

When Are Cash Transfers Transformative?

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Abstract: Cash transfers have emerged over the last two decades as a widespread and highly researched poverty interventions. The use of cash transfers to create a Basic Minimum Income (BMI) now constitutes an important policy debate. Extensive research has been carried out on the impact of both conditional and unconditional cash transfers. Some evidence finds that cash transfers lead to long-term, transformative effects on economic well-being, while in other contexts, the effects appear to be limited to short-term consumption increases. This paper reviews the literature on the impacts of cash transfers. It then presents a simple model that seeks to understand when we can expect cash transfers to have transformative effects in which the income of recipients transitions to a significantly and sustainably higher level. Behavioral extensions to the model show how responses to cash transfers may change when we account for endogenous discount rates, cognitive ability, and aspirations.

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“In India, apart from its anti-poverty potential, (a basic minimum income) can be a substantial measure to improve autonomy and dignity by giving workers an escape ladder from socially despised occupations.” –Pranab Bardhan, *Times of India*, May 3, 2017.

1. Introduction

Perhaps unknown at the time, the 1997 introduction of Mexico’s *Progresa* cash transfer program became a watershed moment for both economic development and development economics. *Progresa* began cash transfers to low-income Mexican households conditional upon children’s enrollment in school, regular check-ups at health clinics, and attending nutritional education meetings. During the early phase-in of *Progresa* in 1998, the government randomly chose 320 treated villages while 185 acted as controls that were phased in two years later, greatly facilitating the early identification of large treatment effects on education (Schultz, 2004) and health (Gertler, 2004).¹

The demonstrated impacts of *Progresa* on the well-being of the poor inspired its sweeping replication across Latin America.² In 2002 alone, Colombia initiated the conditional cash transfer (CCT) program *Familias en Acción*, Chile introduced *Chile Solidario*, and Brazilian President Fernando Henrique Cardoso scaled up *Bolsa Escola*, previously introduced only in Brasília by governor Cristovam Buarque, to create the largest CCT program today, *Bolsa Família*. Recent data identify 63 countries with CCT programs (Honorati et al. 2015), as well as 130 low- and middle-income countries that have now implemented unconditional cash transfer (UCT) programs, in which cash is transferred to eligible segments of the population without conditions upon behaviors (Bastagli et al., 2016). The rapid spread of cash transfer programs has helped spur the argument for a basic minimum income (BMI) (sometimes called universal basic income or UBI) that would provide a minimum cash grant to all citizens of a country.

Accompanying the rapid spread of cash transfer programs has been an extensive empirical literature seeking to ascertain the impacts of CCT and UCT programs on poverty alleviation more generally, and in specific domains such as education, health, and labor activity. But with the movement of development economics toward empirical research, a theoretical framework for understanding the impacts of cash transfers is not as well developed as its empirical counterpart. While reduced-form causal econometrics excels at identifying net effects of cash transfers, it is

¹ A comprehensive review of the benefits of the program and its impacts is Parker and Todd (2017).

² As a national-level conditional cash transfer program (CCT), *Progresa* was preceded only by the 1994 introduction of the Female Secondary School Assistance Project in Pakistan.

less helpful at helping policymakers to understand why cash transfers, varying in type and context, exhibit heterogeneous effects on recipient behavior.

This has made it more difficult to assess some of the controversies related to cash transfers, such as questions over whether they disincentivize work, foster consumption at the expense of savings, and lead to increase increases in expenditures on “temptation goods” such as alcohol and cigarettes. For example, while an analysis of formal cash transfer programs in developing countries fails to uncover any evidence increases in temptation good expenditures (Evans and Popova, 2017) or decreases in work (Banerjee et al., 2015), other evidence indicates that in the U.S. a large percentage of the cash transferred to the poor on the street is spent on temptation goods (Lee and Farrell, 2003) and that cash transfers inherent to U.S. welfare programs decrease work incentives (Hoynes et al., 2012). What might account for these apparent contradictions? Perhaps most importantly, when might we expect cash transfers, rather than disincentivating work, instead to facilitate investments that create permanent increases in future income, and in this sense to be “transformative” in moving recipients out of poverty?

Here I offer a review of the empirical evidence on the effects of cash transfers, and then a framework to address these questions in the development of a simple neoclassical model that points to the conditions under which cash transfers are likely to be transformative. Subsequently, I propose some extensions to the model from the perspective of behavioral economics to consider how these predictions may change given different assumptions about the behavior of cash transfer recipients. Specifically, I consider cases in which rates of time preference are endogenous to first-period consumption, when cognitive capabilities and executive control are constrained by poverty, and then where preferences are shaped not by standard neoclassical utility, but by aspirations.

2. The Impacts of Cash Transfers: A Review of Empirical Evidence

An enormous research effort over the last decade has documented the impact of cash transfers on different measures of welfare and economic well-being. These include impacts on consumption and other general poverty measures, children’s schooling, child and maternal health, and labor market outcomes. They include evaluations of randomized controlled trials in which inference is derived from experimental data as well as quasi-experimental studies which make use of natural experiments and other phenomena to isolate the impact of cash transfers on dependent variables. Fiszbein and Shady (2009) provide a comprehensive summary of early evidence for positive impacts across consumption, schooling, and health. While impacts vary across research designs

and across world regions, the volume of this and subsequent research, and several carefully executed meta-studies, has allowed for some identification of distinguishable patterns of impact from CCTs and UCTs across the impact variables mentioned above.

Impacts on poverty, income, and consumption

While CCTs are typically designed to incentivize particular economic behaviors related to the health and education of children, the cash transfer itself provides a benefit to households designed to facilitate movement out of poverty. As a result, CCT programs embody substitution effects on economic behavior in that they increase the opportunity cost of child labor by providing monetary rewards for child schooling. But like UCT programs, they also create income effects from the cash grants themselves, which will tend to promote the consumption of a wide class of normal goods. In contrast, UCT programs embody only income effects, and they are implemented with poverty reduction goals specifically. What does the evidence say about the impact of cash transfers on basic measures of poverty reduction?

It would seem that consumption should increase with any type of cash transfer, but it is conceivable that potential increases in children's schooling with CCTs may be offset by losses in income from child labor and from additional schooling costs. Hagen-Zanker et al. (2011) present a meta-study of 37 employment guarantee schemes (EGSs), UCT programs, and CCT programs, of which 18 measure changes in household income, consumption, and poverty reduction. Of these 18 programs, 17 indicate reductions in poverty, although most of the studies did not report statistical significance to estimates. CCT programs in their analysis consistently (although not universally) increase household income and consumption, where they also find that across studies, the cash transfer programs consistently outperformed EGSs in each of these areas.

In addition Kabeer et al. (2012) carry out a meta-study of 46 evaluations of 11 CCT programs in Latin America. Similarly, they find that across Latin America, CCT programs significantly boost food and non-food consumption, most especially in studies by Gitter and Caldes (2010) in Nicaragua, Attanasio et al. (2012) in Colombia, and by Angelucci and Attanasio (2009), Hoddinot and Skoufias (2004), and Gertler et al. (2012) in Mexico through *Oportunidades/Progres*a. Overall Kabeer et al. find that CCTs increased household consumption by about 7% across seven high-quality program evaluations. Especially in Latin America, the evidence is overwhelming that cash transfer programs, at least while recipients continue to receive transfers, reduce poverty.

More recently, Haushofer and Shapiro (2016) study the impacts of the GiveDirectly UCT intervention on 1,372 households in Kenya. Here the authors analyze treated households in treated communities and untreated households in treated communities relative to a sample of pure control households. They also randomize the magnitude of the UCT (US\$404 vs. US\$1,525), the timing of the transfer (one-month installments over nine months vs. a one-time transfer), and whether the transfer was given to the wife or husband household. The Haushofer and Shapiro study has offered some of the most convincing evidence for big, short-term impacts from cash transfers, finding a US\$36 increase in monthly non-durable consumption over a baseline control mean of US\$158. Perhaps most importantly, they find asset holdings increased by US\$302 from US\$495, increasing the income stream from animal husbandry and agriculture by US\$16 (over a control group mean of US\$49). Notably, the impact on consumption from the large transfer treatment was nearly 50% higher than the impact of small transfers; on asset accumulation, but the impact for large transfers was nearly double, making the marginal expenditure on investment greater as transfers increased. The transfers also realized positive psychological effects on the well-being of transfer recipients: a 0.16σ increase in happiness, a 0.17σ increase in life satisfaction, and a 0.26σ reduction in stress.

A concern commonly voiced with cash transfer programs is that they facilitate increases in spending on “temptation goods” such as alcohol and tobacco. Studies of the homeless in North America indicate that a substantial fraction of the cash transfers received by panhandlers from altruistic donors on the street is spent on tobacco, alcohol and narcotics (Lee and Farrell, 2003; *San Francisco Chronicle*, 2013). Using survey data from a random sample of panhandlers in Toronto, Bose and Hwang (2002) estimate, that from the \$638 average monthly income in their sample (about half of which is obtained through panhandling) \$200 is spent on food, \$112 is spent on tobacco, and \$80 on alcohol and narcotics. But while this stereotype of mis-spent cash appears to have some backing in the data among the North American homeless, is not borne out empirically from cash transfers that occur in the developing world.

Evans and Popova (2017) study the impact of cash transfers on temptation-good spending, noting that changes in spending on temptation goods may be affected through several channels: an income effect (more income may lead to increased purchases of all normal goods), a substitution effect (the incentives for schooling investment in a CCT may should move consumption away from temptation goods) the labeling effect (where governments overtly discourage the use of cash transfers for temptation goods), and a household bargaining effect

(where cash transfers directed toward mothers may reduce temptation good spending by fathers). Evans and Popova conduct a meta-study on 50 estimates from 19 countries, finding virtually no evidence of increased average spending on temptation goods resulting from cash transfers. Indeed, point estimates in the study consistently indicate a *decrease* in expenditures on alcohol and tobacco, where this decrease is actually statistically significant for the subset of Latin American countries. This result holds true for a number of robustness checks, including limiting the study to seven especially high-quality randomized trials. It seems possible then that in some contexts, small cash transfers may be used to medicate feelings of hopelessness, while larger transfers may be directed toward more fruitful ends.

Impacts on labor market activity

Another common concern related to cash transfer programs is that they reduce participation in the labor market, *i.e.* they discourage work. Like spending on temptation goods, these concerns stem not just from stereotypes of welfare recipients in the United States and other industrialized countries, but from studies which have documented such an effect. Cole and Ohanian (2002) find a negative effect on willingness to work in the post-War years from the generous cash transfer program contained in the British dole. Hoynes et al. (2012) use county-level difference-in-difference estimation on data from the Panel Study of Income Dynamics (PSID) from 1968–1978 to examine the U.S. food stamp program on labor supply, earnings, and income. Their results indicate modest reductions in both employment and hours worked as a result of food stamp program introduction, where impacts are larger on female-headed households. The authors find no significant impacts of the FSP on earnings or family income. These results are consistent with a set of earlier studies summarized in a review by Moffit (2002) that show modest but significant reductions in labor market participation in a majority of studies on the impact of U.S. welfare programs.³

Perhaps more noteworthy is evidence showing that negative effects in the labor market from U.S. cash transfers exhibit protracted effects. Price and Song (2016) report on the long-term effects of the 1970s Seattle-Denver Income Maintenance Experiment, which gave thousands of randomly selected families a guaranteed annual income of \$26,000 for 3–5 years. In response to the program, they show that adult work hours dropped by 12 percent, and the

³ The Jones and Marinescu (2018) study of cash transfers from the Alaska Permanent Fund provides evidence that partially contradicts these results, finding that the general equilibrium effects of cash transfers are neutral on labor supply.

households earned \$1,600 less per year than households that didn't receive the free income. More disconcertingly, recipient households continued to earn \$1,800 less per year decades after the experiment ended (although there were no discernible impacts on recipients' children). Such results indicate "transformative" effects from sustained cash transfers, but in a direction in which participation in the economy is discouraged rather than enhanced.

Similar to expenditures on temptation goods, the effect of cash transfers on disincentives to work does not seem to extend to low and middle-income countries. In a review of seven RCTs on cash transfer programs in six developing countries,⁴ Banerjee et al. (2015) discover no evidence from cash transfer programs on either the propensity to work outside the household or the overall number of hours worked for either men or women. Why there exist such notable differences in the effects of cash transfer programs on labor market activity between industrialized countries and developing countries is an unresolved question and a compelling topic for research.

Impacts on education

Increasing schooling levels among children is a primary goal of most CCTs. In a meta-analysis Saavedra and Garcia (2012) study the effect of CCT programs on schooling outcomes across 42 studies from programs in 19 developing countries, twelve in Latin America, six in Asia and one in Africa, where they find a positive and statistically significant effect of CCT programs on enrollment and attendance in both primary and secondary education. Increases in enrollment are about 6 percentage points for both, but relative effects are considerably larger for secondary education because baseline levels of enrollment are much higher in primary education (84%) than in secondary education (59%). Results for school attendance show an even more dramatic difference, at 3% increase for primary school and a 12% increase for secondary school. Importantly, Saavedra and Garcia also find that impacts are increasing in the size of the transfer; larger transfers augment increases in school enrollment and attendance.

Baird et al.'s (2013) meta-study on the impacts of both CCT and UCT programs on schooling enrollment from 75 studies cover 35 cash transfer programs worldwide, 19 programs in Latin America and the Caribbean, eight programs in Asia, and eight programs in Africa. The studies they incorporate include five UCTs, 26 CCTs, and four that provide comparisons between the two. They find unequivocally positive impacts on schooling enrollment, where household

⁴ The seven programs included Honduras' PRAF II, Morocco's Tayssir, Mexico's Progresa and PAL, Philippines' PPPP, Indonesia's PKH, and Nicaragua's RPS.

participation in a CCT program increases the statistical odds of a child being enrolled in school by 41%. The effect of UCT programs on enrollment is smaller, a 23% increase in the odds of enrollment, but still highly significant. The difference between UCTs and CCTs is statistically insignificant, but they find much larger effects (a 60% increase in the odds of enrollment) for CCT programs that have strong monitoring systems to ensure compliance with school enrollment of children. Although school enrollments are higher as a result of cash transfer programs, the authors do not find improvements in school test scores.

There is other evidence that larger transfers are more likely to have bigger impacts on schooling. Using a natural experiment in which the *Oportunidades* CCT program increased the average grant in middle and high school in 2009 by about 30% in 263 of 630 urban localities in Mexico, Araujo et al. (2018) find that students in the Mexican households with access to the larger grants exhibited lower dropout rates during middle school, and then increase secondary school completion by about 33%. Moreover, they find the expected income from this additional schooling to be more than double the cost of the CCT. Akee et al. (2010) study the impact of cash transfers in the United States among Eastern Cherokee reservation families receiving an average of \$4,000 per person every year from casino profit-sharing. Relative to their non-Native American neighbors, they find that the cash transfers (implicitly a UCT) caused the Cherokee children to complete an average of one additional year of education. Both CCTs and UCTs are likely to exhibit bigger impacts on school: Larger CCTs more strongly incentivize schooling relative to child labor, and the augmentation of both types of transfers creates an income effect in the present that permits households to invest in future consumption.

Impacts on health and nutrition

There is substantial evidence that both CCTs and UCTs improve health. Gertler (2004) finds positive impacts on a number of health measures on children born during this time to families benefiting from the *Progresa* transfers. The rate of illness from children born in program villages during this two-year period was 25.3% lower than that of children born in control villages, and children born in the three years before the program was phased in experienced a 39.5% reduction in reported illness. The program also appears to have reduced stunting; Remarkably, Gertler reports children born in program villages grew approximately 1 cm more during the first year of the program alone, although impacts on stunting would not seem to be universal. For example, Chakrabarti et al., (2020) find insignificant impacts on child height from an evaluation of the Zambia Child Grant Program.

Some of the health benefits from *Progresa* are likely to accrue through the impact of cash transfers on improved diet. Angelucci and de Georgi (2009) estimate that *Progresa* increased food expenditures by 30 pesos over a baseline of 154 pesos for households eligible for the program in treated villages. The program also increased consumption among *ineligible* households in treated villages by 19 pesos over a 201-peso baseline, illustrating the importance of spillover effects to the program. Caloric intake also increased for specific foods including chicken and beef, milk, and an array of vegetables.

Early results on the health effects of *Progresa* cash transfers have been externally validated in work that has studied other CCT programs. Guanais (2015) finds that increasing coverage of cash transfers under *Bolsa Familia* were key to reducing infant mortality when combined with the Brazilian government's family health program. Using data from the *PANES* cash transfer program⁵ in Uruguay, Amarante et al. (2016) find that *PANES* led to a significant reduction in instances of low birthweight, results attributed to faster intrauterine growth. In a meta-study covering research on 13 CCTs, Meghna and Lagarde (2012) conclude that CCTs have been highly effective in fostering the use of preventive services, improving immunization coverage, a number of standard health outcomes, and in encouraging healthy behaviors.

Long-term Effects of Cash Transfers

The aggregated results on the effect of cash transfers overwhelmingly indicate significant impacts on schooling and health during the time a household is receiving them. But whether or not these positive impacts have long-term transformative effects—and under what conditions—is a question that is less settled and remains an active subject of research. There is mixed evidence that the short-term positive effects on schooling and health, especially for UCTs, endure when the cash transfers end.

Evidence for longer-term impacts is greater for CCT programs such as *Progresa*. Behrman et al (2011) find that impacts on schooling from the program had lasting effects among children who had stronger exposure to the *Progresa* cash transfers 10 years later. Gertler et al. (2012) studies the program's long-term impact on consumption and the relationship of this increase in consumption to investment in productive activities. They find that for every peso transferred to a low-income household in Mexico, about 74 centavos are consumed and 26 are invested in income-generating activity. Gertler et al. demonstrate how this investment in

⁵ *PANES* was originally conceived as a CCT program, but because the government at the time of the research did not enforce conditionality, it can be viewed as a *de facto* UCT program.

income-generating activity from the transfers appears to yield long-run increases in consumption: Five years after the initial program rollout, consumption among treated households was 42 pesos per month higher than the 160-peso baseline among control households. Nine years later, monthly household consumption among participant households had grown by 54 pesos relative to the control. They connect this long-run increase in consumption to the higher levels of investment that occur through the fraction of the monthly transfer. The end result they find is sustainably higher levels of consumption, believed to be permanent even when households stop receiving the transfers. Parker and Vogl (2018) execute a long-term evaluation of Oportunidades to ascertain the extent to which transfers affected measures of poverty and development in the next generation, who were of school age when transfers began. They find that early beneficiaries of the transfers completed 1.4 years of schooling over the control group, increasing labor market participation by women female beneficiaries by 7-11 percentage points while labor earnings increased by US\$30-40 per month—about half of average earnings in the control cohorts. Parker and Vogl find effects on male labor outcomes to be somewhat lower, but still positive and significant. Thus especially for females, the evidence obtained from Oportunidades/Progresa/Prospera indeed weighs in favor of transformative effects from CCTs, at least in an middle-income economy such as Mexico's that offers significant economic opportunities for those able to achieve higher levels of education.

The evidence from other studies on the long-term impacts of cash transfers is more mixed, especially for UCTs. Arujo et al. (2016), examining the 10-year effects of cash transfers in Ecuador, conclude that any effect of cash transfers from the 1-2 percentage point increase in secondary school completion on the inter-generational transmission of poverty in Ecuador is modest. Evans et al. (2019) study long-term effects from a CCT program in rural Tanzania, finding that while the program significantly increased clinic visits in the first 1.5 years after transfers, this impact vanished by 2.5 years, although after this point they find increases in preventive health investments and health insurance. Baird et al. (2017) explore whether notable reductions in HIV prevalence, teen pregnancy, and marriage along with increases in school participation and test scores realized during the early phases of UCT and CCT programs in Malawi exhibited sustained impacts. They find that two years after the program ended, girls who had received the UCTs were no better off than a control group, the treated girls having rates of HIV and pregnancy apparently unaffected by having received the earlier transfers. They do find

potential evidence of long-lasting effects among a group of girls who had dropped out of school and were offered the CCT as an incentive to return.

The evidence here appears to point to an advantage of CCTs over UCTs in that they force households into investments in schooling and health that are more likely to yield long-term transformative effects, albeit at the expense of the short-term consumption gains with UCTs that would have been realized among those unwilling to comply with the conditionality of a CCT. Brudevold-Newman et al. (2017) find similar results in a randomized evaluation of a program working among impoverished young women in Nairobi. One treatment arm provided cash grants for business while the other also included mentoring and franchising components. While results after one year showed a 30% increase in weekly income, these income gains disappeared in the second year of the program.

Haushofer and Shapiro (2018) shows results from a three-year follow-up study of GiveDirectly cash transfers in Kenya. They find asset holdings among the treated households to be US\$416 (40%) higher than untreated households in the same village accompanied by increases of 0.20σ in a food security index, 0.15σ an educational index, an 0.16σ improvement in psychological well-being, but zero impacts on health. But is difficult to ascertain how much of these differences are due to negative spillovers to non-recipients in the treated villages. The authors find similar sized impacts on household assets when treated households are compared to households in pure control villages although not in other impact variables, although the lack of baseline controls in control villages make comparisons difficult. As a result, Haushofer and Shapiro reveal fairly convincing evidence of impacts on assets, but inconclusive impacts on food security, health, education, and psychological well-being.

Achieving longer-term effects to cash transfers appears to be more likely if behavioral considerations are incorporated into programming. Barrera-Orsorio et al. (2016) study CCT programs in Columbia when combined with a creative set of structured incentives. In one treatment arm, these force families save a third of the stipend each month until they make enrollment decisions for the next academic year; in a second treatment arm they provide a stipend for secondary school graduation and tertiary school enrollment. They find that both of these result in significant improvements in long-run schooling outcomes, with the stipend treatment increasing tertiary enrollment by 5.7 percentage points over a baseline of 35 percent.

A discernable pattern also exists in which both CCTs and UCTs tend to have long-term impacts in countries in which greater employment opportunities exist and where individuals are

able to realize a higher level of returns to schooling. These results are consistent with other work such as Wydick et al. (2013) which finds *educational* impacts from an international child sponsorship program higher in sub-Saharan Africa, but long-term impacts on *employment* to be higher in Asia and Latin America, where economic opportunities for those with higher levels of schooling are arguably greater. Similarly, Filmer and Schady (2014) similarly find a large impact on schooling outcomes from scholarships in Cambodia, but little subsequent impact on long-term economic well-being due to the country's limited economic opportunities. Thus the gains from CCT programs are likely to be yield transformative effects when economies provide recipients employment opportunities for those who have been induced to realize higher levels of schooling through the transfers. Without such opportunities, the average economic return to these marginally added years of education will be lower.

In conclusion, the empirical evidence is that cash transfers exhibit heterogeneous effects not only across different measures of poverty, but these effects depend on conditionality and the context in which the transfer is executed. In the subsequent section I consider what may be some of the underlying rationale for these heterogeneous effects.

3. Basic Model

To understand the qualitatively different effects across cash transfers of different sizes, consider a two-period model in which consumption occurs in “the present” (C_1) and “the future” (C_2). Let utility be equal to $U(C_1) + \delta U(C_2) - \bar{\ell}$, where in our basic neoclassical formulation $U(\cdot)$ is concave and twice differentiable, U'_1 and U'_2 represent the marginal utilities of consumption in the first and second periods, $\delta \in (0, 1)$ discounts future utility relative to present utility, and $\bar{\ell}$ represents a fixed cost of labor activity across periods. Labor activity can either include the effort expended in seeking charity from others (e.g. begging) or labor for earned income such that $\bar{\ell} \in \{\bar{\ell}_b, \bar{\ell}_l\}$ where for simplicity but without loss of generality we assume that $\bar{\ell}_b = \bar{\ell}_l$. Although this is true, we assume that $\bar{\ell}_l$ is more desirable from a social point of view since the activity $\bar{\ell}_b$ represents a transfer from others that is not given in a mutually beneficial exchange of goods or services.

The context for the model is an individual in poverty (whom we will refer to as the agent) who is able to obtain b in each period through charity at a utility cost of $\bar{\ell}_b$, and is able to save from the present period to the future period, but is not able to borrow. Thus the agent maximizes

utility subject to the constraints $C_1 \leq b$ and $C_2 \leq 2b - C_1$. Incorporating the two constraints in an optimization framework with Lagrangian multipliers λ_1 and λ_2 respectively, the maximization problem becomes

$$U(C_1) + \delta U(C_2) - \bar{\ell} + \lambda_1(b - C_1) + \lambda_2(2b - C_2 - C_1), \quad (1)$$

where differentiation with respect to the first and second arguments yields the first-order conditions $U'_1 - \lambda_1 - \lambda_2 = 0$ and $\delta U'_2 - \lambda_2 = 0$, respectively. Subtracting the second of these from the first yields the relationship at optimum, $U'_1 = \delta U'_2 + \lambda_1$.

Suppose that along with the possibility of saving some fraction of income from the present to the future period, the agent may make a durable investment that requires a minimum fixed investment d in the present that yields $r = (1 + R)d$ in future period income above b where $R > 0$. This “lumpy” durable investment could take a number of forms, each requiring a lump sum outlay of present resources. This could literally represent a durable investment in physical capital such as a shop, a machine, or other types of equipment that increase the agent’s future productivity to r . Likewise, it could represent investment in education or other forms of human capital that result in a future wage income of r . Any such investment is thus “transformative” for a person living in poverty in the sense that it changes the agent’s labor activity from $\bar{\ell}_b$ to $\bar{\ell}_l$, from dependence on the charity of others to self-reliance and the socially preferred outcome.

Here we can expect different levels of cash transfer h to exhibit not just quantitatively different, but *qualitatively* different effects on the agent’s behavior. Specifically, I offer the following proposition:

PROPOSITION: *Small cash transfers $h \in (0, h^*]$ will result in increases in the agent’s present consumption with no change in future consumption and a continued reliance upon charity. Intermediate levels of cash transfers $h \in (h^*, h^{**}]$ will increase both present consumption and savings for future consumption, but a continued reliance upon charity. Large cash transfers $h \in (h^{**}, \infty]$ will result in investments in future productivity that have “transformative” effects on income and labor activity.*

PROOF: Consider first the case of a small cash transfer. With consumption initially equal to b across periods, $\lambda_1 = U'_1(b) - \delta U'_2(b) > 0$. Let $h^* > 0$ be the transfer that satisfies $U'_1(b + h^*) - \delta U'_2(b) = 0$ and where $\lambda_1 = 0$. Thus for $\delta > 0$, $\exists h \in (0, h^*]$ for which $U'_1(b + h) \geq \delta U'_2(b)$ and therefore a small transfer h is consumed only in the present period. Because $\delta U'_2(b) > U'_1(b + h)$ at $h > h^*$, there exists an optimal savings level s^* such that

$U(b + h - s^*) + \delta U(b + s^*) > U(b + h) + \delta U(b)$ that maximizes utility. However, $\exists h^{**} > h^*$ above and only above which the agent will prefer the durable investment rather than save. For transfers below h^* , and with a sufficiently large investment d needed for the durable and sufficiently low R and δ , $U(b + h) + \delta U(b) > U(b + h - d) + \delta U(b + r)$ because as $d \rightarrow b + h^*$ and R and $\delta \rightarrow 0$, utility under the durable investment tends toward zero. For transfers above h^* , the first-order condition from maximization of $U(b + h - s) + \delta U(b + s)$ with respect to s is $-U'_1 + \delta U'_2 = 0$, where total differentiation yields $\frac{ds}{dh} = \frac{U_{11}}{U_{11} + \delta U_{22}} > 0$, meaning that the optimal s^* is increasing in h . But as h increases and $s^* \rightarrow d$, the marginally utility loss in the present period from the durable investment falls sufficiently after h^{**} such that $U(b + h^{**} - d) + \delta U(b + r) > U(b + h^{**} - s^*) + \delta U(b + s^*)$ and the durable investment becomes preferable since its return is $1 + R > s/s = 1$.

Figure 1 illustrates the main results of the PROPOSITION. It also serves as a guide into understanding the relative behavioral reactions to CCTs and UCTs. For example if a cash transfer of size h_1 is a CCT that is granted conditional upon undertaking the durable investment, it will be rejected although a UCT of any size will be accepted. The terms of a CCT of size h_1 conditional upon undertaking the durable investment will be accepted, although it yields a utility lower than a UCT of the same size. Finally, a CCT of size h_3 conditional upon undertaking the durable investment will be accepted, and the durable investment is actually preferred to merely saving for second-period consumption. Thus, when cash transfers are smaller, a CCT that is conditional on the durable investment may be rejected or at the very least is less preferable to the household than a UCT of the same size. But sequentially larger UCTs both increase the likelihood of durable investment in the first period and begin to mimic the transformative economic choices that would have existed anyway under a CCT of the same size. Figure 2 shows a utility simulation with $b = 1, R = 0.10, d = 5$, and $\delta = 0.70$, showing how optimal behavior increases from consumption to savings and then to durable investment as the size of cash transfers increases.

4. Behavioral Extensions

In this section I consider how responses by cash-transfer recipients may change as we move from a neoclassical economics to a behavioral economics framework. I consider three possibilities:

1) how cash transfer recipients may behave when the rate of time preference is endogenous to consumption as well as issues of self-control; 2) considerations related to executive control and cognitive ability; and 3) when utility is not neoclassical, but rather is shaped by aspirations.

Endogenous Time Preference and Self-Control

Both theoretical and empirical work has demonstrated that the discount factor is likely to increase in poverty status (Lawance, 1991; Becker and Mulligan, 1997). Moreover, one can also interpret the discount factor as the probability that a second period will even exist, which in dire cases of poverty may be a function of first period consumption. Suppose then that δ is a positive function of first period consumption, or $\delta(C_1)$. This changes the slope of the indifference curves in Figure 1 from $\frac{dC_2}{dC_1} = -\frac{U'_1}{\delta U'_2}$ to $\frac{dC_2}{dC_1} = -\frac{U'_1 + \delta'(C_1)U(C_2)}{\delta U'_2}$ and the consumption rule based on the first-order conditions from $U'_1 = \delta U'_2 + \lambda_1$ to $U'_1 + \delta'(C_1)U(C_2) = \delta U'_2 + \lambda_1$.

This implies that h^* , or the critical level of UCT needed before savings occurs will increase as the marginal utility of first-period consumption must decline more substantially before saving for second-period consumption becomes optimal. Likewise, h^{**} , the critical UCT level required to induce durable investment will increase to compensate for the effect that a reduction in first-period consumption has on the discounted value of its return in the second period. It also implies that under endogenous discounting, a CCT that provides transfers conditional upon making the durable investment is likely to result in lower take-up.

There is considerable evidence that discount rates among the poor are higher than those of the rich, especially in situations of malnutrition or with households and individuals living close to subsistence (Bardhan, 1996). Endogenous discount rates have been modeled as a poverty trap (Chakrabarty, 2012; Haaparanta and Puhakka, 2004) in which poverty leads to high discounting of the future while simultaneously high discount rates discourage investment in the future. Thus if poverty causes high discount rates, it is likely to perpetuate poverty. While the effect of high discount rates on poverty is less disputed, experimental work has attempted to establish causality in the opposite relationship—from poverty to high discount rates.

Haushofer et al. (2013) provide just such an experiment among a sample of students at the University of Zürich given varying degrees of endowments. Subjects were given positive and negative “income shocks” and then led through a series of intertemporal choices. What they find is that positive income shocks induce lower discount rates among subjects, while negative income shocks increase them. Their results support the hypothesis that falling into poverty

increases causes people to more heavily discount future income flows, creating poverty traps from skewed intertemporal decision-making that inhibits long-term investment.

Issues of endogenous time preference are related to the relationship between self-control and poverty, a subject of increasing research in behavioral development economics. As Bernheim et al. (2015) note, self-control differs from simple time discounting based on the observation that people often employ, and indeed are often willing to pay for, commitment devices to help them make choices consistent with the time preferences of a “present self.” Psychologist George Ainslie (1975, 1992) describes the mechanisms by which ordinary people exhibit self-control, where they are often through the adoption of “private rules” that regulate consumption choices in the present, such as “I never eat dessert.” Deviations from these private rules in the present are often viewed by the present self as having implications for future behaviors, where eating dessert today implies that one is likely to break the private rule in the future as well (Bernheim et al., 2015). Thus, these kinds of private rules, though in some sense non-optimal by imposing arbitrary constraints, are able to create personal habits that keep high rates of time preference in check.

How habits are related to individual identity is a fascinating subject of research and pose challenges in our understanding of the impact of cash transfers once these behavioral nuances are taken into account. It may be that through episodes of chronic poverty, habits are developed among the poor that make present consumption a focal point. An inertia may develop with respect to intertemporal choices that thwart investments with returns that lie in the relatively distant future. This may include present-focused behaviors such as drug use and impulsive violence, behaviors whose future consequences are (under)valued at high discount rates. The extent to which poverty becomes geographically concentrated, and social behaviors begin to reinforce each other through network effects, may compound the difficulties in transmitting even substantial cash transfers into transformative investments in the future.

One innovative approach has been to combine cash transfers with cognitive behavioral therapy (CBT). Viewed in a time-discounting framework, along with addressing other important issues, CBT helps individuals to reflect on behavioral choices (Hoffman et al., 2012), exhibit greater self-control (Almund et al., 2011), and build a stronger mental connection between present choices and future consequences (Lipsey et al., 2007). Blattman et al. (2017) experiment with a creative randomized trial in which cash transfers (UCTs) amounting to US\$200 were crosscut with a CBT intervention involving approximately 1000 men with criminal backgrounds in Liberia. The therapy attempted to develop self-control, a non-criminal self-image, and foster

economic behaviors oriented toward positive future goals. Almost immediately after the eight-week sessions, criminal activity dropped precipitously, thefts falling by one-third and drug dealing by one-half. After one year these behaviors had returned to previous levels among those receiving only cash or CBT alone, but effects were much more sustained for those who were given both the CBT and the cash transfers: While in the pure control group, men reported stealing almost once per week on average, the combination of cash transfers and CBT reduce this rate by 40%.

Cognitive Capacity and Executive Control

Other research (Shah et al., 2012; Mani et al., 2013; Mullainathan and Shafir, 2013; Schofield, 2014; Schilbach et al., 2016) has studied the impact of poverty on other psychological phenomena related to cognitive ability. As with high rates of time preference, positive correlations have been known for some time between poverty and lower levels of cognition and poverty (e.g. McLoyd, 1998; Barr, 2012). A primary objective of this area of research has been to disentangle issues of causality, seeking to understand the extent to which poverty affects cognitive ability. These issues may be critical for understanding how cash transfers may be used by households and individuals living at the edges of subsistence.

Mullainathan and Shafir (2013) develop the term “mental bandwidth” to describe two major psychological components: 1) cognitive capacity, the psychological mechanisms that underlie our ability to solve different kinds of problems, retain information in our brains, and engage in logical reasoning; and 2) executive control, which governs our ability to plan future courses of action, initiate and inhibit actions, and control our impulses. Both of these components become overloaded when mental bandwidth is taxed by preoccupation, especially for basic needs like food and shelter. In this way poverty taxes mental bandwidth, affecting decision-making, productivity, and even the utility individuals receive utility from consumption or different types of activities.

Schofield (2014) illustrates how poor nutrition affects poverty through a randomized controlled trial with adult cycle-rickshaw drivers in Chennai having a BMI less than 20. Half of the participants received an additional 700 calories per day, and half formed the control. Those receiving the additional calories showed improvements in both physical and cognitive tasks. By the final week of the five-week experiment, the treated rickshaw drivers had increased both their labor supply and income by approximately 10 percent. Rickshaw drivers in the treatment group

were also less likely to delay postponing difficult tasks until the next day, also indicating that poverty manifest in low caloric intake may also increase future discounting.

Mani et al. (2013) demonstrate how poverty in particular affects cognitive capacity related to decision-making about money. Not only do those in poverty struggle when they are malnourished; people in poverty struggle specifically with decisions related to money and finances. In a set of experiments involving both rich and poor subjects, they find that, relative to the rich, the mental bandwidth of the poor is taxed specifically in reference to sets of questions dealing with finances.

How might the effects of poverty on cognitive capacity and executive control affect behavioral decisions related to cash transfers? Whereas in an economic model, the choice between present consumption and a durable investment involves a rather straightforward calculus, in practice the option of investing a cash transfer in additional schooling or an income generating asset may involve a series of mental financial calculations, an intimidating navigation through the bureaucracy, or stacks of paperwork. In the context of our model we can represent this tax on the mental bandwidth as 1) an increase in d , the simple cost of investment in the durable; or perhaps 2) uncertainty over R , the return to the durable investment which may make what is in reality a utility-increasing investment appear to be less certain, or a relatively safe investment appear to be more risky. Furthermore, the depression often accompanying poverty may both add to the mental costs associated with d and also cause an individual to become pessimistic about R if he or she believes recent episodes of “bad luck” are likely to persist in the future (de Quidt and Haushofer, 2016). It may thus prove less mentally taxing to simply use UCTs for present consumption when the more complicated set of economic costs and benefits related to an investment in the future are more difficult to rationally process.

This branch of research appears nearly unanimous in recommending the use of “nudges” and defaults in designing programs and policies intending to address the needs of people in poverty (Shah et al., 2012, Pace et al., 2019). In some respects this may speak for use of CCTs which create a default response as a condition for the transfer, however UCTs which are given without conditions, but are accompanied by nudges and coaching toward forward-looking behaviors such as investment in microenterprises, schooling, and providing adequate health and nutritional support for children may also constitute valid responses that take into account the taxing effects of poverty on economic decision-making. In an extreme-poverty graduation program implemented in six countries, Banerjee et al. (2015), for example, packaged two types

of cash transfers, temporary cash for consumption and a productive asset grant with vocational training, a life skills coach, support, a formal savings accounts and health services. Three years after the intervention, eight out of ten poverty indices continued to show significant improvement, highlighting the impact cash transfers may have when thoughtfully combined with other interventions. Subsequent work such as Bedoya et al. (2019) in Afghanistan has also shown marked results, where the fraction of treated households, receiving a holistic transfer package including life coach along with a cash transfer, remaining under the poverty line to fell to 62 percent at endline relative to 82 percent for a control group.

Aspirations-based Utility

A burgeoning literature has suggested that aspirations play a central role in the decision-making of the poor. This is been the subject of recent theoretical work in development economics (Genicot and Ray, 2014; Dalton et al., 2016, Lybbert and Wydick, 2018) as well as recent experimental and empirical work (Beaman, 2012; Bernard et al., 2015; Glewwe et al., 2018, Wydick and Lybbert, 2018). This literature suggests that the aspirations of individuals may create a reference point at which utility either makes a discontinuous jump, or before which marginal utility substantially increases, but then decreases afterwards.

Individuals, of course, may have aspirations over a number of outcome variables, including education, income, savings, or consumption. In Lybbert and Wydick (2018), we suggest the following functional form that is rooted in the Kahneman and Tversky (1979) value function and satisfies four properties⁶ that should characterize an aspirations-based utility function:

$$U_A(Y|A) = A \left(\frac{C_t}{A} \right)^{(1/1-\alpha_1)} \cdot 1(C_t < A) + A \left(\frac{C_t}{A} \right)^{(1-\alpha_2)} \cdot 1(C_t \geq A), \quad (2)$$

where A represents an aspiration for consumption in each period and $\alpha_1, \alpha_2 \in [0,1]$ measure the strength of aspirations in shaping utility. In the special case in which $\alpha_2 = \frac{\alpha_1}{\alpha_1-1}$, this aspirations-based utility function simplifies to the standard concave neo-classical utility function in which

$$U_N(Y|A) = A \left(\frac{C_t}{A} \right)^{(1-\alpha_2)} = A^{\alpha_2} C_t^{(1-\alpha_2)}, \quad (3)$$

⁶ Specifically, these are that (1) Marginal utility is higher immediately below A than it is just above it; (2) Marginal utility increases with the outcome below the aspiration and decreases with outcome at and beyond the aspiration; (3) As aspirations grow in importance to utility, gains in utility become uniquely a function of realized aspirations; and (4) Utility is increasing in higher realized aspirations.

where A^{α_2} is a constant and α_2 indicates relative risk aversion. The aspirations-based utility function U_A in (2) yields the functional form shown in Figure 3. In aspirations-based utility, an aspiration forms a reference point that rewards aspirational attainment increasingly in the value of α , but where diminishing returns set in quickly after the aspiration is realized. This functional form can be easily incorporated into the two-period model in (1) so that utility across the two periods remains additive and discounted in the second period by δ .

This aspirations-based utility function generates a set of non-standard-looking indifference curves that reflect the “kink” in the utility function that represents aspirations attainment. Unlike the standard neo-classical indifference curves portrayed in Figure 1, the indifference curves based in Figure 3 display a concave shape relative to the origin over the domain in which consumption lies below aspirations for periods 1 and 2. The indifference curves then assume different shapes based on whether consumption lies below or above aspirations in the two periods. (See the appendix for derivation.)

If rather than by standard neo-classical utility, the utility of a cash-transfer recipient is shaped by future aspirations that are below current levels of consumption, cash transfers are more likely to result in the durable investment. This is because (for sufficiently low b) the convexity of the utility function below A implies that the present utility costs d of the durable investment are lower with aspirations-based utility and that the marginal gains from the future return r to the durable in second-period consumption are higher, whether the aspiration is realized or not. More generally, for C_1 less than A and $U'_A(b) = U'_N(b)$ (where U_A is aspirations-based utility and U_N is neo-classical-based utility), $U_A(b+h) - U_A(b+h-d) < U_N(b+h) - U_N(b+h-d)$ and $U_A(b+r) - U_A(b) > U_N(b+r) - U_N(b)$. The latter holds true even in the case that the aspiration is realized in the second period since $U'_A = U'_N$ for $\forall C_t \geq A$. An illustration of this appears in Figure 5. Costs of investment in the durable under aspirations-based utility and neoclassical utility are equal to $U^2 - U^1 < U^4 - U^3$, respectively, while gains in the second period are equal to $U^5 - U^2 > U^5 - U^4$ in the case where the aspiration is not realized and $U^6 - U^2 > U^6 - U^4$ when it is.

Some of the largest impacts of cash transfers have been found in experimental studies where subjects have been randomly chosen, not from the population at large, but from a pool of candidates who have submitted formal grant proposals for durable investment projects, typically for vocational training or small enterprise capital (Blattman et al., 2013, McKenzie 2017).

Virtually by definition, such project proposals form an aspiration, creating a focal point for use of a cash transfer. The mere fact that subjects in these experimental studies are able to articulate a goal in a proposal, a pathway to that goal, and confidence in their own agency of navigating the pathway toward the goal (Snyder, 1994) suggest the manifestation of an “aspirational hope” (Lybbert and Wydick, 2018) that is likely to serve as an antecedent to transformative effects from cash transfers.

Blattman et al. (2013) carry out a randomized trial among 535 village groups of 10 to 40 members in Uganda submitting formal proposals for cash grants related to vocational training and microenterprises start-up. The researchers find that an array of impacts on the treatment group were large and sustained. Four years after the transfers, assets among those randomly selected for treatment increased 57% relative to control. Earnings were 38% higher, producing annual returns of an estimated 30-50% from investment in the program. The authors also find evidence of employment generation within the microenterprises, extending the benefit of the cash transfers to others in the villages.⁷

Similarly, McKenzie (2017) presents results of a randomized trial carried out with the YouWiN! business plan competition in Nigeria among both start-up and existing firms. A group of 1,841 semifinalists were solicited from 24,000 submitted applications, from which 729 winners were randomly chosen to receive US\$50,000 grants given for cash payments conditional on achieving some basic milestones at each stage. McKenzie finds large impacts from the transfers on treatment group businesses after three years: new and existing businesses added 5.2 and 5.6 employees, respectively, a 140% and 80% increase over the endline level of employment in control businesses. Overall, the entrepreneurs receiving the transfers were 37 percentage points more likely to be in business, 23 percentage points more likely to have more than 10 employees, and a 0.2-0.3 standard deviation increase in a sales and profitability index. The study represents a clear picture of the transformative effects of cash transfers when properly targeted and carried out in a context of high aspirations.

5. Conclusion

⁷ New unpublished findings from Blattman et al. based on a 9-year follow-up study seem to indicate that members of the control group were able to achieve similar outcomes simply by saving for these same durable investments. Nor do the changes over nine years indicate differences between treatment and control groups in key poverty indicators such as health and education. Nevertheless, it appears that the cash transfer helped to accelerate these changes within a shorter period of time.

I present here a review of work that assesses the impacts of both conditional and unconditional cash transfers on key areas such as poverty measures, labor market activity, education and, health. I then develop a simple model with neoclassical assumptions to serve as a baseline framework for understanding when UCTs and CCTs are likely to exhibit transformative effects in movement out of poverty through durable investments that yield a permanently higher future income. Extending the model, I consider how responses by cash transfer recipients might be affected by psychological phenomena that is a subject of research in behavioral economics: endogenous discounting, cognitive capability and executive control, and aspirations-based utility. From this exercise I conclude with five factors that indicate conditions under which cash transfers are likely to be transformative:

- 1) *Both UCTs and CCTs are much more likely to be transformative when they are large.* For the poor to undertake durable investments in the future, UCTs need to satiate present consumption sufficiently in order to induce investments with future returns. The marginal rate of investment in durable assets appears to increase as the size of UCTs grow (Haushofer and Shapiro, 2016). CCTs also need to be sufficiently large to provide for present consumption in order to induce investments with future returns, for example, to outweigh the opportunity cost of child labor in the present when the marginal utility of first-period consumption is high. The likely presence of endogenous discount rates among the poor magnifies the requirement that cash transfers be large in order to have transformative effects.
- 2) *There is evidence that CCTs exhibit greater long-term transformative effects than UCTs.* This seems particularly true when CCTs are larger (Saavedra and Garcia, 2012; Baird, 2013; Araujo et al., 2018). The relative merits of UCTs vs. CCTs can be debated over policy weights placed on short-term consumption versus sustainable long-term impacts. But while UCTs clearly result in short to medium-term increases in consumption, the evidence, especially from Mexico (Parker and Vogl, 2018), is that CCTs appear more likely to yield long-term effects among households willing to accept their conditionality.
- 3) *Cash transfers are more likely to be transformative when their design accounts for psychological and behavioral phenomena that deviate from neoclassical rationality.* Cash transfer designs that force or nudge savings to account for lumpy investments in productive assets or schooling help facilitate investments in durable assets (Barrera-Osorio, 2016). Cash transfers packaged

with psychological interventions such as cognitive behavioral therapy and life coaching have exhibited significant medium-term impacts (Blattman et al., 2017; Banerjee et al., 2015).

4) *Targeting both UCTs and CCTs at individuals with elevated aspirations is more likely to result in transformative economic effects.* This is clear not only from theoretical results derived from models of aspirations-base utility, but from recent empirical evidence. Experimental interventions suggest transformative effects when cash transfers in the form of business grants have been targeted at those who manifest both general aspirations for economic improvement and concrete proposals for investment in microenterprises and educational/vocational training (Blattman et al., 2013; McKenzie, 2015). In the absence of aspirations, permanent UCTs such as a BMI are less likely to yield transformative effects.

5) *To be maximally transformative, cash transfers require complementary policies, programs, and interventions.* Absent tangible economic opportunities, UCTs are likely to exhibit primarily palliative effects (Baird et al., 2013; Baird et al., 2017; Brudevold-Newman, 2017) that provide significant short-term increases in consumption and economic well-being, but are unlikely to be transformative. Cash transfers have never been, and should never be, regarded as a silver bullet for poverty alleviation. Evidence for long-term, transformative impacts via investments in education and enterprise is weaker in sub-Saharan Africa than Latin America, where economies tend to be stronger. Macroeconomic policies that create the conditions for widespread economic opportunity and confidence in the returns from investments in the future are strong complements to cash transfers.

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Appendix: Derivation of indifference curve mapping. Note that before the aspiration A is reached, the utility function is convex and equal to $(C_t|A) = A \left(\frac{C_t}{A}\right)^{(1/1-\alpha)}$. Setting A equal to 1 for simplicity makes utility equal to $U(C_t|A = 1, C_t < A) = C_t^{(1/1-\alpha)}$ where in the domain after the aspiration is realized we have $U(C_t|A = 1, C_t \geq A) = C_t^{(1-\alpha)}$. In the northwest quadrant where the aspiration is reached in the second period, but not the first, the slope of the indifference curves is $\frac{dC_1}{dC_2} = -\frac{1}{(1-\alpha)^2} C_1^{\frac{\alpha}{(1-\alpha)}} C_2^{-\alpha}$ and hence negative, and where the 2nd derivative $\frac{d^2 C_1}{dC_2^2} = -\frac{\alpha}{(1-\alpha)^3} C_1^{\frac{2\alpha-1}{(1-\alpha)}} C_2^{-\alpha}$ is negative such that the indifference curves are concave. In the northeast quadrant in which the aspiration is reached in both the first and second period, the slope of the indifference curves is $\frac{dC_1}{dC_2} = -\left(\frac{C_1}{C_2}\right)^{-\alpha}$ and hence negative, and where the 2nd derivative $\frac{d^2 C_1}{dC_2^2} = \alpha \left(\frac{C_1}{C_2}\right)^{-(1+\alpha)}$ is positive such that the indifference curves are convex. In the southwest quadrant in which the aspiration is reached in neither period, the slope of the indifference curves is $\frac{dC_1}{dC_2} = -\left(\frac{C_1}{C_2}\right)^{(\alpha/1-\alpha)}$ and hence negative, and where the 2nd derivative $\frac{d^2 C_1}{dC_2^2} = -(\alpha/1-\alpha) \left(\frac{C_1}{C_2}\right)^{2\alpha-1}$ is negative such that the indifference curves are concave. In the southeast quadrant in which the aspiration is reached in the first period, but not the second, the slope of the indifference curves is $\frac{dC_1}{dC_2} = -(1-\alpha)^2 C_1^{-\alpha} C_2^{\frac{-\alpha}{(1-\alpha)}}$ and hence negative, and where the 2nd derivative $\frac{d^2 C_1}{dC_2^2} = -\alpha(1-\alpha)^2 C_1^{-(1+\alpha)} C_2^{\frac{-\alpha}{(1-\alpha)}}$ is positive such that the indifference curves are convex.

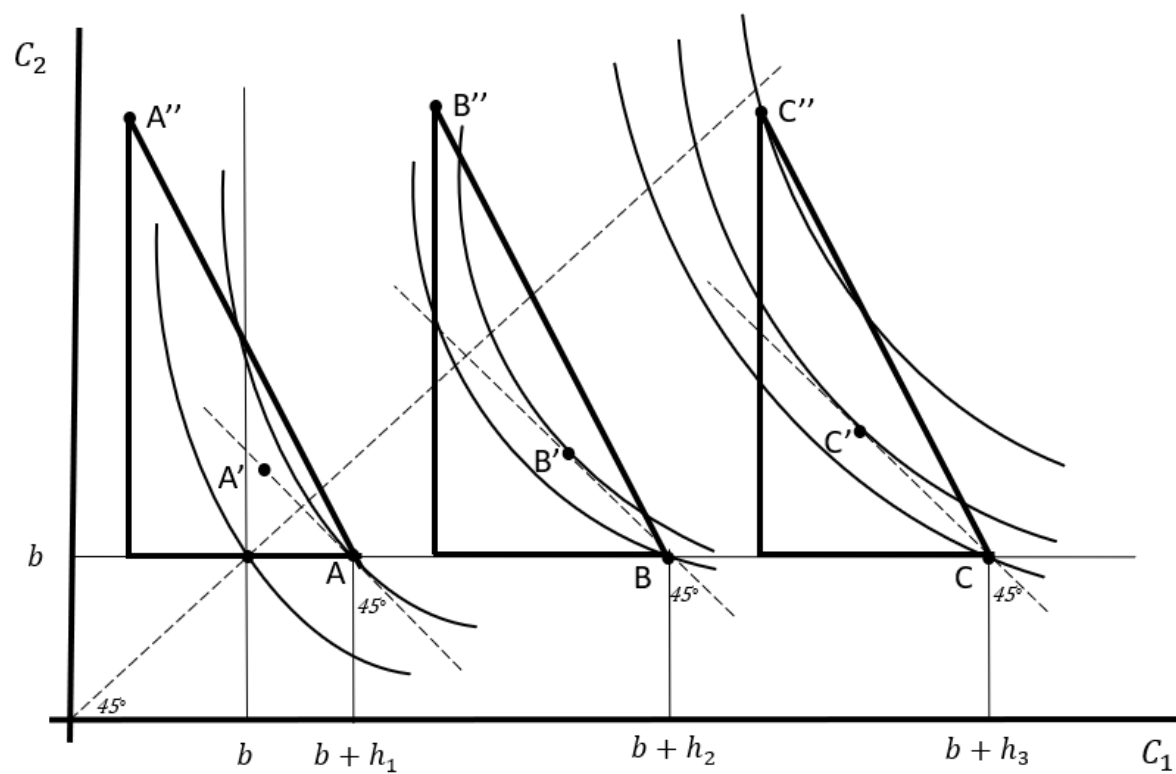


Figure 1: Responses to Higher Levels of Cash Transfers

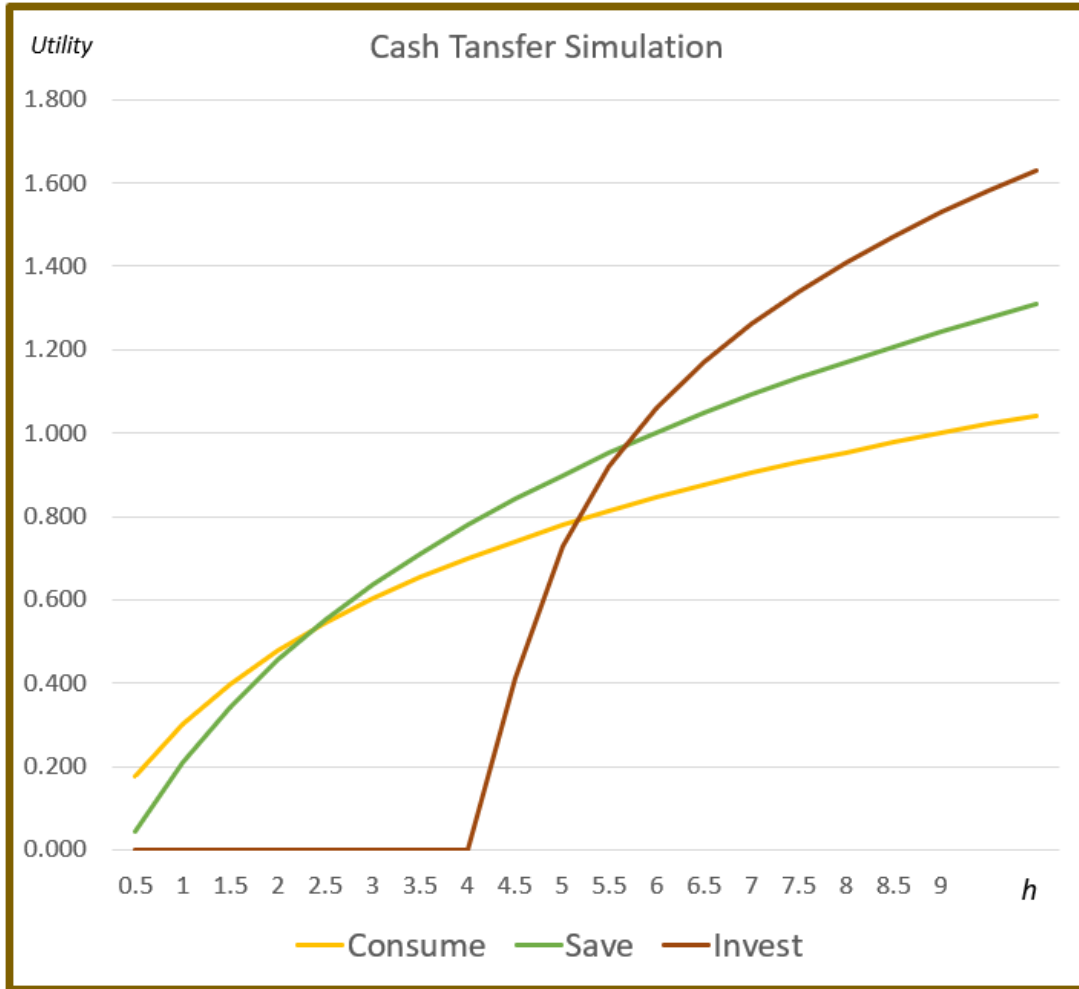


Figure 2: Simulation of Optimal Behavioral Responses to Cash Transfers
 $(b = 1, R = 0.10, d = 5, \text{ and } \delta = 0.70)$

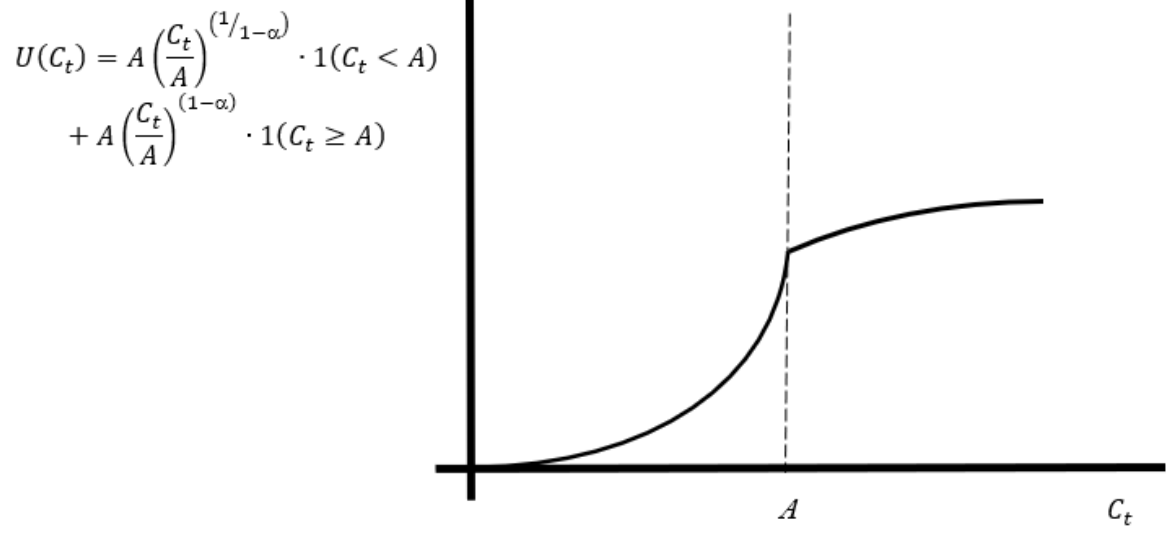


Figure 3: Aspirations-Based Utility

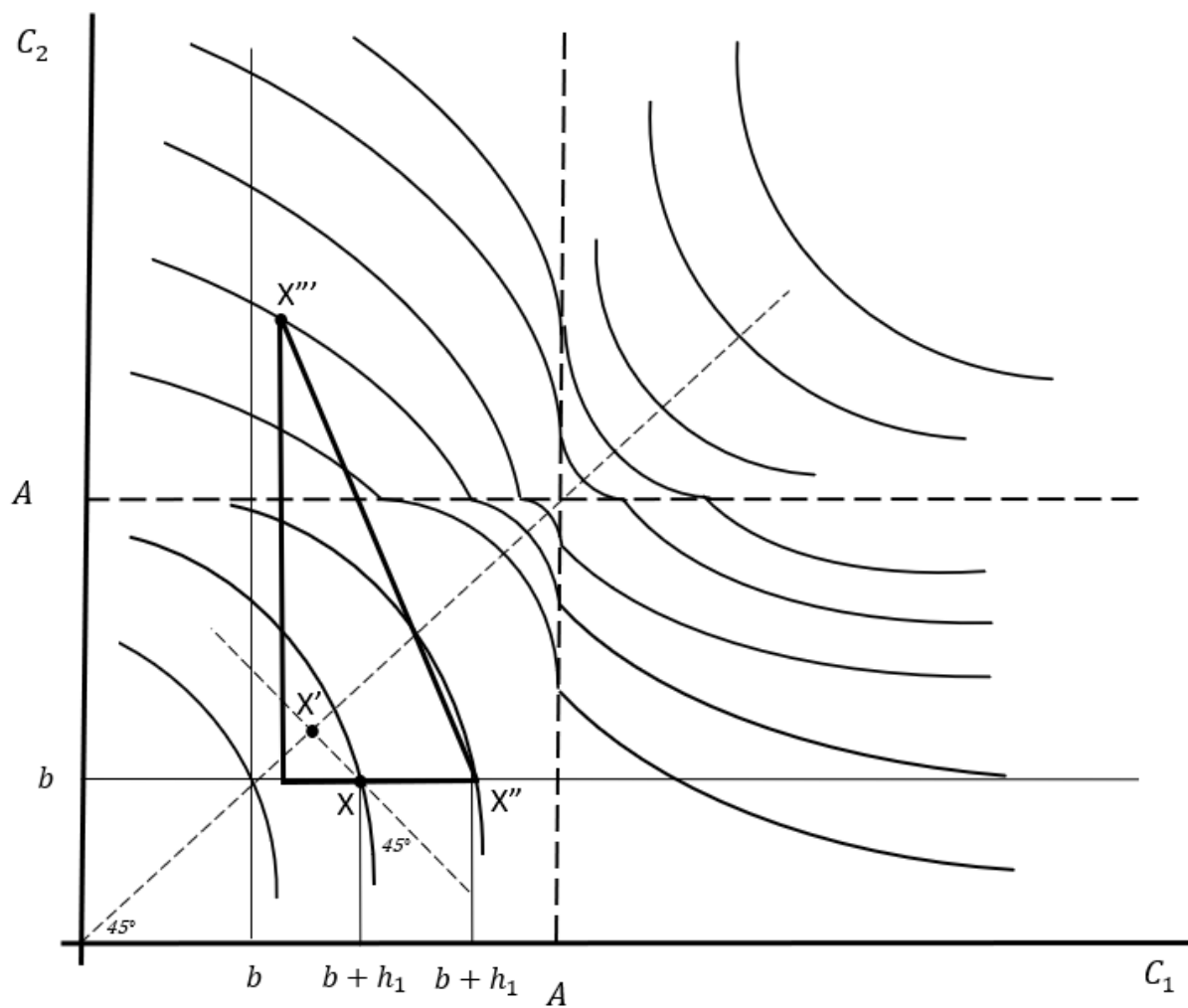


Figure 4: Behavioral Responses to Cash Transfers with Aspirations-Based Utility

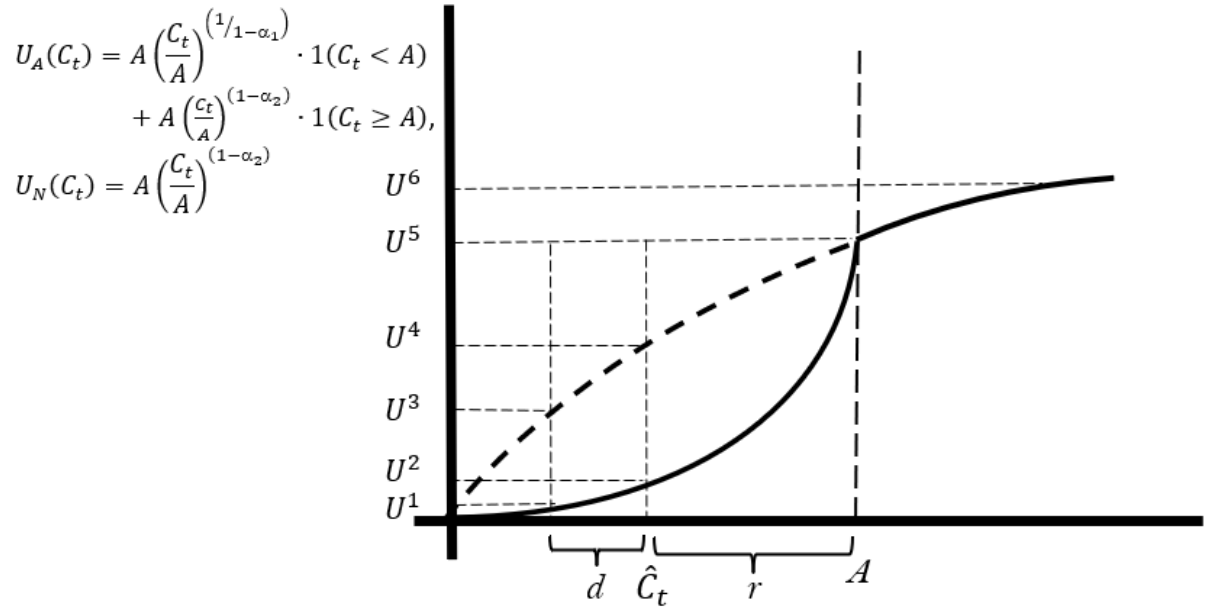


Figure 5: Cash Transfers with Neo-classical and Aspirations-based utility.