

# Revising Commitments: Field Experimental Evidence on Determinants of Intertemporal Plan Revision\*

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October 18, 2011

## Abstract

Failures to carry out intertemporal plans can have important welfare consequences. We shed light on the determinants of intertemporal plan revision via a lab-in-the-field experiment in rural Malawi with large real stakes. We make two key contributions. First, we construct a new dependent variable: later revisions of a sequence of future money disbursements (that respondents had initially decided upon several weeks before). This allows us to *directly* examine intertemporal plan revision and its determinants, and makes possible new evidence for the existence of self-control problems: revisions of money allocations toward the present are positively associated with measures of present-bias from an earlier baseline survey, as well as the (explicitly randomized) closeness in time to the first possible date of money disbursement. Second, we investigate other potential determinants of revision, aside from self-control problems. Revisions of money allocations toward the present are positively associated with spousal preferences for such revision, but not with household shocks or the financial sophistication of respondents.

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\*Niall Keleher, of Innovations for Poverty Action, was instrumental to the design and implementation of this study. We thank him for his important contributions to this project. We also thank James Andreoni, Stefano DellaVigna, Yoram Halevy, Glenn Harrison, Pam Jakiela, Damon Jones, David I. Levine, Stephan Meier, Ted Miguel, Matthew Rabin, and participants in several seminars for their many helpful comments. We thank Lasse Brune, Jason Kerwin, and Prachi Jain for excellent research assistance.

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# 1 Introduction

Intertemporal tradeoffs are central to many economic decisions. As a result, plans about choice over time are critical to well-being, perhaps especially so in developing countries. For example, investment plans for small business capital, agricultural inputs, education, and health are often key to economic well-being in low-income countries. Similarly, plans to smooth consumption over time, such as farm households spreading intermittent harvest income, are often critical to welfare in poor areas.

There is much evidence that individuals in developing countries do not allocate resources intertemporally in ways that are likely to be welfare improving. For example, in Malawi, a large share of smallholder farmers fails to use sufficient amounts of fertilizer, probably one of the highest-return agricultural investments available to them. Among Malawian farmers in our study, current levels of fertilizer use imply that 94.2% apply less than the recommended amount of nitrogen on maize (the country's main subsistence crop), with 21.1% applying no nitrogen at all.<sup>1</sup> Malawian farmers also fail to achieve smooth consumption over the course of the agricultural cycle, typically experiencing substantial seasonality in their caloric consumption. In the months during and after the annual harvest in May and June, consumption can be roughly a fifth higher than in the lean or "hungry" months preceding the harvest (World Bank 2006).

While there may be many possible reasons behind low investment or low consumption smoothing in developing countries, much attention has been focused on self-control problems that limit individuals' abilities to make or carry out welfare-improving intertemporal plans. Some part of the low fertilizer use in Malawi may in fact be due to failure to carry out plans. We asked farmers in November 2009 how much fertilizer they planned to use in the coming (December through May) planting season, at which point 85% of farmers planned to use some nonzero amount. Then, 8 months later, we asked them how much they actually used during that season. Among farmers who planned to use some fertilizer, 51% reported using less than the full amount they planned to use, with about 40% reporting that their actual use was at or below 50% of their planned use, and 14% reporting using no fertilizer at all.

In this paper, we ask: why don't people follow through on plans made in advance? Put differently: when people make future plans, what explains why they revise those plans later? We make two contributions. First, we test for the existence of self-control problems using a novel approach. Second, we investigate other potential determinants of intertemporal plan revision (aside

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<sup>1</sup>Authors' calculations from 2009 socioeconomic survey of the study sample. For phosphorus pentoxide (P<sub>2</sub>O<sub>5</sub>), the other key nutrient for maize farming, 83.5% use less than recommended and 52.4% use none at all. Recommended levels for our central Malawi study area are 37.2 kg of nitrogen and 8.5 kg of P<sub>2</sub>O<sub>5</sub> per acre (Benson 1999.)

from self-control problems).

The current literature gives substantial attention to present-biased time preferences as an explanation for failures to carry out intertemporal plans. The long-standing interest in intertemporal choice has, in recent years, been further fueled by evidence of non-constant time discounting and a better understanding of its theoretical consequences. Several studies, drawing mostly on experimental data, can be interpreted to show that time discount rates decline as tradeoffs are pushed into the temporal distance.<sup>2</sup> Specifically, many of these studies document dynamic preference reversals: under commitment, subjects choose the larger and later of two rewards when both are distant in time, but prefer the smaller and earlier one as both rewards draw nearer to the present.

Interpreted as non-constant time discounting, these preference reversals have important implications. When utility is time-separable, non-constant time discounting implies time-inconsistency; the choices (plans) that a person makes now about consumption at a later date are different from the choices she would make when that date arrives. Self-control problems and a demand for commitment (for individuals who are not fully naïve) thus emerge. If plans set at some earlier point will not be followed, then sophisticated decision-makers will want to limit their own ability to revise decisions about the future. The important consequences of this time-inconsistency and its associated self-control problems have generated a great deal of interest. They have now been studied, with both theoretical and empirical methods, in many different contexts.<sup>3</sup> Evidence for the existence of present-biased time preferences has also been provided by field experimental studies such as Ashraf, Karlan, and Yin (2006), who find that women in the Philippines whose survey responses indicate present-bias have higher demand for a commitment savings device.<sup>4</sup>

This paper aims to fill key gaps in the current literature. First and foremost, there is currently no direct evidence that present-biased preferences are associated with failure to carry out future plans: there has been no previous examination of “revision of previous decisions” as the key dependent variable of interest. Rather, previous work has examined demand for commitment devices. Demand for commitment is useful to examine and potentially revealing of the existence of present-biased preferences, but for two reasons such analyses are likely to understate self-control problems. First, demand for commitment requires some degree of sophistication on the part of respondents: individuals who are fully naïve about their self-control problems should not exhibit

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<sup>2</sup>See Ainslie (1992), Thaler (1991) and several papers in Loewenstein and Elster (1992), for reviews of this evidence.

<sup>3</sup>Early contributions include Phelps and Pollak (1968), Laibson (1997) and O’Donoghue and Rabin (1999). See DellaVigna (2009) for a recent review of empirical applications.

<sup>4</sup>Ashraf, Karlan, and Yin (2006) do not find this result holds for men. Similarly, Brune, Giné, Goldberg, and Yang (2011) do not find a relationship between hyperbolic preference measures and demand for a commitment savings device among male tobacco farmers in Malawi.