

CSAE Working Paper WPS/2025-08-02

The Welfare and Market Effects of Delays in Humanitarian Assistance

Vittorio Bruni, and Olivier Sterck*

October 2025

Abstract

Delays in aid delivery are common, yet their impacts on households and markets are theoretically ambiguous and empirically understudied. Models with financial constraints or present bias predict sharp consumption declines, while the Permanent Income Hypothesis predicts consumption smoothing. We test these predictions using high-frequency data and random interview timing in a large refugee camp in Kenya. Households smooth consumption under regular aid cycles, but delays reduce food consumption and food security. Informal credit through shops mitigates short-term impacts, but entails higher prices (+17%). Prices also respond to the timing of aid. Results support credit constraint models.

JEL Classification: D50, I38, O12, O19

Keywords: Cash transfers, Consumption smoothing, Delays, Humanitarian assistance

*Vittorio Bruni: University of Oxford. E-mail: vittorio.bruni@gtc.ox.ac.uk; Olivier Sterck: University of Oxford and University of Antwerp. E-mail: olivier.sterck@uantwerpen.be. We thank Alexander Betts, Onur Altındağ, Frédéric Aubery, Samuel Bazzi, Antonia Delius, Dennis Egger, Richard Freund, Flavia Galvani, Jason Kerwin, Charles Kenny, Stephen O’Connell, Jean-François Maystadt, Naohiko Omata, Isabel Ruiz, Matthias Schündeln, Jade Siu, Carlos Vargas-Silva, and seminar participants at the University of Oxford, University of Reading, University of Antwerp, Goethe-Universität Frankfurt, and at the 2025 CSAE, NCDE, and Fragile Lives conferences for helpful feedback and suggestions. We thank Raphael Bradenbrink, Andhira Kara, Patrick Mutinda, and Nada Rostom for wonderful research assistance. During survey implementation, we were privileged to work with excellent teams of enumerators, which were led by Pascal Zigashane Bahati, Christine Achola Dominic, John Amanyia Simon, Betty Zekira Valeirano, Samuel Binja Cimanuka, and Farhan Aden. Finally, we express our deepest gratitude to all households that participated to our surveys. This research would not have been possible without their collaboration. We gratefully acknowledge financial support from the IKEA Foundation. The field operations and logistics of this study were supported by the World Food Programme (WFP). From WFP, we are especially grateful to Calum Gardner, Felix Okech, Olivier Nkakudulu, Tina Wu, Zippy Mbatii, Samal Lokuno, Boniface Wanganju, Thomas Chika, Harun Kamau, Elizabeth Wambui, Walter Nyasinga, Ronald Odhiambo, Nicholas Mweresa, and Jackline Mwinzi. This impact evaluation study received Institutional Review Board (IRB) clearance from The University of Oxford, under protocol SSH/C1A.22.007.

1 Introduction

Income delays are a pervasive and understudied friction that may distort household consumption, behavior, and market dynamics. Previous research has examined how income shocks affect consumption and other outcomes e.g, following cash transfers (Gentilini 2024), weather shocks (Dell et al. 2014), or seasonal fluctuations (Fink et al. 2020). Less is known about the impact of unexpected shifts in the timing of income, holding its level constant. We study this question in the context of humanitarian aid, a vital but often delayed income source for millions.

In 2023, 339 million people required humanitarian assistance, a fourfold increase since 2015 (Development Initiatives 2023). However, only 68% received aid due to insufficient donor contributions. Aid delivery is also frequently delayed due to conflict, logistical barriers, and bureaucracy. In war-affected regions such as Gaza, DR Congo, Ethiopia, and Sudan, blockades, looting, and insecurity cause severe disruptions. Even outside conflict zones, delays are common due to administrative and logistical constraints. From a policy perspective, understanding the impacts of humanitarian aid delays is critical, as they affect millions of highly vulnerable individuals and are likely to become more frequent amid ongoing budget cuts by major donors, including the US, UK, and several European countries.

From an academic perspective, delays in humanitarian aid offer an opportunity to test competing models of intertemporal choice. Classical models such as the Permanent Income Hypothesis (PIH) predict that households smooth consumption by allocating resources based on expected lifetime income, implying minimal impact of temporary fluctuations such as aid delays (Friedman 1957; Hall 1978). In contrast, behavioral models with high discounting, temptation, or limited attention predict limited consumption smoothing even in the absence of shocks (Strotz 1956; Laibson 1997; Gul and Pesendorfer 2001; Banerjee and Mullainathan 2010; Gabaix and Laibson 2017), with the most extreme case corresponding to hand-to-mouth behavior where households consume resources immediately as they arrive (Kaplan and Violante 2022; Gelman 2022). Between these extremes lie models with credit or savings constraints, where consumption smoothing during shocks is partial and depends on access to credit or precautionary reserves (e.g., Deaton 1991; Carroll 1997).

We test these theories by assessing the impact of humanitarian aid delays in one of the world’s largest refugee camps, in Kenya.¹ Kenya hosted about 600,000 refugees in October 2022, when data collection began. The vast majority of these refugees (86%) resided in the Kakuma and Dadaab refugee camps, the two largest refugee camps in Africa. All camp-based refugees in Kenya received food assistance from the World Food Programme (WFP) in the form of monthly cash or in-kind transfers, valued at approximately USD

¹We study the impact of aid cuts in a companion paper, see Bruni and Sterck (2025).

17 per refugee per month at the start of the study. Most refugees fully depend on these transfers to survive. However, cash transfers were delayed by an average of 11 days during the study period because of bureaucratic happenstance, with significant variation across months (s.d. = 7, min. = 0, max. = 23).

We study consumption smoothing in the presence of transfer delays by exploiting high-frequency data collected in Kakuma over the course of one year, between October 2022 and September 2023.² Our identification strategy leverages three unique features of the data. First, ten waves of panel data were collected for a representative sample of 622 South-Sudanese households (6,220 interviews in total), enabling us to track socioeconomic variables over time while controlling for household fixed effects. Second, aid transfers were frequently delayed because of bureaucratic procedures that are independent of refugee and market outcomes. Third, interview dates were randomly assigned, creating experimental variation in whether and to what extent households were impacted by delays at the time of their interviews. Our study exploits this experimental variation together with household fixed effects to study the impact of delays and, more broadly, how the monthly aid cycle affects consumption smoothing and the socioeconomic outcomes of recipients.

During the data collection year, we also gathered longitudinal data on the prices of 70 food and beverage items in different markets in the camp. This high-frequency dataset allows us to study the market effects of aid delays and, more broadly, how prices fluctuate throughout the monthly aid cycle. The quantitative data are supplemented by over 250 qualitative interviews conducted with refugees, wholesalers, food retailers, and humanitarian workers, both before and after the data collection period.

We highlight three key findings from our study. First, we identify large negative impacts of aid delays on refugees' consumption and food security. Delays reduce caloric intake, dietary diversity, food security, and the value of consumption, contradicting the predictions of the PIH. Our regression model predicts that daily calorie intake falls by about 137 calories (7%) following an average delay of 12 days, and by about 286 calories (15%) after the longest observed delay of 23 days. At the same time, we find that refugees are generally able to smooth consumption during a "normal" aid cycle, when transfers are received on time, contrary to the predictions of behavioral and hand-to-mouth models, which typically imply overconsumption upon receipt.

Second, we find strong heterogeneity in the effects of aid delays based on households' place of residence, providing suggestive evidence that credit and liquidity constraints drive our results. Kakuma comprises two distinct sites—the Kakuma camp and the Kalobeyei settlement—each with its own modalities of aid delivery. In Kalobeyei, humanitarian aid is provided as cash transfers via ATM or SIM cards. Refugee households use these cards—and the promise of future cash transfers—as collateral to secure food on credit

²Data collection was not conducted in Dadaab due to security concerns. Our research covers the Kakuma site, which comprises the four Kakuma camps and the three villages of the Kalobeyei settlement.

when aid is delayed. As a result, they can better smooth consumption during delays. This comes at a steep cost, however, as prices for purchases on credit are 17% higher on average, reflecting an implicit interest rate. By contrast, in the Kakuma camp, aid is delivered as a mix of in-kind transfers (about 60% of transfer value) and cash transfers (about 40%), limiting households' ability to use cash transfers as collateral to access credit. Facing both liquidity and credit constraints, households in Kakuma struggle to smooth consumption during aid delays.

Finally, we document general-equilibrium effects in local markets. The prices of staple goods purchased with aid cards fall when transfers are delayed, reflecting weaker demand, while the prices of goods purchased with hard cash rise, as cash becomes the only available means of payment. These findings highlight how market dynamics in humanitarian settings are impacted by the timing of aid.

Our paper makes several contributions to the literature. First, it provides causal evidence on the effects of delays in regular income payments, highlighting the welfare costs of frictions in transfer timing. It adds to research on how the timing (Parker et al. 2013; Brune et al. 2021) and frequency (Aguila et al. 2017; Casaburi and Macchiavello 2019; Brune and Kerwin 2019) of payments shape household outcomes.³ Whereas these studies exploit randomized variation in payment schedules that are subsequently predictable, we examine unexpected, exogenous disruptions to the timing of payments, which generate temporary liquidity constraints without reducing the overall transfer amount. It complements studies that exploit bureaucratic failures in cash transfer delivery to assess program impacts (e.g., Gilligan et al. 2013, Bazzi et al. 2015).⁴ We show that unexpected shocks to transfer timing have large negative effects on refugee households, suggesting that the predictability of aid may be as important for welfare as the amount transferred.

Second, we contribute to the literature on consumption smoothing and intra-cycle consumption dynamics by testing competing models of intertemporal choice in a context of extreme vulnerability, where these theories are arguably most relevant. An important literature examines how households smooth consumption and expenditures between regular payments. In high-income settings, studies document payday-driven expenditure spikes, consistent with models of hyperbolic discounting and present bias (e.g., Stephens 2003, 2006; Shapiro 2005; Mastrobuoni and Weinberg 2009; Hastings and Washington 2010; Gelman et al. 2014; Goldin et al. 2022).⁵ In low-income contexts, evidence remains more limited. Aubery and Buisson (2024) find that refugees in Chad do not fully smooth consumption across the aid cycle, though their data do not capture behavior immediately

³A burgeoning literature also examines how impacts persist or fade over time (Blattman et al. 2020; Balboni et al. 2022; Altındağ and O'Connell 2023).

⁴Gilligan et al. (2013) study delays in cash transfers to demobilized combatants in Burundi, while Bazzi et al. (2015) examine delays in the rollout of a social transfer program in Indonesia. Both focus on temporary programs and disruptions during early implementation. In contrast, our study examines delays in the delivery of regular and ongoing payments.

⁵Carvalho et al. (2016) also finds evidence of present bias.

before or after disbursements, while Angelucci et al. (2024) find evidence consistent with smoothing among PROSPERA beneficiaries in Mexico. This literature faces several empirical challenges. First, existing studies cannot usually distinguish between smoothing over regular, anticipated income cycles and responses to unexpected shocks in timing. Second, transfer dates typically coincide with other predictable payments, confounding causal inference (Gelman et al. 2014; Goldin et al. 2022). Third, most studies focus on expenditures, even though smoothing theories make predictions about consumption (Aguiar and Hurst 2005; Angelucci et al. 2024). Our study addresses these challenges by combining high-frequency panel data with detailed consumption measures (rather than expenditure proxies), randomly assigned interview dates (as in Stephens 2003), and quasi-random variation in aid delays, capturing both the regular aid cycle and unexpected timing shocks. We find that households smooth consumption under normal aid timing, contradicting behavioral and hand-to-mouth models, but struggle to do so when aid is delayed, in contradiction to the PIH. These results highlight the central role of liquidity, credit, and savings constraints in shaping responses to shocks in transfer timing.

Third, our study advances the literature on seasonality, poverty dynamics, and food insecurity. A large literature studies seasonality and consumption smoothing in agrarian economies, where predictable fluctuations in income and prices generate recurrent cycles of food insecurity and borrowing (e.g., Paxson 1993; Devereux et al. 2012; Kaminski et al. 2016), with households only partially adapting (e.g., Basu and Wong 2015; Fink et al. 2020). A related strand of work analyzes the dynamics of poverty (Christiaensen and Shorrocks 2012; Addison et al. 2009) and food insecurity (Barrett 2010), with recent evidence highlighting the importance of short-term (monthly) variations (Merfeld and Morduch 2022). Our data allow us to go a step further by analyzing high-frequency fluctuations in food consumption, food insecurity, and other outcomes within the monthly aid cycle. Unlike the seasonality literature, which focuses on anticipated patterns, we isolate the impact of unexpected and quasi-random shifts in the timing of income, holding its level constant.

Fourth, our findings contribute to the growing literature on the link between cash transfers and credit. Angelucci (2015) and Gazeaud et al. (2023) examine theoretically and empirically how future cash transfers can be used as a collateral to finance migration. On the supply side, Torkelson (2020) shows how microfinance institutions in South Africa targeted the recipients of government-guaranteed cash transfers to offer credit, using transfers as a collateral to secure credit. Our results demonstrate that refugees leverage cash transfers as collateral to cope with idiosyncratic shocks. However, this strategy comes at a high cost, as indebted households must accept higher prices from shopkeepers, who also act as their credit providers. More generally, our study contributes to the literature on shocks and coping strategies (Dercon 2002) by examining how households cope with liquidity shocks within a humanitarian economy.

Finally, our study contributes to the growing literature on the market effects of cash transfers, which documents spillover effects on businesses (Egger et al. 2022; Delius and Sterck 2024) and prices (D’Aoust et al. 2018; Cunha et al. 2019; Filmer et al. 2023). It also complements the literature on the short-term effects of food stamps on US prices (Hastings and Washington 2010; Goldin et al. 2022). While most of these studies focus on the effects of changes in the amount or coverage of transfers, we show how variation in the timing of cash delivery, without changes in value, affects local prices. More generally, our study offers insights into how market dynamics evolve within the monthly aid cycle in a humanitarian economy.

The paper is structured as follows. Section 2 provides background on humanitarian assistance and the living conditions of refugees in Kakuma and Kalobeyei. Section 3 introduces the data sources and survey design. Section 4 presents the analysis of household-level data, while Section 5 examines price dynamics. Section 6 discusses the welfare implications of our findings, and Section 7 concludes.

2 Context

Kakuma town is located in Turkana County, an arid area in north-western Kenya bordering Uganda, South-Sudan, and Ethiopia. The Kakuma camp was established there in 1992 due to the arrival of South-Sudanese refugees escaping the civil war (Jansen 2018). Over the years, recurrent violence and climatic shocks in the region have driven tens of thousands of additional refugees to the camp. To address this growing influx, UNHCR together with the Kenyan Government have expanded the camp multiple times and, in 2016, they opened the Kalobeyei settlement a few kilometers away from Kakuma (MacPherson and Sterck 2021).

The Kakuma camp and Kalobeyei settlement are often regarded as a single large camp due to their close proximity, shared environment, and joint administration by the same UN and government offices. By the end of our fieldwork, in late October 2023, the combined population of Kakuma camp and Kalobeyei settlement reached 270,000 people, making the camp the third largest in the world and the second in Africa (UNHCR 2023). Almost one in two refugee households in Kakuma camp and Kalobeyei settlement were from South Sudan (49%). The camp also hosted a significant number of Somali (16%) and Congolese (10%) households. In October 2022, 81 percent of the refugee population lived in the Kakuma camp, while 19 percent resided in the Kalobeyei settlement.

The refugee population across both sites faces significant socioeconomic challenges, including a high dependency ratio, low employment rates, and a heavy reliance on humanitarian aid (Bruni et al. 2024). Households are typically large, averaging 7.3 members, with children accounting for approximately 60% of the population. Kenya’s encampment policy restricts refugee freedom of movement and access to formal employment. Only 40%

of households in Kakuma and Kalobeyei have at least one adult earning an income, and the few adults who work earn less than USD 50 per month on average. The majority of households depend on humanitarian assistance—food assistance in particular—to survive. Food assistance represents approximately 68% of total income per capita in Kakuma and Kalobeyei.

In both sites, the World Food Programme (WFP) oversees the distribution of food assistance, aiming to provide 2100 calories per person per day. However, funding shortfalls often result in reduced food assistance. Between October 2022 and June 2023, food assistance provided about 80% of the target level of 2100 calories per person per day. From July 2023 onward, humanitarian assistance was further reduced by approximately 20%. We study the impact of this aid cut in Bruni and Sterck (2025).

The modalities of food distribution vary between sites.⁶ During our study, households registered in Kakuma received a mix of in-kind food assistance (~60% of total value) and cash transfers (~40% of total value). A typical in-kind food basket included 6.51 kilograms of grains (such as maize, sorghum, wheat, or rice), 1.86 kilograms of pulses (beans or split peas), and 1 liter of oil. In-kind distributions in Kakuma consistently occurred during the first week of each month. In addition, households registered in Kakuma received monthly cash transfers that are delivered via SIM cards and are restricted. The money can only be used to purchase food items from WFP-contracted shops (Siu et al. 2023; Delius and Sterck 2024).⁷

Households registered in Kalobeyei received cash transfers only. For most households, transfers are delivered via bank cards and are unrestricted, allowing households to spend the money in any shop and on any items. The system also enables cash withdrawals for purchases with hard cash. A smaller subset of households, mainly those without adults, received restricted cash transfers on SIM cards.⁸

Cash transfers in Kakuma and Kalobeyei were consistently delayed during our study, often by several days (Figure 1). According to WFP’s Standard Operating Procedures (SoPs), restricted cash transfers in Kakuma were scheduled to be distributed on the 23rd of each month. However, delays occurred in ten out of the twelve months, with an average delay of five days and a maximum delay of 15 days (s.d. = 4.2). In Kalobeyei, cash transfers were supposed to be distributed on the 11th of each month as per the SoPs. Despite this, delays were recorded every month for both cash transfer programs. For the

⁶Due to mobility between the sites after registration, a number of households receive assistance modalities that do not align with their current place of residence. In Kakuma, 83% of households received a combination of in-kind food rations and restricted cash transfers, while 17% received cash transfers only. In Kalobeyei, 94% of households received cash transfers exclusively, while the remaining 6% also received in-kind food rations.

⁷The cash transfer amount in Kakuma was KES 850 (USD 7.1) per person per month from October 2022 to June 2023, and KES 450 (USD 3.8) per person per month from July 2023.

⁸In October 2022, the cash transfer amount in Kalobeyei was KES 2,000 (USD 17) per refugee per month. By July 2023, this amount was reduced to KES 1,600 (USD 13) per refugee per month.

unrestricted cash program, the average delay was 12 days (min. = 5, max. = 22, s.d. = 5.3). For the program of restricted transfers, the average delay was even longer, at 16 days (min. = 5, max. = 23, s.d. = 4.3).

The primary reason for delays in cash transfers is that bureaucratic procedures are taking longer than planned, making them unpredictable for households. Each month, four steps involving various UN agencies and NGOs must be completed before transfers are delivered. The first step, referred to as “proof of life”, involves the UNHCR and WFP sub-offices in Kakuma, along with their partners managing food distribution. They verify whether beneficiaries are still alive and residing in either the Kakuma refugee camp or the Kalobeyei settlement, requiring the fingerprints of at least one household member. The proof of life is conducted during in-kind distribution in Kakuma and during the last week of each month in Kalobeyei. The main output of this step is the generation of a distribution list containing all beneficiaries, which is then submitted to the WFP office in Nairobi. According to SoPs, this first step is supposed to take between 1 and 4 days; however, during our study, it took an average of 9 days. The second step involves cross-checking the submitted distribution list, creating a payment list, and submitting it to WFP’s Programme team. This task, carried out by the WFP Supply Chain team in Nairobi, is expected to take one working day. On average, it took 1.3 days during the study period. In the third step, WFP’s Programme team reviews the payment list, releases the down payment, and finalizes a new list to submit to the finance team. According to SoPs, this step should also take one day, but it averaged 2.7 days during our study. Finally, the fourth step requires the finance team and business partners at Equity Bank and Safaricom to disburse funds to beneficiaries, a process that should take three days according to SoPs. However, the average time for this step extended to 6.2 days. According to SoPs, in the worst-case scenario, all four steps combined should take no more than 9 days. Yet, during our data collection year, the process lasted nearly 20 days on average (19.6), a timeline consistent with previous years.

Importantly, the delays we study are neither unique to Kakuma nor limited to the period of our data collection. Aid delays were already widespread before our research began and continue to affect refugee populations in Kenya and beyond. Across Kenya, more than half a million refugees are affected by delayed assistance. Globally, aid delays have been widely documented in both refugee and non-refugee settings (Lentz et al. 2013; Nikulkov et al. 2016).

3 Data

Between September 2022 and November 2023, we conducted three complementary data collection activities: (1) a high-frequency household survey, (2) a high-frequency price survey, and (3) in-depth qualitative research.

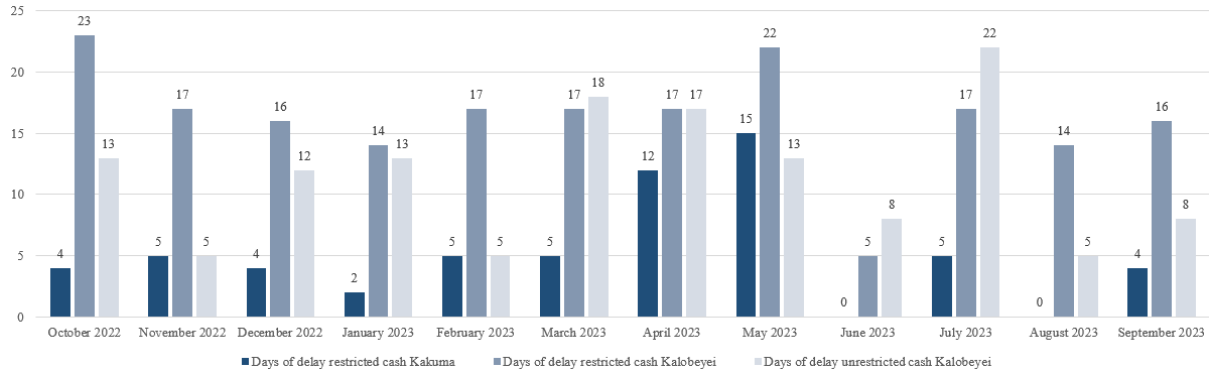


Figure 1: Cash transfer delays in Kakuma and Kalobeyei

Data source: WFP distribution dates.

First, we aimed to collect high-frequency data from a representative sample of 622 South-Sudanese households.⁹ Our objective was to collect 10 waves of data for each household, totaling 6220 interviews. Data collection started on the 6th of October 2022 and finished on the 27th of September 2023. To ensure the highest data quality on consumption and food security, interviews were conducted with the household member responsible for meal preparation. The data were collected by trained refugee enumerators on survey tablets.

Each wave lasted exactly four weeks and was divided into eight three-day intervals, with Sundays excluded from the survey protocol. Before the first wave, households were randomly assigned to one of these intervals, which determined their interview schedule for all subsequent waves. We employed two strategies to maximize variation in survey days for each household across waves. First, each wave spanned 28 days, while a typical month averages 30.4 days. Second, throughout the data collection period, we scheduled four two-week breaks and one one-week break. These two factors introduced variation in interview timing. For example, households assigned to the first three-day window were interviewed around October 6-8 (Wave 1), November 17-19 (Wave 2), December 15-17, January 26-28, March 2-4, April 13-15, May 11-13, June 22-24, July 20-22, and August 31 to September 1 (Wave 10). Our analysis leverages this exogenous variation in survey days for each household across waves. Overall, 91% of the interviews were conducted within the assigned three-day windows, while 9% fell outside of them. In the analysis, we address this non-compliance using instrumental variable regression (see Section 4.1 for details).

Attrition was minimal in this study, with only 34 out of 622 households (5.4%) either refusing to participate or relocating from Kakuma during the data collection period. Attrition is not correlated with the random assignment of interview dates (p -value = 0.52). When households dropped out, they were replaced by their nearest neighbor, who

⁹In the first wave, we also collected data on representative samples of Congolese and Somali households (see Bruni et al. 2024 for details).

was assigned a new identifier and is treated as a distinct household in the analysis. In total, our full sample includes 656 households, of which 588 completed all 10 waves, 34 attrited during the one-year survey period, and 34 are replacements. The results remain consistent even when excluding attrited or replacement households from the analysis (see Appendix Table A.8).

In parallel with the household survey, we conducted a high-frequency price survey of food, beverages, and non-food items in both Kakuma refugee camp and Kalobeyei settlement. Data collection started on the 27th of October 2022 and finished on the 27th of September 2023. Price data were collected weekly from shopkeepers in the main market areas of the four *camps* of Kakuma and the three *villages* of Kalobeyei. The survey covered 70 different types of food items.¹⁰ A full assessment took a week to complete. The data are used to analyze the market effects of aid distribution and aid delays, and more generally, to study how prices evolve throughout the monthly aid cycle.

Finally, we also conducted more than 250 in-depth interviews before and after the quantitative surveys, which offer insights into the broader economic challenges faced by refugee communities and their coping strategies. The qualitative work was organized in two phases. In September 2022, we conducted 70 semi-structured interviews with refugees and shop owners to explore economic activities, resources, consumption patterns, and coping strategies. These interviews, along with focus group discussions with our enumerators informed the development of the quantitative surveys. In October and November 2023, we followed up with 134 one-off interviews with refugees, shopkeepers, wholesalers, and key informants. In the same period, we also conducted a food security journaling component with six South-Sudanese households from Kakuma and Kalobeyei, interviewing them two to three times per week over a month to understand how they manage food supplies. We use the qualitative data to triangulate results, examine perceptions, and explore mechanisms of impact.

4 Analysis of Household Data

4.1 Identification Strategy

The analysis of high-frequency household data focuses on two key questions: (1) Can households effectively smooth their consumption and other outcomes throughout the aid cycle? (2) Do delays in cash transfer delivery affect households' ability to smooth their consumption and other outcomes?¹¹ To address these questions, we estimate the following

¹⁰Different quantities of the same product are considered separately. For instance, maize is typically sold per kg or in bags of 45kg. These are considered as separate goods in the analysis.

¹¹Because all households in our sample are sometimes affected by aid delays, we cannot compare counterfactual worlds with and without delays. Instead, using household fixed effects, we study how consumption smoothing is affected when aid is delayed.

regression equation:¹²

$$Y_{i,t} = \beta_0 + \beta_1 Days_{i,t} + \beta_2 Cash\ delay_{i,t} + \delta^T X_{i,t} + \gamma HH_i + \epsilon_{i,t}, \quad (1)$$

where $Y_{i,t}$ represents the outcome of interest for household i at time t .

The variable $Days_{i,t}$ denotes the number of days since the last transfer was received, either cash or in-kind. It is set to zero on the distribution day and increases by one unit each subsequent day until the next distribution day. Figure 3 shows the distribution of this variable by location.¹³ The coefficient β_1 measures households' ability to smooth consumption and other outcomes between transfers.¹⁴

The variable $Cash\ delay_{i,t}$ measures the number of days by which a cash transfer is overdue. It takes the value zero before the expected delivery date, equals one on the first day after the due date if the transfer has not yet arrived, and increases by one for each additional day until the transfer is delivered.¹⁵ The coefficient β_2 captures whether the outcome variables are specifically impacted during delays.

The coefficients β_1 of the smoothing variable and β_2 of the delay variable should be interpreted jointly, as illustrated in Figure 2. Mechanically, there is indeed a strong correlation between these variables. As aid delays increase, the number of days since the last transfer should also rise. In our data, the correlation coefficient between $Days_{i,t}$ and $Cash\ delay_{i,t}$ is 0.57. As such high correlation between explanatory variables of interest could create a problem of multicollinearity, we perform robustness checks by re-estimating regressions where smoothing and delay variables are included separately. To avoid omitted variable bias, the results of these regressions should only be interpreted if the coefficients of the excluded variables are close to zero and insignificant in the full specification.

Figure 2 illustrates key scenarios for an outcome variable such as consumption, which is expected to decrease over the aid cycle and in response to delays. If $\beta_1 < 0$ but $\beta_2 = 0$, households are unable to smooth consumption over the aid cycle, but aid delays do not have a distinct impact. Importantly, delays still matter indirectly, as each additional day without aid further reduces consumption. If $\beta_1 = 0$ but $\beta_2 < 0$, households are able to smooth consumption over the aid cycle, except when aid is delayed, which leads to a progressive drop in consumption. If $\beta_1 < 0$ and $\beta_2 < 0$, households face two

¹²We did not register a pre-analysis plan (PAP) because data on delays, our key source of identifying variation, only became available after data collection was completed.

¹³Food consumption indicators and the measures of sleep quality and moods relate to the day preceding the survey. For these outcomes, $Days_{i,t}$ is set to zero if distribution occurred the day before the survey. In our main specification, we exclude the few observations recorded on transfer days, as it is unclear whether they belong to the delay period. The results remain similar when these observations are included (Appendix Table A.9).

¹⁴For simplicity, this specification implicitly assumes that consumption smoothing is similar after cash and in-kind transfers. We test this assumption and find supporting evidence in Appendix Table A.10.

¹⁵As a robustness check, we also test a specification where $Cash\ delay_{i,t}$ is a binary variable, finding similar results (Appendix Table A.13).

challenges: an inability to smooth consumption over the aid cycle and an additional decline in consumption due to aid delays. In the most optimistic scenario, consistent with the Permanent Income Hypothesis, $\beta_1 = \beta_2 = 0$, indicating that households fully smooth consumption and are unaffected by delays (not shown in the figure).

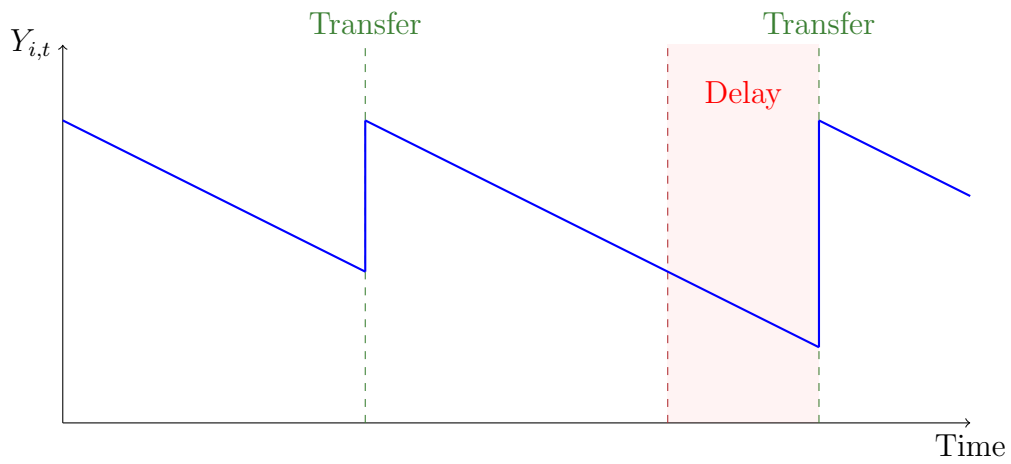
The two variables of interest depend on two sources of variation: aid distribution dates and survey dates. We exploit the randomization of survey dates and quasi-random variation in distribution dates to estimate regression coefficients.

Aid distribution dates are plausibly exogenous to the outcomes of interest. A total of 36 different cash transfers were organized by WFP and its partners during the one-year study period.¹⁶ Importantly, the timing of cash distributions was not tailored to individual households and did not depend on the socioeconomic conditions in the camp. As detailed in Section 2, cash transfer dates are set in WFP’s standard operating procedures but subject to bureaucratic contingencies. This makes the occurrence of delays plausibly exogenous to household-level outcomes. In Appendix Table A.1, we also provide evidence that delays are uncorrelated with the time of the year, weekends or holiday periods, weather data, or the KES-USD exchange rate.

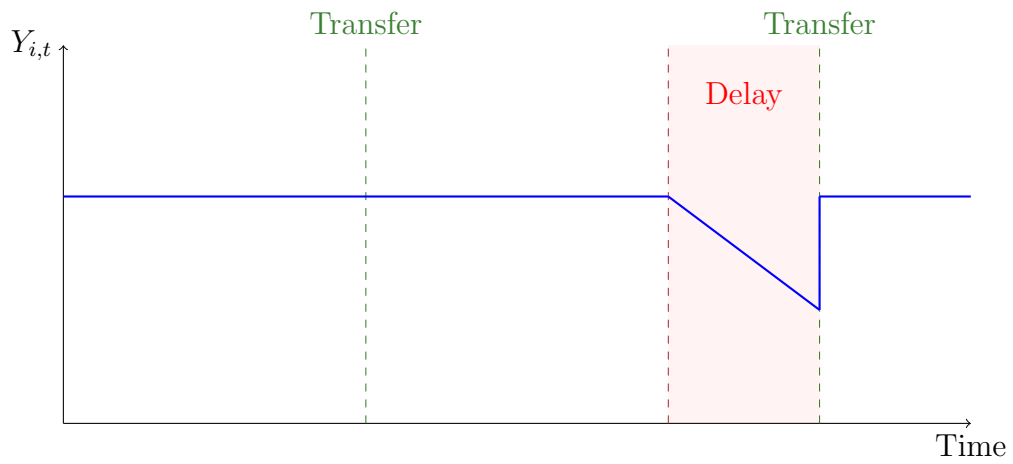
Randomly assigned interview dates are also exogenous. To be sure, actual interview dates may be endogenous. For instance, the poorest households might be more likely to postpone interviews during delays if they feel too weak or stressed to participate. Conversely, they might prioritize participation to receive the study compensation. To address this potential endogeneity concern, we exploit the random assignment of interview dates. As detailed in Section 3, each survey wave was organized over four weeks, divided into eight blocks of three consecutive days, with Sundays excluded. Households were randomly assigned to one of these 3-day blocks at the start of the fieldwork. Appendix Table A.2 demonstrates that treatment assignment is orthogonal to 21 baseline variables, with an F -test of joint orthogonality yielding a p -value of 0.96 using randomization inference (Kerwin et al. 2024). This confirms that the randomization process successfully generated exogenous variation. Consequently, the assigned interview day—defined as the midpoint of the 3-day block—is an exogenous variable which we use to construct exogenous instruments for our two variables of interest, denoted $Days_{i,t}^{IV}$ and $Cash\ delay_{i,t}^{IV}$.¹⁷ We use these variables as instruments to estimate Equation (1). The compliance rate with random assignment was very high, with 91% of interviews conducted within the randomly assigned 3-day windows. As a result, the first-stage regressions are strong, with Kleibergen-Paap F -statistics exceeding 100 in most specifications (Lee et al. 2022). Results are consistent

¹⁶There are three cash transfer modalities (restricted cash transfers in Kakuma, unrestricted cash transfers in Kalobeyei, and restricted cash transfers in Kalobeyei) and 12 transfers per year per modality.

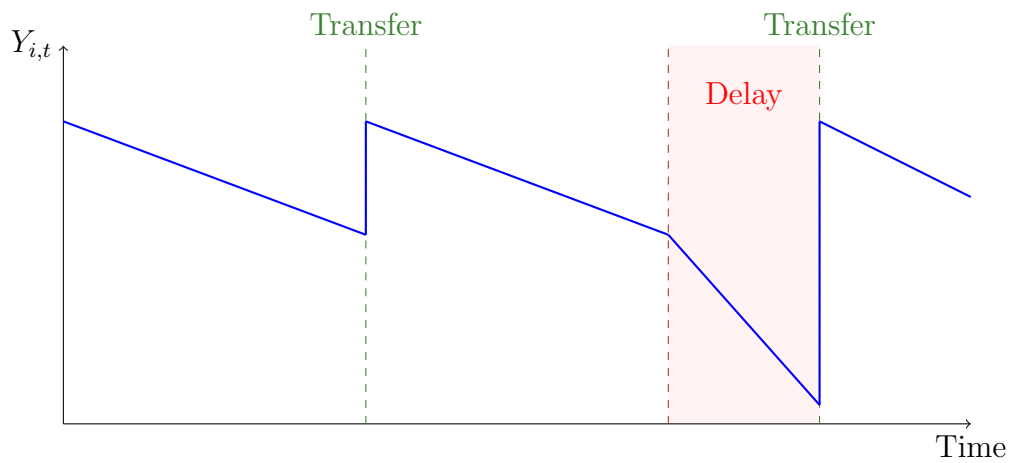
¹⁷For instance, while $Days_{i,t}$ measures the number of days between the *actual* interview date and the most recent aid distribution, $Days_{i,t}^{IV}$ measures the number of days between the *randomly-assigned* interview date and the most recent aid distribution. Similarly, $Cash\ delay_{i,t}^{IV}$ measures the number of days by which the cash transfer was overdue on the randomly-assigned interview date.



(a) $\beta_1 < 0, \beta_2 = 0$. Consumption decreases linearly over the aid cycle.



(b) $\beta_1 = 0, \beta_2 < 0$. Decline when aid is delayed.



(c) $\beta_1 < 0, \beta_2 < 0$. Consumption decreases linearly over the aid cycle, with additional decline when aid is delayed.

Figure 2: Smoothing and delays for different values of β_1 and β_2 .

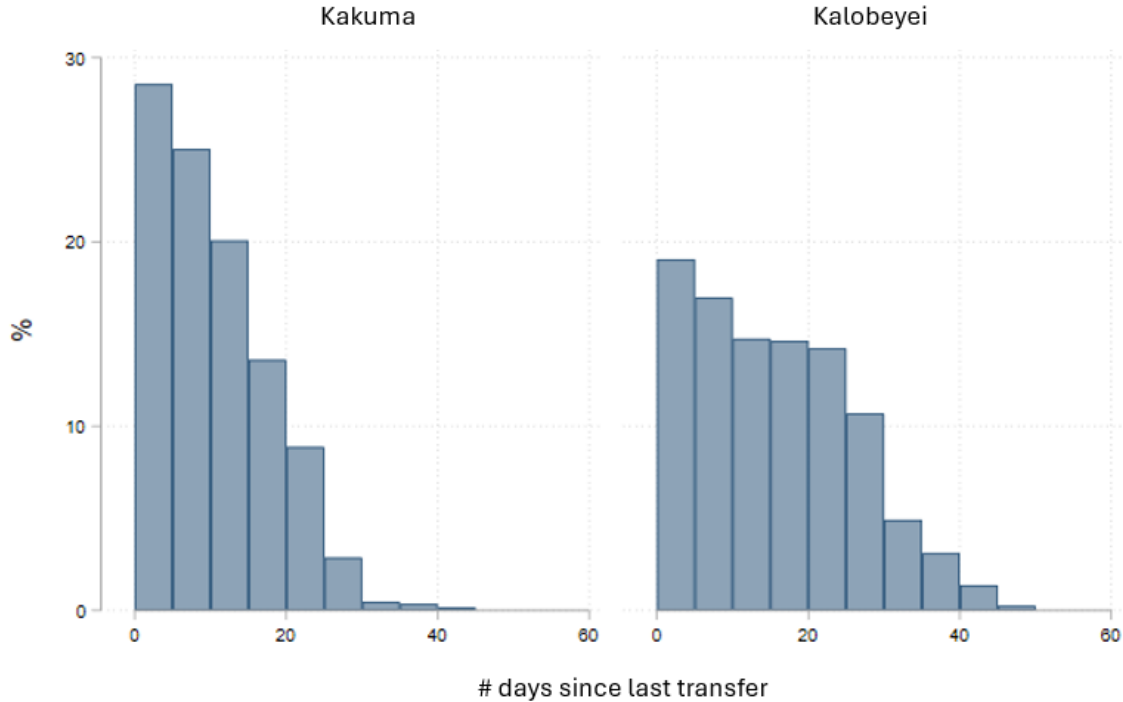


Figure 3: Distribution of the number of days since the last transfer

when using the reduced form, as shown in Appendix Table A.14.

Benchmark regressions include a vector $X_{i,t}$ of control variables that are expected to predict the outcomes.¹⁸ All regressions also include household fixed effects. While the inclusion of control variables and fixed effects is not necessary to obtain unbiased coefficients, they are added to the regressions to improve precision. As shown in Appendix Tables A.6 and A.7, the results remain virtually unchanged when controls or fixed effects are omitted.

We cluster standard errors at two levels. First, the household level, which is the unit of observation repeatedly surveyed over time and the level at which serial correlation in the error term is most likely to arise. Second, the survey date by camp of registration, because households registered in the same camp and interviewed the same day will have the same treatment status. Conclusions are similar if we consider only one level of clustering or use robust standard errors (Appendix Tables A.15 and A.16).

The main analysis focuses on 23 outcome variables, organized into four categories (see

¹⁸The control variables include household size, the number of adults, the number of children in school (to account for potential effects of free school meals on consumption measures), the number of jobs per capita, the value of the harvest during the four weeks preceding the survey, a dummy variable indicating whether the household experienced a shock in the four weeks preceding the survey, a dummy variable for whether behavioral games were conducted at the end of the survey, the number of individuals registered on the household's ration cards, the per capita value of in-kind assistance received during the most recent distribution, and binary and running variables identifying observations before and after the 3th of July 2023 (a significant aid cut occurred on that day, see Bruni and Sterck (2025) for details). See Table A.3 for a detailed description of these variables.

Section 4.2). To address concerns about multiple testing, we report sharpened q -values in the main analysis to control for the false discovery rate (Benjamini et al. 2006; Anderson 2008). All p -values of the regression coefficients shown in the main analysis of household data are considered together when estimating q -values.

We examine heterogeneous treatment effects based on the camp where households resided and the type of aid they received at baseline. In Kakuma, most households receive humanitarian assistance twice per month—once in-kind and once in cash. By contrast, households in Kalobeyei typically receive cash transfers once per month. Indebtedness is significantly higher in Kalobeyei, as households use the SIM or ATM cards on which they receive aid as collateral to access credit. Since cash assistance amounts are higher in Kalobeyei, the value of the collateral is also greater, enabling shopkeepers to grant higher levels of debt. Consequently, we re-estimate Equation (1) separately for households in Kakuma and Kalobeyei, as well as for those receiving in-kind rations versus cash transfers only at baseline.

We conduct multiple tests to assess the robustness and consistency of benchmark results. Specifically, we re-estimate Equation (1) without control variables, without fixed effects, excluding both attrited households and replacement households, including transfer days, and considering smoothing and delay variables separately. Additionally, we test extended specifications that account for potential differences in consumption smoothing following cash and in-kind transfers, and for non-linearities in consumption smoothing and in the impact of delays. We consider an alternative definition of the delay variable, as a dummy. We also estimate reduced-form regressions. We compare standard errors obtained with different levels of clustering, and with heteroskedasticity robust standard errors. The results across these various specifications are largely consistent and are presented in the Appendix. Instances where results are less robust are highlighted and discussed in Section 4.5.

4.2 Outcome Variables

Humanitarian assistance in refugee camps is typically distributed on a monthly cycle, and our objective is to capture significant changes occurring within this short time frame. To this end, our questionnaire was specifically designed to track daily fluctuations in consumption patterns, coping strategies, and well-being. The effects of aid delays are expected to be short-lived, with households experiencing particular hardship for a few days during the delay but generally returning to their baseline conditions once aid is delivered. Consequently, our analysis focuses on variables with a recall period of no more than one day.

In the main analysis, we consider 23 outcome variables, which are classified in four categories. The construction of these variables is described in details in Appendix Table

A.4, with descriptive statistics provided in Appendix Table A.5.

1. Food consumption: We collected detailed data on food consumption during the day prior to the survey, including food eaten at home, away from home, and school meals, which we use to construct six outcome variables. To measure food consumption, we use daily calories per capita, the value of food consumption per capita, and a binary variable equal to one if the household ate two or more meals and zero otherwise. To measure dietary diversity, we use FAO’s Household Dietary Diversity Score (HDDS) (Kennedy et al. 2011). The score counts the number of types of food that a household ate the day before the survey, out of 12 different categories. Building on the work of Kraay et al. (2024) and Sterck (2024), we also consider the number of days that households need to consume 2100 calories per capita—WFP’s daily target. This latter indicator is a distribution-sensitive measure of caloric intake, giving more weight to households with low consumption levels. Finally, we use FAO’s Household Food Insecurity Access Scale (HFIAS) with a one-day recall period to measure food insecurity (Coates et al. 2007).¹⁹

2. Stocks, debts, and assets: Common strategies to cope with shocks include using food stocks, taking up debt, and using savings or reselling assets. Our questionnaire included questions on food stocks related to maize, sorghum, rice, wheat, pasta, and oil. We aggregate the weight of these stocks in kilograms (kg) and their value in USD. Previous research highlights that debt is a particularly prevalent coping strategy in the Kakuma camp and Kalobeyei settlement (Bruni et al. 2024; Siu et al. 2023). The primary sources of debt are food retailers, who often provide food on credit but typically hold the household’s SIM or ATM card used for receiving food assistance as collateral. In our analysis, we examine both the per capita value of debt provided by food retailers and the total per capita value of debt, including from other sources. Using savings or reselling assets are also common strategies in case of shocks. We measure the value of assets and savings by aggregating the value of 24 types of physical assets (e.g., televisions, mobile phones, tables, chairs, cooking pots), animals (mainly chickens, ducks, and doves), and self-reported savings.

3. Mental well-being, time and risk preferences: We analyze six variables to investigate the effects of aid distribution and delays on mental well-being, time preferences, and risk preferences.²⁰ Mental well-being is assessed through self-reported measures of life satisfaction and sleep quality, both rated on a Likert scale from 1 to 5. Additionally,

¹⁹In the first survey wave, the recall period for the HFIAS was 28 days; consequently, this wave is excluded from analyses involving this indicator.

²⁰This module, as per the rest of the survey, was administered to the household member responsible for meal preparation.

we compute a “mood score” based on nine questions from the World Health Organization’s Study on global AGEing and adult health (WHO-SAGE). These questions inquire whether participants experienced various moods on the day prior to the survey, such as enjoying activities or feeling worried, rushed, or calm (Kowal et al. 2012). Responses are binary and aggregated to create a score ranging from 0 (poor mood) to 9 (excellent mood) (Taquet et al. 2020).

We measure time and risk preferences using incentivized games. Time preferences are captured by estimating respondents’ Required Rate of Return (RRR) through five trade-off questions, where participants choose between receiving 500 Kenyan Shillings (KES) in two months or a smaller amount in one month (Cohen et al. 2020; Andreoni and Sprenger 2012). The RRR measures preference of the present, and is proportional to the discount rate under specific assumptions. Additionally, we examine a binary choice between receiving KES 200 immediately or KES 300 in one month.²¹ To measure risk preferences, participants responded to three questions involving a choice between a guaranteed payment of KES 200 or a larger amount with a 50% probability of payout (Dave et al. 2010). Based on their responses, we categorize participants into four groups according to their level of risk tolerance.

4. Mathematics, memory, and cognitive abilities: We used five games to assess participants’ abilities in mathematics, memory, and cognitive tasks. In each wave, mathematical ability was tested using three arithmetic questions related to common market transactions.²² The number of correct responses is used as the outcome variable.

The remaining four games were played directly on the tablet, and the outcome variables are the number of correct responses for each game. Memory was assessed using an adaptation of the Simon memory game, following Carvalho et al. (2016). Participants were shown sequences of colored shapes of increasing length and were asked to replicate the sequence from memory. Selective attention and inhibitory control were measured using the Flanker Task (Eriksen and Eriksen 1974). Participants were presented with a series of five arrows pointing either left or right and had to indicate the direction of the central arrow. Sustained attention was assessed using the Psychomotor Vigilance Task (PVT), where participants were shown sequences of letters (H, O, X, or L) on the screen and had to click as quickly as possible when the letter “O” appeared (Dinges and Powell 1985). Finally, the Hearts and Flowers Task (HFT) was used to measure participants’ ability to process congruent and incongruent information (Davidson et al. 2006). This

²¹For logistical reasons, the incentive payment was based on this specific question. Respondents preferring the immediate payment received it on the spot, while those opting for the larger amount were paid during the next survey wave. Although the questionnaire script did not reveal that this question determined the incentive payment, participants may have inferred this over time as the survey was repeated multiple times. Results are therefore likely more salient with this variable.

²²For example: “One bag of rice costs KES 2800, and one fish costs KES 250. You buy one bag of rice and three fish. How much do you have to pay?”

game consists of three parts:

1. Congruent Information: Participants were shown an “O” on either the left or right side of the screen and had to click the corresponding button (10 rounds).
2. Incongruent Information: Participants were shown an “X” on either side of the screen and had to click the opposite button (10 rounds).
3. Mixed Condition: Participants responded to both congruent and incongruent stimuli in a sequence (20 rounds).

The PVT and HFT were only introduced in the sixth wave and, as a result, the number of observations and statistical power are reduced.

4.3 Results

Benchmark results for consumption outcomes are presented in Table 1. Panel A estimates Equation (1), including both smoothing and delay variables into the regressions. Panels B and C explore the effects of smoothing and delay variables separately. These short specifications reduce multicollinearity but introduce a risk of omitted variable bias if excluded variables impact the outcomes. The results in Panels B and C should only be interpreted if the coefficients of the excluded variables are statistically insignificant and close to zero in Panel A.

Overall, regression results indicate that delays have a substantial negative impact on food consumption and food security. In Panel A, the regression coefficients for the smoothing variable are close to zero, much smaller in magnitude than those for the delay variable, and statistically insignificant based on sharpened q -values. This null result suggests that households successfully smooth consumption between aid transfers in the absence of delays. Consequently, the results in Panel C for consumption outcomes can be interpreted with confidence. The coefficients for the delay variables in Panels A and C have similar signs and magnitudes but are estimated with greater precision in Panel C.

When aid is delayed, refugees are forced to reduce consumption. Each additional day of delay reduces calorie intake by about 12 calories per person per day. Although this effect may appear modest, the consequences for households are substantial because the impact accumulates with each passing day, and average calorie intake is already low in the absence of delays: only 1,962 calories per person per day. To illustrate the magnitude of impacts, we report the predicted effects of both the average delay (11 days) and the longest observed delay (23 days). Our regression model predicts that by the end of the average delay, calorie consumption falls by 137 calories, or 7 percent. During the longest observed delay, the model predicts a decline of 286 calories, or 15 percent.

These results align with the second example in Figure 2, which depicts relatively stable consumption and food security outcomes during the aid cycle, except when aid is delayed. This pattern is inconsistent with both the PIH and behavioral models of intertemporal choice, but consistent with the presence of binding credit and saving constraints.

The effects of delays are consistent across other food consumption indicators. The average delay reduces the average value of daily consumption by approximately USD 0.06 (9%), while the longest observed delay lowers it by about USD 0.12 (18%). The percentage of households eating fewer than two meals per day increases by 4 percentage points with an average delay, and 8 percentage points with the longest delay.

Delays also significantly worsen dietary diversity and food insecurity. Delays increase the average number of days that households need to consume 2100 calories per capita. Our data show that, in the absence of delay, refugee households require 1.6 days on average to reach WFP’s objective of having 2100 calories per member per day. This increases by 0.14 days (9%) with an average delay and 0.29 days (19%) with the maximum delay.

The comparison of results across Panels A, B, and C underscores the importance of accounting for disruptions in program delivery when assessing households’ ability to smooth consumption. Ignoring aid delays, as in Panel B, suggests that refugees struggle to smooth consumption throughout the aid cycle. However, when aid delays are considered (Panels A and C), we find that refugee households generally manage to smooth consumption effectively, except when transfers are delayed. Theoretical and policy implications are very different, as discussed in the conclusion of this article.

The inability of refugees to smooth consumption when facing aid delays was frequently reported during qualitative interviews. When asked about the main challenge linked to aid, a male refugee from Ethiopia living in Kalobeyei reported: *“The major challenge is the delay of aid money, people are dependent on the cash assistance.”* When asked the same question, a female refugee from DRC and living in Kakuma reported: *“the main issue that I can say is the aid delays.”* When asked about the most difficult time of the month, a male refugee living in Kalobeyei and of Congolese origin told us: *“This is mainly when our aid money delays. When this happens we face difficulty in getting food. I remember last month for example the money was delayed by many days, up to the extent where the shopkeeper did not want to give us food. It was really hard for me and my family to get food but we thank God we managed to survive.”* Perhaps most strikingly, a male Ethiopian refugee living in Kalobeyei told us: *“There were many people, families, who were almost to die because of the delay of cash transfers. They should release the money at the right time. Many children could die if the money delays.”*

Table 2 presents the estimated effects of aid delays on food stocks, debt, and assets. For food stocks, the regression coefficients of the smoothing variable are statistically significant both when stocks are expressed in kilos and in USD. By contrast, the coefficients of the delay variable are small and statistically insignificant once the smoothing variable

Table 1: Impacts of aid distribution and aid delays on food indicators

	Food consumption p.c.			Food insecurity		
	Calories (kcal) (1)	USD (2)	> 2 meals (3)	Dietary diversity (4)	days/ 2100 kcal (5)	HFIAS score (6)
Panel A: Smoothing and delay						
# days since last transfer	1.159 (2.610) [0.933]	0.000368 (0.000903) [0.933]	-0.000471 (0.00106) [0.933]	0.0000653 (0.00279) [1]	-0.000107 (0.00440) [1]	0.00793 (0.00505) [0.318]
# days of delay	-13.78*** (4.445) [0.016]	-0.00578*** (0.00150) [0.002]	-0.00291* (0.00171) [0.26]	-0.0114** (0.00470) [0.069]	0.0127* (0.00757) [0.261]	0.0114 (0.00849) [0.381]
Kleibergen-Paap F-statistic	221.3	221.3	221.3	221.3	218.1	179.1
Panel B: Smoothing only						
# days since last transfer	-3.457* (1.850) [0.218]	-0.00157** (0.000679) [0.086]	-0.00144* (0.000842) [0.26]	-0.00375* (0.00208) [0.235]	0.00417 (0.00292) [0.368]	0.0119*** (0.00395) [0.018]
Kleibergen-Paap F-statistic	502.9	502.9	502.9	502.9	500.9	533.7
Panel C: Delay only						
# days of delay	-12.43*** (3.082) [0.001]	-0.00535*** (0.00110) [0.001]	-0.00345** (0.00136) [0.057]	-0.0113*** (0.00342) [0.009]	0.0126*** (0.00488) [0.055]	0.0206*** (0.00673) [0.016]
Kleibergen-Paap F-statistic	681.7	681.7	681.7	681.7	677.7	566.9
Household fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
N	6178	6178	6178	6178	6158	5557
Mean if no delay	1962.4	0.675	0.536	4.789	1.560	4.522

Notes: Instrumental Variable (IV) regressions estimating Equation (1). Outcome variables are defined in Appendix Table A.4. All regressions include household fixed effects and control variables, as specified in Appendix Table A.3. Variables that depend on the actual interview dates are instrumented using their counterparts constructed based on the randomly-assigned interview dates. Standard errors are clustered at the household level, and at the survey date by camp of registration level. Anderson (2008) sharpened q -values are shown in square brackets. Statistical significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

is included (Panel A). These results are consistent with the first example in Figure 2.²³ Each additional day without receiving food assistance reduces food stocks by about 0.5 kg or USD 0.6 per capita. This implies that food stocks fall by roughly 25 percent after two weeks and by 50 percent after four weeks, illustrating the steady depletion of stocks over the aid cycle.

Results show that households rely on debt to cope with delays (Table 2, Columns 3 and 4). The coefficient of the smoothing variable is insignificant and close to zero in Panel A, indicating that debt levels remain relatively stable throughout the monthly aid cycle in the absence of delays. However, when cash assistance is delayed, households increase their borrowing from shopkeepers by an average of USD 2.3 per person (6%) after an average delay (11 days) and USD 4.9 per person (13%) after the longest delay. These amounts are substantial relative to the monthly value of food assistance (USD 17 per person at baseline). Food retailers are the main provider of credit in Kakuma and Kalobeyei, with 95% of households in our sample having contracted a debt with their shopkeeper and 93% of total household debt originating from food retailers.

Households do not seem to rely on assets and savings to cope with aid delays. Based on sharpened q -values, regression coefficients of the smoothing and delay variables are statistically insignificant in all specifications.

Qualitative data also indicate that aid delays are a key driver of widespread indebtedness. Many households reported falling into a debt trap during qualitative interviews. When asked why she had gone into debt, a Somali refugee living in Kalobeyei explained: *“The debt I have is only for food, and my debt amounts to almost fifty thousand [KES]. It is because of the delay of aid. That is the major reason for my debt.”* Similarly, a female refugee from DR Congo living in Kalobeyei shared: *“When I came in the camp, my aid card was in my hands, but I needed food because of delays and there was no way for the shopkeeper to give me food unless I gave my card as guarantee. Unfortunately, I was not able to repay the debt because I do not have any other source of income.”* The link between aid delays and indebtedness was repeatedly emphasized and, when discussing ways to alleviate debt burdens, improving aid delivery was frequently mentioned as a solution. A Somali female refugee living in Kalobeyei told us that to alleviate debts, UN agencies should be: *“Improving on the issue of aid delays. If there is an improvement on the delay, it would address some of the problems. The delay of the money partly contributes to the suffering of refugees.”* In an interview, a Congolese male refugee residing in Kalobeyei linked the issue of aid delays not only to food scarcity and indebtedness, but also to limited dietary diversity: *“I eat the same food because the fund is always sent late, when we have already borrowed [...]. For example, last month, the July fund was sent in August, imagine how people survived for the full of July. This delay is making us to have*

²³For food stocks, we therefore focus on Panel A, as interpreting the results in Panels B and C would risk omitted variable bias.

many debts at the shops.” Instances of credit rationing were consistently reported. As put by a female South Sudanese refugee living in Kakuma: “Having a lot of debts is not good, sometimes the shopkeeper will refuse to give you more credit because of high debts, even if you are in need.”

Table 2: Impacts of aid distribution and aid delays on debt, assets and savings

	Food stocks		Debt p.c. (USD)		Assets & savings
	(kg)	(USD)	Food retailer	Total	(USD)
	(1)	(2)	(3)	(4)	(5)
Panel A: Smoothing and delay					
# days since last transfer	-0.544*** (0.107) [0.001]	-0.595*** (0.117) [0.001]	-0.0217 (0.0532) [0.845]	-0.0371 (0.0572) [0.668]	-0.353 (0.652) [0.791]
# days of delay	0.133 (0.176) [0.611]	0.147 (0.180) [0.594]	0.235** (0.108) [0.105]	0.249** (0.119) [0.119]	2.290* (1.295) [0.23]
Kleibergen-Paap F-statistic	170.4	170.4	170.4	170.4	170.4
Panel B: Smoothing only					
# days since last transfer	-0.506*** (0.0811) [0.001]	-0.553*** (0.0892) [0.001]	0.0456 (0.0414) [0.508]	0.0343 (0.0447) [0.611]	0.303 (0.815) [0.853]
Kleibergen-Paap F-statistic	200.7	200.7	200.7	200.7	200.7
Panel C: Delay only					
# days of delay	-0.478*** (0.129) [0.003]	-0.521*** (0.132) [0.002]	0.211** (0.0830) [0.054]	0.207** (0.0914) [0.085]	1.895 (1.605) [0.471]
Kleibergen-Paap F-statistic	302.6	302.6	302.6	302.6	302.6
Household fixed effects	Yes	Yes	Yes	Yes	Yes
N	6178	6178	6178	6178	6178
Mean if no delay	28.31	28.50	37.15	40.12	763.0

Notes: Instrumental Variable (IV) regressions estimating Equation (1). Outcome variables are defined in Appendix Table A.4. All regressions include household fixed effects and control variables, as specified in Appendix Table A.3. Variables that depend on the actual interview dates are instrumented using their counterparts constructed based on the randomly-assigned interview dates. Standard errors are clustered at the household level, and at the survey date by camp of registration level. Anderson (2008) sharpened q -values are shown in square brackets. Statistical significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Tables 3 and 4 report the effects of aid delays on sleep quality, mood, happiness, time and risk preferences, and various tests of math, memory, and cognitive abilities. Based on sharpened q -values, most regression coefficients are statistically insignificant. Overall, we find no evidence that these variables are impacted by delays.

Yet, during our qualitative research, refugee respondents frequently described the severe impact of food insecurity and high debt levels on their mental well-being. When

asked about the main consequences of food scarcity and indebtedness, one refugee female from South Sudan living in Kalobeyei shared: *“To me, sometimes I lock myself inside, and I don’t sleep. Sometimes from 11pm, 12am to 3am I don’t sleep. I just keep thinking: what kind of life is this?”* Another female refugee from South Sudan but living in Kalobeyei described the mental toll of hunger: *“Sometimes you think until your mind is running short of things to think. Sometimes you’re just silent [...] Sometimes you think to a point when you find KES 50 and you just think of getting local alcohol and drink so that you can sleep without thinking.”* One refugee mother from South Sudan living in Kakuma explained the impacts on her children: *“When children sleep hungry, it might bring stress to them [...] They get sick, and the sickness is of hunger because they lack energy in the body and get weak due to hunger.”* A male South Sudanese refugee residing in Kalobeyei expressed high level of stress because of debt: *“I can’t sleep well at night because I am just thinking of a way to pay this debt. It has been something frustrating and I am working hard because I want to clear all this debt.”* For some, the psychological toll of debt was overwhelming. When asked how she felt after accumulating a large amount of debt, another female refugee from South Sudan and living in Kalobeyei responded: *“The months are stressful because I have debt at the shop and I never cleared that. This affects me a lot. When I think about it I feel like finishing myself.”*

Several factors may explain the discrepancy between quantitative and qualitative results related to sleep and mental well-being. The null findings from regression analysis could reflect a genuine absence of impact, while qualitative reports may be anecdotal. Alternatively, the lack of quantitative impacts may result from measurement error, leading to attenuation bias (Hausman 2001). A third possibility is that our specification, which focuses on short-term dynamics within the monthly cycle, cannot capture effects that accumulate over time. For instance, aid delays cause debt to build up over months or years, which qualitative evidence suggests may generate stress in the longer term, even if short-term regressions fail to detect it.

Taken together, the analysis of household data shows that refugees are generally able to smooth consumption between regular transfers, but delays have severe and widespread effects: reducing food consumption, worsening food security, and increasing reliance on debt. While our quantitative analysis cannot identify downstream impacts on mental health and cognition, qualitative evidence indicates that food insecurity and unsustainable debt burdens may translate into heightened stress and hardship.

4.4 Heterogeneous Effects

We examine heterogeneous effects across Kakuma and Kalobeyei to better understand the mechanisms behind households’ inability to smooth consumption during aid delays. Although the total monthly value of assistance is similar across sites, the modalities dif-

Table 3: Impacts of aid distribution and aid delays on mental health, time and risk preferences

	Mental well-being			Time preferences		Risk pref.
	Sleep quality Likert (1-5) (1)	Good mood score (0-9) (2)	Happiness Likert (1-5) (3)	Required Rate of Return (4)	Payment now (dummy) (5)	Risk loving score (1-4) (6)
Panel A: Smoothing and delay						
# days since last transfer	0.00265 (0.00181) [0.356]	0.00737 (0.00545) [0.381]	0.00288 (0.00181) [0.314]	0.000173 (0.00113) [1]	0.000210 (0.000677) [0.98]	-0.00103 (0.00116) [0.653]
# days of delay	-0.000118 (0.00337) [1]	-0.00800 (0.00982) [0.653]	-0.00516 (0.00370) [0.379]	0.00176 (0.00208) [0.653]	0.000994 (0.00124) [0.653]	0.00184 (0.00228) [0.653]
Kleibergen-Paap F-statistic	221.3	221.3	169.3	171.0	170.4	170.4
Panel B: Smoothing only						
# days since last transfer	0.00261* (0.00144) [0.235]	0.00469 (0.00412) [0.546]	0.00141 (0.00148) [0.614]	0.000677 (0.00101) [0.71]	0.000495 (0.000599) [0.653]	-0.000502 (0.00101) [0.929]
Kleibergen-Paap F-statistic	502.9	502.9	199.3	201.2	200.7	200.7
Panel C: Delay only						
Delayed cash transfer	0.00297 (0.00272) [0.546]	0.000579 (0.00750) [1]	-0.00193 (0.00305) [0.729]	0.00195 (0.00187) [0.576]	0.00123 (0.00111) [0.546]	0.000683 (0.00199) [0.951]
Kleibergen-Paap F-statistic	681.7	681.7	301.3	299.1	302.6	302.6
Household fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
N	6178	6178	6173	6122	6178	6178
Mean if no delay	3.023	4.843	2.716	1.839	0.879	1.343

Notes: Instrumental Variable (IV) regressions estimating Equation (1). Outcome variables are defined in Appendix Table A.4. All regressions include household fixed effects and control variables, as specified in Appendix Table A.3. Variables that depend on the actual interview dates are instrumented using their counterparts constructed based on the randomly-assigned interview dates. Standard errors are clustered at the household level, and at the survey date by camp of registration level. Anderson (2008) sharpened q -values are shown in square brackets. Statistical significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 4: Impacts of aid distribution and aid delays on memory and cognitive abilities

	Math test score (0-3) (1)	Memory test score (0-36) (2)	Flanker task score (0-10) (3)	Psychomotor vigilance task score (0-30) (4)	Hearts & flowers task score (0-40) (5)
Panel A: Smoothing and delay					
# days since last transfer	0.000178 (0.00197) [1]	0.0109 (0.0124) [0.653]	-0.0000683 (0.00333) [1]	-0.00338 (0.00827) [0.933]	-0.0391** (0.0162) [0.069]
# days of delay	-0.00302 (0.00353) [0.653]	-0.00461 (0.0234) [1]	-0.00116 (0.00560) [1]	0.0218 (0.0148) [0.356]	-0.0105 (0.0270) [0.941]
Kleibergen-Paap F-statistic	170.4	170.4	170.4	86.22	86.22
Panel B: Smoothing only					
# days since last transfer	-0.000687 (0.00160) [0.933]	0.00953 (0.0100) [0.614]	-0.000401 (0.00288) [1]	0.00211 (0.00694) [0.98]	-0.0418*** (0.0155) [0.045]
Kleibergen-Paap F-statistic	200.7	200.7	200.7	90.57	90.57
Panel C: Delay only					
# days of delay	-0.00282 (0.00287) [0.614]	0.00756 (0.0187) [0.933]	-0.00124 (0.00494) [1]	0.0187 (0.0124) [0.343]	-0.0462* (0.0265) [0.254]
Kleibergen-Paap F-statistic	302.6	302.6	302.6	180.1	180.1
Household fixed effects	Yes	Yes	Yes	Yes	Yes
N	6178	6178	6178	3069	3069
Mean if no delay	2.085	19.24	8.613	28.29	35.24

Notes: Instrumental Variable (IV) regressions estimating Equation (1). Outcome variables are defined in Appendix Table A.4. All regressions include household fixed effects and control variables, as specified in Appendix Table A.3. Variables that depend on the actual interview dates are instrumented using their counterparts constructed based on the randomly-assigned interview dates. Standard errors are clustered at the household level, and at the survey date by camp of registration level. Anderson (2008) sharpened q -values are shown in square brackets. Statistical significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

fer: Kakuma households receive two smaller transfers per month—one in-kind and one in cash—while Kalobeyei households receive a single monthly cash transfer. These differences likely shape impacts and coping strategies. In both sites, the ATM and SIM cards used for cash transfers serve as collateral to secure credit from food retailers. Because cash transfers are larger in Kalobeyei, this collateral has higher value, giving households greater access to debt to cope with delays.

We replicate our benchmark analysis separately for households registered in Kakuma and Kalobeyei in Appendix Tables A.17 and A.18. We obtain similar results if we instead focus on actual place of residency (Appendix Tables A.19 and A.20) or on households receiving in-kind and cash transfers versus those receiving cash transfers only (Appendix Tables A.21 and A.22).²⁴

We emphasize that the results of this analysis should be interpreted with caution as households' place of residence was not randomly assigned. While our knowledge of the context and qualitative evidence suggest the modality of assistance is the main factor driving differences between the two sites, we cannot rule out that other factors may also play a role.

We find important differences in how refugee households registered in the two sites cope with delays. The effects of cash transfer delays on nutrition are observed in both sites, but they are significantly larger in magnitude for households registered in Kakuma, where households receive a mix of in-kind and cash assistance. For daily calorie intake, the estimated regression coefficient of delays is 3.7 times larger in Kakuma than in Kalobeyei. In Kakuma, the regression model predicts a reduction of 347 calories (16%) after 11 days of delay and 725 calories (34%) after 23 days, compared to 93 calories (4%) and 195 calories (8%) in Kalobeyei.²⁵ Similar patterns emerge for other nutrition and food security outcomes.

By contrast, impacts on debt are much larger for households registered in Kalobeyei, indicating they rely much more on credit secured with their ATM or SIM cards to cope with aid delays. In Kalobeyei, regressions predict that a 11-day delay increases total debt per capita by USD 3.4 (5%) and a 23-day delay by USD 7.2 (10%). Regression coefficients are much smaller and statistically insignificant in Kakuma. Consistent with these results, average household debt per capita in Kalobeyei is approximately five times higher than in Kakuma.

These findings highlight the central role of credit and liquidity constraints in shaping households' ability to cope with delays. Access to debt linked to cash transfers allows households to buffer shocks. Yet this coping strategy comes at a cost: households that borrow face significantly higher prices when purchasing goods on credit from their primary

²⁴Regressions with interaction terms are shown in Appendix Tables A.23 to A.25.

²⁵Delays were on average shorter in Kakuma during our study period, partly attenuating these differences (Figure 1).

food retailers. Our price data indicate that goods bought on credit are, on average, 17% more expensive, effectively functioning as an implicit interest rate. Assessing the welfare implications of delays thus requires weighing the consumption-smoothing benefits of credit against its borrowing costs. We examine these trade-offs in Section 6, comparing scenarios with and without access to debt.

4.5 Robustness Tests

We assess the robustness of our main specification against various modifications in Appendix Tables A.6 to A.16.

Appendix Tables A.6 and A.7 show that results remain consistent when excluding control variables or household fixed effects. Similarly, results are similar after excluding the 34 households that attrited during the study period along with their replacements, or including observations on transfer dates (Appendix Table A.8 and A.9).

In Appendix Table A.10, we use an extended specification that accounts for potential differences in consumption smoothing following cash and in-kind transfers. Consistent with benchmark results, the coefficients of both smoothing variables are statistically insignificant and close to zero with most outcomes. The main exception is food stocks, which decline with the number of days since aid distribution. This decline is more pronounced for in-kind aid, which is likely due to the fact that households receive in-kind rations in a single installment, whereas cash transfers offer greater flexibility in usage throughout the aid cycle. The coefficients of the delay variables remain consistent with our benchmark results.

To test for potential non-linearities, quadratic terms were added for the smoothing and delay variables (Appendix Tables A.11 and A.12). In both cases, the coefficients of the quadratic terms are usually statistically insignificant, which is why we focus on linear regressions in our main specification.

In Appendix Table A.13, we also consider an alternative definition of delay variables, as a dummy variable equal to one when aid is delayed and zero otherwise. The coefficients of the smoothing variables remain statistically insignificant and close to zero for most outcomes, except for food stocks. Cash delays lead to lower food consumption, higher food insecurity, and increased indebtedness. Reduced-form regressions also yield similar results (Appendix Table A.14).

In our main specification, standard errors are clustered at the household level and the survey date by camp of registration. Conclusions are similar if we consider only one level of clustering or use robust standard errors (Appendix Tables A.15 to A.16).

5 Analysis of Price Data

5.1 Identification Strategy

We use high-frequency market data to study how food prices fluctuate across the aid cycle and assess whether aid delays impact prices. We estimate a regression model analogous to the one used in the analysis of household data:

$$\text{Log}(P_{jkt}) = \beta_0 + \beta_1 \text{Days}_{kt} + \beta_2 \text{Cash delay}_{kt} + \delta^T X_{jkt} + \text{Product}_j + \text{Market}_k + \epsilon_{jkt}, \quad (2)$$

where P_{jkt} represents the price of product j in market k at time t .

The variable Days_{kt} is the number of days since the last transfer and Cash delay_{kt} measures the number of days a cash transfer is overdue.²⁶ The coefficient β_1 captures how prices fluctuate following aid transfers, while β_2 isolates the additional effect of delays in cash transfers.

As in the analysis of household data, the variables Days_{kt} and Cash delay_{kt} are highly correlated (coefficient of correlation = 0.70), raising concerns about multicollinearity. To address this, we also estimate specifications with each variable included separately, noting that the results of these short specifications should only be interpreted if the coefficient of the omitted variable is close to zero and statistically insignificant in the full specification.

Explanatory variables of interest depend on the distribution and survey dates. The variation in distribution dates is assumed to be quasi-random, determined by the WFP and its partners independently of market dynamics. Price data were collected weekly across various markets, and all regressions include market fixed effects to account for unobservable market characteristics that remain constant over time.²⁷ Additionally, product fixed effects are included to control for differences in average price levels between products. Prices are expressed in logarithm to interpret regression coefficients in percentage terms.²⁸ Benchmark regressions also incorporate a vector $X_{i,t}$ of control variables, which capture the content of in-kind rations and the market impacts of an aid cut that occurred during the data collection period (see Bruni and Sterck 2025).²⁹ Results are robust if we

²⁶In Kakuma, Days_{kt} is defined as the number of days since the most recent transfer, cash or in-kind, whichever occurred more recently. In Kalobeyei, it is the number of days since the last cash transfer. Because cash and in-kind transfers could plausibly have different effects on prices (Cunha et al. 2019), we also estimate a specification that distinguishes between the two modalities, but find no significant differences (Annex Tables A.34 and A.35).

²⁷Market fixed effects are defined at the level of the four Kakuma camps and the three Kalobeyei villages.

²⁸The logarithmic transformation reduces the importance of outliers at the top of the distribution and magnifies differences at its bottom. We obtain similar results if we instead express prices in percentage of the mean or median for each product (Appendix Tables A.36 to A.39).

²⁹To capture dynamics specific to in-kind distributions, the vector of controls includes a binary indicator for the staple cereal provided in the most recent distribution. For example, this variable equals 1 for rice between October 3, 2022, and November 6, 2022, when rice was the main staple distributed. We also control for the number of days since that cereal was distributed. In addition, the vector of controls

exclude market fixed effects or control variables (Appendix Tables A.26 to A.29).

Standard errors are two-way clustered. The first dimension is the product–market level, which is the unit of observation repeatedly surveyed over time. The second is survey date by camp, since all prices observed in the same camp on the same day have the same treatment status. Results are robust to using only one clustering dimension or heteroskedasticity-robust standard errors (Appendix Tables A.32 and A.33).

To address concerns regarding multiple testing, we also include sharpened q -values, which are calculated using all p -values from the price analysis (Benjamini et al. 2006; Anderson 2008).

We assess the robustness and consistency of benchmark results with multiple robustness tests. Specifically, we re-estimate Equation (2) without control variables (Annex Tables A.26 and A.27), and without fixed effects (Annex Tables A.28 and A.29). We compare standard errors obtained with only one way clustering (Annex Tables A.30 and A.31), and with heteroskedasticity robust standard errors (Annex Tables A.32 and A.33). Additionally, we test a specification accounting for potential differences in prices following cash and in-kind transfers (Annex Tables A.34 and A.35). We also consider specifications where the outcome variable is the price divided by the mean or median price of each product (Annex Tables A.36 to A.39). The results of our main specification remain virtually unchanged across these robustness tests.

5.2 Outcome Variables

We analyze two different measures of prices.

1. Cash prices: Cash prices refer to the amounts refugees pay when purchasing goods using banknotes and coins. We collected weekly data on the prices of 70 commonly traded food and beverage items in the different markets of Kakuma and Kalobeyei. This includes staples such as maize, rice, and oil, as well as other items like tomatoes or milk. For the analysis, we examine the prices of all goods collectively and the prices of staple foods separately.³⁰

2. Aid-card prices: Previous research shows that the law of one price does not consistently hold in Kakuma and Kalobeyei, even within individual shops (Siu et al. 2023; Delius and Sterck 2024). Customers paying with SIM cards linked to restricted cash transfers are often charged significantly higher prices for the same goods. Refugees receiving unrestricted cash transfers also often face higher prices if they pay using their

includes binary and continuous variables identifying observations before and after the aid cut of July 3, 2023.

³⁰Staples include maize (kg or bag), maize flour (kg or bag), sorghum (kg or bag), sorghum flour (kg or bag), wheat flour (kg or bag), corn-soya blend, rice (kg or bag), pasta (500g), oil (1L, 3L, or 5L), sugar (kg), beans (kg), lentils (kg), cowpeas (kg), and potatoes (kg).

ATM aid cards. These customers usually have outstanding debts to their shopkeepers and are charged inflated prices as an implicit interest rate. Shopkeepers justify these higher prices as necessary to cover transaction costs and default risks.

The practice of overcharging customers who pay with SIM or ATM cards is explicitly prohibited by the WFP. As a result, our price survey initially focused on cash prices only. Starting from June 2023, we also asked shopkeepers to report aid-card prices.³¹ A simple regression with market-week fixed effects shows that aid-card prices are approximately 15% higher than cash prices.³² The difference is 14% in Kakuma and 17% in Kalobeyei. The slightly larger markup in Kalobeyei is likely driven by higher levels of indebtedness in that area. While we use this data in the analysis, we note that miss-reporting is possible and only three months of data were collected. Results with this variable should therefore be interpreted with caution.

We analyze price data for Kakuma and Kalobeyei both jointly and separately. The impact of cash transfer delays may differ in Kalobeyei, where transfer amounts are larger but debt is more commonly used as a coping mechanism for shocks. However, given the close proximity of the two sites, we anticipate differences to be relatively small.

5.3 Results

Table 5 reports the results for cash prices. Panel A includes both variables of interest in the regression. Based on sharpened q -values, none of the coefficients are statistically significant, a null result could reflect multicollinearity between the two variables (correlation coefficient = 0.7). A different pattern emerges in Panels B and C, where the variables are introduced separately. Panel B shows that cash prices rise with the number of days since the last transfer, while Panel C shows that prices are higher when aid is delayed. These effects are concentrated in staple foods, with no meaningful differences between Kakuma and Kalobeyei. The results in Panels B and C reflect the same underlying dynamic: when aid is delayed, the number of days since the last transfer is higher, and cash prices tend to rise. The estimates in Panel C imply that an average 11-day delay raises staple prices by about 3%, while a maximal 23-day delay raises them by about 6%.

Table 6 reports the results for aid-card prices. Delays in cash transfers tend to reduce these prices, particularly for staple foods. Panel C implies that staple prices fall by about 5% following an average 11-day delay, and by about 11% following a 23-day delay. The estimated coefficients are larger in Kakuma, where assistance is provided as a mix of in-kind and cash. A plausible explanation is that market effects are more pronounced in

³¹In some markets, our enumerator recorded these prices as aid-card prices while in others, she recorded them as debt prices. For a few places and weeks, we have both sets of prices and find that differences between both sets of prices are small, less than 2%. We group these prices together in the analysis and include a dummy identifying differences in how these prices were labeled.

³²Such markup is consistent with previous evidence from Siu et al. (2023) and Delius and Sterck (2024), who find price differences ranging from 16% to 33% based on household expenditure data.

Kakuma, where demand fluctuates more with delays because households are less likely to use debt to cope with the shock.

The contrasting effects of delays on cash and aid-card prices can be explained by the substitutability between hard cash and cash-transfer money. Immediately after cash-transfer distribution, households rely mainly on the cash transfers they just received, which keeps aid-card prices high and cash prices low. As the distribution date recedes, households increasingly use hard cash to fill consumption gaps. Just before the expected delivery of cash transfers, shops typically replenish stocks in anticipation of higher demand. However, if cash transfers are delayed, supply is high as stocks are full but demand with cash-transfer money is low as transfers are yet to be delivered. This causes aid-card prices to fall. At the same time, households use hard cash to bridge the gap, driving cash prices up.

These dynamics illustrate how aid transfers shape market outcomes. On average, aid-card prices are about 15% higher than cash prices, yet both fluctuate over the aid cycle. Immediately after cash transfers are delivered, aid-card prices peak as households use cash-transfer money to buy food. As the cycle progresses, and especially when transfers are delayed, aid-card prices fall below their average level, while cash prices rise as households rely more on hard cash until transfers are delivered.

Table 5: Impacts of aid distribution and aid delays on cash prices (log)

	Dependent variable: log prices (cash)					
	Both sites		Kakuma		Kalobeyei	
	All goods (1)	Staple (2)	All goods (3)	Staple (4)	All goods (5)	Staple (6)
Panel A: Smoothing and delay						
# days since last transfer	0.000450 (0.000312) [0.24]	0.000914* (0.000517) [0.162]	0.000168 (0.000459) [0.561]	0.00117 (0.000721) [0.189]	0.000416 (0.000626) [0.426]	0.000497 (0.000728) [0.426]
# days of delay	0.00109 (0.000661) [0.189]	0.00125 (0.00116) [0.3]	-0.000235 (0.00141) [0.657]	0.00211* (0.00116) [0.158]	0.00169 (0.00114) [0.235]	0.00174 (0.00178) [0.333]
Panel B: Smoothing only						
# days since last transfer	0.000748*** (0.000267) [0.026]	0.00125*** (0.000395) [0.015]	0.000149 (0.000478) [0.566]	0.00134* (0.000734) [0.158]	0.00106*** (0.000324) [0.015]	0.00115** (0.000432) [0.038]
Panel C: Delay only						
# days of delay	0.00177*** (0.000557) [0.015]	0.00262*** (0.000926) [0.026]	-0.000130 (0.00135) [0.678]	0.00282* (0.00164) [0.178]	0.00242*** (0.000505) [0.001]	0.00262** (0.00105) [0.046]
Market and Product FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	16760	5458	9841	3189	6919	2269

Notes: Ordinary Least Squares (OLS) regressions estimating Equation (2), where the outcome variable is the logarithm of cash prices. Columns (1) and (2) include both Kakuma and Kalobeyei markets, while Columns (3) and (4) focus on Kakuma markets, and Columns (5) and (6) focus on Kalobeyei markets. Regressions in Columns (1), (3), and (5) include all goods, whereas Columns (2), (4), and (6) consider staple goods only. All regressions include product and market fixed effects, and control variables that account for the ration cut implemented on July 3, 2023. Standard errors are two-way clustered, at the product–market and survey-date-by-camp levels. Statistical significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 6: Impacts of aid distribution and aid delays on aid-card prices (log)

	Dependent variable: log prices (aid card)					
	Both sites		Kakuma		Kalobeyei	
	All goods (1)	Staple (2)	All goods (3)	Staple (4)	All goods (5)	Staple (6)
Panel A: Smoothing and delay						
# days since last transfer	0.000151 (0.000480) [0.566]	-0.000121 (0.00107) [0.678]	-0.000232 (0.000842) [0.58]	0.000829 (0.00177) [0.549]	0.000244 (0.000263) [0.37]	-0.000847 (0.00109) [0.396]
# days of delay	-0.00138 (0.00106) [0.273]	-0.00450** (0.00201) [0.079]	-0.00612** (0.00230) [0.046]	-0.0196*** (0.00512) [0.015]	-0.000557 (0.000474) [0.3]	-0.00178 (0.00177) [0.333]
Panel B: Smoothing only						
# days since last transfer	-0.000214 (0.000325) [0.426]	-0.00130 (0.000806) [0.189]	-0.00101 (0.000821) [0.3]	-0.00172 (0.00199) [0.382]	0.0000643 (0.000175) [0.561]	-0.00142* (0.000731) [0.158]
Panel C: Delay only						
# days of delay	-0.00110 (0.000676) [0.189]	-0.00473*** (0.00144) [0.015]	-0.00686*** (0.00187) [0.015]	-0.0169*** (0.00351) [0.004]	-0.000122 (0.000327) [0.561]	-0.00331** (0.00115) [0.044]
Market and Product FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	6949	2996	4084	1768	2865	1228

Notes: Ordinary Least Squares (OLS) regressions estimating Equation (2), where the outcome variable is the logarithm of aid-card prices. Columns (1) and (2) include both Kakuma and Kalobeyei markets, while Columns (3) and (4) focus on Kakuma markets, and Columns (5) and (6) focus on Kalobeyei markets. Regressions in Columns (1), (3), and (5) include all goods, whereas Columns (2), (4), and (6) consider staple goods only. All regressions include product and market fixed effects, and control variables that account for the ration cut implemented on July 3, 2023. Standard errors are two-way clustered, at the product–market and survey-date-by-camp levels. Statistical significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

6 Welfare Impacts

Our analysis shows that aid delays significantly affect households, with notable differences between sites. In Kakuma, where assistance is provided as a mix of cash and in-kind, refugees respond to delays by temporarily reducing consumption. In Kalobeyei, where aid consists only of cash, households rely on debt to cope with delays and, as a result, the impact on consumption is smaller.

In this section, we propose back-of-the-envelope calculations to estimate the welfare costs of delays. This exercise requires making different assumptions as we do not observe a group of refugees who never face delays. All refugees are affected by delays and our identification strategy can only capture how consumption and other indicators fluctuate within households as a function of aid distribution dates and delays.

We construct counterfactual scenarios that are based on regression results, separately for Kakuma and Kalobeyei. Our analysis of welfare impacts focuses on the value of food consumption as our data does not allow us to measure short-term variation in other types of expenditure (we estimate that food expenditures represent about 83% of total expenditures). We use an Atkinson Social Welfare Function with a degree of inequality aversion equal to 2, in line with Sterck (2024). We express daily consumption per capita in 2017 PPP\$ and bottom-code the data at PPP\$ 0.25 per day to prevent very low values from dominating our estimates (Kraay et al. 2024).

In Kakuma, we construct a counterfactual scenario without delays in three steps. First, we re-estimate Equation (1) with daily consumption in 2017 PPP\$. Second, we “cancel” the effect of cash transfer delays by adding the predicted effect of delays ($\beta_2 \text{Cash delay}_{i,t}$) to the value of daily consumption. Finally, we rescale the resulting variable down so that each household’s average in the counterfactual scenario equals its observed average daily consumption.

Results are summarized in Table 7. On average, refugees require 1.09 days to consume just PPP\$ 1 when delays occur, compared to 1.07 days in the absence of delays. Atkinson’s Equally Distributed Equivalent Income (EDEI)—which measures the level of per capita income that, if equally distributed across all individuals, would generate the same level of social welfare as the observed unequal distribution—is PPP\$ 0.92 per person per day with delays and PPP\$ 0.93 without delays. Delays in Kakuma imply a welfare loss of approximately 1.5%.

We estimate the monetary value of this loss for the 400,000 refugees in Kenya who relied on a combination of in-kind and cash transfers in October 2022, when our research began.³³ We estimate that the cost of delays is equivalent to PPP\$ 2.1 million per year, or USD 1.1 million at market exchange rates.

These losses affect one of the poorest populations in the world. A reduction of just

³³This includes refugees in Kakuma and Dadaab camps.

a few cents per day has far greater welfare consequences for refugees in Kakuma than it would for individuals in higher-income countries such as the United States, where the average per capita income is approximately 80 times higher. To illustrate the scale of these losses, we estimate that the welfare impact of delays in Kakuma is equivalent, in welfare terms, to reducing everyone’s income in the United States by about 0.02%—a loss of approximately USD 2 billion from the US economy. While this comparison may seem extreme, it underscores how even small shocks can have disproportionately large welfare impacts when they affect the most vulnerable populations.

Table 7: Measured and counterfactual welfare indicators

	Kakuma		Kalobeyei		
	Delays	No delays	Delays	No delays	
	(1)	(2)	(3)	Debt (4)	No debt (5)
Average poverty, in days/PPP\$	1.09	1.07	1.12	1.10	0.95
EDEI, in PPP\$/day	0.92	0.93	0.89	0.91	1.05
Welfare impact, in %		1.5		1.75	15
Welfare impact, in million PPP\$		2.1		0.28	2.5
Welfare impact, in million USD		1.1		0.15	1.4

Notes: Counterfactual scenarios are described in the text. Average poverty is average number of days needed to consume \$1 (Sterck 2024). Atkinson’s Equally Distributed Equivalent Income (EDEI) is the inverse of average poverty; it is the level of per capita income that—if equally distributed across all individuals—would generate the same level of social welfare as the observed unequal distribution. The Social Welfare Function (SWF) is an Atkinson SWF with a degree of inequality aversion of 2. The estimates of welfare losses compare the EDEI in different scenarios. We use UNHCR population data to estimate welfare losses for the entire camp populations.

In Kalobeyei, households cope with delays primarily through debt, with two main implications. First, direct impacts on consumption are smaller. Using the same counterfactual approach as in Kakuma, we estimate a regression coefficient less than half as large. However, because delays were typically longer in Kalobeyei during the study period, the overall welfare impacts are similar. On average, refugees require 1.12 days to obtain PPP\$ 1 when delays occur, compared to 1.10 days in the absence of delays. Atkinson’s EDEI is PPP\$ 0.89 per person per day with delays and PPP\$ 0.91 without delays. Delays imply a welfare loss of about 1.8%.

Second, reliance on debt exposes households to higher prices. Indebted households face an implicit interest rate through higher markups on goods purchased on credit. Using price data, we estimate that aid-card prices are 17% higher than cash prices in Kalobeyei, consistent with previous estimates by Delius and Sterck (2024) and MacPherson and Sterck (2021). Nearly all households in our sample (97%) reported borrowing from their main food retailer and are therefore likely to face these higher prices. Since about 89% of household income in Kalobeyei comes from cash transfers, this mechanism has a large

impact.

To incorporate this into the counterfactual, we assume that debt is primarily caused by delays and that, in the absence of delays, households would not be indebted and would therefore avoid these implicit interest costs. We adjust the counterfactual measure of consumption for indebted households upward, assuming that without delays, the portion of consumption financed by cash transfers would be 17% cheaper. The welfare effects on businesses are assumed negligible relative to those on households. As shown by Delius and Sterck (2024), only a limited number of food retailers operate in Kalobeyei, benefiting from significant market power and high revenues. Consequently, welfare effects on these few businesses are expected to be of secondary importance.³⁴

When accounting for debt, we estimate that refugees would need 0.95 days on average to consume PPP\$ 1 in the absence of delays, compared to 1.12 days with delays. Atkinson’s EDEI is PPP\$ 1.05 in the counterfactual scenario without delays and debt. The welfare loss due to delays and debt in Kalobeyei is 15%, which is substantially larger than in Kakuma. This shows that debt may not be an optimal coping strategy in the long run, even if it helps smooth consumption in the short run.

The monetary value of the welfare loss for the 47,000 refugees living in Kalobeyei as of October 2022 amounts to roughly PPP\$ 2.7 million per year, or USD 1.4 million at market exchange rates. In welfare terms, delays impose a cost equivalent to reducing everyone’s income in the United States by about 0.02%, a loss of approximately USD 2.3 billion. Again, this extreme comparison underscores the importance of studying and addressing aid frictions that impact most vulnerable populations.

7 Conclusion

More than 300 million people worldwide require humanitarian assistance (Humanitarian Action 2023). However, growing funding shortfalls, logistical obstacles, and security threats often force essential programs to be cut, scaled back, or delayed. News and images from Gaza, DR Congo, Ethiopia, Sudan, and other crises suggest these disruptions are likely to have dramatic consequences.

Our paper assessed the welfare and market impacts of delays in humanitarian assistance in Kenya, where refugees living in camps receive a combination of in-kind and cash transfers every month. Cash transfers were almost always delayed during our one-year high-frequency survey, sometimes by several weeks. To study the impact of delays, we exploited high-frequency household data, combined with random variation in interview

³⁴During qualitative interviews, businesses in Kalobeyei reported struggling with extreme levels of indebtedness. Many rely on credit from wholesalers to purchase stock when aid is delayed, while customers frequently buy goods on credit (see also Bruni et al. 2024). As a result, reducing indebtedness is expected to have mixed welfare effects on businesses—potentially lowering profits in the short term but enhancing long-term financial sustainability.

dates and quasi-random variation in aid delays. We also used high-frequency price data to document how prices vary within the monthly aid cycle in response to the timing of transfers.

Our setting, where the value of aid is predictable but its timing is uncertain, allows us to test competing models of intertemporal choice: from classical models such as the PIH, which predict smooth consumption, to behavioral models and models with liquidity, savings, or credit constraints, which predict limited smoothing and, in extreme cases, hand-to-mouth behavior.

We summarize our findings around two fundamental questions. First, can refugee households effectively smooth consumption across the regular aid cycle? Second, do delays in aid delivery affect their ability to do so? The PIH predicts a yes to both: consumption should track expected lifetime income, not temporary fluctuations. In contrast, behavioral models with high discounting, temptation, or limited attention predict a no to both: households should overspend transfers and fail to plan ahead, leading to cyclical consumption even when aid is predictable. Our results support a third possibility: yes to the first and no to the second.

Indeed, we find that households are generally able to smooth consumption over the course of a regular aid cycle. However, when transfers are delayed, we observe sharp declines in food consumption and food security, along with increased indebtedness. These results highlight the importance of incorporating program disruptions into impact evaluations. An analysis that would ignore delays would misleadingly suggest that households struggle to smooth consumption, pointing to present bias, temptation, or poor planning as the problem. In reality, when aid is delivered on time, refugees do smooth consumption well. The problem lies in unpredictable shocks, not behavioral frictions. This distinction has direct implications for policy and program design, discussed below.

Our analysis identifies credit constraints as a key mechanism underlying households' inability to smooth consumption during aid delays. Households with better access to credit—particularly in Kalobeyei where future cash transfers are widely used as collateral—are able to smooth consumption when aid is delayed, consistent with the predictions of the PIH. By contrast, tighter credit constraints—as in Kakuma where only a portion of aid is delivered cash—limit households' ability to cope with delays. While debt helps refugees smooth consumption during delays, it comes at a significant welfare cost, as purchasing goods on credit increases prices by approximately 17%, reflecting implicit interest rates.

Our results show that addressing delays is of primary importance. First, because delays have significant impacts on household welfare. Second, because aid delays—and more generally disruptions in humanitarian assistance—are widespread, affecting the poorest and most vulnerable segments of the world populations. Third, because addressing aid delays may be a low-hanging fruit in a context of reduced aid budgets.

We propose different policy measures to address aid delays. First, since multiple humanitarian agencies and teams within these organizations are involved in aid distribution, strengthening coordination mechanisms is crucial. This is not merely a management issue. Given the significant funding constraints these organizations face, donors must ensure they are adequately resourced and incentivized to deliver aid efficiently and effectively. Second, humanitarian agencies should commit to disbursing a portion of cash transfers on time, even if beneficiary lists are not fully finalized, to prevent disruptions in household consumption. Most refugee crises are protracted, with households remaining in camps for several years. Consequently, the proof-of-life verification process—one of the primary causes of delays—rarely results in dramatic changes to distribution lists. Third, staggering aid transfers within refugee camps could help reduce collective financial strain and enable traditional coping mechanisms through support networks to function more effectively. Finally, addressing over-indebtedness and its consequences should be a priority to prevent long-term financial vulnerabilities, especially in Kalobeyei. Research to identify effective approaches to prevent and reduce indebtedness is much needed (Garz et al. 2021; Karlan et al. 2019). These policy implications are expected to be not only relevant for the nearly 600,000 refugees in Kenya but also for the 300 million people worldwide who depend on humanitarian assistance.

References

- Addison, T., D. Hulme, and R. Kanbur (2009). *Poverty dynamics: Interdisciplinary perspectives*. OUP Oxford.
- Aguiar, M. and E. Hurst (2005). Consumption versus expenditure. *Journal of Political Economy* 113(5), 919–948.
- Aguila, E., A. Kapteyn, and F. Perez-Arce (2017). Consumption smoothing and frequency of benefit payments of cash transfer programs. *American Economic Review* 107(5), 430–435.
- Altındağ, O. and S. D. O’Connell (2023). The short-lived effects of unconditional cash transfers to refugees. *Journal of Development Economics* 160, 102942.
- Anderson, M. L. (2008). Multiple inference and gender differences in the effects of early intervention: A reevaluation of the Abecedarian, Perry Preschool, and Early Training projects. *Journal of the American Statistical Association* 103(484), 1481–1495.
- Andreoni, J. and C. Sprenger (2012). Estimating time preferences from convex budgets. *American Economic Review* 102(7), 3333–3356.
- Angelucci, M. (2015). Migration and financial constraints: Evidence from Mexico. *Review of Economics and Statistics* 97(1), 224–228.
- Angelucci, M., C. Chiapa, S. Prina, and I. Rojas (2024). Transitory income changes and consumption smoothing: Evidence from Mexico. *Journal of Public Economics* 230, 105013.
- Aubery, F. and M. C. Buisson (2024). Making ends meet in refugee camps: Food distribution cycles, consumption, and undernutrition. *Food Policy* 128, 102666.
- Balboni, C., O. Bandiera, R. Burgess, M. Ghatak, and A. Heil (2022). Why do people stay poor? *The Quarterly Journal of Economics* 137(2), 785–844.
- Banerjee, A. and S. Mullainathan (2010). The shape of temptation: Implications for the economic lives of the poor. *NBER Working Paper* 15973.
- Barrett, C. B. (2010). Measuring food insecurity. *Science* 327(5967), 825–828.
- Basu, K. and M. Wong (2015). Evaluating seasonal food storage and credit programs in east indonesia. *Journal of Development Economics* 115, 200–216.
- Bazzi, S., S. Sumarto, and A. Suryahadi (2015). It’s all in the timing: Cash transfers and consumption smoothing in a developing country. *Journal of Economic Behavior & Organization* 119, 267–288.

- Benjamini, Y., A. M. Krieger, and D. Yekutieli (2006). Adaptive linear step-up procedures that control the false discovery rate. *Biometrika* 93(3), 491–507.
- Blattman, C., N. Fiala, and S. Martinez (2020). The long-term impacts of grants on poverty: Nine-year evidence from Uganda’s youth opportunities program. *American Economic Review: Insights* 2(3), 287–304.
- Brune, L., E. Chyn, and J. Kerwin (2021). Pay me later: Savings constraints and the demand for deferred payments. *American Economic Review* 111(7), 2179–2212.
- Brune, L. and J. T. Kerwin (2019). Income timing and liquidity constraints: Evidence from a randomized field experiment. *Journal of Development Economics* 138, 294–308.
- Bruni, V., P. Mutinda, C. Rodgers, and O. Sterck (2024). Refugee debt and livelihoods in northern Kenya. *Refugees Studies Centre, University of Oxford*.
- Bruni, V. and O. Sterck (2025). The welfare and general-equilibrium impacts of aid cuts. *SSRN Working Paper 5270846*.
- Carroll, C. D. (1997). Buffer-stock saving and the life cycle/permanent income hypothesis. *The Quarterly Journal of Economics* 112(1), 1–55.
- Carvalho, L. S., S. Meier, and S. W. Wang (2016). Poverty and economic decision-making: Evidence from changes in financial resources at payday. *American economic review* 106(2), 260–284.
- Casaburi, L. and R. Macchiavello (2019). Demand and supply of infrequent payments as a commitment device: evidence from Kenya. *American Economic Review* 109(2), 523–555.
- Christiaensen, L. and A. Shorrocks (2012). Measuring poverty over time. *Journal of Economic Inequality* 10(2), 137.
- Coates, J., A. Swindale, and P. Bilinsky (2007). Household food insecurity access scale (hfias) for measurement of food access: indicator guide: version 3. *Food and Agriculture Organization*.
- Cohen, J., K. M. Ericson, D. Laibson, and J. M. White (2020). Measuring time preferences. *Journal of Economic Literature* 58(2), 299–347.
- Cunha, J. M., G. De Giorgi, and S. Jayachandran (2019). The price effects of cash versus in-kind transfers. *The Review of Economic Studies* 86(1), 240–281.
- Dave, C., C. C. Eckel, C. A. Johnson, and C. Rojas (2010). Eliciting risk preferences: When is simple better? *Journal of Risk and Uncertainty* 41, 219–243.

- Davidson, M. C., D. Amso, L. C. Anderson, and A. Diamond (2006). Development of cognitive control and executive functions from 4 to 13 years: Evidence from manipulations of memory, inhibition, and task switching. *Neuropsychologia* 44(11), 2037–2078.
- Deaton, A. (1991). Saving and liquidity constraints. *Econometrica* 59(5), 1221–48.
- Delius, A. and O. Sterck (2024). Cash transfers and micro-enterprise performance: Theory and quasi-experimental evidence from Kenya. *Journal of Development Economics* 167, 103232.
- Dell, M., B. F. Jones, and B. A. Olken (2014). What do we learn from the weather? the new climate-economy literature. *Journal of Economic literature* 52(3), 740–798.
- Dercon, S. (2002). Income risk, coping strategies, and safety nets. *The World Bank Research Observer* 17(2), 141–166.
- Development Initiatives (2023). Global humanitarian assistance report 2023.
- Devereux, S., R. Sabates-Wheeler, R. Longhurst, et al. (2012). *Seasonality, rural livelihoods and development*. Earthscan New York, NY, USA:.
- Dinges, D. F. and J. W. Powell (1985). Microcomputer analyses of performance on a portable, simple visual rt task during sustained operations. *Behavior research methods, instruments, & computers* 17(6), 652–655.
- D’Aoust, O., O. Sterck, and P. Verwimp (2018). Who benefited from Burundi’s demobilization program? *The World Bank Economic Review* 32(2), 357–382.
- Egger, D., J. Haushofer, E. Miguel, P. Niehaus, and M. Walker (2022). General equilibrium effects of cash transfers: experimental evidence from Kenya. *Econometrica* 90(6), 2603–2643.
- Eriksen, B. A. and C. W. Eriksen (1974). Effects of noise letters upon the identification of a target letter in a nonsearch task. *Perception & psychophysics* 16(1), 143–149.
- Filmer, D., J. Friedman, E. Kandpal, and J. Onishi (2023). Cash transfers, food prices, and nutrition impacts on ineligible children. *Review of Economics and Statistics* 105(2), 327–343.
- Fink, G., B. K. Jack, and F. Masiye (2020). Seasonal liquidity, rural labor markets, and agricultural production. *American Economic Review* 110(11), 3351–3392.
- Friedman, M. (1957). *Theory of the Consumption Function*. Princeton University Press.
- Gabaix, X. and D. Laibson (2017). Myopia and discounting. Technical report, National bureau of economic research.

- Garz, S., X. Giné, D. Karlan, R. Mazer, C. Sanford, and J. Zinman (2021). Consumer protection for financial inclusion in low-and middle-income countries: Bridging regulator and academic perspectives. *Annual Review of Financial Economics* 13(1), 219–246.
- Gazeaud, J., E. Mvukiyehe, and O. Sterck (2023). Cash transfers and migration: Theory and evidence from a randomized controlled trial. *Review of Economics and Statistics* 105(1), 143–157.
- Gelman, M. (2022). The self-constrained hand-to-mouth. *Review of Economics and Statistics* 104(5), 1096–1109.
- Gelman, M., S. Kariv, M. D. Shapiro, D. Silverman, and S. Tadelis (2014). Harnessing naturally occurring data to measure the response of spending to income. *Science* 345(6193), 212–215.
- Gentilini, U. (2024). *Timely Cash: Lessons from 2,500 years of giving people money*. Oxford University Press.
- Gilligan, M. J., E. N. Mvukiyehe, and C. Samii (2013). Reintegrating rebels into civilian life: Quasi-experimental evidence from burundi. *Journal of Conflict Resolution* 57(4), 598–626.
- Goldin, J., T. Homonoff, and K. Meckel (2022). Issuance and incidence: SNAP benefit cycles and grocery prices. *American Economic Journal: Economic Policy* 14(1), 152–178.
- Gul, F. and W. Pesendorfer (2001). Temptation and self-control. *Econometrica* 69(6), 1403–1435.
- Hall, R. E. (1978). Stochastic implications of the life cycle-permanent income hypothesis: Theory and evidence. *Journal of Political Economy* 86, 971–987.
- Hastings, J. and E. Washington (2010). The first of the month effect: Consumer behavior and store responses. *American Economic Journal: Economic Policy* 2(2), 142–162.
- Hausman, J. (2001). Mismeasured variables in econometric analysis: problems from the right and problems from the left. *Journal of Economic perspectives* 15(4), 57–67.
- Humanitarian Action (2023). Response plans: Overview for 2024.
- Jansen, B. J. (2018). *Kakuma Refugee Camp: humanitarian urbanism in Kenya’s accidental city*. Bloomsbury Publishing.
- Kaminski, J., L. Christiaensen, and C. L. Gilbert (2016). Seasonality in local food markets and consumption: Evidence from tanzania. *Oxford Economic Papers* 68(3), 736–757.

- Kaplan, G. and G. L. Violante (2022). The marginal propensity to consume in heterogeneous agent models. *Annual Review of Economics* 14(1), 747–775.
- Karlan, D., S. Mullainathan, and B. N. Roth (2019). Debt traps? Market vendors and moneylender debt in India and the Philippines. *American Economic Review: Insights* 1(1), 27–42.
- Kennedy, G., T. Ballard, and M. Dop (2011). *Guidelines for measuring household and individual dietary diversity*. Rome: Food and Agriculture Organization of the United Nations (FAO).
- Kerwin, J., N. Rostom, and O. Sterck (2024). Striking the right balance: Why standard balance tests over-reject the null, and how to fix it. *IZA Discussion Papers*.
- Kowal, P., S. Chatterji, N. Naidoo, R. Biritwum, W. Fan, R. Lopez Ridaura, T. Maximova, P. Arokiasamy, N. Phaswana-Mafuya, S. Williams, et al. (2012). Data resource profile: the World Health Organization study on global AGEing and adult health (SAGE). *International journal of epidemiology* 41(6), 1639–1649.
- Kraay, A., C. Lakner, B. Özler, B. Decerf, D. Jolliffe, O. Sterck, and N. Yonzan (2024). A simple decomposable distribution sensitive welfare index. *World Bank Working Paper*.
- Laibson, D. (1997). Golden eggs and hyperbolic discounting. *The Quarterly Journal of Economics* 112(2), 443–478.
- Lee, D. S., J. McCrary, M. J. Moreira, and J. Porter (2022). Valid t-ratio inference for IV. *American Economic Review* 112(10), 3260–3290.
- Lentz, E. C., S. Passarelli, and C. B. Barrett (2013). The timeliness and cost-effectiveness of the local and regional procurement of food aid. *World Development* 49, 9–18.
- MacPherson, C. and O. Sterck (2021). Empowering refugees through cash and agriculture: A regression discontinuity design. *Journal of Development Economics* 149, 102614.
- Mastrobuoni, G. and M. Weinberg (2009). Heterogeneity in intra-monthly consumption patterns, self-control, and savings at retirement. *American Economic Journal: Economic Policy* 1(2), 163–189.
- Merfeld, J. D. and J. Morduch (2022). Poverty at higher frequency. *KDI School of Public Policy and Management*. Working Paper.
- Nikulkov, A., C. B. Barrett, A. G. Mude, and L. M. Wein (2016). Assessing the impact of us food assistance delivery policies on child mortality in northern kenya. *PLoS one* 11(12), e0168432.

- Parker, J. A., N. S. Souleles, D. S. Johnson, and R. McClelland (2013). Consumer spending and the economic stimulus payments of 2008. *American economic review* 103(6), 2530–2553.
- Paxson, C. H. (1993). Consumption and income seasonality in thailand. *Journal of political Economy* 101(1), 39–72.
- Shapiro, J. M. (2005). Is there a daily discount rate? Evidence from the food stamp nutrition cycle. *Journal of Public Economics* 89(2-3), 303–325.
- Siu, J., O. Sterck, and C. Rodgers (2023). The freedom to choose: Theory and quasi-experimental evidence on cash transfer restrictions. *Journal of Development Economics* 161, 103027.
- Stephens, M. J. (2003). "3rd of tha month": Do social security recipients smooth consumption between checks? *American Economic Review* 93(1), 406–422.
- Stephens, M. J. (2006). Paycheque receipt and the timing of consumption. *The Economic Journal* 116(513), 680–701.
- Sterck, O. (2024). Poverty without poverty line. *SSRN working paper 4785458*.
- Strotz, R. H. (1956). Myopia and inconsistency in dynamic utility maximization. *Review of Economic Studies* 23, 165–180.
- Taquet, M., J. Quoidbach, J. J. Gross, K. E. Saunders, and G. M. Goodwin (2020). Mood homeostasis, low mood, and history of depression in 2 large population samples. *JAMA psychiatry* 77(9), 944–951.
- Torkelson, E. (2020). Collateral damages: Cash transfer and debt transfer in South Africa. *World Development* 126, 104711.
- UNHCR (2023). Kenya, February 2024 operational update.

Online Appendix

A Balance Tests and Variables

Table A.1: Balance table for delays

	Delay dummy			
	(1)	(2)	(3)	(4)
Date	0.104 (0.120)	0.124 (0.122)	0.123 (0.129)	0.203 (0.151)
Date sq.	-0.00000225 (0.00000259)	-0.00000269 (0.00000264)	-0.00000266 (0.00000280)	-0.00000447 (0.00000328)
Weekend dummy	0.0387 (0.0593)	0.0367 (0.0596)	0.0297 (0.0601)	0.0240 (0.0822)
Holiday dummy	0.0807 (0.0734)	0.0923 (0.0757)	0.0850 (0.0780)	0.147* (0.0811)
Precipitation		0.00335 (0.00638)	0.0290 (0.0227)	0.0307 (0.0261)
Highest temperature		-0.00769 (0.0134)	-0.00684 (0.0167)	0.0182 (0.0217)
Lowest temperature		0.0124 (0.00959)	0.0138 (0.0170)	0.00373 (0.0210)
Precipitation (sq. dev.)			-0.000745 (0.000632)	-0.000842 (0.000712)
Highest temperature (sq. dev.)			-0.00000807 (0.00281)	0.00247 (0.00318)
Lowest temperature (sq. dev.)			0.000122 (0.000888)	-0.0000355 (0.00107)
Exchange rate				0.0459* (0.0263)
Exchange rate, growth				2.763 (4.241)
Constant	-1201.4 (1384.2)	-1436.2 (1408.5)	-1416.9 (1492.8)	-2312.3 (1735.2)
Observations	366	366	366	308
R^2	0.006	0.013	0.017	0.036
Fri	0.688	0.700	0.801	0.552

Notes: The p -values for the F -test are calculated using randomization inference, following the recommendation of Kerwin et al. (2024). The dependent variable is a dummy variable equal to one if restricted or unrestricted cash transfers were delayed and zero otherwise. Weather variables are taken from Climate Prediction Center of the U.S. National Oceanic and Atmospheric Administration. Exchange rate data is taken from Google Finance. Regressions consider days between the 1st of October 2022 and the 1st of October 2023.

Table A.2: Balance tests for randomly assigned interview date

	Dependent variable: Randomly-assigned interview date (1)
Household size	0.0194 (0.0419)
Nr of adults in hh	-0.0365 (0.0596)
Child headed household	1.278 (1.073)
Respondent is the household head	0.296 (0.249)
Respondent gender	0.0617 (0.293)
Respondent age	-0.000564 (0.0110)
Respondent education	0.00930 (0.0289)
Respondent speaks Dinka	-0.0615 (0.456)
Respondent speaks Juba Arabic	-0.315 (0.318)
Respondent speaks Nuer	-0.271 (0.446)
registration date	-0.00832 (0.0235)
household has electricity	0.355 (0.285)
Kakuma 1	-0.413 (0.466)
Kakuma 2	-0.886 (0.616)
Kakuma 3	-0.395 (0.479)
Kalobeyei 1	-0.776 (0.750)
Kalobeyei 2	-0.833 (0.752)
Kalobeyei 3	-0.599 (0.756)
Number of ration cards	0.0762 (0.0994)
Ration card total size	0.00148 (0.0360)
Bamba chakula beneficiary	0.471 (0.661)
Observations	622
R^2	0.019
F-test p-value (OLS, randomization inference)	0.955
Chi ² -test p-value (mlogit, randomization inference)	0.643

Notes: The p -values for the F -test and Chi²-test of joint orthogonality are calculated using randomization inference, following the recommendation of Kerwin et al. (2024). The dependent variable represents the 3-day intervals randomly assigned to households at baseline, which determine target interview dates across all survey waves.

Table A.3: List of control variables used in the analysis of household data

Variable	Variable description
Children in school	Count variable representing the number of children aged 6 or older who attended school on the day of the interview.
Shock dummy	Binary variable which takes the value of one if the household faced a shock (theft, ceremony, having to pay bribes, natural hazards, or other shocks) in the four weeks preceding the interview and zero otherwise.
Jobs per capita	Number of jobs per household member (only adult employment).
Harvest value	Value of the food harvested during the four weeks preceding the interview, estimated using prices collected at baseline, and expressed in Kenyan Shillings.
Random order behavioral module	Each questionnaire had a behavioral module, which was randomly assigned to appear at the beginning or end of the questionnaire. This variable is a binary variable taking the value of one if the behavioral module appeared at the end of the questionnaire and zero otherwise.
Household size	Count variable indicating the number of people living in the household.
Adults	Count variable indicating the number of adults living in the household.
Size of ration cards	Count variable indicating the total number of individuals listed on the household ration cards.
In-kind basket value	Per capita value of last in-kind basket, estimated using prices collected at baseline (equal to zero if the household does not receive in-kind aid).
Ration cut, dummy	Dummy variable equal to one for interviews done after the 3rd of July 2023, when a ration cut of about 20% was implemented.
Ration cut, running variable	Running variable identifying interview dates, equal to zero on the 3rd of July 2023.
Ration cut, interaction	Interaction variable between the ration cut dummy and the running variable.

Table A.4: List of outcome variables used for the regressions with household data

Variable	Variable construction
Food consumption per capita: calories, value, and >2 meals	The food consumption module collected data on all food and beverages consumed, whether prepared at home or eaten outside. To estimate <i>calorie intake per capita</i> (kcal), we converted each food item to kilograms using the 2012 FAO density database (version 2.0) and multiplied it by its calorie content per kilogram. Total household calorie intake was then aggregated and adjusted for household size. Similarly, to estimate the per capita value of food consumption (USD), we converted the quantity of each item to kilograms, applied unit prices estimated at baseline, aggregated the total value, and divided by household size. Using the same data, we also constructed a binary variable taking the value of one if the household had two or more meals the day before the interview and zero otherwise.
Dietary diversity	We used data from the food consumption module to construct the Household Dietary Diversity Score (HDDS) for the day preceding the survey, following the methodology and food group classifications of (Kennedy et al. 2011).
Days/2100 kcal	Following Sterck (2024), we construct a distribution-sensitive measure of calorie intake by inverting per capita calorie intake and multiplying the result by 2100, yielding the number of days required to reach 2100 kcal.
HFIAS score	The Household Food Insecurity Access Scale (HFIAS) score measures household food insecurity. We constructed this variable following the 2007 FAO HFIAS methodology but adapted it to a one-day recall period (Coates et al. 2007). From wave 2, the questionnaire asked whether the household experienced nine specific symptoms of food insecurity on the day before the survey, ranging from concerns about food scarcity to going an entire day and night without eating. The score reflects the number of symptoms experienced, ranging from 0 to 9.
Food stocks (kg and USD)	For seven staple goods—maize, sorghum, wheat flour, rice, pasta, and oil—our questionnaire asked households to report their stock quantities in kilograms. We then aggregated these weights to determine the total food stock in kilograms. Using baseline unit prices, we also estimated the total value of food stocks.
Debt per capita (USD)	The questionnaire asked households whether they owed debt to one or more food retailers and, if so, to report the amount in Kenyan Shillings. Additionally, households reported debts to family and friends (in goods or money), formal debts to banks, microfinance institutions, or NGOs, and debts to informal savings groups (such as merry-go-rounds). We express debt per capita and distinguish between debt from food retailers and total debt from all sources.
Value of assets and savings (KES)	This variable represents the total value of a household’s physical assets, livestock, and savings at the time of the interview, expressed in KES, both at the household level and per capita. The questionnaire collected data on ownership of 24 asset types (e.g., televisions, mobile phones, tables, chairs, cooking pots) and 10 types of animals (primarily chickens, ducks, and doves). Savings amounts were self-reported. Asset values were calculated by multiplying the quantity owned by baseline market prices from our price survey.
Sleep quality Likert (1-5)	Sleep quality is assessed using answers to the following question, taken from the World Health Organization’s Study on global AGEing and adult health (WHO-SAGE): “Please rate the quality of your sleep last night. Was it very good, good, moderate, poor or very poor?” Answers are coded from 1 “very poor” to 5 “very good”.
Good mood score (0-9)	We compute a “mood score” based on nine questions from the WHO-SAGE study. These questions inquire whether participants experienced various moods on the day prior to the survey, such as enjoying activities or feeling worried, rushed, or calm (Kowal et al. 2012). Responses are binary and aggregated to create a score ranging from 0 (poor mood) to 9 (excellent mood) (Taquet et al. 2020).
Happiness Likert (1-5)	Happiness is assessed using answers to the following question, taken from World Values Survey: “All things considered, how satisfied are you with your life as a whole today?” Answers are coded from 1 “very unhappy” to 5 “very happy”.
Required Rate of Return	The questionnaire included five trade-off questions in which participants chose between receiving 500 Kenyan Shillings (KES) in two months or a smaller amount in one month. We calculate the Required Rate of Return (RRR) in two steps (Cohen et al. 2020). First, we determine the indifference point—the amount xx at which the respondent switches their choice. Second, we estimate the RRR using the formula: $RRR = \log(500/x)$.
Payment now (dummy)	The questionnaire included a binary choice question: receive KES 200 immediately or KES 300 in one month. For logistical reasons, the incentive payment was based on this specific question. Respondents who chose the immediate payment received it on the spot, while those who opted for the delayed payment received it during the next survey wave. We treat responses as a binary variable.
Risk loving score (1-4)	To assess risk preferences, participants answered three questions, each offering a choice between a guaranteed KES 200 and a larger amount (KES 300, 400, or 500) with a 50% probability of payout (Dave et al. 2010). Based on their choices, we classify participants into four risk tolerance groups.
Math test score (0-3)	In each wave, mathematical ability was tested using three arithmetic questions related to common market transactions. One example of question was: “One bag of rice costs KES 2800, and one fish costs KES 250. You buy one bag of rice and three fish. How much do you have to pay?” Due to a coding error in one survey wave, six questions were included instead of three. For consistency, we divided the number of correct answers by 2 in that wave to ensure the variable ranged between 0 and 3. The number of correct responses is used as the outcome variable.
Memory test score (0-36)	Memory was assessed using an adaptation of the Simon memory game, following Carvalho et al. (2016). Participants were shown sequences of colored shape (red O, blue \$, yellow +, or green Δ) of increasing length. They were then asked to replicate the sequence from memory. Each respondent first completed four practice trials with sequences of one to four symbols, followed by eight test trials with sequences of one to eight symbols. The outcome variable is the number of correct responses.
Flanker task score (0-10)	Selective attention and inhibitory control were assessed using the Flanker Task (Eriksen and Eriksen 1974). Participants were shown sequences of five arrows pointing either left or right and had to identify the direction of the central arrow. Each respondent completed 10 practice trials followed by 10 test trials, which were used to construct the outcome variable. The outcome is the number of correct responses.
Psychomotor vigilance task score (0-30)	”Sustained attention was measured using the Psychomotor Vigilance Task (PVT) (Dinges and Powell 1985). Participants were shown sequences of letters (H, O, X, or L) on the tablet screen and instructed to click as quickly as possible when the letter ‘O’ appeared. Each respondent first completed a practice trial with 20 symbols, followed by a test trial with 30 symbols. This task was introduced in the sixth wave of the panel survey.
Hearts & flowers task score (0-40)	The Hearts and Flowers Task (HFT) was used to assess participants’ ability to process congruent and incongruent information (Davidson et al. 2006). The task consists of three parts: (1) Congruent Condition: Participants saw an “O” on either the left or right side of the screen and had to click the corresponding button (10 rounds). (2) Incongruent Condition: Participants saw an “X” on either side of the screen and had to click the opposite button (10 rounds). (3) Mixed Condition: Participants responded to both congruent and incongruent stimuli in a sequence (20 rounds). The outcome variable is the number of correct responses. This task was introduced in the sixth wave of the panel survey.

Table A.5: Descriptive statistics

Variable	Observations	Mean	Std. dev.	Median
Calories (kcal)	6220	1905.9	1072.5	1647.5
Food consumption (USD)	6220	0.665	0.382	0.598
2 meals or more	6220	0.559	0.497	1
Dietary Diversity (HDDS)	6220	4.758	1.337	5
Days to get 2100 kcal	6200	1.586	1.540	1.272
Food insecurity (HFIAS)	5598	4.341	2.524	5
Food stocks (kg)	6220	24.59	29.94	14
Food stocks (USD)	6220	23.96	30.41	13.50
Debt per capita, food retailer (USD)	6220	44.20	46.24	31.29
Debt per capita, total (USD)	6220	46.98	47.59	36.17
Assets, household level (USD)	6220	755.5	639.9	588.5
Sleep quality (Likert 1-5)	6220	3.095	1.071	3
Good mood score (0-9)	6220	5.152	3.589	6
Happiness (Likert 1-5)	6215	2.766	1.016	3
Required Rate of Return	6164	1.814	0.725	2.303
Payment now (dummy)	6220	0.877	0.329	1
Risk loving score (1-4)	6220	1.400	0.990	1
Math test score (0-3)	6220	2.010	1.184	3
Memory test score (0-36)	6220	19.12	6.595	19
Flanker task score (0-10)	6220	8.598	1.810	9
PVT score (0-30)	3104	28.33	3.076	30
HFT score (0-40)	3104	34.97	5.902	37
# days since last transfer	6220	13.03	9.705	12
Delayed cash transfer (dummy)	6220	0.389	0.487	0
Household size	6220	9.329	5.472	8
Nr of adults in hh	6220	3.516	2.680	3
registration date	6220	16.05	4.590	16
Where is the household living?	6220	0.585	0.493	1
Number of ration cards	6220	1.953	1.414	2
Bamba chakula beneficiary	6220	0.588	0.492	1
Observations	6220			

B Analysis of Household Data - Additional Tables

Table A.6: Main specification with no control variables

Table 1: Food Indicators											Table 2: Debt, assets and savings				
	Calories p.c. (kcal)	Food expenses p.c. (USD)	> 2 meals	Dietary Diversity	days/ 2100 kcal	HFIAS score	Food stocks (kg)	Food stocks (USD)	Debt p.c. (USD) Food retailer	Debt p.c. (USD) Total	Assets HH (USD)				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)				
Panel A: Smoothing and delay															
# days since last transfer	2.104 (2.612)	0.000398 (0.000906)	-0.000627 (0.00105)	-0.000393 (0.00274)	-0.000637 (0.00434)	0.00786 (0.00505)	-0.510*** (0.105)	-0.576*** (0.114)	-0.0290 (0.0515)	-0.0430 (0.0558)	-0.468 (0.056)				
# days of delay	-14.73*** (4.499)	-0.00569*** (0.00150)	-0.00267 (0.00173)	-0.0109** (0.00463)	0.0136* (0.00768)	0.0117 (0.00847)	0.0811 (0.172)	0.109 (0.176)	0.271*** (0.104)	0.286** (0.115)	2.644** (1.306)				
Panel B: Smoothing only															
# days since last transfer	-2.754 (1.861)	-0.00148** (0.000692)	-0.00151* (0.000849)	-0.00398* (0.00206)	0.00385 (0.00285)	0.0119*** (0.00397)	-0.487*** (0.0799)	-0.545*** (0.0887)	0.0473 (0.0417)	0.0377 (0.0451)	0.277 (0.789)				
Panel C: Delay only															
# days of delay	-12.28*** (3.129)	-0.00523*** (0.00112)	-0.00341** (0.00141)	-0.0113*** (0.00342)	0.0128*** (0.00493)	0.0209*** (0.00676)	-0.490*** (0.127)	-0.536*** (0.130)	0.238*** (0.0825)	0.238*** (0.0915)	2.120 (1.562)				
N	6178	6178	6178	6178	6158	5557	6178	6178	6178	6178	6178				
Table 3: Mental health, time and risk preferences											Table 4: Memory and cognitive abilities				
	Sleep quality Likert (1-5)	Good mood score (0-9)	Happiness Likert (1-5)	Required Rate of Return	Payment now (dummy)	Risk loving score (1-4)	Math test score (0-3)	Memory test score(0-36)	Flanker task score(0-10)	Psychomotor vigilance task score (0-30)	Hearts & flower task score (0-40)				
	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)				
Panel A: Smoothing and delay															
# days since last transfer	0.00211 (0.00175)	0.00644 (0.00531)	0.00240 (0.00179)	0.000238 (0.00115)	0.000391 (0.000673)	-0.000914 (0.00118)	0.000119 (0.00191)	0.0116 (0.0124)	0.000448 (0.00333)	-0.00331 (0.00816)	-0.0377** (0.0159)				
# days of delay	0.000412 (0.00337)	-0.00698 (0.00980)	-0.00452 (0.00372)	0.00160 (0.00207)	0.000749 (0.00123)	0.00173 (0.00227)	-0.00309 (0.00348)	-0.00717 (0.0236)	-0.00200 (0.00561)	0.0227 (0.0148)	-0.0104 (0.0268)				
Panel B: Smoothing only															
# days since last transfer	0.00225 (0.00141)	0.00413 (0.00407)	0.00113 (0.00147)	0.000691 (0.00102)	0.000602 (0.000603)	-0.000427 (0.00103)	-0.000751 (0.00157)	0.00961 (0.0100)	-0.000117 (0.00289)	0.00246 (0.00689)	-0.0403*** (0.0153)				
Panel B: Delay only															
# days of delay	0.00288 (0.00271)	0.000543 (0.00759)	-0.00183 (0.00309)	0.00187 (0.00187)	0.00119 (0.00112)	0.000706 (0.00197)	-0.00296 (0.00286)	0.00586 (0.0190)	-0.00150 (0.00495)	0.0196 (0.0124)	-0.0456* (0.0264)				
N	6178	6178	6173	6122	6178	6178	6178	6178	6178	3069	3069				

Notes: Instrumental Variable (IV) regressions estimating Equation (1) without control variables. Outcome variables are defined in Appendix Table A.4. All regressions include household fixed effects. Variables that depend on the actual interview dates are instrumented using their counterparts constructed based on the randomly-assigned interview dates. Cluster standard errors by date of the interview and household are reported in parentheses. Statistical significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A.7: Main specification without fixed effects

Table 1: Food Indicators											
	Calories p.c. (kcal) (1)	Food expenses p.c. (USD) (2)	> 2 meals (3)	Dietary Diversity (4)	days/ 2100 kcal (5)	HFIAS score (6)	Food stocks (kg) (7)	Food stocks (USD) (8)	Debt p.c. (USD) Food retailer (9)	Debt p.c. (USD) Total (10)	Assets HH (USD) (11)
Panel A: Smoothing and delay											
# days since last transfer	5.912** (2.528)	0.000686 (0.000889)	-0.00297** (0.00117)	-0.000493 (0.00284)	-0.00143 (0.00412)	0.0344*** (0.00597)	-0.340*** (0.0935)	-0.333*** (0.100)	-0.233** (0.0957)	-0.244** (0.0976)	1.244 (0.940)
# days of delay	-23.50*** (4.277)	-0.00581*** (0.00148)	0.00254 (0.00211)	-0.0119** (0.00504)	0.0145** (0.00703)	-0.0486*** (0.0115)	-0.266* (0.156)	-0.371** (0.158)	0.841*** (0.202)	0.828*** (0.208)	-2.575 (1.853)
Panel B: Smoothing only											
# days since last transfer	-1.551 (1.819)	-0.00116* (0.000676)	-0.00216** (0.000922)	-0.00427** (0.00215)	0.00320 (0.00279)	0.0185*** (0.00455)	-0.410*** (0.0749)	-0.430*** (0.0804)	-0.0123 (0.0715)	-0.0259 (0.0730)	0.567 (0.813)
Panel C: Delay only											
# days of delay	-17.35*** (2.958)	-0.00509*** (0.00109)	-0.000543 (0.00165)	-0.0124*** (0.00377)	0.0130*** (0.00466)	-0.0125 (0.00903)	-0.601*** (0.125)	-0.698*** (0.127)	0.612*** (0.147)	0.589*** (0.154)	-1.353 (1.606)
N	6188	6188	6188	6188	6168	5566	6188	6188	6188	6188	6188
Table 3: Mental health, time and risk preferences											
	Sleep quality Likert (1-5) (12)	Good mood score (0-9) (13)	Happiness Likert (1-5) (14)	Required Rate of Return (15)	Payment now (dummy) (16)	Risk loving score (1-4) (17)	Math test score (0-3) (18)	Memory test score(0-36) (19)	Flanker task score(0-10) (20)	Psychomotor vigilance task score (0-30) (21)	Hearts & flower task score (0-40) (22)
Panel A: Smoothing and delay											
# days since last transfer	-0.00474** (0.00238)	-0.0246*** (0.00809)	-0.00192 (0.00216)	0.00219 (0.00165)	0.00108 (0.000703)	-0.00993*** (0.00247)	0.00571** (0.00269)	0.0332** (0.0143)	0.001000 (0.00338)	-0.00840 (0.00869)	-0.0470*** (0.0167)
# days of delay	0.0133*** (0.00431)	0.0605*** (0.0157)	0.00397 (0.00430)	-0.00447 (0.00313)	-0.000175 (0.00135)	0.0206*** (0.00536)	-0.0143*** (0.00500)	-0.0449 (0.0279)	0.00105 (0.00606)	0.0181 (0.0116)	-0.00591 (0.0247)
Panel B: Smoothing only											
# days since last transfer	-0.000522 (0.00165)	-0.00541 (0.00547)	-0.000876 (0.00174)	0.00102 (0.00130)	0.00103* (0.000583)	-0.00451*** (0.00159)	0.00196 (0.00211)	0.0214** (0.0104)	0.00128 (0.00287)	-0.00354 (0.00771)	-0.0486*** (0.0164)
Panel C: Delay only											
# days of delay	0.00834*** (0.00297)	0.0349*** (0.0107)	0.00209 (0.00346)	-0.00233 (0.00246)	0.000883 (0.00112)	0.0109*** (0.00372)	-0.00867** (0.00387)	-0.0123 (0.0205)	0.00203 (0.00513)	0.0105 (0.0103)	-0.0487* (0.0261)
N	6188	6188	6183	6132	6188	6188	6188	6188	6188	3072	3072

Notes: Instrumental Variable (IV) regressions estimating Equation (1) without fixed effects. Outcome variables are defined in Appendix Table A.4. All regressions control variables, as specified in Appendix Table A.3. Variables that depend on the actual interview dates are instrumented using their counterparts constructed based on the randomly-assigned interview dates. Cluster standard errors by date of the interview and household are reported in parentheses. Statistical significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A.8: Main specification with no replacement or attrited households

Table 1: Food Indicators										Table 2: Debt, assets and savings				
	Calories p.c. (kcal)	Food expenses p.c. (USD)	> 2 meals (3)	Dietary Diversity (4)	days/ 2100 kcal (5)	HFIAS score (6)	Food stocks (kg) (7)	Food stocks (USD) (8)	Debt p.c. (USD) Food retailer (9)	Debt p.c. (USD) Total (10)	Assets HH (USD) (11)			
Panel A: Smoothing and delay														
# days since last transfer	1.090 (2.674)	0.000327 (0.000921)	-0.000438 (0.00113)	-0.00144 (0.00283)	0.000449 (0.00440)	0.00860 (0.00523)	-0.567*** (0.109)	-0.618*** (0.118)	-0.0100 (0.0557)	-0.0304 (0.0594)	-0.342 (0.685)			
# days of delay	-13.96*** (4.579)	-0.00589*** (0.00155)	-0.00277 (0.00178)	-0.00847* (0.00475)	0.0123 (0.00784)	0.0113 (0.00883)	0.170 (0.178)	0.178 (0.181)	0.236** (0.113)	0.236** (0.120)	2.432* (1.356)			
Panel B: Smoothing only														
# days since last transfer	-3.566* (1.896)	-0.00164** (0.000684)	-0.00136 (0.000891)	-0.00427** (0.00210)	0.00458 (0.00290)	0.0125*** (0.00405)	-0.518*** (0.0833)	-0.567*** (0.0914)	0.0573 (0.0429)	0.0369 (0.0459)	0.351 (0.855)			
Panel C: Delay only														
# days of delay	-12.68*** (3.191)	-0.00551*** (0.00112)	-0.00328** (0.00142)	-0.0102*** (0.00346)	0.0129** (0.00508)	0.0213*** (0.00693)	-0.465*** (0.132)	-0.514*** (0.135)	0.225*** (0.0859)	0.202** (0.0912)	2.049 (1.687)			
N	5849	5849	5849	5849	5830	5261	5850	5850	5850	5850	5850			

Table 3: Mental health, time and risk preferences										Table 4: Memory and cognitive abilities				
	Sleep quality Likert (1-5)	Good mood score (0-9)	Happiness Likert (1-5)	Required Rate of Return	Payment now (dummy)	Risk loving score (1-4)	Math test score (0-3)	Memory test score (0-36)	Flanker task score (0-10)	Psychomotor vigilance task score (0-30)	Hearts & flower task score (0-40)			
Panel A: Smoothing and delay														
# days since last transfer	0.00231 (0.00184)	0.00920* (0.00558)	0.00339* (0.00187)	0.0000268 (0.00116)	0.000125 (0.000705)	-0.000707 (0.00117)	-0.0000173 (0.00202)	0.00856 (0.0127)	0.000730 (0.00345)	-0.00390 (0.00851)	-0.0406** (0.0162)			
# days of delay	-0.000422 (0.00347)	-0.0127 (0.00998)	-0.00679* (0.00382)	0.00138 (0.00213)	0.00116 (0.00129)	0.00212 (0.00234)	-0.00324 (0.00366)	-0.00737 (0.0243)	-0.00137 (0.00605)	0.0206 (0.0151)	-0.00306 (0.0283)			
Panel B: Smoothing only														
# days since last transfer	0.00217 (0.00147)	0.00497 (0.00413)	0.00146 (0.00152)	0.000421 (0.00102)	0.000456 (0.000616)	-0.000104 (0.00103)	-0.000939 (0.00167)	0.00646 (0.0101)	0.000341 (0.00300)	0.00133 (0.00711)	-0.0414*** (0.0153)			
Panel C: Delay only														
# days of delay	0.00228 (0.00279)	-0.00195 (0.00746)	-0.00300 (0.00312)	0.00141 (0.00189)	0.00130 (0.00114)	0.00133 (0.00205)	-0.00326 (0.00303)	0.00222 (0.0193)	-0.000550 (0.00534)	0.0171 (0.0125)	-0.0403 (0.0271)			
N	5849	5849	5845	5798	5850	5850	5850	5850	5850	2904	2904			

Notes: Instrumental Variable (IV) regressions estimating Equation (1) with no replacement or attrited households. Outcome variables are defined in Appendix Table A.4. All regressions include household fixed effects and control variables, as specified in Appendix Table A.3. Variables that depend on the actual interview dates are instrumented using their counterparts constructed based on the randomly-assigned interview dates. Cluster standard errors by date of the interview and household are reported in parentheses. Statistical significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A.9: Main specification without excluding transfer days

Table 1: Food Indicators											Table 2: Debt, assets and savings				
	Calories p.c. (kcal)	Food expenses p.c. (USD)	> 2 meals	Dietary Diversity	days/ 2100 kcal	HFIAS score	Food stocks (kg)	Food stocks (USD)	Debt p.c. (USD) Food retailer	Debt p.c. (USD) Total	Assets HH (USD)				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)				
Panel A: Smoothing and delay															
# days since last transfer	1.054 (2.591)	0.000337 (0.000897)	-0.000433 (0.00105)	-0.0000985 (0.00279)	0.000468 (0.00437)	0.00859* (0.00509)	-0.532*** (0.107)	-0.580*** (0.116)	-0.0183 (0.0530)	-0.0346 (0.0569)	-0.418 (0.652)				
# days of delay	-13.34*** (4.390)	-0.00567*** (0.00148)	-0.00275 (0.00171)	-0.0111** (0.00464)	0.0121 (0.00751)	0.0102 (0.00845)	0.127 (0.176)	0.142 (0.179)	0.235** (0.107)	0.246** (0.117)	2.271* (1.282)				
Panel B: Smoothing only															
# days since last transfer	-3.423* (1.837)	-0.00157** (0.000672)	-0.00136 (0.000841)	-0.00382* (0.00206)	0.00454 (0.00290)	0.0121*** (0.00392)	-0.495*** (0.0805)	-0.539*** (0.0885)	0.0493 (0.0411)	0.0364 (0.0442)	0.237 (0.813)				
Panel C: Delay only															
# days of delay	-12.11*** (3.045)	-0.00528*** (0.00108)	-0.00325** (0.00137)	-0.0112*** (0.00334)	0.0126*** (0.00484)	0.0202*** (0.00659)	-0.468*** (0.128)	-0.507*** (0.130)	0.214*** (0.0816)	0.208** (0.0896)	1.803 (1.593)				
N	6210	6210	6210	6210	6190	5589	6210	6210	6210	6210	6210				
Table 3: Mental health, time and risk preferences											Table 4: Memory and cognitive abilities				
	Sleep quality Likert (1-5)	Good mood score (0-9)	Happiness Likert (1-5)	Required Rate of Return	Payment now (dummy)	Risk loving score (1-4)	Math test score (0-3)	Memory test score(0-36)	Flanker task score(0-10)	Psychomotor vigilance task score (0-30)	Hearts & flower task score (0-40)				
	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)				
Panel A: Smoothing and delay															
# days since last transfer	0.00273 (0.00180)	0.00718 (0.00546)	0.00286 (0.00180)	0.000231 (0.00113)	0.000241 (0.000677)	-0.00101 (0.00116)	0.000188 (0.00197)	0.0119 (0.0125)	-0.000143 (0.00333)	-0.00331 (0.00824)	-0.0372** (0.0160)				
# days of delay	-0.000192 (0.00334)	-0.00742 (0.00976)	-0.00464 (0.00370)	0.00165 (0.00206)	0.000875 (0.00123)	0.00182 (0.00225)	-0.00304 (0.00351)	-0.00281 (0.0234)	-0.000836 (0.00552)	0.0260* (0.0149)	-0.00679 (0.0265)				
Panel B: Smoothing only															
# days since last transfer	0.00267* (0.00144)	0.00468 (0.00413)	0.00152 (0.00148)	0.000706 (0.00100)	0.000494 (0.000597)	-0.000488 (0.00101)	-0.000687 (0.00160)	0.0111 (0.0102)	-0.000384 (0.00287)	0.00344 (0.00699)	-0.0389** (0.0153)				
Panel C: Delay only															
# days of delay	0.00299 (0.00269)	0.000925 (0.00745)	-0.00145 (0.00306)	0.00191 (0.00184)	0.00115 (0.00110)	0.000682 (0.00196)	-0.00283 (0.00285)	0.0105 (0.0189)	-0.000997 (0.00485)	0.0229* (0.0125)	-0.0409 (0.0258)				
N	6210	6210	6205	6154	6210	6210	6210	6210	6210	3101	3101				

Notes: Instrumental Variable (IV) regressions estimating Equation (1) without excluding transfer days. Outcome variables are defined in Appendix Table A.4. All regressions include household fixed effects and control variables, as specified in Appendix Table A.3. Variables that depend on the actual interview dates are instrumented using their counterparts constructed based on the randomly-assigned interview dates. Cluster standard errors by date of the interview and household are reported in parentheses. Statistical significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A.10: Main specification with two smoothing variables

Table 1: Food Indicators											
	Calories p.c. (kcal)	Food expenses p.c. (USD)	> 2 meals	Dietary Diversity	days/ 2100 kcal	HFIAS score	Food stocks (kg)	Food stocks (USD)	Debt p.c. (USD) Food retailer	Debt p.c. (USD) Total	Assets HH (USD)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Panel A: Smoothing and delay											
# days since last cash transfer	-0.191 (2.568)	0.000358 (0.000936)	-0.000448 (0.00112)	0.000749 (0.00286)	0.00215 (0.00445)	0.00210 (0.00482)	-0.401*** (0.0980)	-0.429*** (0.104)	-0.0343 (0.0583)	-0.0503 (0.0625)	-0.259 (0.712)
# days since last in-kind transfer	5.547 (4.248)	0.000330 (0.00126)	-0.000246 (0.00141)	-0.00259 (0.00398)	-0.00730 (0.00648)	0.0233*** (0.00838)	-0.959*** (0.179)	-1.086*** (0.200)	0.0188 (0.0583)	-0.00341 (0.0644)	-0.731 (0.787)
# days of delay	-13.06*** (4.426)	-0.00577*** (0.00151)	-0.00296* (0.00172)	-0.0117** (0.00471)	0.0115 (0.00757)	0.0150* (0.00833)	0.0380 (0.169)	0.0379 (0.171)	0.243** (0.110)	0.259** (0.121)	2.240* (1.266)
Panel B: Smoothing only											
# days since last cash transfer	-4.741*** (1.821)	-0.00165** (0.000711)	-0.00148* (0.000889)	-0.00332 (0.00213)	0.00617** (0.00299)	0.00749* (0.00382)	-0.390*** (0.0729)	-0.418*** (0.0783)	0.0402 (0.0455)	0.0290 (0.0486)	0.428 (0.887)
# days since last in-kind transfer	2.041 (3.886)	-0.00122 (0.00114)	-0.00104 (0.00131)	-0.00573 (0.00365)	-0.00421 (0.00571)	0.0275*** (0.00788)	-0.951*** (0.171)	-1.079*** (0.192)	0.0657 (0.0522)	0.0465 (0.0585)	-0.299 (0.816)
N	6178	6178	6178	6178	6158	5557	6178	6178	6178	6178	6178

Table 2: Debt, assets and savings

Table 3: Mental health, time and risk preferences											
	Sleep quality Likert (1-5)	Good mood score (0-9)	Happiness Likert (1-5)	Required Rate of Return	Payment now (dummy)	Risk loving score (1-4)	Math test score (0-3)	Memory test score (0-36)	Flanker task score (0-10)	Psychomotor vigilance task score (0-30)	Hearts & flower task score (0-40)
	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
# days since last cash transfer	0.00236 (0.00186)	0.00852 (0.00552)	0.00263 (0.00185)	0.000826 (0.00119)	0.000318 (0.000750)	-0.00110 (0.00126)	-0.000820 (0.00226)	0.0234* (0.0128)	0.000969 (0.00351)	-0.00453 (0.00817)	-0.0379** (0.0164)
# days since last in-kind transfer	0.00339 (0.00265)	0.00164 (0.00820)	0.00381 (0.00288)	-0.00253 (0.00158)	0.0000183 (0.000796)	-0.000482 (0.00154)	0.00194 (0.00258)	-0.0265 (0.0176)	-0.00221 (0.00492)	-0.00183 (0.0125)	-0.0384 (0.0235)
# days of delay	0.0000624 (0.00342)	-0.00834 (0.00983)	-0.00502 (0.00373)	0.00141 (0.00208)	0.000907 (0.00127)	0.00185 (0.00231)	-0.00222 (0.00362)	-0.0130 (0.0230)	-0.00196 (0.00557)	0.0227 (0.0149)	-0.0114 (0.0272)
# days since last cash transfer	0.00238 (0.00145)	0.00561 (0.00420)	0.00109 (0.00150)	0.00126 (0.00106)	0.000596 (0.000647)	-0.000533 (0.00109)	-0.00150 (0.00181)	0.0194* (0.0105)	0.000367 (0.00307)	0.00158 (0.00680)	-0.0410*** (0.0156)
# days since last in-kind transfer	0.00341 (0.00253)	-0.000594 (0.00748)	0.00284 (0.00275)	-0.00225 (0.00153)	0.000193 (0.000788)	-0.000125 (0.00149)	0.00152 (0.00251)	-0.0290* (0.0168)	-0.00259 (0.00468)	0.00140 (0.0120)	-0.0400* (0.0234)
N	6178	6178	6173	6122	6178	6178	6178	6178	6178	3069	3069

Table 4: Memory and cognitive abilities

Notes: Instrumental Variable (IV) regressions estimating Equation (1) with two smoothing variables, one for cash transfers and one for in-kind transfers.

Outcome variables are defined in Appendix Table A.4. All regressions include household fixed effects and control variables, as specified in Appendix Table A.3. Variables that depend on the actual interview dates are instrumented using their counterparts constructed based on the randomly-assigned interview dates. Cluster standard errors by date of the interview and household are reported in parentheses. Statistical significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A.11: Main specification with quadratic smoothing

Table 1: Food Indicators											Table 2: Debt, assets and savings					
	Calories p.c. (kcal) (1)	Food expenses p.c. (USD) (2)	> 2 meals (3)	Dietary Diversity (4)	days/ 2100 kcal (5)	HFIAS score (6)	Food stocks (kg) (7)	Food stocks (USD) (8)	Debt p.c. (USD) Food retailer (9)	Debt p.c. (USD) Total (10)	Assets HH (USD) (11)					
Panel A: Smoothing and delay																
# days since last transfer	3.328 (5.291)	-0.0000168 (0.00191)	0.00312 (0.00212)	-0.00188 (0.00613)	0.00124 (0.00778)	0.0143 (0.0121)	-1.019*** (0.230)	-1.180*** (0.254)	-0.0112 (0.115)	-0.0978 (0.122)	-1.510 (1.651)					
# days since last transfer squared	-0.0765 (0.147)	0.0000136 (0.0000565)	-0.000127* (0.0000703)	0.0000685 (0.000191)	-0.0000477 (0.000238)	-0.000234 (0.000362)	0.0167*** (0.00572)	0.0206*** (0.00619)	-0.000369 (0.00404)	0.00214 (0.00421)	0.0407 (0.0693)					
# days of delay	-12.66*** (4.789)	-0.00598*** (0.00161)	-0.00105 (0.00214)	-0.0124** (0.00560)	0.0134 (0.00893)	0.0150 (0.00992)	-0.119 (0.194)	-0.164 (0.195)	0.240* (0.134)	0.217 (0.146)	1.676 (1.049)					
Panel B: Smoothing only																
# days since last transfer	6.089 (5.365)	0.00129 (0.00192)	0.00335* (0.00203)	0.000827 (0.00599)	-0.00166 (0.00779)	0.0104 (0.0118)	-0.986*** (0.232)	-1.135*** (0.255)	-0.0777 (0.110)	-0.158 (0.116)	-1.973 (1.632)					
# days since last transfer squared	-0.287** (0.137)	-0.0000859 (0.0000525)	-0.000144** (0.0000561)	-0.000138 (0.000161)	0.000175 (0.000198)	0.0000463 (0.000314)	0.0147*** (0.00532)	0.0178*** (0.00583)	0.00377 (0.00325)	0.00587* (0.00335)	0.0696 (0.0672)					
N	6178	6178	6178	6178	6158	5557	6178	6178	6178	6178	6178					
Table 3: Mental health, time and risk preferences												Table 4: Memory and cognitive abilities				
	Sleep quality Likert (1-5) (12)	Good mood score (0-9) (13)	Happiness Likert (1-5) (14)	Required Rate of Return (15)	Payment now (dummy) (16)	Risk loving score (1-4) (17)	Math test score (0-3) (18)	Memory test score(0-36) (19)	Flanker task score(0-10) (20)	Psychomotor vigilance task score (0-30) (21)	Hearts & flower task score (0-40) (22)					
Panel A: Smoothing and delay																
# days since last transfer	0.00270 (0.00451)	0.00837 (0.0136)	0.00202 (0.00433)	-0.00115 (0.00273)	-0.000566 (0.00148)	-0.00291 (0.00308)	-0.0136*** (0.00442)	-0.0255 (0.0285)	-0.0164** (0.00725)	-0.0171 (0.0172)	-0.0460 (0.0429)					
# days since last transfer squared	-0.00000173 (0.000137)	-0.0000351 (0.000432)	0.0000305 (0.000131)	0.0000466 (0.0000884)	0.0000273 (0.0000470)	0.0000662 (0.000104)	0.000486*** (0.000134)	0.00128 (0.000867)	0.000576** (0.000223)	0.000492 (0.000525)	0.000246 (0.00138)					
# days of delay	-0.00000931 (0.00376)	-0.00749 (0.0111)	-0.00562 (0.00409)	0.00106 (0.00259)	0.000582 (0.00159)	0.000837 (0.00288)	-0.0104** (0.00416)	-0.0239 (0.0263)	-0.00985 (0.00606)	0.0142 (0.0180)	-0.0143 (0.0356)					
Panel B: Smoothing only																
# days since last transfer	0.00272 (0.00442)	0.0100 (0.0134)	0.00357 (0.00429)	-0.00144 (0.00253)	-0.000727 (0.00135)	-0.00314 (0.00283)	-0.0108** (0.00425)	-0.0189 (0.0279)	-0.0137* (0.00712)	-0.0238 (0.0168)	-0.0392 (0.0369)					
# days since last transfer squared	-0.00000328 (0.000122)	-0.000160 (0.000381)	-0.0000662 (0.000120)	0.0000648 (0.0000706)	0.0000374 (0.0000352)	0.0000806 (0.0000830)	0.000308*** (0.000113)	0.000869 (0.000765)	0.000407** (0.000201)	0.000818* (0.000437)	-0.0000821 (0.00104)					
N	6178	6178	6173	6122	6178	6178	6178	6178	6178	3069	3069					

Notes: Instrumental Variable (IV) regressions estimating Equation (1) with quadratic smoothing. Outcome variables are defined in Appendix Table A.4. All regressions include household fixed effects and control variables, as specified in Appendix Table A.3. Variables that depend on the actual interview dates are instrumented using their counterparts constructed based on the randomly-assigned interview dates. Cluster standard errors by date of the interview and household are reported in parentheses. Statistical significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A.12: Main specification with quadratic delays

Table 1: Food Indicators												
	Calories p.c. (kcal) (1)	Food expenses p.c. (USD) (2)	> 2 meals (3)	Dietary Diversity (4)	days/2100 kcal (5)	HFIAS score (6)	Food stocks (kg) (7)	Food stocks (USD) (8)	Food retailer (9)	Debt p.c. (USD) Total (10)	Assets HH (USD) (11)	
Panel A: Smoothing and delay												
# days since last transfer	0.543 (2.729)	0.000149 (0.000950)	-0.000479 (0.00109)	-0.00102 (0.00300)	0.000866 (0.00430)	0.00873* (0.00515)	-0.535*** (0.115)	-0.583*** (0.124)	-0.0437 (0.0553)	-0.0494 (0.0592)	0.146 (0.944)	
# days of delay	-4.763 (11.08)	-0.00258 (0.00411)	-0.00279 (0.00414)	0.00454 (0.0129)	-0.00143 (0.0180)	-0.00123 (0.0221)	0.00997 (0.428)	-0.00593 (0.437)	0.513** (0.240)	0.405 (0.261)	-4.018 (4.167)	
# days of delay squared	-0.572 (0.574)	-0.000203 (0.000231)	-0.00000708 (0.000248)	-0.00101 (0.000677)	0.000898 (0.00107)	0.000814 (0.00117)	0.00781 (0.0205)	0.00973 (0.0208)	-0.0177 (0.0145)	-0.00997 (0.0156)	0.402 (0.306)	
Panel B: Delay only												
# days of delay	-3.432 (9.277)	-0.00222 (0.00347)	-0.00397 (0.00381)	0.00203 (0.0104)	0.000701 (0.0170)	0.0197 (0.0204)	-1.325*** (0.340)	-1.462*** (0.355)	0.404* (0.207)	0.282 (0.226)	-3.654 (2.387)	
# days of delay squared	-0.620 (0.552)	-0.000216 (0.000219)	0.0000354 (0.000246)	-0.000920 (0.000620)	0.000821 (0.00111)	0.0000676 (0.00116)	0.0593*** (0.0189)	0.0659*** (0.0197)	-0.0135 (0.0141)	-0.00521 (0.0152)	0.388* (0.233)	
N	6178	6178	6178	6178	6158	5557	6178	6178	6178	6178	6178	
Table 2: Debt, assets and savings												
	Flanker task score (0-10) (20)	Psychomotor vigilance task score (0-30) (21)	Hearts & flower task score (0-40) (22)									
# days since last transfer	0.00174 (0.00215)	0.00915 (0.0141)	0.00103 (0.00884)									
# days of delay	-0.0228** (0.00998)	0.0170 (0.0646)	-0.0308 (0.0349)									
# days of delay squared	0.00126** (0.000593)	-0.00138 (0.00381)	0.00329* (0.00174)									
Panel B: Delay only												
# days of delay	-0.0185** (0.00827)	0.0398 (0.0493)	-0.135* (0.0799)									
# days of delay squared	0.00109** (0.000543)	-0.00226 (0.00337)	0.00319* (0.00505)									
N	6178	6178	3069									

Notes: Instrumental Variable (IV) regressions estimating Equation (1) with quadratic delays. Outcome variables are defined in Appendix Table A.4. All regressions include household fixed effects and control variables, as specified in Appendix Table A.3. Variables that depend on the actual interview dates are instrumented using their counterparts constructed based on the randomly-assigned interview dates. Cluster standard errors by date of the interview and household are reported in parentheses. Statistical significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A.13: Main specification with binary delays

Table 1: Food Indicators											
	Calories p.c. (kcal) (1)	Food expenses p.c. (USD) (2)	> 2 meals (3)	Dietary Diversity (4)	days/ 2100 kcal (5)	HFIAS score (6)	Food stocks (kg) (7)	Food stocks (USD) (8)	Debt p.c. (USD) Food retailer (9)	Debt p.c. (USD) Total (10)	Assets HH (USD) (11)
Panel A: Smoothing and binary delay											
# days since last transfer	-0.733 (2.586)	-0.000327 (0.000913)	-0.0000581 (0.00115)	-0.000989 (0.00294)	0.000990 (0.00409)	0.00833* (0.00480)	-0.430*** (0.107)	-0.469*** (0.116)	-0.0477 (0.0570)	-0.0551 (0.0611)	0.528 (1.064)
Aid delay (binary)	-76.38 (50.01)	-0.0348** (0.0163)	-0.0389** (0.0176)	-0.0774 (0.0537)	0.0891 (0.0762)	0.0974 (0.0876)	-2.231 (1.905)	-2.474 (1.967)	2.741** (1.063)	2.626** (1.163)	-6.594 (13.08)
Panel B: Binary delay only											
Aid delay (binary)	-85.84** (35.87)	-0.0390*** (0.0121)	-0.0396*** (0.0130)	-0.0902** (0.0378)	0.102* (0.0543)	0.206*** (0.0729)	-7.536*** (1.430)	-8.257*** (1.507)	2.153*** (0.779)	1.947** (0.859)	-0.0867 (10.08)
N	6178	6178	6178	6178	6158	5557	6178	6178	6178	6178	6178
Table 3: Mental health, time and risk preferences											
	Sleep quality Likert (1-5) (12)	Good mood score (0-9) (13)	Happiness Likert (1-5) (14)	Required Rate of Return (15)	Payment now (dummy) (16)	Risk loving score (1-4) (17)	Math test score (0-3) (18)	Memory test score(0-36) (19)	Flanker task score(0-10) (20)	Psychomotor vigilance task score (0-30) (21)	Hearts & flower task score (0-40) (22)
Panel A: Smoothing and binary delay											
# days since last transfer	0.00248 (0.00203)	0.00468 (0.00630)	0.000871 (0.00196)	-0.00120 (0.00138)	-0.000174 (0.000783)	-0.000447 (0.00145)	0.00282 (0.00225)	0.00407 (0.0138)	0.00307 (0.00369)	-0.00171 (0.00934)	-0.0419** (0.0184)
Aid delay (binary)	0.00371 (0.0393)	0.000440 (0.118)	0.0158 (0.0403)	0.0553** (0.0255)	0.0197 (0.0145)	-0.00163 (0.0281)	-0.103*** (0.0398)	0.160 (0.240)	-0.102 (0.0643)	0.117 (0.178)	0.00513 (0.320)
Panel B: Binary delay only											
Aid delay (binary)	0.0357 (0.0280)	0.0608 (0.0771)	0.0265 (0.0305)	0.0404** (0.0183)	0.0175 (0.0111)	-0.00714 (0.0198)	-0.0683** (0.0281)	0.211 (0.171)	-0.0641 (0.0501)	0.0975 (0.133)	-0.464* (0.271)
N	6178	6178	6173	6122	6178	6178	6178	6178	6178	3069	3069

Notes: Instrumental Variable (IV) regressions estimating Equation (1) by using binary delay variables. Outcome variables are defined in Appendix Table A.4. All regressions include household fixed effects and control variables, as specified in Appendix Table A.3. Variables that depend on the actual interview dates are instrumented using their counterparts constructed based on the randomly-assigned interview dates. Cluster standard errors by date of the interview and household are reported in parentheses. Statistical significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A.16: Main specification with robust standard errors

Table 1: Food Indicators												Table 2: Debt, assets and savings				
	Calories p.c. (kcal)	Food expenses p.c. (USD)	> 2 meals (3)	Dietary Diversity (4)	days/ 2100 kcal (5)	HFIAS score (6)	Food stocks (kg) (7)	Food stocks (USD) (8)	Debt p.c. (USD) Food retailer (9)	Debt p.c. (USD) Total (10)	Assets HH (USD) (11)					
Panel A: Smoothing and delay																
# days since last transfer	1.159 (2.085)	0.000368 (0.000709)	-0.000471 (0.000883)	0.0000653 (0.00253)	-0.000107 (0.00320)	0.00793* (0.00443)	-0.544*** (0.0557)	-0.595*** (0.0554)	-0.0217 (0.0501)	-0.0371 (0.0532)	-0.353 (0.644)					
# days of delay	-13.78*** (3.551)	-0.00578*** (0.00122)	-0.00291* (0.00157)	-0.0114** (0.00449)	0.0127** (0.00587)	0.0114 (0.00813)	0.133 (0.105)	0.147 (0.0998)	0.235** (0.0915)	0.249** (0.0977)	2.290* (1.221)					
Panel B: Smoothing only																
# days since last transfer	-3.457** (1.532)	-0.00157*** (0.000547)	-0.00144** (0.000697)	-0.00375** (0.00190)	0.00417* (0.00232)	0.0119*** (0.00336)	-0.506*** (0.0408)	-0.553*** (0.0405)	0.0456 (0.0429)	0.0343 (0.0451)	0.303 (0.767)					
Panel C: Delay only																
# days of delay	-12.43*** (2.574)	-0.00535*** (0.000938)	-0.00345*** (0.00124)	-0.0113*** (0.00336)	0.0126*** (0.00425)	0.0206*** (0.00617)	-0.478*** (0.0748)	-0.521*** (0.0693)	0.211*** (0.0787)	0.207** (0.0831)	1.895 (1.486)					
N	6178	6178	6178	6178	6158	5557	6178	6178	6178	6178	6178					

Table 3: Mental health, time and risk preferences												Table 4: Memory and cognitive abilities				
	Sleep quality Likert (1-5)	Good mood score (0-9)	Happiness Likert (1-5)	Required Rate of Return	Payment now (dummy)	Risk loving score (1-4)	Math test score (0-3)	Memory test score (0-36)	Flanker task score (0-10)	Psychomotor vigilance task score (0-30)	Hearts & flower task score (0-40)					
Panel A: Smoothing and delay																
# days since last transfer	0.00265 (0.00181)	0.00737 (0.00558)	0.00288 (0.00179)	0.000173 (0.00112)	0.000210 (0.000590)	-0.00103 (0.00125)	0.000178 (0.00182)	0.0109 (0.0115)	-0.0000683 (0.00328)	-0.00338 (0.00795)	-0.0391** (0.0164)					
# days of delay	-0.000118 (0.00332)	-0.00800 (0.00962)	-0.00516 (0.00334)	0.00176 (0.00206)	0.000994 (0.00107)	0.00184 (0.00225)	-0.00302 (0.00343)	-0.00461 (0.0207)	-0.00116 (0.00604)	0.0218 (0.0134)	-0.0105 (0.0259)					
Panel B: Smoothing only																
# days since last transfer	0.00261* (0.00145)	0.00469 (0.00433)	0.00141 (0.00147)	0.000677 (0.000935)	0.000495 (0.000499)	-0.000502 (0.00104)	-0.000687 (0.00148)	0.00953 (0.00956)	-0.000401 (0.00267)	0.00211 (0.00714)	-0.0418*** (0.0149)					
Panel C: Delay only																
# days of delay	0.00297 (0.00266)	0.000579 (0.00747)	-0.00193 (0.00274)	0.00195 (0.00172)	0.00123 (0.000911)	0.000683 (0.00187)	-0.00282 (0.00279)	0.00756 (0.0172)	-0.00124 (0.00490)	0.0187 (0.0121)	-0.0462* (0.0241)					
N	6178	6178	6173	6122	6178	6178	6178	6178	6178	3069	3069					

Notes: Instrumental Variable (IV) regressions estimating Equation (1) with heteroskedasticity-robust standard errors (reported in parentheses). Outcome variables are defined in Appendix Table A.4. All regressions include household fixed effects and control variables, as specified in Appendix Table A.3. Variables that depend on the actual interview dates are instrumented using their counterparts constructed based on the randomly-assigned interview dates. Statistical significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A.17: Main specification with households registered in Kakuma

Table 1: Food Indicators											Table 2: Debt, assets and savings				
	Calories p.c. (kcal) (1)	Food expenses p.c. (USD) (2)	> 2 meals (3)	Dietary Diversity (4)	days/2100 kcal (5)	HFIAS score (6)	Food stocks (kg) (7)	Food stocks (USD) (8)	Debt p.c. (USD) Food retailer (9)	Debt p.c. (USD) Total (10)	Assets HH (USD) (11)				
Panel A: Smoothing and delay															
# days since last transfer	-0.345 (5.632)	-0.00213 (0.00155)	-0.00305* (0.00156)	-0.00600 (0.00479)	0.00429 (0.00747)	0.0456*** (0.00966)	-1.480*** (0.240)	-1.646*** (0.263)	-0.0471 (0.0335)	-0.0751 (0.0465)	-0.0469 (0.807)				
# days of delay	-31.17** (13.03)	-0.00890*** (0.00342)	-0.00274 (0.00326)	-0.0274** (0.0119)	0.0306** (0.0132)	0.0230 (0.0188)	-0.350 (0.635)	-0.324 (0.662)	0.0891 (0.0728)	-0.0408 (0.0968)	-0.768 (1.727)				
Panel B: Smoothing only															
# days since last transfer	-6.287 (4.729)	-0.00382*** (0.00122)	-0.00358** (0.00140)	-0.0112*** (0.00401)	0.0102 (0.00636)	0.0500*** (0.00801)	-1.526*** (0.196)	-1.689*** (0.219)	-0.0353 (0.0329)	-0.0805* (0.0454)	-0.148 (0.734)				
# days of delay	-31.54** (11.04)	-0.0112*** (0.00274)	-0.00601* (0.00311)	-0.0338*** (0.0100)	0.0353*** (0.0111)	0.0687*** (0.0195)	-1.814*** (0.650)	-1.952*** (0.697)	0.0426 (0.0736)	-0.115 (0.0985)	-0.814 (1.536)				
N	2565	2565	2565	2565	2555	2309	2563	2563	2563	2563	2563				
Table 3: Mental health, time and risk preferences											Table 4: Memory and cognitive abilities				
	Sleep quality Likert (1-5) (12)	Good mood score (0-9) (13)	Happiness Likert (1-5) (14)	Required Rate of Return (15)	Payment now (dummy) (16)	Risk loving score (1-4) (17)	Math test score (0-3) (18)	Memory test score (0-36) (19)	Flanker task score (0-10) (20)	Psychomotor vigilance score (0-30) (21)	Hearts & flower task score (0-40) (22)				
Panel A: Smoothing and delay															
# days since last transfer	0.00785** (0.00326)	0.0117 (0.0106)	0.00732** (0.00287)	-0.00299* (0.00167)	-0.000193 (0.000703)	0.00109 (0.00150)	-0.00519* (0.00306)	-0.00755 (0.0221)	-0.00534 (0.00523)	-0.00589 (0.0131)	-0.0336 (0.0208)				
# days of delay	-0.00734 (0.00687)	-0.0324 (0.0233)	-0.00349 (0.00673)	0.00643** (0.00322)	-0.00245 (0.00174)	0.00750*** (0.00283)	-0.0106 (0.00775)	0.0700 (0.0487)	-0.00167 (0.00976)	0.0201 (0.0277)	0.0474 (0.0463)				
Panel B: Smoothing only															
# days since last transfer	0.00645** (0.00271)	0.00552 (0.00900)	0.00686** (0.00264)	-0.00213 (0.00158)	-0.000517 (0.000709)	0.00207 (0.00140)	-0.00658** (0.00303)	0.00168 (0.0207)	-0.00556 (0.00484)	-0.00410 (0.0125)	-0.0294 (0.0196)				
# days of delay	0.00106 (0.00554)	-0.0199 (0.0193)	0.00375 (0.00639)	0.00345 (0.00297)	-0.00265 (0.00173)	0.00857*** (0.00256)	-0.0157** (0.00773)	0.0625 (0.0439)	-0.00696 (0.00894)	0.0152 (0.0266)	0.0194 (0.0435)				
N	2565	2565	2563	2555	2563	2563	2563	2563	2563	1269	1269				

Notes: Instrumental Variable (IV) regressions estimating Equation (1) for households registered in Kakuma only. Outcome variables are defined in Appendix Table A.4. All regressions include household fixed effects and control variables, as specified in Appendix Table A.3. Variables that depend on the actual interview dates are instrumented using their counterparts constructed based on the randomly-assigned interview dates. Cluster standard errors by date of the interview and household are reported in parentheses. Statistical significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A.18: Main specification with households registered in Kalobeyei

Table 1: Food Indicators											
	Calories p.c. (kcal) (1)	Food expenses p.c. (USD) (2)	> 2 meals (3)	Dietary Diversity (4)	days/ 2100 kcal (5)	HFIAS score (6)	Food stocks (kg) (7)	Food stocks (USD) (8)	Debt p.c. (USD) Food retailer (9)	Debt p.c. (USD) Total (10)	Assets HH (USD) (11)
Panel A: Smoothing and delay											
# days since last transfer	1.807 (2.592)	0.00143 (0.00105)	0.000813 (0.00138)	0.00338 (0.00327)	-0.00274 (0.00578)	-0.00840* (0.00467)	-0.00731 (0.0546)	0.00570 (0.0469)	0.0130 (0.0822)	-0.00271 (0.0859)	-0.583 (0.958)
# days of delay	-10.59*** (4.056)	-0.00571*** (0.00162)	-0.00358* (0.00192)	-0.0101** (0.00506)	0.0111 (0.00939)	0.0197** (0.00822)	-0.156 (0.101)	-0.171** (0.0817)	0.265* (0.144)	0.313** (0.154)	2.913** (1.408)
Panel B: Smoothing only											
# days since last transfer	-2.363 (1.924)	-0.000816 (0.000809)	-0.000596 (0.00103)	-0.000616 (0.00231)	0.00165 (0.00334)	-0.000266 (0.00396)	-0.0628 (0.0433)	-0.0551 (0.0371)	0.108* (0.0552)	0.109* (0.0583)	0.455 (1.212)
# days of delay	-8.485*** (2.966)	-0.00404*** (0.00122)	-0.00263* (0.00143)	-0.00620* (0.00350)	0.00794 (0.00520)	0.00975 (0.00679)	-0.164** (0.0798)	-0.164** (0.0648)	0.280*** (0.0952)	0.310*** (0.103)	2.259 (2.002)
N	3613	3613	3613	3613	3603	3248	3615	3615	3615	3615	3615
Table 3: Mental health, time and risk preferences											
	Sleep quality Likert (1-5) (12)	Good mood score (0-9) (13)	Happiness Likert (1-5) (14)	Required Rate of Return (15)	Payment now (dummy) (16)	Risk loving score (1-4) (17)	Math test score (0-3) (18)	Memory test score(0-36) (19)	Flanker task score(0-10) (20)	Psychomotor vigilance task score (0-30) (21)	Hearts & flower task score (0-40) (22)
# days since last transfer	-0.000875 (0.00213)	0.00594 (0.00593)	-0.000149 (0.00231)	0.00192 (0.00152)	-0.0000176 (0.000993)	-0.00225 (0.00169)	0.00350 (0.00245)	0.0163 (0.0148)	0.00140 (0.00452)	-0.00679 (0.0120)	-0.0428 (0.0263)
# days of delay	0.00390 (0.00374)	-0.000776 (0.0102)	-0.00334 (0.00418)	-0.000563 (0.00259)	0.00197 (0.00158)	0.00203 (0.00291)	-0.00423 (0.00399)	-0.0243 (0.0259)	-0.00191 (0.00678)	0.0283 (0.0181)	-0.0266 (0.0330)
Panel B: Smoothing only											
# days since last transfer	0.000660 (0.00170)	0.00564 (0.00431)	-0.00134 (0.00179)	0.00172 (0.00125)	0.000685 (0.000812)	-0.00153 (0.00139)	0.00199 (0.00181)	0.00764 (0.0120)	0.000716 (0.00364)	0.00357 (0.00957)	-0.0525** (0.0250)
# days of delay	0.00288 (0.00296)	0.00615 (0.00749)	-0.00350 (0.00325)	0.00158 (0.00214)	0.00195 (0.00131)	-0.000490 (0.00239)	-0.000304 (0.00292)	-0.00600 (0.0207)	-0.000344 (0.00554)	0.0229 (0.0148)	-0.0608* (0.0322)
N	3613	3613	3610	3567	3615	3615	3615	3615	3615	1800	1800

Notes: Instrumental Variable (IV) regressions estimating Equation (1) for households registered in Kalobeyei only. Outcome variables are defined in Appendix Table A.4. All regressions include household fixed effects and control variables, as specified in Appendix Table A.3. Variables that depend on the actual interview dates are instrumented using their counterparts constructed based on the randomly-assigned interview dates. Cluster standard errors by date of the interview and household are reported in parentheses. Statistical significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A.19: Main specification with households living in Kakuma

Table 1: Food Indicators											Table 2: Debt, assets and savings				
	Calories p.c. (kcal) (1)	Food expenses p.c. (USD) (2)	> 2 meals (3)	Dietary Diversity (4)	days/ 2100 kcal (5)	HFIAS score (6)	Food stocks (kg) (7)	Food stocks (USD) (8)	Debt p.c. (USD) Food retailer (9)	Debt p.c. (USD) Total (10)	Assets HH (USD) (11)				
Panel A: Smoothing and Delay															
# days since last transfer	-0.132 (5.676)	-0.00183 (0.00155)	-0.00273* (0.00155)	-0.00509 (0.00471)	0.00392 (0.00739)	0.0436*** (0.00956)	-1.454*** (0.242)	-1.628*** (0.263)	-0.0621* (0.0319)	-0.0871* (0.0459)	-0.0620 (0.803)				
# days of delay	-30.59** (13.45)	-0.00789** (0.00344)	-0.00188 (0.00350)	-0.0244** (0.0121)	0.0270** (0.0130)	0.0125 (0.0193)	-0.327 (0.656)	-0.252 (0.679)	0.130** (0.0621)	0.0144 (0.0908)	-0.668 (1.783)				
Panel B: Smoothing only															
# days since last transfer	-6.004 (4.673)	-0.00335*** (0.00121)	-0.00309** (0.00138)	-0.00978** (0.00383)	0.00913 (0.00617)	0.0460*** (0.00794)	-1.499*** (0.193)	-1.663*** (0.215)	-0.0443 (0.0318)	-0.0852* (0.0443)	-0.154 (0.717)				
Panel C: Delay only															
# days of delay	-30.74*** (11.09)	-0.00995*** (0.00273)	-0.00495 (0.00330)	-0.0302*** (0.00991)	0.0314*** (0.0106)	0.0589*** (0.0199)	-1.878*** (0.658)	-1.988*** (0.703)	0.0633 (0.0664)	-0.0785 (0.0925)	-0.735 (1.545)				
N	2563	2563	2563	2563	2554	2307	2562	2562	2562	2562	2562				
Table 3: Mental health, time and risk preferences															
	Sleep quality Likert (1-5) (12)	Good mood score (0-9) (13)	Happiness Likert (1-5) (14)	Required Rate of Return (15)	Payment now (dummy) (16)	Risk loving score (1-4) (17)	Math test score (0-3) (18)	Memory test score(0-36) (19)	Flanker task score(0-10) (20)	Psychomotor vigilance task score (0-30) (21)	Hearts & flower task score (0-40) (22)				
Panel A: Smoothing and Delay															
# days since last transfer	0.00694** (0.00319)	0.00762 (0.0103)	0.00642** (0.00289)	-0.00231 (0.00167)	-0.0000401 (0.000714)	0.000748 (0.00145)	-0.00482 (0.00301)	-0.0128 (0.0220)	-0.00446 (0.00530)	-0.00212 (0.0123)	-0.0336 (0.0203)				
# days of delay	-0.00679 (0.00702)	-0.0235 (0.0223)	-0.00268 (0.00684)	0.00539 (0.00331)	-0.00186 (0.00181)	0.00695** (0.00290)	-0.00991 (0.00788)	0.0769 (0.0511)	0.00423 (0.00962)	0.000887 (0.0246)	0.0300 (0.0460)				
Panel B: Smoothing only															
# days since last transfer	0.00564** (0.00262)	0.00312 (0.00877)	0.00605** (0.00275)	-0.00157 (0.00157)	-0.000295 (0.000715)	0.00170 (0.00133)	-0.00618** (0.00299)	-0.00220 (0.0203)	-0.00388 (0.00498)	-0.00204 (0.0121)	-0.0307 (0.0192)				
# days of delay	0.00103 (0.00565)	-0.0149 (0.0186)	0.00416 (0.00676)	0.00290 (0.00308)	-0.00190 (0.00181)	0.00775** (0.00256)	-0.0151* (0.00788)	0.0633 (0.0454)	-0.000525 (0.00921)	-0.00110 (0.0251)	-0.00153 (0.0433)				
N	2563	2563	2561	2554	2562	2562	2562	2562	2562	1268	1268				

Notes: Instrumental Variable (IV) regressions estimating Equation (1) for households residing in Kakuma only. Outcome variables are defined in Appendix Table A.4. All regressions include household fixed effects and control variables, as specified in Appendix Table A.3. Variables that depend on the actual interview dates are instrumented using their counterparts constructed based on the randomly-assigned interview dates. Cluster standard errors by date of the interview and household are reported in parentheses. Statistical significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A.20: Main specification with households living in Kalobeyei

Table 1: Food Indicators											Table 2: Debt, assets and savings				
	Calories p.c. (kcal)	Food expenses p.c. (USD)	> 2 meals (3)	Dietary Diversity (4)	days/ 2100 kcal (5)	HFIAS score (6)	Food stocks (kg) (7)	Food stocks (USD) (8)	Debt p.c. (USD) Food retailer (9)	Debt p.c. (USD) Total (10)	Assets HH (USD) (11)				
Panel A: Smoothing and delay															
# days since last transfer	1.899 (2.582)	0.00135 (0.00104)	0.000813 (0.00137)	0.00312 (0.00327)	-0.00288 (0.00577)	-0.00896* (0.00464)	-0.0140 (0.0541)	0.000645 (0.0462)	0.0212 (0.0817)	0.00649 (0.0851)	-0.474 (0.966)				
# days of delay	-10.87*** (4.019)	-0.00581*** (0.00161)	-0.00376** (0.00186)	-0.0103** (0.00505)	0.0120 (0.00934)	0.0220*** (0.00804)	-0.140 (0.100)	-0.162** (0.0813)	0.252* (0.1142)	0.295* (0.151)	2.799** (1.417)				
Panel B: Smoothing only															
# days since last transfer	-2.376 (1.939)	-0.000935 (0.000809)	-0.000667 (0.00103)	-0.000923 (0.00233)	0.00183 (0.00336)	0.000120 (0.00394)	-0.0635 (0.0431)	-0.0568 (0.0367)	0.110** (0.0557)	0.111* (0.0586)	0.517 (1.212)				
Panel C: Delay only															
# days of delay	-8.676*** (2.979)	-0.00425*** (0.00122)	-0.00282** (0.00140)	-0.00668* (0.00351)	0.00862 (0.00523)	0.0115* (0.00664)	-0.155* (0.0797)	-0.162** (0.0647)	0.275*** (0.0953)	0.302*** (0.103)	2.274 (1.995)				
N	3613	3613	3613	3613	3602	3250	3614	3614	3614	3614	3614				
Table 3: Mental health, time and risk preferences											Table 4: Memory and cognitive abilities				
	Sleep quality Likert (1-5)	Good mood score (0-9)	Happiness Likert (1-5)	Required Rate of Return	Payment now (dummy)	Risk loving score (1-4)	Math test score (0-3)	Memory test score (0-36)	Flanker task score (0-10)	Psychomotor vigilance task score (0-30)	Hearts & flower task score (0-40)				
Panel A: Smoothing and delay															
# days since last transfer	-0.000706 (0.00217)	0.00766 (0.00608)	0.000126 (0.00230)	0.00156 (0.00154)	0.0000717 (0.000985)	-0.00218 (0.00169)	0.00328 (0.00244)	0.0171 (0.0148)	0.00140 (0.00446)	-0.0102 (0.0127)	-0.0452* (0.0263)				
# days of delay	0.00373 (0.00373)	-0.00374 (0.0103)	-0.00364 (0.00415)	0.0000478 (0.00258)	0.00175 (0.00154)	0.00212 (0.00285)	-0.00405 (0.00394)	-0.0230 (0.0256)	-0.00253 (0.00683)	0.0356* (0.0186)	-0.0188 (0.0329)				
Panel B: Smoothing only															
# days since last transfer	0.000761 (0.00172)	0.00619 (0.00427)	-0.00116 (0.00176)	0.00158 (0.00127)	0.000691 (0.000816)	-0.00142 (0.00140)	0.00184 (0.00182)	0.00892 (0.0120)	0.000508 (0.00359)	0.00249 (0.0100)	-0.0519** (0.0250)				
# days of delay	0.00291 (0.00295)	0.00511 (0.00734)	-0.00351 (0.00320)	0.00177 (0.00214)	0.00183 (0.00130)	-0.000288 (0.00237)	-0.000422 (0.00291)	-0.00411 (0.0206)	-0.000977 (0.00557)	0.0277* (0.0150)	-0.0541* (0.0321)				
N	3613	3613	3610	3566	3614	3614	3614	3614	3614	1801	1801				

Notes: Instrumental Variable (IV) regressions estimating Equation (1) for households residing in Kalobeyei only. Outcome variables are defined in Appendix Table A.4. All regressions include household fixed effects and control variables, as specified in Appendix Table A.3. Variables that depend on the actual interview dates are instrumented using their counterparts constructed based on the randomly-assigned interview dates. Cluster standard errors by date of the interview and household are reported in parentheses. Statistical significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A.22: Main specification with households receiving cash transfers only

Table 1: Food Indicators											Table 2: Debt, assets and savings				
	Calories p.c. (kcal)	Food expenses p.c. (USD)	> 2 meals (3)	Dietary Diversity (4)	days/ 2100 kcal (5)	HFIAS score (6)	Food stocks (kg) (7)	Food stocks (USD) (8)	Debt p.c. (USD) Food retailer (9)	Debt p.c. (USD) Total (10)	Assets HH (USD) (11)				
Panel A: Smoothing and delay															
# days since last transfer	3.077 (2.787)	0.00155 (0.00114)	0.000144 (0.00154)	0.00409 (0.00383)	-0.00114 (0.00598)	-0.00771 (0.00524)	0.00484 (0.0661)	0.0205 (0.0544)	0.0368 (0.0789)	0.0332 (0.0828)	-0.0447 (1.053)				
# days of delay	-12.77*** (4.466)	-0.00620*** (0.00188)	-0.000720 (0.00225)	-0.00908 (0.00592)	0.00889 (0.0115)	0.0152 (0.00978)	-0.192 (0.124)	-0.180* (0.1000)	0.259* (0.136)	0.297** (0.149)	2.804 (1.823)				
Panel B: Smoothing only															
# days since last transfer	-1.735 (2.207)	-0.000785 (0.000948)	-0.000127 (0.00109)	0.000664 (0.00272)	0.00222 (0.00323)	-0.00168 (0.00433)	-0.0613 (0.0485)	-0.0416 (0.0399)	0.126** (0.0628)	0.135** (0.0660)	0.921 (1.467)				
Panel C: Delay only															
# days of delay	-9.015** (3.565)	-0.00430*** (0.00155)	-0.000543 (0.00156)	-0.00409 (0.00413)	0.00750 (0.00649)	0.00551 (0.00789)	-0.186** (0.0915)	-0.156** (0.0734)	0.303*** (0.108)	0.336*** (0.117)	2.751 (2.654)				
N	2674	2674	2674	2674	2667	2402	2677	2677	2677	2677	2677				
Table 3: Mental health, time and risk preferences											Table 4: Memory and cognitive abilities				
	Sleep quality Likert (1-5)	Good mood score (0-9)	Happiness Likert (1-5)	Required Rate of Return (15)	Payment now (dummy) (16)	Risk loving score (1-4) (17)	Math test score (0-3) (18)	Memory test score(0-36) (19)	Flanker task score(0-10) (20)	Psychomotor vigilance task score (0-30) (21)	Hearts & flower task score (0-40) (22)				
Panel A: Smoothing and delay															
# days since last transfer	-0.00249 (0.00217)	0.00192 (0.00654)	-0.00254 (0.00224)	0.00190 (0.00163)	0.000259 (0.00110)	-0.00199 (0.00182)	0.00229 (0.00284)	0.0189 (0.0178)	-0.000658 (0.00450)	-0.000331 (0.0141)	-0.0535 (0.0354)				
# days of delay	0.00725* (0.00391)	0.00427 (0.0116)	-0.000683 (0.00463)	-0.00137 (0.00294)	0.00195 (0.00171)	-0.000167 (0.00330)	-0.000302 (0.00495)	-0.0154 (0.0315)	0.000982 (0.00781)	0.0315 (0.0192)	-0.00830 (0.0356)				
Panel B: Smoothing only															
# days since last transfer	0.000245 (0.00181)	0.00353 (0.00486)	-0.00278 (0.00192)	0.00143 (0.00128)	0.000929 (0.000897)	-0.00205 (0.00146)	0.00218 (0.00206)	0.0136 (0.0138)	-0.000319 (0.00389)	0.00980 (0.0111)	-0.0562* (0.0327)				
Panel C: Delay only															
# days of delay	0.00421 (0.00324)	0.00662 (0.00866)	-0.00369 (0.00389)	0.000892 (0.00233)	0.00225 (0.00143)	-0.00253 (0.00265)	0.00242 (0.00358)	0.00705 (0.0244)	0.000201 (0.00684)	0.0313** (0.0151)	-0.0509 (0.0356)				
N	2674	2674	2675	2640	2677	2677	2677	2677	2677	1330	1330				

Notes: Instrumental Variable (IV) regressions estimating Equation (1) for households receiving cash transfers only. Outcome variables are defined in Appendix Table A.4. All regressions include household fixed effects and control variables, as specified in Appendix Table A.3. Variables that depend on the actual interview dates are instrumented using their counterparts constructed based on the randomly-assigned interview dates. Cluster standard errors by date of the interview and household are reported in parentheses. Statistical significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A.23: Main specification with interaction term by place of registration

Table 1: Food Indicators											
	Calories p.c. (kcal) (1)	Food expenses p.c. (USD) (2)	> 2 meals (3)	Dietary Diversity (4)	days/ 2100 kcal (5)	HFIAS score (6)	Food stocks (kg) (7)	Food stocks (USD) (8)	Debt p.c. (USD) Food retailer (9)	Debt p.c. (USD) Total (10)	Assets HH (USD) (11)
Panel A: Smoothing and delay											
# days since last transfer	1.575 (5.867)	-0.00174 (0.00164)	-0.00284 (0.00174)	-0.00449 (0.00522)	0.00288 (0.00768)	0.0437*** (0.00989)	-1.483*** (0.238)	-1.660*** (0.261)	-0.0584 (0.0482)	-0.0848 (0.0555)	0.0437 (0.785)
# days of delay	-37.96*** (14.50)	-0.0122*** (0.00404)	-0.00949* (0.00512)	-0.0350** (0.0148)	0.0421** (0.0175)	0.0255 (0.0222)	-0.322 (0.624)	-0.355 (0.646)	-0.277*** (0.104)	-0.376*** (0.119)	1.420 (1.633)
# days since last transfer X Kalobeyi	-1.070 (6.508)	0.00297 (0.00203)	0.00335 (0.00248)	0.00623 (0.00657)	-0.00383 (0.00986)	-0.0532*** (0.0117)	1.419*** (0.248)	1.609*** (0.270)	0.0413 (0.0923)	0.0548 (0.100)	-0.630 (1.249)
# days of delay X Kalobeyi	30.12** (15.27)	0.00729 (0.00462)	0.00742 (0.00585)	0.0279* (0.0167)	-0.0354* (0.0200)	-0.00470 (0.0246)	0.223 (0.634)	0.236 (0.654)	0.630*** (0.169)	0.769*** (0.187)	1.243 (2.221)
N	6178	6178	6178	6178	6158	5557	6178	6178	6178	6178	6178

Table 2: Debt, assets and savings											
Panel A: Smoothing and delay											
# days since last transfer	0.0107*** (0.00373)	0.0128 (0.0118)	0.00750** (0.00312)	-0.00291 (0.00180)	-0.0000886 (0.000744)	0.000652 (0.00150)	-0.00522 (0.00319)	-0.00563 (0.0217)	-0.00509 (0.00523)	-0.00425 (0.0133)	-0.0311 (0.0211)
# days of delay	-0.00998 (0.00880)	-0.0347 (0.0277)	-0.00191 (0.00678)	0.00835*** (0.00316)	-0.00195 (0.00164)	0.00635*** (0.00237)	-0.0131* (0.00770)	0.0934* (0.0481)	-0.00357 (0.00945)	0.0105 (0.0264)	0.0675 (0.0457)
# days since last transfer X Kalobeyi	-0.0121*** (0.00451)	-0.00849 (0.0139)	-0.00696* (0.00391)	0.00490** (0.00237)	0.000370 (0.00123)	-0.00243 (0.00232)	0.00794** (0.00402)	0.0280 (0.0265)	0.00760 (0.00704)	0.00123 (0.0175)	-0.0121 (0.0336)
# days of delay X Kalobeyi	0.0148 (0.00995)	0.0349 (0.0310)	-0.00238 (0.00805)	-0.00944** (0.00395)	0.00359 (0.00222)	-0.00505 (0.00374)	0.0107 (0.00859)	-0.129** (0.0543)	0.00117 (0.0114)	0.0151 (0.0316)	-0.103* (0.0551)
N	6178	6178	6173	6122	6178	6178	6178	6178	6178	3069	3069

Table 3: Mental health, time and risk preferences											
Sleep quality Likert (1-5) (12)	0.0107*** (0.00373)	0.0128 (0.0118)	0.00750** (0.00312)	-0.00291 (0.00180)	-0.0000886 (0.000744)	0.000652 (0.00150)	-0.00522 (0.00319)	-0.00563 (0.0217)	-0.00509 (0.00523)	-0.00425 (0.0133)	Hearts & flower task score (0-40) (22)
Good mood score (0-9) (13)	-0.00998 (0.00880)	-0.0347 (0.0277)	-0.00191 (0.00678)	0.00835*** (0.00316)	-0.00195 (0.00164)	0.00635*** (0.00237)	-0.0131* (0.00770)	0.0934* (0.0481)	-0.00357 (0.00945)	0.0105 (0.0264)	Psychomotor vigilance task score (0-30) (21)
Happiness Likert (1-5) (14)	-0.0121*** (0.00451)	-0.00849 (0.0139)	-0.00696* (0.00391)	0.00490** (0.00237)	0.000370 (0.00123)	-0.00243 (0.00232)	0.00794** (0.00402)	0.0280 (0.0265)	0.00760 (0.00704)	0.00123 (0.0175)	Flanker task score (0-10) (20)
Math test score (0-3) (18)	0.0148 (0.00995)	0.0349 (0.0310)	-0.00238 (0.00805)	-0.00944** (0.00395)	0.00359 (0.00222)	-0.00505 (0.00374)	0.0107 (0.00859)	-0.129** (0.0543)	0.00117 (0.0114)	0.0151 (0.0316)	Memory test score (0-36) (19)
N	6178	6178	6173	6122	6178	6178	6178	6178	6178	3069	3069

Table 4: Memory and cognitive abilities											
Panel A: Smoothing and delay											
# days since last transfer	0.0107*** (0.00373)	0.0128 (0.0118)	0.00750** (0.00312)	-0.00291 (0.00180)	-0.0000886 (0.000744)	0.000652 (0.00150)	-0.00522 (0.00319)	-0.00563 (0.0217)	-0.00509 (0.00523)	-0.00425 (0.0133)	Hearts & flower task score (0-40) (22)
# days of delay	-0.00998 (0.00880)	-0.0347 (0.0277)	-0.00191 (0.00678)	0.00835*** (0.00316)	-0.00195 (0.00164)	0.00635*** (0.00237)	-0.0131* (0.00770)	0.0934* (0.0481)	-0.00357 (0.00945)	0.0105 (0.0264)	Psychomotor vigilance task score (0-30) (21)
# days since last transfer X Kalobeyi	-0.0121*** (0.00451)	-0.00849 (0.0139)	-0.00696* (0.00391)	0.00490** (0.00237)	0.000370 (0.00123)	-0.00243 (0.00232)	0.00794** (0.00402)	0.0280 (0.0265)	0.00760 (0.00704)	0.00123 (0.0175)	Flanker task score (0-10) (20)
# days of delay X Kalobeyi	0.0148 (0.00995)	0.0349 (0.0310)	-0.00238 (0.00805)	-0.00944** (0.00395)	0.00359 (0.00222)	-0.00505 (0.00374)	0.0107 (0.00859)	-0.129** (0.0543)	0.00117 (0.0114)	0.0151 (0.0316)	Memory test score (0-36) (19)
N	6178	6178	6173	6122	6178	6178	6178	6178	6178	3069	3069

Notes: Instrumental Variable (IV) regressions estimating Equation (1) with interaction term by place of registration. Outcome variables are defined in Appendix Table A.4. All regressions include household fixed effects and control variables, as specified in Appendix Table A.3. Variables that depend on the actual interview dates are instrumented using their counterparts constructed based on the randomly-assigned interview dates. Cluster standard errors by date of the interview and household are reported in parentheses. Statistical significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A.24: Main specification with interaction term by camp

Table 1: Food Indicators											Table 2: Debt, assets and savings				
	Calories p.c. (kcal) (1)	Food expenses p.c. (USD) (2)	> 2 meals (3)	Dietary Diversity (4)	days/2100 kcal (5)	HFIAS score (6)	Food stocks (kg) (7)	Food stocks (USD) (8)	Debt p.c. (USD) Food retailer (9)	Debt p.c. (USD) Total (10)	Assets HH (USD) (11)				
Panel A: Smoothing and delay															
# days since last transfer	1.716 (5.879)	-0.00131 (0.00165)	-0.00266 (0.00173)	-0.00312 (0.00516)	0.00281 (0.00763)	0.0417*** (0.00976)	-1.443*** (0.240)	-1.624*** (0.261)	-0.0711 (0.0469)	-0.0949* (0.0549)	0.0278 (0.782)				
# days of delay	-37.83** (14.90)	-0.0119*** (0.00415)	-0.00881* (0.00530)	-0.0328** (0.0152)	0.0381** (0.0175)	0.0167 (0.0230)	-0.306 (0.645)	-0.300 (0.664)	-0.254** (0.107)	-0.341*** (0.123)	1.563 (1.683)				
# days since last transfer X Kalobeyi	-1.153 (6.459)	0.00238 (0.00202)	0.00313 (0.00244)	0.00437 (0.00645)	-0.00394 (0.00969)	-0.0506*** (0.0114)	1.364*** (0.248)	1.562*** (0.269)	0.0657 (0.0906)	0.0765 (0.0681)	-0.596 (1.241)				
# days of delay X Kalobeyi	29.77* (15.62)	0.00700 (0.00468)	0.00660 (0.00598)	0.0253 (0.0171)	-0.0303 (0.0199)	0.00540 (0.0252)	0.225 (0.652)	0.189 (0.670)	0.590*** (0.171)	0.713*** (0.188)	1.040 (2.277)				
N	6178	6178	6178	6178	6158	5557	6178	6178	6178	6178	6178				
Table 3: Mental health, time and risk preferences											Table 4: Memory and cognitive abilities				
	Sleep quality Likert (1-5) (12)	Good mood score (9-9) (13)	Happiness Likert (1-5) (14)	Required Rate of Return (15)	Payment now (dummy) (16)	Risk loving score (1-4) (17)	Math test score (0-3) (18)	Memory test score (0-36) (19)	Flanker task score (0-10) (20)	Psychomotor vigilance task score (0-30) (21)	Hearts & flower task score (0-40) (22)				
Panel A: Smoothing and delay															
# days since last transfer	0.00978*** (0.00368)	0.00893 (0.0116)	0.00661** (0.00315)	-0.00251 (0.00180)	-0.000148 (0.000757)	0.000803 (0.00153)	-0.00448 (0.00313)	-0.00575 (0.0218)	-0.00384 (0.00531)	-0.000900 (0.0122)	-0.0306 (0.0207)				
# days of delay	-0.00932 (0.00902)	-0.0271 (0.0277)	-0.00130 (0.00684)	0.00681** (0.00322)	-0.00145 (0.00173)	0.00557** (0.00249)	-0.0126 (0.00781)	0.0055* (0.0504)	-0.000225 (0.00928)	-0.00870 (0.0234)	0.0531 (0.0449)				
# days since last transfer X Kalobeyi	-0.0106** (0.00448)	-0.00255 (0.0138)	-0.00562 (0.00391)	0.00420* (0.00240)	0.000498 (0.00126)	-0.00272 (0.00242)	0.00692* (0.00399)	0.0274 (0.0266)	0.00577 (0.00703)	-0.00477 (0.0171)	-0.0144 (0.0330)				
# days of delay X Kalobeyi	0.0135 (0.0102)	0.0240 (0.0310)	-0.00348 (0.00808)	-0.00724* (0.00398)	0.00292 (0.00224)	-0.00400 (0.00374)	0.0102 (0.00865)	-0.130** (0.0563)	-0.00251 (0.0113)	0.0418 (0.0293)	-0.0818 (0.0537)				
N	6178	6178	6173	6122	6178	6178	6178	6178	6178	3069	3069				

Notes: Instrumental Variable (IV) regressions estimating Equation (1) with interaction term by camp of residence. Outcome variables are defined in Appendix Table A.4. All regressions include household fixed effects and control variables, as specified in Appendix Table A.3. Variables that depend on the actual interview dates are instrumented using their counterparts constructed based on the randomly-assigned interview dates. Cluster standard errors by date of the interview and household are reported in parentheses. Statistical significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A.25: Main specification with interaction term by type of aid received

Table 1: Food Indicators										Table 2: Debt, assets and savings				
	Calories p.c. (kcal) (1)	Food expenses p.c. (USD) (2)	> 2 meals (3)	Dietary Diversity (4)	days/ 2100 kcal (5)	HFIAS score (6)	Food stocks (kg) (7)	Food stocks (USD) (8)	Debt p.c. (USD) Food retailer (9)	Debt p.c. (USD) Total (10)	Assets HH (USD) (11)			
Panel A: Smoothing and delay														
# days since last transfer	-0.503 (4.305)	-0.000261 (0.00127)	-0.00103 (0.00143)	-0.00302 (0.00430)	0.000522 (0.00000)	0.0275*** (0.00817)	-1.099*** (0.182)	-1.212*** (0.199)	-0.0899 (0.0781)	-0.125 (0.0829)	-0.605 (0.692)			
# days of delay	-19.65** (7.862)	-0.00781*** (0.00226)	-0.00868*** (0.00317)	-0.0218** (0.00853)	0.0253** (0.0103)	0.0184 (0.0143)	0.111 (0.332)	0.0775 (0.342)	0.0695 (0.162)	0.0527 (0.177)	1.730 (1.378)			
# days since last transfer X cash recipient	2.570 (4.981)	0.000986 (0.00167)	0.000591 (0.00215)	0.00480 (0.00611)	-0.000284 (0.00768)	-0.0349*** (0.0101)	1.034*** (0.193)	1.146*** (0.205)	0.113 (0.110)	0.147 (0.115)	0.421 (1.211)			
# days of delay X cash recipient	9.631 (8.825)	0.00330 (0.00296)	0.00984** (0.00430)	0.0171 (0.0112)	-0.0216 (0.0150)	-0.00400 (0.0176)	-0.223 (0.353)	-0.170 (0.357)	0.257 (0.206)	0.302 (0.227)	0.861 (2.342)			
N	6178	6178	6178	6178	6158	5557	6178	6178	6178	6178	6178			
Table 3: Mental health, time and risk preferences										Table 4: Memory and cognitive abilities				
	Sleep quality Likert (1-5) (1)	Good mood score (0-9) (2)	Happiness Likert (1-5) (3)	Required Rate of Return (4)	Payment now (dummy) (5)	Risk loving score (1-4) (6)	Math test score (0-3) (7)	Memory test score(0-36) (8)	Flanker task score(0-10) (9)	Psychomotor vigilance task score (0-30) (10)	Hearts & flower task score (0-40) (11)			
Panel A: Smoothing and delay														
# days since last transfer	0.0101*** (0.00303)	0.0199** (0.00924)	0.00879*** (0.00265)	-0.00150 (0.00155)	-0.000379 (0.000766)	0.000751 (0.00149)	-0.00195 (0.00274)	-0.00736 (0.0177)	-0.00189 (0.00473)	-0.00477 (0.0114)	-0.0189 (0.0217)			
# days of delay	-0.00985* (0.00570)	-0.0288* (0.0168)	-0.00697 (0.00500)	0.00532** (0.00251)	0.000212 (0.00165)	0.00513* (0.00290)	-0.0106** (0.00522)	0.0189 (0.0331)	-0.00470 (0.00803)	0.0124 (0.0210)	0.0112 (0.0386)			
# days since last transfer X Kalobeyei	-0.0140*** (0.00416)	-0.0239** (0.0121)	-0.0112*** (0.00335)	0.00343 (0.00216)	0.00103 (0.00127)	-0.00303 (0.00224)	0.00331 (0.00395)	0.0361 (0.0244)	0.00308 (0.00618)	0.00246 (0.0170)	-0.0430 (0.0394)			
# days of delay X Kalobeyei	0.0195*** (0.00749)	0.0404* (0.0217)	0.00593 (0.00685)	-0.00701** (0.00356)	0.00109 (0.00216)	-0.00492 (0.00423)	0.0122 (0.00742)	-0.0497 (0.0444)	0.00532 (0.0116)	0.0173 (0.0265)	-0.0301 (0.0511)			
N	6178	6178	6173	6122	6178	6178	6178	6178	6178	3069	3069			

Notes: Instrumental Variable (IV) regressions estimating Equation (1) with interaction term by type of aid received. Outcome variables are defined in Appendix Table A.4. All regressions include household fixed effects and control variables, as specified in Appendix Table A.3. Variables that depend on the actual interview dates are instrumented using their counterparts constructed based on the randomly-assigned interview dates. Cluster standard errors by date of the interview and household are reported in parentheses. Statistical significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

C Analysis of Price Data - Additional Tables

Table A.26: Impacts of aid distribution and aid delays on cash prices (log), no control variables

	Dependent variable: log prices (cash)					
	Both sites		Kakuma		Kalobeyei	
	All goods (1)	Staple (2)	All goods (3)	Staple (4)	All goods (5)	Staple (6)
Panel A: Smoothing and delay						
# days since last transfer	0.000317 (0.000444)	0.000720 (0.000597)	0.000949 (0.000624)	0.00196** (0.000834)	-0.000447 (0.000710)	-0.000305 (0.000938)
# days of delay	0.00246** (0.000950)	0.00309** (0.00146)	0.00263 (0.00163)	0.00554*** (0.00113)	0.00356** (0.00146)	0.00370* (0.00219)
Panel B: Smoothing only						
# days since last transfer	0.00101*** (0.000315)	0.00159*** (0.000485)	0.00125** (0.000564)	0.00258** (0.000990)	0.000881** (0.000383)	0.00107** (0.000456)
Panel C: Delay only						
# days of delay	0.00294*** (0.000628)	0.00417*** (0.00116)	0.00341*** (0.000963)	0.00712*** (0.00210)	0.00278*** (0.000778)	0.00317*** (0.00114)
Observations	16760	5458	9841	3189	6919	2269
R^2	0.987	0.988	0.987	0.988	0.987	0.989

Notes: Ordinary Least Squares (OLS) regressions estimating Equation (2), where the outcome variable is the logarithm of cash prices. Columns (1) and (2) include both Kakuma and Kalobeyei markets, while Columns (3) and (4) focus on Kakuma markets, and Columns (5) and (6) focus on Kalobeyei markets. Regressions in Columns (1), (3), and (5) include all goods, whereas Columns (2), (4), and (6) consider staple goods only. All regressions include product and market fixed effects. Control variables are excluded from regressions. Standard errors are two-way clustered, at the product–market and survey-date-by-camp levels. Statistical significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A.27: Impacts of aid distribution and aid delays on aid-card prices (log), no control variables

	Dependent variable: log prices (Bamba Chakula)					
	Both sites		Kakuma		Kalobeyei	
	All goods (1)	Staple (2)	All goods (3)	Staple (4)	All goods (5)	Staple (6)
Panel A: Smoothing and delay						
# days since last transfer	0.000521 (0.000836)	0.000454 (0.00145)	0.000974 (0.00207)	0.00282 (0.00303)	0.000400 (0.000449)	-0.000465 (0.00123)
# days of delay	-0.00147 (0.00170)	-0.00532* (0.00283)	-0.00568 (0.00666)	-0.0214* (0.0102)	-0.000857 (0.000756)	-0.00273 (0.00195)
Panel B: Smoothing only						
# days since last transfer	0.000120 (0.000459)	-0.00100 (0.000949)	0.000235 (0.00138)	0.00000393 (0.00249)	0.000112 (0.000297)	-0.00138 (0.000879)
Panel C: Delay only						
# days of delay	-0.000449 (0.000633)	-0.00443*** (0.00148)	-0.00254 (0.00212)	-0.0122*** (0.00336)	-0.000125 (0.000518)	-0.00359** (0.00138)
Observations	6949	2996	4084	1768	2865	1228
R^2	0.989	0.988	0.989	0.987	0.989	0.990

Notes: Ordinary Least Squares (OLS) regressions estimating Equation (2), where the outcome variable is the logarithm of aid-card prices. Columns (1) and (2) include both Kakuma and Kalobeyei markets, while Columns (3) and (4) focus on Kakuma markets, and Columns (5) and (6) focus on Kalobeyei markets. Regressions in Columns (1), (3), and (5) include all goods, whereas Columns (2), (4), and (6) consider staple goods only. All regressions include product and market fixed effects. Control variables are excluded from regressions. Standard errors are two-way clustered, at the product–market and survey-date-by-camp levels. Statistical significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A.28: Impacts of aid distribution and aid delays on cash prices (log), without market fixed effects

	Dependent variable: log prices (cash)					
	Both sites		Kakuma		Kalobeyei	
	All goods (1)	Staple (2)	All goods (3)	Staple (4)	All goods (5)	Staple (6)
Panel A: Smoothing and delay						
# days since last transfer	0.000367 (0.000280)	0.000895* (0.000517)	0.000233 (0.000444)	0.00117 (0.000730)	0.000407 (0.000615)	0.000482 (0.000719)
# days of delay	0.000987 (0.000662)	0.00124 (0.00116)	-0.000303 (0.00147)	0.00210* (0.00117)	0.00170 (0.00113)	0.00175 (0.00175)
Panel B: Smoothing only						
# days since last transfer	0.000645*** (0.000215)	0.00124*** (0.000381)	0.000209 (0.000465)	0.00134* (0.000738)	0.00105*** (0.000321)	0.00114** (0.000435)
Panel C: Delay only						
# days of delay	0.00161*** (0.000478)	0.00275*** (0.000889)	-0.000158 (0.00136)	0.00281* (0.00164)	0.00241*** (0.000508)	0.00260** (0.00105)
Observations	16760	5458	9841	3189	6919	2269
R^2	0.987	0.989	0.987	0.988	0.987	0.989

Notes: Ordinary Least Squares (OLS) regressions estimating Equation (2), where the outcome variable is the logarithm of cash prices. Columns (1) and (2) include both Kakuma and Kalobeyei markets, while Columns (3) and (4) focus on Kakuma markets, and Columns (5) and (6) focus on Kalobeyei markets. Regressions in Columns (1), (3), and (5) include all goods, whereas Columns (2), (4), and (6) consider staple goods only. All regressions include product fixed effects, and control variables that account for the ration cut implemented on July 3, 2023. Standard errors are two-way clustered, at the product–market and survey-date-by-camp levels. Statistical significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A.29: Impacts of aid distribution and aid delays on aid-card prices (log), without market fixed effects

Dependent variable: log prices (Bamba Chakula)						
	Both sites		Kakuma		Kalobeyei	
	All goods (1)	Staple (2)	All goods (3)	Staple (4)	All goods (5)	Staple (6)
Panel A: Smoothing and delay						
# days since last transfer	0.000533 (0.000643)	0.000906 (0.00140)	-0.000172 (0.000855)	0.000932 (0.00230)	0.000242 (0.000262)	-0.000819 (0.00116)
# days of delay	-0.000913 (0.00131)	-0.00341 (0.00273)	-0.00646** (0.00253)	-0.0199** (0.00846)	-0.000580 (0.000486)	-0.00191 (0.00175)
Panel B: Smoothing only						
# days since last transfer	0.000284 (0.000391)	-0.0000178 (0.000909)	-0.000988 (0.000926)	-0.00166 (0.00248)	0.0000557 (0.000169)	-0.00143* (0.000773)
Panel C: Delay only						
# days of delay	0.000168 (0.000646)	-0.00154 (0.00159)	-0.00701*** (0.00167)	-0.0169*** (0.00420)	-0.000147 (0.000317)	-0.00338** (0.00118)
Observations	6949	2996	4084	1768	2865	1228
R^2	0.989	0.988	0.990	0.989	0.990	0.990

Notes: Ordinary Least Squares (OLS) regressions estimating Equation (2), where the outcome variable is the logarithm of aid-card prices. Columns (1) and (2) include both Kakuma and Kalobeyei markets, while Columns (3) and (4) focus on Kakuma markets, and Columns (5) and (6) focus on Kalobeyei markets. Regressions in Columns (1), (3), and (5) include all goods, whereas Columns (2), (4), and (6) consider staple goods only. All regressions include product fixed effects, and control variables that account for the ration cut implemented on July 3, 2023. Standard errors are two-way clustered, at the product–market and survey-date-by-camp levels. Statistical significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A.30: Impacts of aid distribution and aid delays on cash prices (log), only product–market level clustering

	Dependent variable: log prices (cash)					
	Both sites		Kakuma		Kalobeyei	
	All goods (1)	Staple (2)	All goods (3)	Staple (4)	All goods (5)	Staple (6)
Panel A: Smoothing and delay						
# days since last transfer	0.000450** (0.000212)	0.000914*** (0.000293)	0.000168 (0.000254)	0.00117*** (0.000384)	0.000416 (0.000373)	0.000497 (0.000438)
# days of delay	0.00109** (0.000438)	0.00125** (0.000572)	-0.000235 (0.000723)	0.00211** (0.000891)	0.00169** (0.000688)	0.00174** (0.000848)
Panel B: Smoothing only						
# days since last transfer	0.000748*** (0.000166)	0.00125*** (0.000228)	0.000149 (0.000249)	0.00134*** (0.000379)	0.00106*** (0.000217)	0.00115*** (0.000249)
Panel C: Delay only						
# days of delay	0.00177*** (0.000344)	0.00262*** (0.000448)	-0.000130 (0.000709)	0.00282*** (0.000886)	0.00242*** (0.000399)	0.00262*** (0.000479)
Observations	16760	5458	9841	3189	6919	2269
R^2	0.987	0.989	0.987	0.988	0.987	0.989

Notes: Ordinary Least Squares (OLS) regressions estimating Equation (2), where the outcome variable is the logarithm of cash prices. Columns (1) and (2) include both Kakuma and Kalobeyei markets, while Columns (3) and (4) focus on Kakuma markets, and Columns (5) and (6) focus on Kalobeyei markets. Regressions in Columns (1), (3), and (5) include all goods, whereas Columns (2), (4), and (6) consider staple goods only. All regressions include product fixed effects, and control variables that account for the ration cut implemented on July 3, 2023. Standard errors are clustered by product and market. Statistical significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A.31: Impacts of aid distribution and aid delays on aid-card prices (log), only product–market level clustering

Dependent variable: log prices (Bamba Chakula)						
	Both sites		Kakuma		Kalobeyei	
	All goods (1)	Staple (2)	All goods (3)	Staple (4)	All goods (5)	Staple (6)
Panel A: Smoothing and delay						
# days since last transfer	0.000151 (0.000359)	-0.000121 (0.000452)	-0.000232 (0.000556)	0.000829 (0.000764)	0.000244 (0.000485)	-0.000847 (0.000596)
# days of delay	-0.00138 (0.00102)	-0.00450*** (0.00119)	-0.00612* (0.00318)	-0.0196*** (0.00427)	-0.000557 (0.00115)	-0.00178 (0.00116)
Panel B: Smoothing only						
# days since last transfer	-0.000214 (0.000270)	-0.00130*** (0.000384)	-0.00101** (0.000500)	-0.00172** (0.000669)	0.0000643 (0.000327)	-0.00142*** (0.000471)
Panel C: Delay only						
# days of delay	-0.00110 (0.000764)	-0.00473*** (0.00102)	-0.00686** (0.00278)	-0.0169*** (0.00367)	-0.000122 (0.000776)	-0.00331*** (0.000987)
Observations	6949	2996	4084	1768	2865	1228
R^2	0.989	0.989	0.990	0.989	0.990	0.990

Notes: Ordinary Least Squares (OLS) regressions estimating Equation (2), where the outcome variable is the logarithm of aid-card prices. Columns (1) and (2) include both Kakuma and Kalobeyei markets, while Columns (3) and (4) focus on Kakuma markets, and Columns (5) and (6) focus on Kalobeyei markets. Regressions in Columns (1), (3), and (5) include all goods, whereas Columns (2), (4), and (6) consider staple goods only. All regressions include product fixed effects, and control variables that account for the ration cut implemented on July 3, 2023. Standard errors are clustered by product and market. Statistical significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A.32: Impacts of aid distribution and aid delays on cash prices (log), robust standard errors

Dependent variable: log prices (cash)						
	Both sites		Kakuma		Kalobeyei	
	All goods (1)	Staple (2)	All goods (3)	Staple (4)	All goods (5)	Staple (6)
Panel A: Smoothing and delay						
# days since last transfer	0.000450* (0.000233)	0.000914*** (0.000317)	0.000168 (0.000310)	0.00117*** (0.000440)	0.000416 (0.000411)	0.000497 (0.000563)
# days of delay	0.00109** (0.000520)	0.00125* (0.000677)	-0.000235 (0.000809)	0.00211** (0.00107)	0.00169** (0.000848)	0.00174 (0.00113)
Panel B: Smoothing only						
# days since last transfer	0.000748*** (0.000181)	0.00125*** (0.000242)	0.000149 (0.000304)	0.00134*** (0.000437)	0.00106*** (0.000232)	0.00115*** (0.000304)
Panel C: Delay only						
# days of delay	0.00177*** (0.000405)	0.00262*** (0.000518)	-0.000130 (0.000793)	0.00282*** (0.00108)	0.00242*** (0.000478)	0.00262*** (0.000604)
Observations	16760	5458	9841	3189	6919	2269
R^2	0.987	0.989	0.987	0.988	0.987	0.989

Notes: Ordinary Least Squares (OLS) regressions estimating Equation (2), where the outcome variable is the logarithm of cash prices. Columns (1) and (2) include both Kakuma and Kalobeyei markets, while Columns (3) and (4) focus on Kakuma markets, and Columns (5) and (6) focus on Kalobeyei markets. Regressions in Columns (1), (3), and (5) include all goods, whereas Columns (2), (4), and (6) consider staple goods only. All regressions include product fixed effects, and control variables that account for the ration cut implemented on July 3, 2023. Heteroskedasticity-robust standard errors are reported in parentheses. Statistical significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A.33: Impacts of aid distribution and aid delays on aid-card prices (log), robust standard errors

Dependent variable: log prices (Bamba Chakula)						
	Both sites		Kakuma		Kalobeyei	
	All goods (1)	Staple (2)	All goods (3)	Staple (4)	All goods (5)	Staple (6)
Panel A: Smoothing and delay						
# days since last transfer	0.000151 (0.000353)	-0.000121 (0.000443)	-0.000232 (0.000566)	0.000829 (0.000748)	0.000244 (0.000461)	-0.000847 (0.000570)
# days of delay	-0.00138 (0.000981)	-0.00450*** (0.00115)	-0.00612** (0.00302)	-0.0196*** (0.00386)	-0.000557 (0.00115)	-0.00178 (0.00133)
Panel B: Smoothing only						
# days since last transfer	-0.000214 (0.000257)	-0.00130*** (0.000315)	-0.00101** (0.000457)	-0.00172*** (0.000607)	0.0000643 (0.000316)	-0.00142*** (0.000378)
Panel C: Delay only						
# days of delay	-0.00110 (0.000713)	-0.00473*** (0.000816)	-0.00686*** (0.00242)	-0.0169*** (0.00306)	-0.000122 (0.000781)	-0.00331*** (0.000883)
Observations	6949	2996	4084	1768	2865	1228
R^2	0.989	0.989	0.990	0.989	0.990	0.990

Notes: Ordinary Least Squares (OLS) regressions estimating Equation (2), where the outcome variable is the logarithm of aid-card prices. Columns (1) and (2) include both Kakuma and Kalobeyei markets, while Columns (3) and (4) focus on Kakuma markets, and Columns (5) and (6) focus on Kalobeyei markets. Regressions in Columns (1), (3), and (5) include all goods, whereas Columns (2), (4), and (6) consider staple goods only. All regressions include product fixed effects, and control variables that account for the ration cut implemented on July 3, 2023. Heteroskedasticity-robust standard errors are reported in parentheses. Statistical significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A.34: Impacts of aid distribution and aid delays on cash prices (log), with two smoothing variables

	Dependent variable: log prices (cash)					
	Both sites		Kakuma		Kalobeyei	
	All goods (1)	Staple (2)	All goods (3)	Staple (4)	All goods (5)	Staple (6)
Panel A: Smoothing and delay						
# days since last cash transfer	0.000312 (0.000286)	0.000321 (0.000550)	0.000262 (0.000309)	0.000152 (0.000674)	0.000416 (0.000626)	0.000497 (0.000728)
# days since last in-kind transfer	0.0000785 (0.000348)	0.000861 (0.000541)	0.0000296 (0.000318)	0.000679 (0.000556)		
# days of delay	0.00119 (0.000776)	0.00200 (0.00139)	-0.000691 (0.00151)	0.00240 (0.00186)	0.00169 (0.00114)	0.00174 (0.00178)
Observations	16760	5458	9841	3189	6919	2269
R^2	0.987	0.989	0.987	0.988	0.987	0.989
Panel B: Smoothing only						
# days since last cash transfer	0.000602*** (0.000210)	0.000807** (0.000363)	0.000170 (0.000265)	0.000471 (0.000533)	0.00106*** (0.000324)	0.00115** (0.000432)
# days since last in-kind transfer	0.000154 (0.000346)	0.000976* (0.000533)	0.00000188 (0.000333)	0.000776 (0.000559)		
Observations	16760	5458	9841	3189	6919	2269
R^2	0.987	0.989	0.987	0.988	0.987	0.989

Notes: Ordinary Least Squares (OLS) regressions estimating Equation (2), where the outcome variable is the logarithm of cash prices, and including two smoothing variables differentiating between restricted and unrestricted cash transfers. Columns (1) and (2) include both Kakuma and Kalobeyei markets, while Columns (3) and (4) focus on Kakuma markets, and Columns (5) and (6) focus on Kalobeyei markets. Regressions in Columns (1), (3), and (5) include all goods, whereas Columns (2), (4), and (6) consider staple goods only. All regressions include product and market fixed effects, and control variables that account for the ration cut implemented on July 3, 2023. Standard errors are two-way clustered, at the product-market and survey-date-by-camp levels. Statistical significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A.35: Impacts of aid distribution and aid delays on aid-card prices (log), with two smoothing variables

	Dependent variable: log prices (Bamba Chakula)					
	Both sites		Kakuma		Kalobeyei	
	All goods (1)	Staple (2)	All goods (3)	Staple (4)	All goods (5)	Staple (6)
Panel A: Smoothing and delay						
# days since last cash transfer	0.0000148 (0.000375)	-0.000174 (0.000796)	-0.000177 (0.000492)	0.000663 (0.00116)	0.000244 (0.000263)	-0.000847 (0.00109)
# days since last in-kind transfer	-0.000493 (0.000603)	-0.00117 (0.00122)	-0.000633 (0.000631)	-0.00108 (0.00143)		
# days of delay	-0.00100 (0.000895)	-0.00410** (0.00179)	-0.00472* (0.00234)	-0.0175** (0.00641)	-0.000557 (0.000474)	-0.00178 (0.00177)
Observations	6949	2996	4084	1768	2865	1228
R^2	0.989	0.989	0.990	0.989	0.990	0.990
Panel B: Smoothing only						
# days since last cash transfer	-0.000173 (0.000274)	-0.000960 (0.000673)	-0.000531 (0.000481)	-0.000708 (0.00111)	0.0000643 (0.000175)	-0.00142* (0.000731)
# days since last in-kind transfer	-0.000570 (0.000599)	-0.00149 (0.00119)	-0.000884 (0.000570)	-0.00204 (0.00125)		
Observations	6949	2996	4084	1768	2865	1228
R^2	0.989	0.989	0.990	0.989	0.990	0.990

Notes: Ordinary Least Squares (OLS) regressions estimating Equation (2), where the outcome variable is the logarithm of aid-card prices, and including two smoothing variables differentiating between restricted and unrestricted cash transfers. Columns (1) and (2) include both Kakuma and Kalobeyei markets, while Columns (3) and (4) focus on Kakuma markets, and Columns (5) and (6) focus on Kalobeyei markets. Regressions in Columns (1), (3), and (5) include all goods, whereas Columns (2), (4), and (6) consider staple goods only. All regressions include product and market fixed effects, and control variables that account for the ration cut implemented on July 3, 2023. Standard errors are two-way clustered, at the product–market and survey-date-by-camp levels. Statistical significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A.36: Impacts of aid distribution and aid delays on cash prices, normalized by the mean price of each product

Dependent variable: price normalized by mean price (cash)						
	Both sites		Kakuma		Kalobeyei	
	All goods (1)	Staple (2)	All goods (3)	Staple (4)	All goods (5)	Staple (6)
Panel A: Smoothing and delay						
# days since last transfer	0.000283 (0.000343)	0.000874* (0.000499)	0.000218 (0.000481)	0.00144** (0.000688)	-0.0000417 (0.000765)	0.000191 (0.000714)
# days of delay	0.00124* (0.000667)	0.00108 (0.00113)	-0.000136 (0.00139)	0.00215* (0.00110)	0.00232* (0.00131)	0.00194 (0.00175)
Panel B: Smoothing only						
# days since last transfer	0.000623** (0.000285)	0.00117*** (0.000389)	0.000207 (0.000494)	0.00161** (0.000705)	0.000836** (0.000392)	0.000922** (0.000425)
Panel C: Delay only						
# days of delay	0.00166*** (0.000557)	0.00239** (0.000922)	4.46e-08 (0.00129)	0.00302* (0.00173)	0.00225*** (0.000542)	0.00228** (0.00103)
Observations	16760	5458	9841	3189	6919	2269
R^2	0.083	0.097	0.095	0.101	0.083	0.109

Notes: Ordinary Least Squares (OLS) regressions estimating Equation (2), where the outcome variable is the cash price divided by the mean price of each product. Columns (1) and (2) include both Kakuma and Kalobeyei markets, while Columns (3) and (4) focus on Kakuma markets, and Columns (5) and (6) focus on Kalobeyei markets. Regressions in Columns (1), (3), and (5) include all goods, whereas Columns (2), (4), and (6) consider staple goods only. All regressions include product and market fixed effects, and control variables that account for the ration cut implemented on July 3, 2023. Standard errors are two-way clustered, at the product–market and survey-date-by-camp levels. Statistical significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A.37: Impacts of aid distribution and aid delays on aid-card prices, normalized by the mean price of each product

	Dependent variable: price normalized by mean price (Bamba Chakula)					
	Both sites		Kakuma		Kalobeyei	
	All goods (1)	Staple (2)	All goods (3)	Staple (4)	All goods (5)	Staple (6)
Panel A: Smoothing and delay						
# days since last transfer	-0.000113 (0.000527)	-0.000289 (0.00116)	-0.000356 (0.000885)	0.000673 (0.00189)	-0.000313 (0.000436)	-0.00122 (0.00121)
# days of delay	-0.000731 (0.00121)	-0.00448** (0.00217)	-0.00433 (0.00268)	-0.0194*** (0.00574)	0.000351 (0.000929)	-0.00145 (0.00206)
Panel B: Smoothing only						
# days since last transfer	-0.000305 (0.000313)	-0.00147* (0.000861)	-0.000904 (0.000804)	-0.00185 (0.00204)	-0.000200 (0.000214)	-0.00169* (0.000789)
Panel C: Delay only						
# days of delay	-0.000947 (0.000727)	-0.00504*** (0.00154)	-0.00546** (0.00234)	-0.0172*** (0.00392)	-0.000208 (0.000491)	-0.00365** (0.00132)
Observations	6949	2996	4084	1768	2865	1228
R^2	0.213	0.207	0.201	0.232	0.280	0.209

Notes: Ordinary Least Squares (OLS) regressions estimating Equation (2), where the outcome variable is the aid-card price divided by the mean price of each product. Columns (1) and (2) include both Kakuma and Kalobeyei markets, while Columns (3) and (4) focus on Kakuma markets, and Columns (5) and (6) focus on Kalobeyei markets. Regressions in Columns (1), (3), and (5) include all goods, whereas Columns (2), (4), and (6) consider staple goods only. All regressions include product and market fixed effects, and control variables that account for the ration cut implemented on July 3, 2023. Standard errors are two-way clustered, at the product–market and survey-date-by-camp levels. Statistical significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A.38: Impacts of aid distribution and aid delays on cash prices, normalized by the median price of each product

	Dependent variable: price normalized by median price (cash)					
	Both sites		Kakuma		Kalobeyei	
	All goods (1)	Staple (2)	All goods (3)	Staple (4)	All goods (5)	Staple (6)
Panel A: Smoothing and delay						
# days since last transfer	0.000252 (0.000358)	0.000875* (0.000503)	0.000201 (0.000498)	0.00145** (0.000691)	-0.0000519 (0.000809)	0.000200 (0.000718)
# days of delay	0.00124* (0.000668)	0.00113 (0.00115)	-0.0000119 (0.00139)	0.00227** (0.00112)	0.00226* (0.00134)	0.00197 (0.00176)
Panel B: Smoothing only						
# days since last transfer	0.000593** (0.000291)	0.00118*** (0.000391)	0.000200 (0.000506)	0.00163** (0.000710)	0.000802* (0.000411)	0.000942** (0.000428)
Panel C: Delay only						
# days of delay	0.00162*** (0.000543)	0.00245*** (0.000928)	0.000113 (0.00129)	0.00315* (0.00172)	0.00217*** (0.000533)	0.00232** (0.00104)
Observations	16760	5458	9841	3189	6919	2269
R^2	0.186	0.152	0.186	0.151	0.202	0.170

Notes: Ordinary Least Squares (OLS) regressions estimating Equation (2), where the outcome variable is the cash price divided by the median price of each product. Columns (1) and (2) include both Kakuma and Kalobeyei markets, while Columns (3) and (4) focus on Kakuma markets, and Columns (5) and (6) focus on Kalobeyei markets. Regressions in Columns (1), (3), and (5) include all goods, whereas Columns (2), (4), and (6) consider staple goods only. All regressions include product and market fixed effects, and control variables that account for the ration cut implemented on July 3, 2023. Standard errors are two-way clustered, at the product–market and survey-date-by-camp levels. Statistical significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A.39: Impacts of aid distribution and aid delays on aid-card prices, normalized by the median price of each product

	Dependent variable: price normalized by median price (Bamba Chakula)					
	Both sites		Kakuma		Kalobeyei	
	All goods (1)	Staple (2)	All goods (3)	Staple (4)	All goods (5)	Staple (6)
Panel A: Smoothing and delay						
# days since last transfer	-0.000331 (0.000649)	-0.000258 (0.00117)	-0.000266 (0.000983)	0.000717 (0.00192)	-0.000794 (0.000731)	-0.00122 (0.00122)
# days of delay	0.000227 (0.00166)	-0.00459** (0.00221)	-0.00377 (0.00307)	-0.0197*** (0.00583)	0.00172 (0.00166)	-0.00149 (0.00206)
Panel B: Smoothing only						
# days since last transfer	-0.000271 (0.000335)	-0.00147 (0.000871)	-0.000743 (0.000915)	-0.00185 (0.00207)	-0.000240 (0.000381)	-0.00170* (0.000795)
Panel C: Delay only						
# days of delay	-0.000407 (0.000907)	-0.00509*** (0.00156)	-0.00461 (0.00318)	-0.0174*** (0.00400)	0.000303 (0.000791)	-0.00368** (0.00133)
Observations	6949	2996	4084	1768	2865	1228
R^2	0.455	0.275	0.430	0.301	0.516	0.281

Notes: Ordinary Least Squares (OLS) regressions estimating Equation (2), where the outcome variable is the aid-card price divided by the median price of each product. Columns (1) and (2) include both Kakuma and Kalobeyei markets, while Columns (3) and (4) focus on Kakuma markets, and Columns (5) and (6) focus on Kalobeyei markets. Regressions in Columns (1), (3), and (5) include all goods, whereas Columns (2), (4), and (6) consider staple goods only. All regressions include product and market fixed effects, and control variables that account for the ration cut implemented on July 3, 2023. Standard errors are two-way clustered, at the product–market and survey-date-by-camp levels. Statistical significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.