

# The impact of a nutrition-sensitive graduation model on child nutrition:

## Experimental evidence from Ethiopia

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### Highlights

- This brief reports on a three-arm cluster randomized controlled trial of 3,015 households evaluating the effectiveness of SPIR II, a nutrition-sensitive graduation model implemented in Ethiopia.
- The full treatment package—combining nutrition-focused behavior change communication (BCC), village economics and savings associations, monthly maternal cash transfers of US\$20, and a one-time livelihood grant of US\$300—generates large, sustained improvements in child diet quality, household consumption, livestock holdings, and formal savings.
- A substantial reduction in childhood stunting (7 percentage points) is observed in the same sub-arm; BCC alone improves caregiver nutrition knowledge but does not lead to improved child feeding or growth.
- The benefit-cost ratio is nearly two, suggesting the program more than pays for itself.

## Background

Nearly 150 million children under five years of age suffer from chronic undernutrition in low- and middle-income countries (FAO et al. 2022), and children in the poorest households are the most severely affected. To address the poverty underlying these conditions, multifaceted graduation models that provide a bundle of interventions have been developed and widely deployed over the last 20 years; these have had impressive effects in both the short and long term (Balboni et al. 2022; Banerjee et al. 2021; Barker et al. 2024). However, most graduation models neither explicitly incorporate child nutritional investments into their design nor systematically evaluate effects on nutritional outcomes.<sup>1</sup>

To address this evidence gap, we conducted a cluster randomized controlled trial (RCT) to assess the effects of a nutrition-sensitive graduation model embedded in Ethiopia's flagship safety net program, the Productive Safety Net Programme (PSNP). Our goal was to explore whether this model can reduce child undernutrition and enhance child development, while also enhancing livelihoods and increasing consumption at the household level. SPIR II<sup>2</sup> was a graduation model program implemented in the Amhara and Oromia regions of Ethiopia that incorporated targeted nutrition-related components to address high rates of childhood stunting; it was funded by the United States government and implemented by a consortium led by World Vision in partnership with CARE and the Organization for Rehabilitation and Development in Amhara. The program combined livelihood-oriented graduation programming—designed to build household assets and productive capacity—with nutrition-focused behavior change communication (BCC) delivered through peer-led Nurturing Care Groups (NCGs). This brief reports on findings from the randomized trial.

## Intervention and Study Design

Core SPIR II graduation programming includes the organization of village economic and social associations (VESAs); VESAs serve as a platform for trainings and other project activities related to financial literacy, promotion of savings and credit use, agriculture, livestock value chain development, and gender. In addition, approximately the poorest 30 percent of households in each kebele (identified by a baseline asset index) were eligible for an additional one-time livelihood grant of US\$300 to support investment in productive assets.

This evaluation particularly focused on innovations in nutrition-related programming that centered around enhanced infant and young child feeding (IYCF) practices. The NCG model, delivered through peer-led neighbor groups, provides structured counseling on breastfeeding, complementary feeding, dietary diversity, hygiene, and early childhood stimulation. The NCG model, in conjunction with the core SPIR II program, was rolled out in the second study arm of this trial (T2). However, improving caregiver knowledge may not be sufficient to improve complementary feeding practices if households cannot afford to purchase nutritious foods. Therefore, the third study arm (T3) introduced maternal cash transfers of US\$20 per month during the child's first 24 months of life to alleviate budgetary constraints on child feeding.

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<sup>1</sup> The existing papers in the graduation model literature generally do not measure or report any effects on child nutrition or anthropometric status, though Bedoya (2019) shows positive effects in reducing the incidence of child diarrhea. Raza and colleagues (2018) use the Targeting the Ultra-Poor evaluation data to estimate the program's impact on child nutrition. The analysis does document positive effects on indicators capturing acute undernutrition, but the impacts on chronic undernutrition outcomes are not significantly different from zero, possibly due to the relatively small number of young children in the data. Another recent paper analyzed nutritional effects of an earlier iteration of the SPIR program (Alderman et al. 2024).

<sup>2</sup> The full name of SPIR II is Strengthen PSNP Institutions and Resilience.

The full set of interventions thus varies by arm:

- T1 (Control): PSNP transfers only. No supplemental programming from SPIR II (80 kebeles).
- T2 (BCC): PSNP transfers plus SPIR II graduation programming, including VESA enrollment for group savings and social learning, and participation in NCGs delivering structured IYCF counseling (77 kebeles).
- T3 (BCC + Cash Transfer): Same as T2, plus monthly maternal cash transfers of approximately US\$20 per month during the child's first 24 months of life, which were intended to alleviate financial constraints to child feeding (80 kebeles).

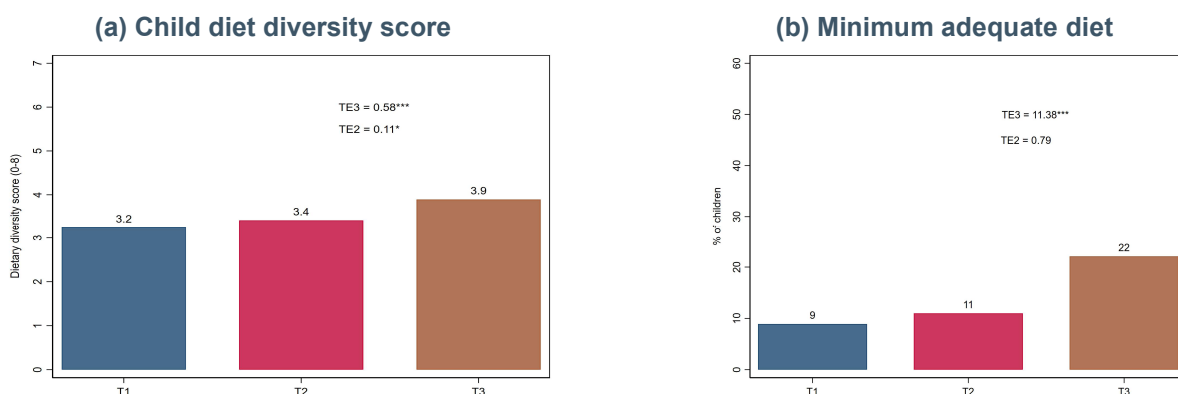
To assess the effectiveness of this model, the trial included a sample of 3,015 households, which were enrolled at baseline and included either a pregnant woman or an infant under nine months of age. The baseline survey was conducted in August–September 2022, the one-year follow-up survey in August–December 2023, and the two-and-a-half-year follow-up survey in May–June 2025. In the second follow-up survey, the evaluation achieved a household retention rate of 96.3 percent (2,902 of 3,015 originally enrolled households), and the child sample comprised 2,210 children ages 24–48 months.

## Nutrition Outcomes

### *Nutrition knowledge and diet quality*

Our findings suggest that both T2 and T3 generate some small gains in caregiver knowledge of IYCF practices, consistent with the direct effects of the NCG-based BCC component. However, improvements in actual feeding practices observed in the one-year follow-up diverge meaningfully across treatment arms. T3 improves child dietary diversity by 0.58 food groups ( $p < 0.01$ ), representing an 18 percent increase relative to the control mean of 3.25 food groups (Figure 1a). The share of children achieving a minimum acceptable diet approximately doubles in T3 (20 percent versus 9 percent in the control group, a difference that is robust across multiple hypothesis testing adjustments and captured in Figure 1b). By contrast, T2 shows no statistically significant improvement in feeding practices, despite the knowledge gains. This pattern suggests that knowledge alone is necessary but not sufficient to shift dietary behavior, and the additional financial resources provided by the maternal cash transfer in T3 appear to enable households to translate knowledge into practice.

**Figure 1. Child diet diversity and minimum adequate diet (one year)**



Source: SPIR II data.

Note: N = 2,233 children ages 6–23 months. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.10$ .

### *Stunting and early childhood development*

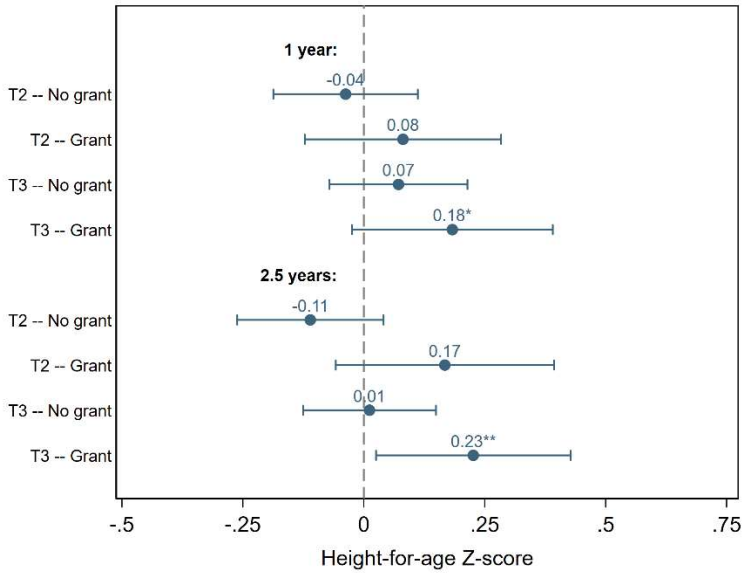
In the second follow-up survey, children in the control arm exhibit a stunting prevalence of 57 percent, indicating severe chronic malnutrition in the study population. In the full sample, T3 yields a point estimate of +0.07 SD on height-for-age z-scores (HAZ), which is small in magnitude and statistically insignificant. However, the treatment effects are markedly heterogeneous by grant eligibility status, as captured in Figure 2. Among grant-eligible T3 households (approximately the poorest 30 percent), HAZ improves by 0.23 SD ( $p < 0.05$ ), and stunting prevalence falls by approximately 7 percentage points ( $p = 0.06$ ). In contrast, T3 households that were not eligible for the livelihood grant show no significant anthropometric effects; the increase in HAZ among T2-grant-eligible households is nearly as large as the increase among T3-grant-eligible households, though noisily estimated. These findings are consistent with the hypothesis that the combination of maternal cash transfers and the livelihood grant—jointly facilitating both a short-term increase in consumption and accumulation of productive assets in the medium term—appears necessary to generate detectable improvements in linear growth among the most disadvantaged children.

In the area of early childhood development, we find that T3 improves CREDI<sup>3</sup> z-scores (a measure of early childhood cognitive and socioemotional development) by 0.19 SD at one year and 0.12 SD at two and a half years (both  $p < 0.01$ ), while T2 shows no significant effect on this measure. An index of child stimulation behaviors on the part of parents is also meaningfully higher in T3 (+0.22 SD,  $p < 0.01$ ), consistent with the hypothesis that the additional resources provided by the cash transfer enable more stimulating home environments. The pattern across these developmental outcomes reinforces the broader finding that although the BCC component alone is effective in improving knowledge, it does not generate sufficient behavioral change to shift child development trajectories in the absence of complementary financial resources.

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<sup>3</sup> Caregiver Reported Early Development Instruments.

**Figure 2. Height-for-age z-score treatment effects by grant eligibility (2.5-year follow-up)**



**Source:** SPIR II evaluation.

**Note:** Coefficient estimates and 95% confidence intervals from four-way interaction regression.

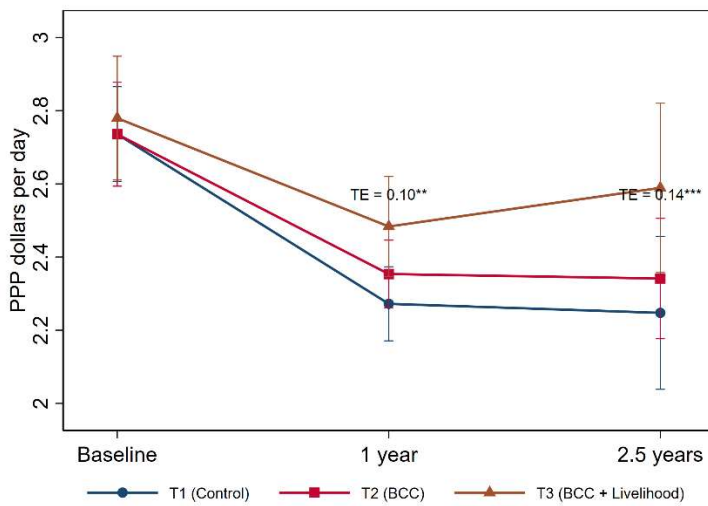
## Livelihood Outcomes

For consumption and poverty outcomes, we find that T3 increases per capita consumption by approximately \$0.15 per day at endline ( $p < 0.01$ ), representing a 10 percent increase relative to the control mean of \$1.47 per day.<sup>4</sup> Extreme poverty<sup>5</sup> is reduced by 6 percentage points in T3. Notably, these effects grow over time, suggesting a dynamic process of asset accumulation and income growth rather than a one-time consumption boost. The effects of T2 on consumption are small and not statistically significant. Importantly, these effects are observed in the context of deteriorating outcomes in the control arm, as shown in Figure 3.

<sup>4</sup> In 2011 international PPP dollars.

<sup>5</sup> Defined as consumption below \$2.15 per day in 2017 PPP.

**Figure 3. Per capita consumption (PPP dollars/day), by treatment arm and survey round**



**Source:** SPIR II evaluation.

**Note:** Per capita daily consumption in 2011 international PPP dollars. \*\*\* p<0.01, \*\* p<0.05, \* p<0.10. BCC = behavior change communication.

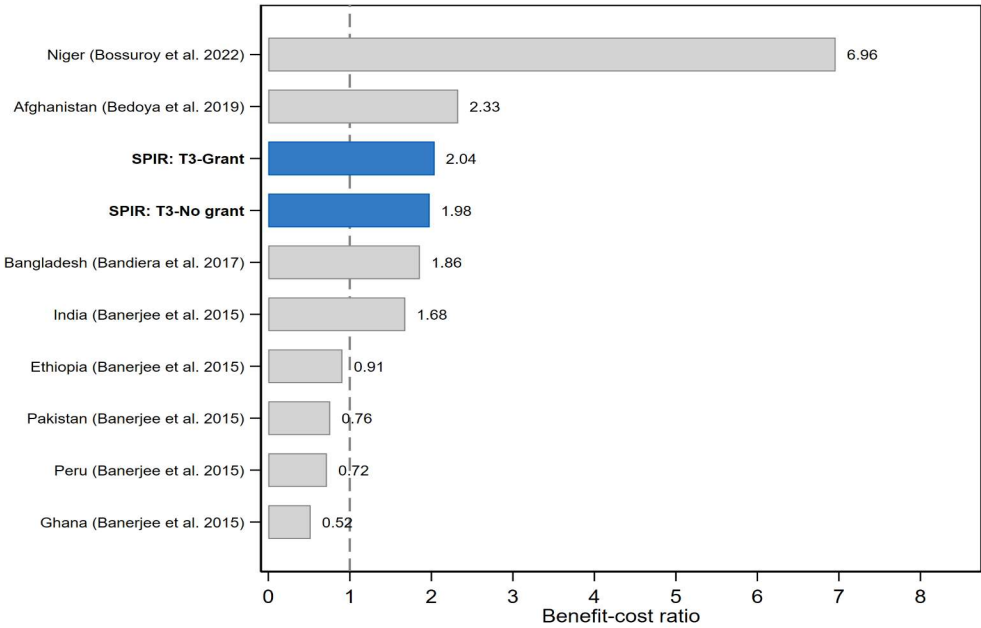
The positive effects on consumption are consistent with substantial positive effects on asset accumulation and financial inclusion. Tropical livestock units increase by 25–40 percent among households that receive a grant or transfer, consistent with the program’s design of channeling the livelihood grant primarily toward livestock acquisition. These effects persist and strengthen over time, suggesting that the initial asset transfer catalyzes a sustained process of capital accumulation. Formal savings increase by more than 20 percentage points for all treatment households. The magnitude of the livestock effect is particularly salient, given the central role of livestock in rural Ethiopian livelihoods, both as a productive asset and as a store of wealth that provides insurance against shocks.

## Cost-Benefit Analysis

We also conduct a cost-benefit analysis to assess the economic returns to SPIR II programming by comparing the discounted stream of future consumption benefits against program costs. We assume the consumption gains from the RCT are projected over a 10-year horizon and that the treatment effect decays to zero by year 10, following the approach of Banerjee and colleagues (2015) and subsequent graduation program evaluations. An annual discount rate of 5 percent is applied. Program costs are drawn from financial records and implementation partner reports.

The cost-benefit analysis yields encouraging results. The ratio of benefits to costs is 2.04 for T3-grant households and 1.98 for T3-no grant-households, indicating that every dollar invested in the program generates approximately two dollars in discounted consumption gains over a 10-year horizon (at a 5 percent discount rate). These estimates are comparable to the most cost-effective graduation programs documented in the literature, as summarized in Figure 4. We assess these as conservative estimates, as they exclude the intergenerational benefits of improved child nutrition and early childhood development, which the existing evidence base suggests may be substantial.

**Figure 4. Benefit-cost ratios across graduation programs**



**Source:** SPIR II endline evaluation and published literature.

**Note:** The benefit-cost ratio is the discounted consumption benefit of the program, calculated across a 10-year horizon at a 5% discount rate, divided by the program cost.

### Conclusions

These findings have several implications for the broader evidence base around nutrition-sensitive social protection programming. First, BCC alone is insufficient to improve child feeding practices or anthropometric outcomes in resource-constrained settings; it must be combined with financial transfers that enable households to act on improved knowledge. Second, both maternal cash transfers and livelihood grants have positive effects on child nutrition and growth outcomes, and there is some evidence of complementarities. Third, the program demonstrates dual returns on both livelihoods and nutrition, and its returns relative to cost compare favorably to other major programs in the literature.

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Daniel Gilligan is the Unit Director, and Kalle Hirvonen and Jessica Leight are Senior Research Fellows, all in the Poverty, Gender, and Inclusion Unit at the International Food Policy Research Institute (IFPRI). Hiwot Mekonnen Mesfin is an economist with the Gender Innovation Lab at the World Bank. Michael Mulford is director of the Global Poverty Research Lab at Northwestern University. Haleluya Tesfaye is a Research Officer at IFPRI.

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