Commitment and Welfare

Frank N. Caliendo and T. Scott Findley
Utah State University

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★ Our finding: Pareto rationale for standard approach if the number of selves (decision nodes) *exceeds* a threshold.

Threshold can be very small (as small as 3 selves).

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- But again, we show: all selves benefit from commitment if #selves > threshold.

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—Equilibrium allocation far from what any one self wants.

★ When all selves are very unhappy in equilibrium, the door is open for a Pareto improvement (even if they disagree on the ideal allocation).

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- These examples span a range of settings in which DI preferences are considered.
- Results go through in both settings.

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- Following the terminology of Bernheim and Rangel (2009), an allocation $\mathbf{c}' \in S$ **multiself Pareto dominates** another allocation $\mathbf{c}'' \in S$ if and only if

$$U(t, \mathbf{c}') > U(t, \mathbf{c}'') \text{ for all } t \in [0, T].$$

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- **Point of our paper**: understand the conditions under which $\mathbf{c^0}$ multiself Pareto dominates $\mathbf{c}^*$.

Part I: Eating Fruit from a Tree

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- Tree dies and no consumption takes place beyond T.
- We call T the number of decision nodes.

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• The lifetime utility of the individual at age t is

$$U(t, \mathbf{c}) = \begin{cases} \beta \sum_{s=1}^{T} c_s & t = 0 \\ \gamma \sum_{s=1}^{t-1} c_s + c_t + \beta \sum_{s=t+1}^{T} c_s & t \in [1, T] \end{cases}$$

Three Allocations

$$\begin{aligned} \mathbf{c^0} &= (0, c^+, ..., c^+) \\ \mathbf{c}^* &= (c^-, ..., c^-, 0) \\ \mathbf{c^1} &= (c^-, 0, c^+, ..., c^+). \end{aligned}$$

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Examples

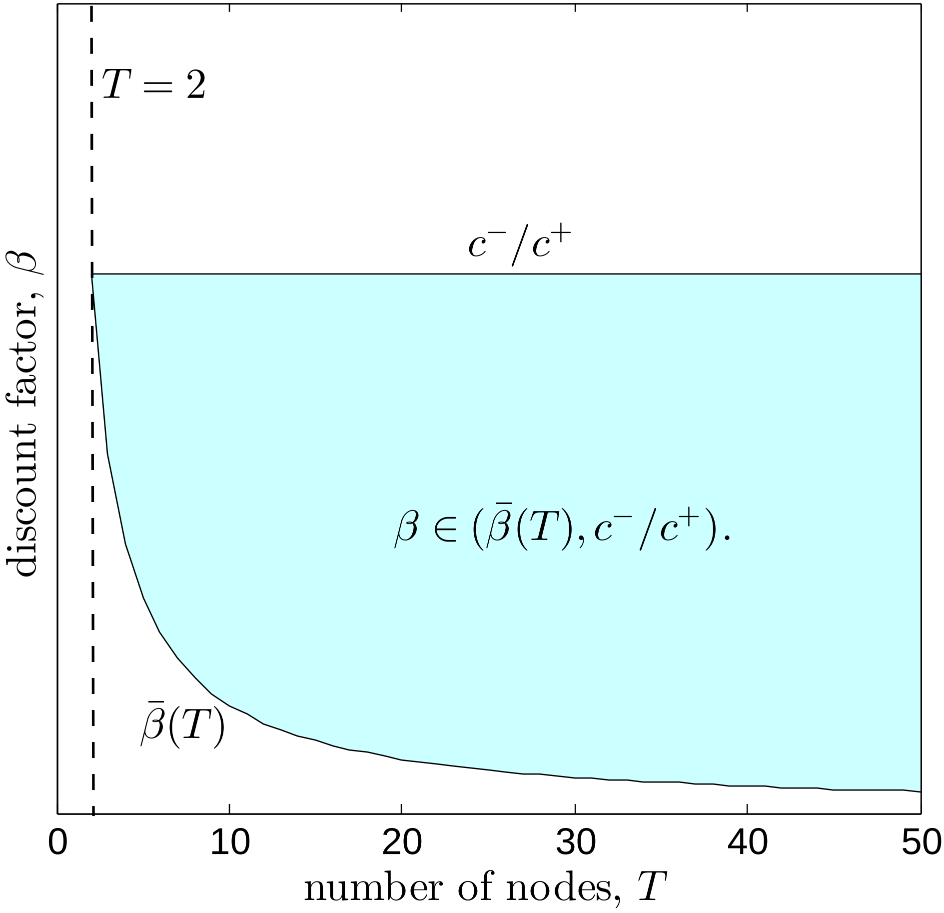
- $c^+/c^- = 2$ and $\beta = 0.4 \implies$ all selves eat unripe fruit in equilibrium.

- If $T = 2$, commitment doesn't make everyone happy.

- If $T > 2$, then all selves like commitment over equilibrium (for any γ).

- Note the surprise: adding more selves (more conflicting points of view) makes commitment a Pareto move!

Figure 1. Parameter Space where $U(t, \mathbf{c^0}) > U(t, \mathbf{c}^*)$ for all t



Note: $U(t, \mathbf{c^0}) > U(t, \mathbf{c}^*)$ for all t, if $\beta \in (\bar{\beta}(T), c^-/c^+)$.

Figure 2. 3 Allocations and 2 Decision Nodes ($T = 2$)

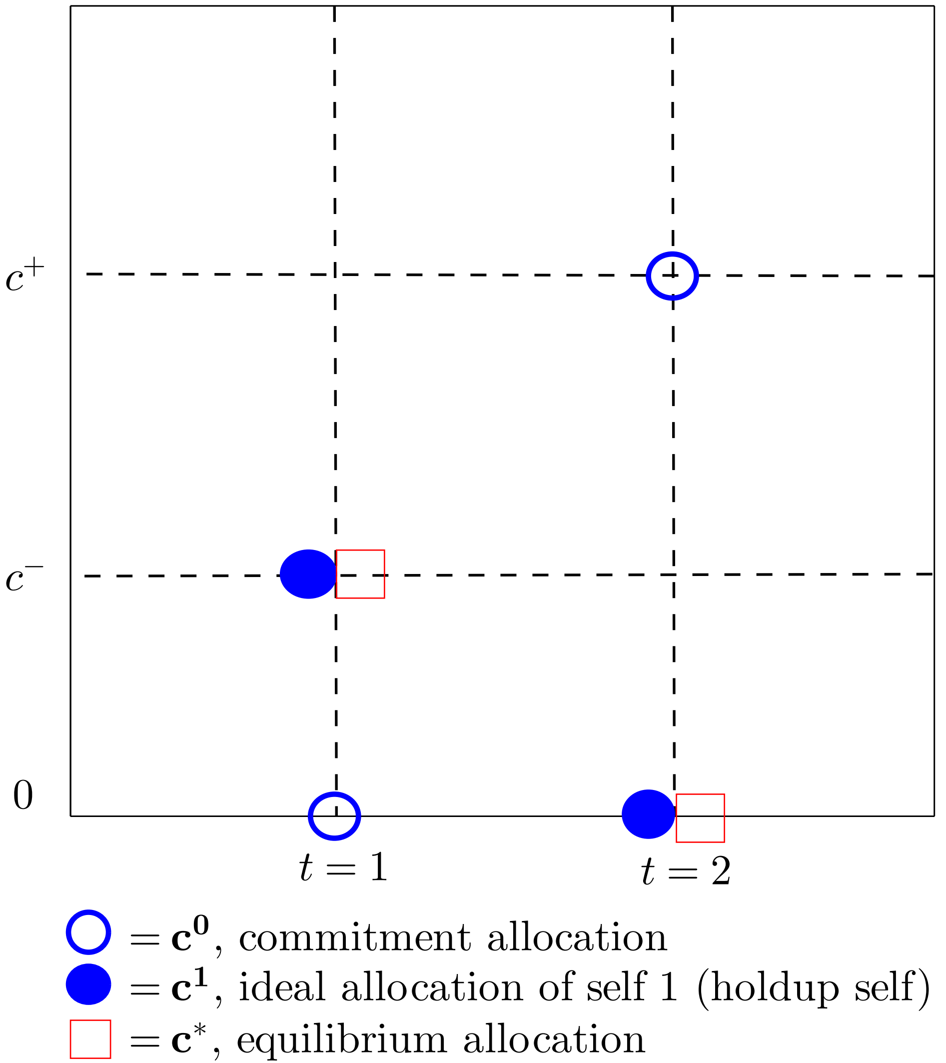
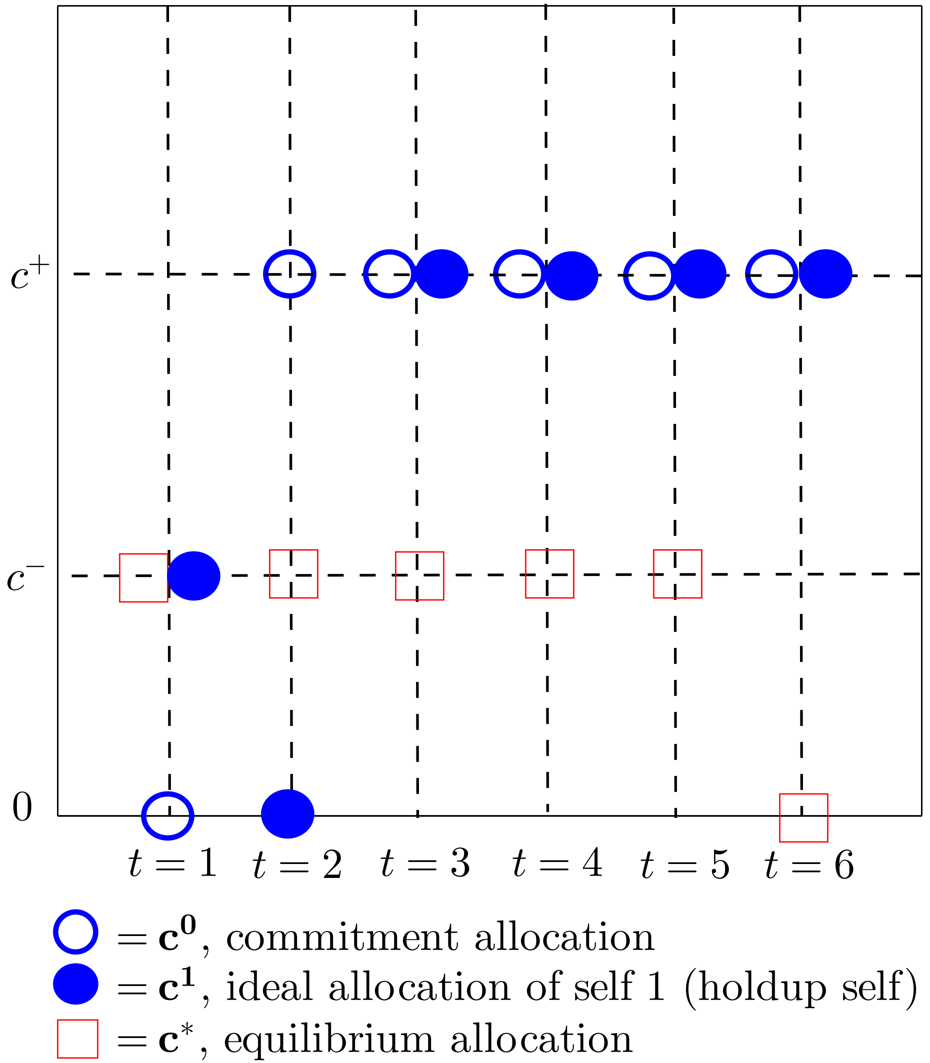


Figure 3. 3 Allocations and 6 Decision Nodes ($T = 6$)



Part II: Eating a Cake

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- T decision nodes or opportunities to eat from the cake.
- Cake doesn't spoil or grow.

Self 0 would like his future selves to obey

$$\max : \sum_{t=1}^{T} F(t) \ln c_t, \quad \text{s.t. } \sum_{t=1}^{T} c_t = C,$$

which has the following solution (commitment allocation)

$$c_t = \frac{CF(t)}{\sum_{s=1}^{T} F(s)}, \text{ for all } t > 0.$$

However, equilibrium allocation satisfies the following recursion

$$c_{t+1} = c_t \left(\frac{\sum_{s=1}^{T-t} F(s)}{1 + \sum_{s=1}^{T-t-1} F(s)} \right) < c_t.$$

Table 1. $U(t, \mathbf{c^0}) > U(t, \mathbf{c}^*)$ for all t iff:

	$\beta = 0.2$	$\beta = 0.4$	$\beta = 0.6$	$\beta = 0.8$
$\gamma = 1$	$T \geq 9$	$T \geq 8$	$T \geq 8$	$T \geq 8$
$\gamma = \beta$	$T \geq 6$	$T \geq 5$	$T \geq 4$	$T \geq 4$
$\gamma = 0$	$T \geq 6$	$T \geq 5$	$T \geq 4$	$T \geq 4$

β is the forward disc. factor, γ is the backward disc. factor.

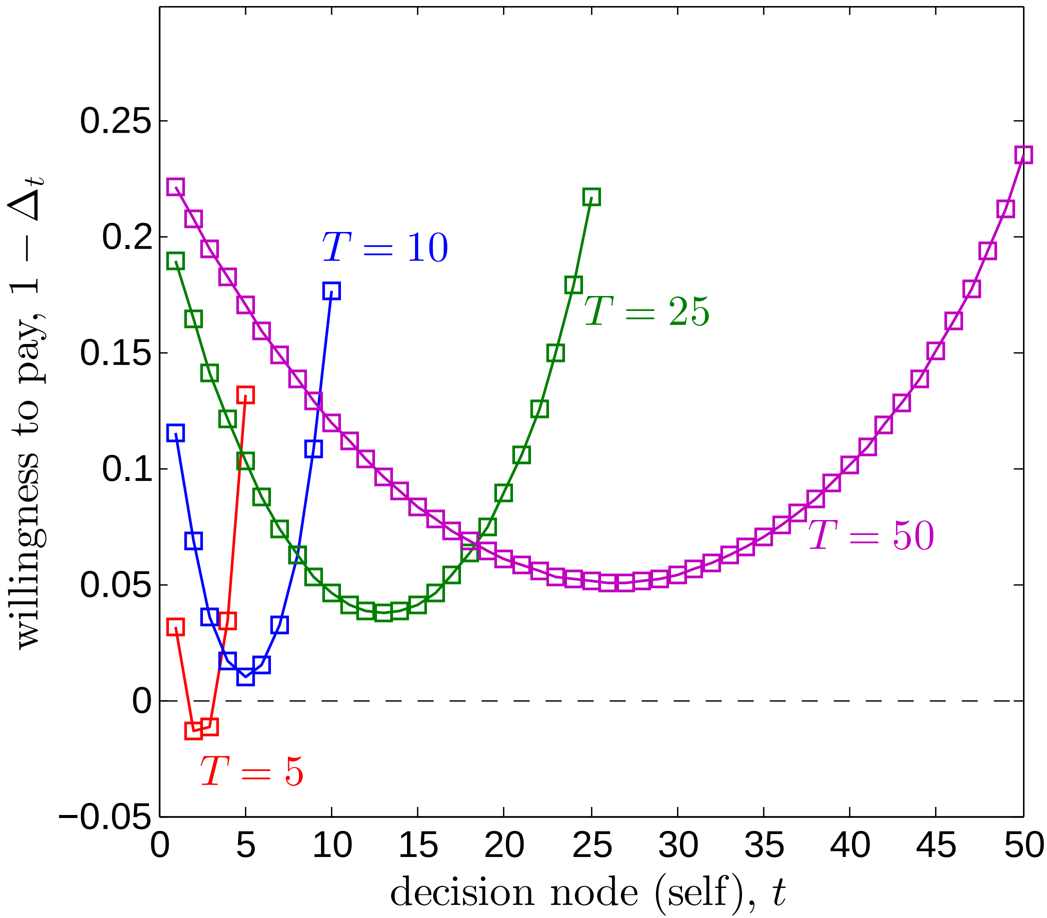
How big are the gains from commitment?

Define Δ_t as the solution to

$$U(t, \mathbf{c}^{\mathbf{0}}(C\Delta_t)) = U(t, \mathbf{c}^*(C)).$$

The function $1 - \Delta_t$ is the fraction of cake self t would give up to commit to $\mathbf{c}^{\mathbf{0}}(C\Delta_t)$.

Figure 4. Willingness to Pay for Commitment: The Case of $\beta = 0.5$, $\gamma = 1$



Note: $1 - \Delta_t$ is the fraction of cake self t would give up; β and γ are the forward and backward discount factors.

Figure 5. Willingness to Pay for Commitment: The Case of $\beta = \gamma = 0.5$

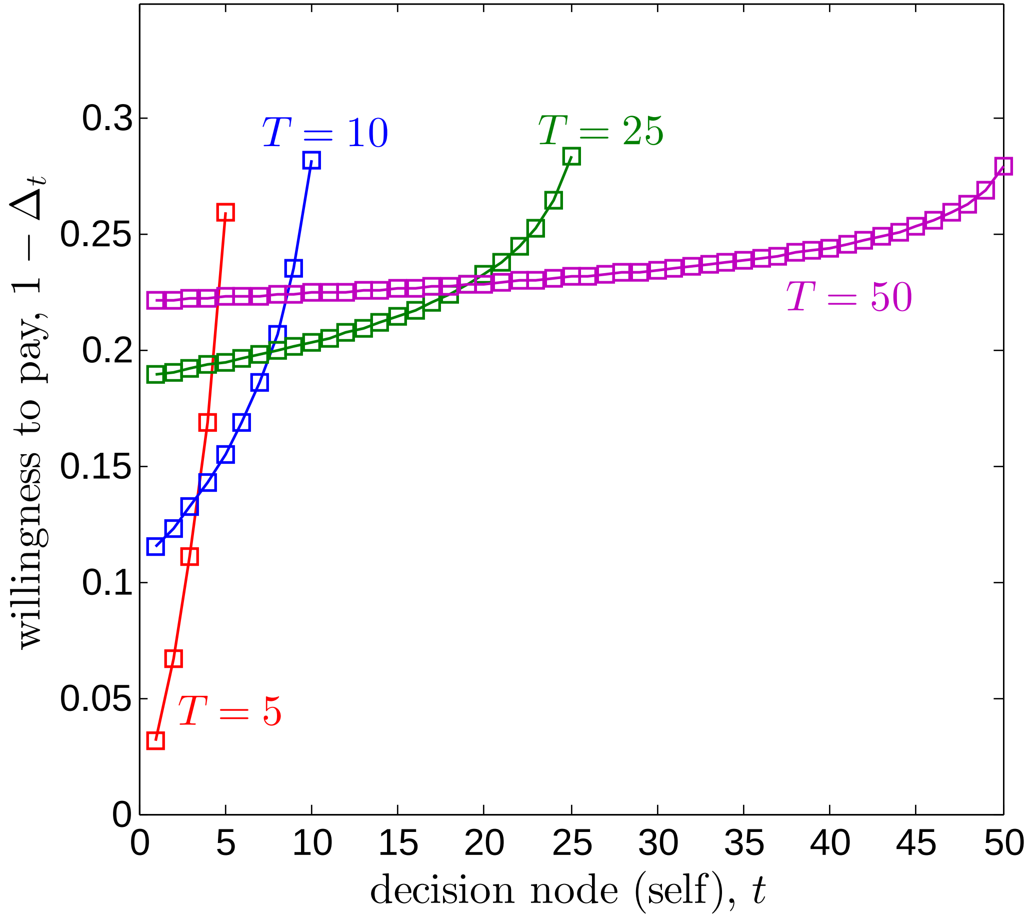


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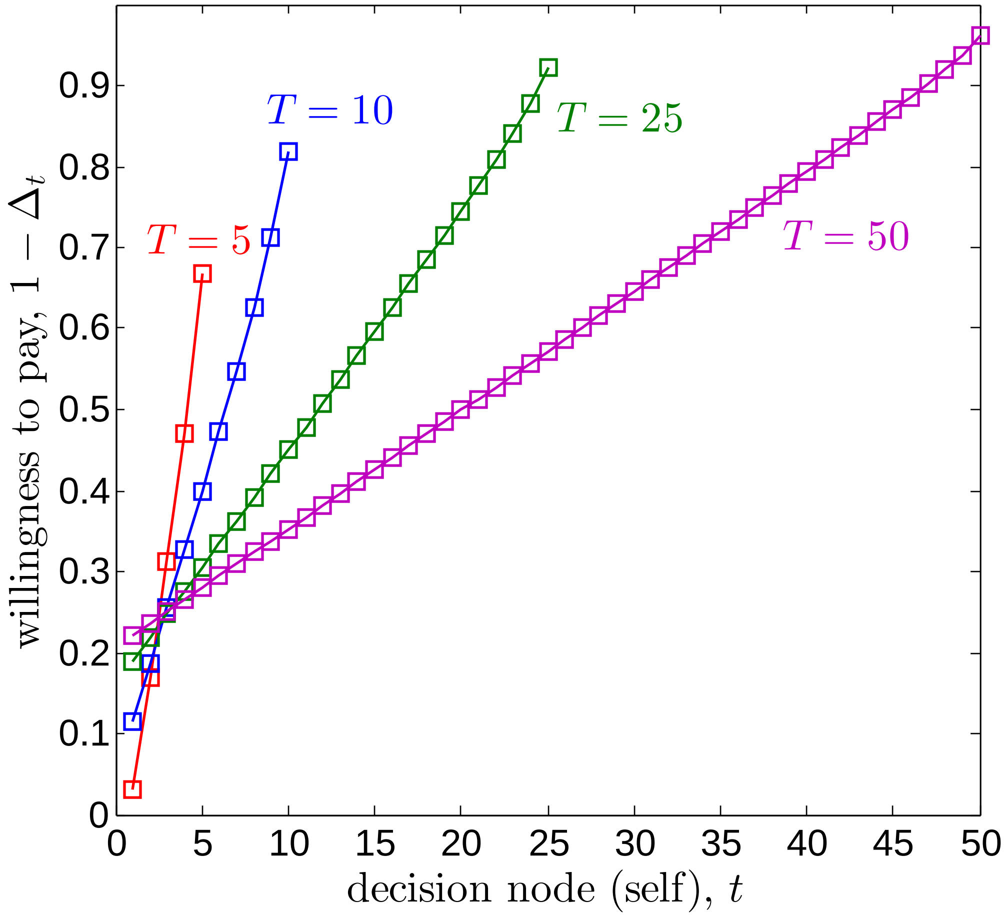
Figure 6. Willingness to Pay for Commitment: The Case of $\beta = 0.5$, $\gamma = 0$



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What's new in our paper?

★ We uncover the fundamental connection between the number of decision nodes and the appropriateness of the time-zero welfare criterion.

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- But just because selves disagree on the *ideal* doesn't mean they can't all agree on *something*.

- Our point: as the # of decision nodes (intra-temporal selves) increases, it becomes easier to reach the unanimous agreement that commitment beats the equilibrium.

- In some cases, as few as 3 nodes will do the trick.

Thank You!