u_i^{A'} \geq \hat{\delta} u_{i+1}^{A'}$*, for all* $i > 1$*).*

(c) Commitment will make the period 1 consumer strictly better off than in autarky if and only if $\sum_{i=t+1}^{n-1} U_t^{A(\triangle_i)} > 0$. *This condition is satisfied if autarky utility is sufficiently decreasing over time (*$u_i^{A'} \leq \beta\hat{\delta} u_{i+1}^{A'}$*, for all* $i > 1$*).*

Two aspects of this proposition merit comment. First, it highlights a fundamental difference between borrowing and savings motives. Two individuals with identical autarky utilities will fare very differently under commitment if one intends to borrow while the other intends to save (for implications of this argument, it is useful to refer to Banerjee & Duflo (2011)). People born with endowments can expect to do better under commitment, while those expecting later spikes in income do worse. Second, under any autarky path involving close to steady consumption, monopoly commitment unambiguously lowers period 1's discounted utility.

3.4 The welfare effects of commitment

Since under hyperbolic discounting the individual's preferences change over time, there is a natural question about how the individual's welfare is evaluated. One common approach involves simply using period 1's discounted utility as a measure of her welfare. Another involves using the discounted utility of a hypothetical 'period 0'–the perspective of someone before the individual is born. But each of these approaches has a problem of privileging particular 'selves' over others. One way around this is to think in terms of Pareto improvements or worsenings. In this subsection, I derive conditions under which commitment raises/lowers the discounted utility of the consumer from *each* period's perspective.

When will everyone be made worse off by monopoly commitment? First, period 1 should be made worse off, as described in Proposition 1. Second, for periods 2 to n, autarky consumption in each period must be high enough relative to all others that period 1's contract makes them worse off. When will these two conditions be simultaneously satisfied?

For period n, this is easily achieved–the higher period n consumption is in autarky, the more likely that both conditions are satisfied. But for intermediate periods, higher consumption makes it more likely they will be worse off than in autarky, but less likely that they will contribute negatively to period 1's outside option. Let's formalize (all else equal, what is the effect on the contract relative to autarky):

- As u_1^A gets smaller, periods 2 to n are hurt because period 1's contract will divert consumption away from the future and into period 1.
- As u_n^A gets bigger, all periods are hurt by commitment. A larger u_n^A means $V_{n-2}\left(U_{n-2}^{A(\triangle_{n-1})}\right)$ will be smaller (period $n-1$ will tilt consumption in a way that hurts $n-2$).[8] Repeating this step, we see that a rise in u_n^A hurts period 1's outside option, and therefore indirectly hurts all periods.
- Consider an intermediate period, for example $n-1$. If u_{n-1}^A gets bigger, this is good for all periods because of the improved outside option for period 1 through the adjustment of period $n-1$'s contract. On the other hand, this is bad for all periods because of the worsened outside option through $n-2$'s contract, $n-3$'s contract, etc. And finally, it is

[8]Suppose u_n^A goes up. U_{n-2}^A goes up by $\beta\hat{\delta}^2(1)$. Then U_{n-2}^O goes up by less than 1.

also bad for period $n-1$ because in any contract signed by period 1, it is more likely that period $n-1$'s consumption will be lowered relative to autarky.

The above itemization shows the multiple channels through which autarky streams affect the commitment contract, which in turn affects discounted utilities. However, these can be quite easily collapsed into the sufficient conditions that are summarized in Proposition 2. For commitment to make everyone worse off, period 1's outside option must be worsened, and each u_i^A must be sufficiently large. For commitment to make everyone better off, period 1's outside option must be improved and each u_i^A must be sufficiently small.

Proposition 2. *(a) Commitment lowers the discounted utility of the individual in each period if* $u_1^{A'} \geq \beta\hat{\delta}u_2^{A'} \geq \beta\hat{\delta}^2 u_3^{A'} \geq ... \geq \beta\hat{\delta}^{n-1}u_n^{A'}$

(b) Commitment raises the discounted utility of the individual in each period if $u_1^{A'} \leq \beta\hat{\delta}u_2^{A'} \leq \beta\hat{\delta}^2 u_3^{A'} ... \leq \beta\hat{\delta}^{n-1}u_n^{A'}$.

Proof. (a) Based on Proposition 1, the second to nth inequalities ensure that commitment will hurt period 1. The inequalities comparing u_1^A to each future period ensure that under period 1's contract each period from 2 to n will consume less than in autarky (despite any potentially beneficial rearranging across periods). (b) The same argument can be applied. □

Each statement of the above proposition deserves emphasis. First, statement (a) shows that under quite common autarky consumption streams (including approximately steady consumption), access to commitment hurts the individual regardless of which time perspective is used. Second, statement (b) shows that again under reasonable autarky streams (with savings motives), commitment helps the individual from every perspective. In this case, not only is the monopolist unable to extract all surplus from period 1, the commitment contract helps every future self that is being committed.

4 Extensions and conclusion

This paper focuses on the effects of commitment through modifications of the consumer's outside option. By setting aside other considerations, I show how threats of future contracts inform current contracts and through this, affect consumer utility.

Section 3 establishes some key results that also suggest several directions for extension. First, the analysis could be extended to other market structures, including competition or nonprofit banks. In these cases, results similar to the ones above can be established if there is a fixed cost of service provision. Second, it would be instructive to separate the commitment aspect of banking contracts from the traditional borrowing/saving aspects, as these could have distinct effects on consumer utility. This will also allow an analysis of the effects of differing degrees of commitment. Third, the time horizon clearly matters. As n gets larger, the positive or negative effects of accumulated outside options get accentuated. This in turn could generate policy prescriptions for the provision of commitment. And fourth, in the above analysis I have assumed that if an individual were to reject a contract, she is entirely at the mercy of her future selves and the contracts they might sign with the bank. But in reality, it is likely that in the event of rejecting a contract, the individual could also engage in some adjustments to consumption through informal banking means, as a way to exert some influence on future contracts. To make this point more formally: an individual's consumption/informal banking choices in period t could depend to some extent on whether she anticipates remaining in autarky in the future or anticipates signing a commitment contract. These choices will be determined by the consumer's beliefs about the likelihood of future commitment access. These are the subjects of continuing investigation.

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