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Is there a daily discount rate? Evidence from the food stamp nutrition cycle

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Abstract

Quasi-hyperbolic discounting predicts impatience over short-run tradeoffs. I present a direct non-laboratory test of this implication using data on the nutritional intake of food stamp recipients. Caloric intake declines by 10 to 15 percent over the food stamp month, implying a significant preference for immediate consumption. These findings constitute a rejection of the permanent income hypothesis and are extremely difficult to reconcile with exponential discounting. The data support an explanation based on time preference and reject several alternative explanations, including highly elastic intertemporal substitution. I explore implications for the optimal timing of transfer payments under alternative assumptions about preferences.

JEL classification: D91; E21; I38
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1. Introduction

Consider a consumer who discounts tomorrow's utility by a factor of 0.996. Such an individual has a daily discount factor of 0.996, and if she is an exponential discounter her annual discount *factor* will be about 0.23 (corresponding to an annual discount *rate* of about 146 percent). She would, therefore, discount utility 5 years from now by a factor of 0.0007.

As these calculations illustrate, an exponential discounter who is reasonably patient in the long-run must be almost perfectly patient in the short-run. Even small amounts of daily

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discounting translate into enormous amounts of annual discounting in the exponential model. By contrast, the quasi-hyperbolic model of discounting (Laibson, 1997) severs the link between short- and long-run time preference, and predicts significant present-bias even in short-run trade-offs.

In this paper, I test for the presence of short-run impatience using data on the caloric intake of food stamp recipients. I find that the average caloric intake of members of recipient households declines by 10 to 15 percent over the food stamp month. A calibration exercise shows that, to be resolved with exponential discounting, these facts require an annual discount factor of about 0.23 or an extremely high elasticity of intertemporal substitution. Survey evidence on household financial circumstances reveals rising desperation over the course of the food stamp month, which suggests that a high elasticity of intertemporal substitution is not a likely explanation. Additionally, estimates of the responsiveness of caloric intake to food prices show elasticities far too small to resolve the observed consumption patterns with sensible exponential discount rates. Finally, households with more short-run impatience (as estimated from hypothetical intertemporal choices) are more likely to run out of food sometime during the month, consistent with an explanation based on time preference.

The data can reject a number of alternative hypotheses. Households that shop for food more frequently do not display a smaller decline in intake over the month, casting doubt on explanations based on the depreciation of the household's food stock. Individuals in single-person households experience no less of a decline in caloric intake over the month than individuals in multi-person households, indicating that competition for resources within the household is not a likely explanation for my findings. Survey respondents are not more likely to eat in another person's home toward the end of the month, suggesting that resource transfers between households are not driving the consumption cycle. Extramarginal households for whom food stamps cover the entire monthly food budget do not experience a significantly smaller nutrition cycle, casting doubt on the view that the cycle results from households' confusion about the value of their food stamps. Finally, the data show no evidence of learning over time, which seems difficult to resolve with explanations based on over-optimism about how long food stamps will last.

This paper makes several contributions. First, my findings constitute direct field evidence for short-run impatience. While quasi-hyperbolic discounting has been applied to a wide range of economic issues (see, e.g., Angeletos et al., 2001; Cutler et al., 2003; Gruber and Koszegi, 2001; O'Donoghue and Rabin, 2001), evidence on short-run discounting has derived mainly from the laboratory (Frederick et al., 2002)[1]. Having reliable, real-world values for short-run time preference parameters is essential to conducting simulations of savings policy experiments (Laibson et al., 1998). Although food stamp recipients may have different intertemporal preferences from the overall population, they constitute an important group for policy analysis and one for which short-run impatience may be especially relevant.

[1] Exceptions include DellaVigna and Paserman (2001), DellaVigna and Malmendier (2002), Laibson et al. (2003a,b), which infer hyperbolic preferences from job search behavior, health club plan choice, and life cycle consumption and savings facts, respectively.