

The Marginal Value of Public Funds for Unconditional Cash Transfers in a Developing Country: Evidence from Kenya*

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Abstract

The MVPF framework has transformed policy analysis in the United States, where fiscal externalities—tax revenue from behavioral responses—offset program costs. In developing countries, widespread informality breaks this channel. Does the welfare state still “work” when 80% of workers escape the tax net?

I calculate the MVPF for Kenya’s GiveDirectly program and find that unconditional cash transfers achieve 0.87—comparable to leading US programs. Two compensating forces explain this: fiscal externalities matter less than assumed even in rich countries, while developing countries gain through local general equilibrium multipliers. In Kenya’s village economies, transfers generate spillovers to non-recipients that boost welfare by 9 percentage points (0.87 to 0.96). The case for cash transfers in developing countries rests on different economic foundations than in the United States, but informality does not undermine the core welfare rationale.

JEL Codes: H53, I38, O15, O22

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1. Introduction

Randomized evaluations tell us what social programs do. But for policymakers facing budget constraints, the relevant question is different: *how much welfare does a dollar of spending deliver?* And does the answer depend on where the dollar is spent?

The Marginal Value of Public Funds (MVPF) framework, developed by [Hendren and Sprung-Keyser \(2020\)](#), provides a unified answer for the United States. But the framework's applicability to developing countries is not obvious—and the stakes are high. Cash transfers now reach 1.5 billion people globally, with governments and donors spending over \$500 billion annually ([Gentilini et al., 2022](#)). If the economics of transfers differs systematically between rich and poor countries, we may be misallocating vast resources.

The concern is straightforward. In the United States, transfer programs can partially “pay for themselves” through fiscal externalities: when the Earned Income Tax Credit increases labor supply, the government collects additional income tax on those earnings, reducing the net cost. This mechanism is central to the MVPF framework’s appeal—it creates the possibility that some programs deliver more than a dollar of welfare per dollar spent. But in developing countries, the channel is broken. When 80% of workers are in the informal sector—outside the tax net—increased earnings generate no fiscal externality. Does this mean cash transfers are fundamentally less efficient in poor countries?

This paper shows that the answer is no. I calculate the MVPF for Kenya’s GiveDirectly program and find it remarkably similar to comparable US programs, despite the near-absence of fiscal externalities. The explanation reveals something important about the economics of transfers in different contexts: what developing countries lose on the fiscal externality margin, they gain through local general equilibrium effects. In Kenya’s relatively closed village economies, transfers generate substantial spillovers to non-recipients—a channel that is largely absent in the integrated markets of rich countries.

GiveDirectly’s Kenya program provides an ideal setting for this analysis. Two randomized experiments—[Haushofer and Shapiro \(2016\)](#) with 1,372 households and [Egger et al. \(2022\)](#) with over 10,500—provide credible estimates of both direct effects and general equilibrium spillovers.¹ No other cash transfer program has such comprehensive experimental evidence on both margins.

My main finding is that Kenya’s program achieves an MVPF of 0.88 for direct recipients—between the EITC (0.92) and TANF (0.65). Incorporating spillovers to non-recipients raises the MVPF to 0.96 (95% CI: [0.82, 1.07]): we cannot reject that the program delivers welfare

¹The randomized design avoids the identification challenges that complicate difference-in-differences studies with staggered treatment timing ([Goodman-Bacon, 2021](#); [Callaway and Sant’Anna, 2021](#); [de Chaisemartin and D’Haultfoeuille, 2020](#)).

equal to its cost.

Why is the MVPF so similar across contexts? The answer cuts against a common intuition. One might expect fiscal externalities to be the key margin distinguishing rich and poor countries—and they are different. But fiscal externalities are quantitatively modest even in the United States: the EITC’s high MVPF comes primarily from direct benefits, not from recovered tax revenue. Breaking the fiscal externality channel in Kenya costs perhaps 2–3 percentage points of MVPF. Meanwhile, the general equilibrium multiplier documented by [Egger et al. \(2022\)](#)—transfers generating spillover consumption gains equal to 84% of direct effects—adds roughly 9 points back. The mechanisms differ; the bottom line does not.

This finding has immediate policy relevance. If cash transfers were fundamentally less efficient in informal economies, developing-country governments might reasonably prioritize other interventions. Instead, the similarity of MVPFs across contexts suggests that unconditional transfers are a robust policy tool—though the economic rationale differs.

This paper makes three contributions. First, it extends the MVPF framework to developing countries—the first full calculation outside the United States. The challenges I confront (informal taxation, limited fiscal data, uncertain effect persistence) will be common to future applications; my solutions provide a template. Second, I show how to incorporate general equilibrium spillovers into welfare calculations without double-counting—a conceptually subtle problem since spillovers to non-recipients are genuine welfare gains but arise through market channels rather than direct transfer. Third, the heterogeneity analysis reveals that MVPF varies substantially across recipient characteristics: poorest households achieve MVPFs above 0.90, while less-poor recipients fall below 0.85. This has direct implications for targeting.

The remainder of the paper proceeds as follows. Section 2 describes the GiveDirectly program and the experimental evidence I draw upon. Section 3 presents the MVPF framework and discusses how I adapt it to the Kenyan context. Section 4 describes the data and calibration. Section 5 presents the main MVPF results. Section 6 conducts extensive sensitivity analysis. Section 7 compares Kenya’s MVPF to US programs and discusses implications. Section 8 concludes.

2. Institutional Background: The GiveDirectly Program in Kenya

2.1 Program Design

GiveDirectly is an international NGO founded in 2009 that provides unconditional cash transfers to poor households in developing countries. The organization began operations in Kenya in 2011 and has since expanded to Uganda, Rwanda, Liberia, Malawi, and the Democratic Republic of Congo, as well as disaster relief programs in the United States

(GiveDirectly, 2023).

The Kenya program targets poor rural households using a combination of geographic and household-level criteria. Villages are selected based on poverty rates measured by asset indices and housing quality. Within villages, households are eligible if they live in homes with thatched roofs (rather than metal), indicating low wealth. This targeting approach achieves reasonable accuracy: among recipient households, 86% lived on less than \$2/day at baseline (Haushofer and Shapiro, 2016).

Transfers are delivered electronically via M-Pesa, Kenya's mobile money platform. M-Pesa is widely accessible in rural Kenya—over 80% of adult Kenyans have a registered account—and allows recipients to withdraw cash at any of thousands of agent locations (Suri and Jack, 2017). Electronic delivery reduces leakage and administrative costs compared to in-person distribution.

The standard transfer amount is approximately \$1,000 USD, equivalent to about 75% of annual household consumption for the typical recipient. This is substantially larger than most government cash transfer programs, which typically provide small monthly amounts. GiveDirectly's approach is based on the hypothesis that large lump-sum transfers enable recipients to make lumpy investments (livestock, home improvements, business capital) that would be infeasible with smaller transfers (Haushofer and Shapiro, 2016).

Transfers are explicitly unconditional. Recipients face no requirements regarding how they spend the money, whether they work, or whether children attend school. This contrasts with conditional cash transfer (CCT) programs like Mexico's Prospera or Brazil's Bolsa Família, which require health checkups and school attendance. The unconditional design is based on evidence that conditions add administrative costs without improving outcomes, and that poor households generally make reasonable spending decisions (Banerjee et al., 2015).

Administrative costs at GiveDirectly are approximately 15% of funds raised, meaning 85% reaches recipients (GiveDirectly, 2023). This is low compared to many development programs, reflecting the simplicity of cash transfers and electronic delivery. For MVPF calculations, I treat administrative costs as reducing the effective transfer to recipients.

2.2 The Haushofer and Shapiro (2016) Experiment

Haushofer and Shapiro (2016) conducted the first major evaluation of GiveDirectly's Kenya program, enrolling 1,372 households across 120 villages in Rarieda District (2011–2013). The design randomized at both village and household levels: 60 treatment and 60 control villages, with within-village randomization into treatment, spillover, and ineligible groups. The experiment also varied recipient gender, transfer timing (lump sum vs. installments), and magnitude (\$404 vs. \$1,525 PPP).

At 9-month follow-up, transfers produced broad improvements: monthly consumption rose \$35 PPP (22% above control), assets increased \$174 PPP (58% above control, concentrated in livestock), and non-agricultural revenue grew \$17 PPP/month. Psychological well-being improved by 0.20 standard deviations, while spending on temptation goods decreased. At 3-year follow-up ([Haushofer and Shapiro, 2018](#)), asset effects persisted at 60% of short-run magnitude while consumption effects attenuated substantially—a persistence pattern central to MVPF calculations.

2.3 The Egger et al. (2022) General Equilibrium Experiment

[Egger et al. \(2022\)](#) designed a larger experiment (10,546 households, 653 villages in Siaya County, 2014–2017) specifically to measure general equilibrium effects. The key innovation was a saturation design: villages were grouped into 83 clusters randomized to high (2/3 treated) or low (1/3 treated) saturation, with within-village household randomization. This multi-level design identifies spillover effects that household-level randomization cannot.

The study documents a local fiscal multiplier of 2.5–2.7: each \$1 transferred generated \$2.50–2.70 in total economic activity. Non-recipients in treatment villages experienced consumption gains of \$245 PPP annually—84% of the recipient effect (\$293 PPP). Local enterprise revenues rose 30–46%. Prices increased only 0.1%, indicating real rather than pecuniary spillovers: elastic local supply (expanded production, restocked inventory) absorbed the demand shock without inflation.

2.4 Relevance for Government Policy

While GiveDirectly is a private charity, its program design closely mirrors government cash transfer programs. Kenya’s own government program, Inua Jamii, provides unconditional transfers to elderly, disabled, and orphaned populations. Similar programs exist across Africa (Ethiopia’s PSNP, South Africa’s Child Support Grant) and globally ([Gentilini et al., 2022](#)).

The key question for policymakers is whether the effects observed under GiveDirectly would generalize to government implementation. Several considerations suggest broad applicability. The transfer mechanism—mobile money via M-Pesa—is identical to what the Kenyan government uses for its Inua Jamii program, eliminating concerns about differential delivery infrastructure. The targeting approach, combining community-based identification with asset proxies like housing quality, closely mirrors methods used by government safety net programs throughout sub-Saharan Africa. When scaled to typical program budgets, transfer amounts are comparable, and the underlying labor markets and consumption patterns are obviously identical since both programs operate in the same communities.

However, some differences may matter. Government programs face political economy constraints (geographic allocation, elite capture) that NGOs avoid. Administrative costs may be higher. And sustainability concerns may lead to smaller, more frequent transfers rather than large lump sums.

For this paper, I treat the GiveDirectly effects as the best available evidence on what unconditional cash transfers achieve in rural Kenya. The MVPF I calculate represents an upper bound for government programs to the extent that implementation quality would be lower.

2.5 The Kenyan Economic and Fiscal Context

Understanding Kenya's economic structure is essential for calculating fiscal externalities. Kenya is a lower-middle-income country with GDP per capita of approximately \$2,000 USD (2020) and a population of 54 million. The economy is characterized by substantial regional inequality, with Nairobi and central regions significantly wealthier than western and coastal areas where GiveDirectly operates.

Labor Market Structure. Kenya's labor market is dominated by informal employment, particularly in rural areas. According to the Kenya National Bureau of Statistics, formal sector employment accounts for only about 18% of total employment nationally, with the remainder in informal enterprises, smallholder agriculture, and household production. In rural western Kenya—where GiveDirectly operates—formal employment is even rarer, with an estimated 80% or more of workers in the informal sector. This employment structure is typical of developing countries and has profound implications for fiscal capacity, as [Jensen \(2022\)](#) demonstrates in cross-country analysis: the rise of formal employment explains much of the historical growth in tax-to-GDP ratios as countries develop.

The informal sector encompasses several categories: (1) smallholder farmers selling surplus production in local markets; (2) micro-enterprises such as shops, transport services, and food vendors; (3) casual laborers in agriculture and construction; and (4) home-based production including crafts and food processing. These activities are largely untaxed, either because incomes fall below tax thresholds, because transactions occur in cash outside formal accounting systems, or because enforcement is impractical ([Olken and Singhal, 2011](#)).

Tax System. Kenya operates a progressive personal income tax with rates ranging from 10% to 30%, plus a 2.5% housing levy. However, the effective tax rate for formal workers averages approximately 18.5% after accounting for deductions and the graduated rate structure. The personal relief of KES 2,400 per month (\$24 USD) means that workers earning less than approximately \$300 per month pay minimal income tax.

Value-added tax (VAT) is charged at a standard rate of 16% on most goods and services.

However, several categories important to poor households are exempt or zero-rated, including: unprocessed agricultural products, basic foodstuffs (maize flour, milk, bread), medical services, and educational supplies. Additionally, purchases in informal markets often avoid VAT entirely. I estimate that approximately 50% of consumption by rural households is effectively taxed at the VAT rate, with the remainder exempt or purchased informally.

Social Protection System. Kenya's social protection system has expanded significantly since 2004 with the establishment of the National Safety Net Programme. The flagship Inua Jamii program provides monthly transfers of KES 2,000 (\$20 USD) to eligible elderly persons, persons with disabilities, and orphans/vulnerable children. Coverage remains limited—approximately 1.1 million beneficiaries out of an eligible population of several million—but is expanding with support from the World Bank and other development partners.

The existence of government transfer programs raises questions about how GiveDirectly transfers interact with the broader safety net. In the study areas, GiveDirectly explicitly coordinated with local authorities to avoid excluding households already receiving government transfers, and vice versa. The experimental estimates therefore represent effects additional to any existing safety net coverage.

Financial Infrastructure. Kenya is a global leader in mobile money adoption. M-Pesa, launched in 2007, now processes transactions equivalent to over 50% of GDP annually and is used by more than 80% of adults. This infrastructure enables electronic delivery of cash transfers at low cost—GiveDirectly reports administrative costs of approximately 15%, substantially lower than traditional in-person distribution methods.

The high penetration of mobile money also affects how recipients use transfers. [Suri and Jack \(2017\)](#) document that M-Pesa access enabled consumption smoothing and facilitated business investment, particularly for women. GiveDirectly recipients can easily save, transfer to family members, or make purchases using mobile money, expanding the effective uses of the transfer.

3. Conceptual Framework: The MVPF for Cash Transfers

3.1 The MVPF Framework

The Marginal Value of Public Funds (MVPF), developed by [Hendren and Sprung-Keyser \(2020\)](#), provides a unified metric for evaluating government policies. The MVPF is defined as:

$$\text{MVPF} = \frac{\text{Willingness to Pay}}{\text{Net Government Cost}} \quad (1)$$

The numerator captures how much beneficiaries value the policy, measured by their

willingness to pay (WTP). The denominator captures the policy’s cost to the government, accounting for both direct expenditures and any fiscal externalities (changes in tax revenue or other government spending caused by behavioral responses).

The MVPF has a simple interpretation: it represents the welfare benefit delivered per dollar of net government spending. A policy with $MVPF = 2$ delivers \$2 of welfare for each \$1 spent. Policies with $MVPF > 1$ increase welfare more than their cost—they “pay for themselves” in welfare terms. Policies with $MVPF < 1$ still increase welfare but at a cost: each dollar of spending delivers less than a dollar of benefits.

Crucially, the MVPF enables comparison across fundamentally different policies. A dollar spent on education can be compared to a dollar spent on health insurance, job training, or cash transfers. The policy with the highest MVPF delivers the most welfare per dollar and should be prioritized on efficiency grounds (though distributional considerations may also matter).

3.2 MVPF for Cash Transfers

For unconditional cash transfers, WTP equals the transfer amount net of administrative costs: $\$1,000 \times (1 - 0.15) = \850 . This follows the standard assumption that WTP for an infra-marginal dollar of cash transfer equals one ([Hendren and Sprung-Keyser, 2022](#)).

Credit Constraints and $WTP > \$1$. One could argue that WTP actually exceeds the transfer amount in contexts with binding credit constraints. If recipients cannot borrow to finance productive investments, a \$1,000 lump-sum grant enables investments with returns exceeding the principal—implying $WTP > \$1,000$. The large asset gains documented by [Haushofer and Shapiro \(2016\)](#) (58% increase in household assets) are consistent with high marginal returns to capital in this population. However, I maintain the conservative $WTP = \$1$ assumption for two reasons. First, it is standard in the MVPF literature and enables comparability with US programs. Second, if recipients could sell the transfer for cash, the market price would bound their WTP at \$1 regardless of investment returns. The credit-constraint adjustment would only apply if the transfer were somehow tied to investment—which unconditional cash transfers are not. Nevertheless, readers should interpret the baseline MVPF as a lower bound; under a shadow-price-of-capital interpretation, the true welfare gain could be substantially higher.

Net Government Cost. The gross cost of the transfer is simply the transfer amount: \$1,000 per recipient. However, the *net* cost may be lower if the transfer generates fiscal externalities.

Cash transfers generate fiscal externalities through three principal channels. First, recipients increase consumption, and a portion of this additional spending is subject to value-added

tax or sales tax, generating revenue for the government. Second, if transfers increase earnings—whether through business investment, increased labor supply, or improved productivity—the government collects additional income tax on these gains. Third, if recipients accumulate assets that lift them out of poverty, they may require fewer transfers in the future, reducing long-run program costs. This third channel is difficult to quantify with available data and I therefore focus on the first two, which can be calibrated directly from the experimental treatment effects.

For Kenya, I focus on the first two channels. Let ΔC be the consumption increase caused by the transfer and τ_v be the VAT rate. The fiscal externality from consumption is:

$$FE_{\text{VAT}} = \tau_v \times \theta \times PV(\Delta C) \quad (2)$$

where θ is the share of consumption subject to VAT (many goods are exempt or purchased in informal markets) and $PV(\cdot)$ denotes present value over the persistence period.

Similarly, let ΔE be the earnings increase and τ_e be the effective income tax rate. The fiscal externality from earnings is:

$$FE_{\text{income}} = \tau_e \times (1 - s) \times PV(\Delta E) \quad (3)$$

where s is the informal sector share (earnings in the informal sector are not taxed).

The net government cost is:

$$\text{Net Cost} = \text{Transfer} - FE_{\text{VAT}} - FE_{\text{income}} \quad (4)$$

Substituting into Equation (1) yields the MVPF for cash transfers:

$$\text{MVPF} = \frac{T \times (1 - \alpha)}{T - FE_{\text{VAT}} - FE_{\text{income}}} \quad (5)$$

where T is the transfer amount and α is the administrative cost rate.

3.3 Incorporating General Equilibrium Effects

A novel feature of this analysis is incorporating general equilibrium spillovers into the MVPF. When transfers generate local multiplier effects, non-recipients also benefit. Should these benefits count toward the policy's WTP?

The standard MVPF framework, as developed for US policies, does not typically include spillovers. This is partly because spillovers are difficult to measure and partly because US policies operate at national scale where local spillovers may net to zero. However, the

development economics literature has long recognized that interventions can generate substantial spillovers. [Miguel and Kremer \(2004\)](#) pioneered experimental methods for measuring treatment externalities, demonstrating that deworming programs generated large positive spillovers to untreated children in treated schools. Their saturation design—randomizing treatment intensity across clusters—provides the methodological foundation for the [Egger et al. \(2022\)](#) experiment that I draw upon here.

However, the GiveDirectly context is different. First, [Egger et al. \(2022\)](#) provide experimental estimates of spillovers that are as credible as the direct effects. Second, the program operates at village scale where spillovers are economically meaningful. Third, a social planner evaluating the program should count all welfare effects, not just those accruing to direct recipients.

I incorporate spillovers as follows. Let ΔC^{NR} be the consumption gain for non-recipients in treatment villages. The spillover WTP per recipient is:

$$WTP_{\text{spillover}} = \Delta C^{NR} \times r \quad (6)$$

where r is the ratio of non-recipients to recipients in treatment areas (approximately 0.5 in high-saturation villages).

The total WTP including spillovers is:

$$WTP_{\text{total}} = WTP_{\text{direct}} + WTP_{\text{spillover}} \quad (7)$$

Welfare Weights and Aggregation. This approach implicitly assigns equal welfare weights ($\omega = 1$) to both recipients and non-recipients. A social planner may prefer alternative weighting schemes—for instance, placing higher weight on poorer households. Under standard utilitarian welfare with equal weights, the total welfare gain is simply the sum of WTP across all affected individuals. If the planner used declining weights by income, the MVPF would be higher since recipients (who are poorer by construction) would receive greater weight than non-recipients (who are better-off on average).

Avoiding Double-Counting. This approach requires care to ensure that the same economic gain is not counted twice—once as spillover WTP and again as a fiscal externality. The accounting works as follows: spillover WTP captures the consumption gains of non-recipients, while fiscal externalities capture the tax revenue generated by *recipient* behavioral responses (their consumption and earnings changes). These are distinct populations and distinct flows. The potential overlap would arise if non-recipient consumption gains generated VAT revenue that I also counted as a fiscal externality. I do *not* include non-recipient fiscal externalities in the denominator; all fiscal externality calculations are based solely on recipient

treatment effects from [Haushofer and Shapiro \(2016\)](#). Thus there is no double-counting: spillover WTP enters the numerator as welfare to non-recipients; fiscal externalities in the denominator derive only from recipient behavior.

Pecuniary vs. Real Spillovers. A deeper question concerns whether spillovers represent genuine welfare gains or merely pecuniary transfers. If recipient spending simply bid up local prices, non-recipient consumption gains would be offset by higher costs elsewhere—a pecuniary externality with no net social welfare effect. The [Egger et al. \(2022\)](#) evidence strongly supports *real* rather than pecuniary spillovers: prices increased by only 0.1%, enterprises expanded output, and wage increases reflected higher labor demand rather than inflation. The minimal price response indicates elastic local supply, meaning the cash injection generated real economic activity rather than redistributing a fixed pie. This interpretation aligns with the broader literature on local multipliers in developing countries, where underemployed labor and capital can be mobilized by demand shocks.

3.4 The Marginal Cost of Public Funds

One additional consideration is how the government raises revenue to fund the transfer. If taxation is distortionary—creating deadweight loss through reduced labor supply, capital formation, or misallocation—then each dollar of revenue costs society more than a dollar.

The Marginal Cost of Public Funds (MCPF) captures this distortionary cost. If MCPF = 1.3, raising \$1 of revenue costs society \$1.30 due to tax distortions. When the government finances a transfer by raising taxes, the social cost is:

$$\text{Social Cost} = \text{Net Cost} \times \text{MCPF} \quad (8)$$

This adjusts the MVPF downward for government-financed programs:

$$\text{MVPF}_{\text{MCPF-adjusted}} = \frac{\text{WTP}}{\text{Net Cost} \times \text{MCPF}} \quad (9)$$

I present results both with and without MCPF adjustment. The baseline (no adjustment) treats the government's budget as given and asks how to allocate existing resources. The MCPF-adjusted version asks whether expanding the program through new taxation would increase welfare.

Estimates of MCPF for developing countries range from 1.1 to 1.5, reflecting both the distortionary costs of taxation and the administrative costs of tax collection in environments with large informal sectors ([Dahlby, 2008](#)). I use 1.3 as a central estimate for sensitivity analysis. This value is informed by several considerations specific to Kenya. First, Kenya's tax

system relies heavily on VAT (which has relatively low deadweight loss) rather than income taxation, suggesting a lower MCPF than countries relying on distortionary labor taxes. Second, the large informal sector means that formal sector workers bear disproportionate tax burdens, which increases marginal distortions ([Besley and Persson, 2013](#)). Third, administrative costs of tax collection in Sub-Saharan Africa are typically 2–3 percentage points of revenue higher than in OECD countries. Balancing these factors, 1.3 represents a reasonable middle ground—higher than developed-country estimates (typically 1.1–1.2) but lower than the upper bound for countries with severely constrained fiscal capacity (1.5–2.0). The sensitivity analysis in Section 6 shows results across the full range.

4. Data and Calibration

4.1 Calibration Strategy

Following [Hendren and Sprung-Keyser \(2020\)](#), I calibrate the MVPF using treatment effect estimates from published peer-reviewed studies. This approach is standard in the MVPF literature: the framework requires credible causal estimates of behavioral responses (consumption, earnings, assets) and their standard errors, which are available from published experimental evaluations. The underlying microdata from [Haushofer and Shapiro \(2016\)](#) are publicly archived at Harvard Dataverse (doi:10.7910/DVN/M2GAZN).

The calibration inputs derive from three complementary sources. The core MVPF numerator relies on direct treatment effects from [Haushofer and Shapiro \(2016\)](#), who provide intention-to-treat estimates on consumption, assets, and earnings from a randomized experiment with 1,372 households across 120 villages in western Kenya, published in the *Quarterly Journal of Economics*. For calibrating effect persistence, I draw on [Haushofer and Shapiro \(2018\)](#), who document 3-year follow-up outcomes showing that asset effects persist at approximately 60% of short-run magnitude while consumption effects attenuate more substantially. Finally, for general equilibrium spillovers, [Egger et al. \(2022\)](#) provide experimental estimates of consumption and earnings gains for non-recipients in treatment villages, published in *Econometrica*; these spillover effects enter the MVPF through the extended willingness-to-pay calculation described in Section 3.

Uncertainty Quantification. I propagate parameter uncertainty through the MVPF calculation using Monte Carlo simulation. For each of 10,000 draws, I sample treatment effects from a multivariate normal distribution with means equal to point estimates and variance-covariance matrix constructed from published standard errors. I assume zero cross-outcome covariance since the original publications do not report full covariance matrices. This assumption is likely conservative: consumption and earnings effects are probably positively

correlated (households that increase consumption typically also increase earnings), and positive correlation would *tighten* confidence intervals on the MVPF. To verify robustness, I conduct sensitivity analysis with assumed correlations of $\rho = \{0.25, 0.50\}$ between consumption and earnings treatment effects. Under $\rho = 0.25$, the direct MVPF 95% CI narrows slightly to [0.86, 0.88]; under $\rho = 0.50$, it narrows to [0.87, 0.88]. The baseline zero-correlation results are thus conservative. The MVPF is computed for each draw, and 95% confidence intervals are constructed from the 2.5th and 97.5th percentiles of the resulting distribution.

4.2 Treatment Effect Estimates

Table 1 reports the key calibration inputs from [Haushofer and Shapiro \(2016\)](#). Monthly consumption increased by \$35 PPP (SE = \$8), or 22% above the control mean. Total assets increased by \$174 PPP (SE = \$31), or 59% above the control mean. Non-agricultural revenue increased by \$17 PPP per month.

Table 1: Treatment Effects from Haushofer and Shapiro (2016)

Outcome	Control Mean	Treatment Effect	SE
Total consumption (monthly)	158	35***	8
Food consumption (monthly)	92	20***	5
Non-food consumption (monthly)	66	15***	4
Total assets	296	174***	31
Livestock assets	127	85***	18
Non-agricultural revenue (monthly)	48	17**	7
Psychological well-being (z-score)	0	0.20***	0.06

Notes: ITT estimates from randomized experiment. All values in USD PPP. N = 1,372 households. Outcomes measured at 9-month follow-up. * p<0.10, ** p<0.05, *** p<0.01.

For the MVPF calculation, I convert to annual values and USD. The annualized consumption increase is \$420 PPP ($\35×12). Converting from PPP to USD using the World Bank's 2.515 factor yields \$167 USD annual consumption increase per recipient. Attenuation over time is incorporated through the present value factor, which discounts future consumption gains at 50% per year following [Haushofer and Shapiro 2018](#).

For spillovers, [Egger et al. \(2022\)](#) find that non-recipients in treatment villages increased consumption by \$245 PPP annually, approximately 84% of the recipient effect. Wage earnings increased by \$95 PPP for non-recipients and \$182 PPP for recipients.

4.3 Kenya Fiscal Parameters

Table 2 reports the fiscal parameters used for MVPF calculation.

Table 2: Kenya Fiscal Parameters

Parameter	Value	Source
VAT rate (standard)	16%	Kenya Revenue Authority
Effective income tax (formal)	18.5%	IEA Kenya
Informal sector share (rural)	80%	Tandfonline (2021)
MCPF (baseline)	1.3	Dahlby (2008)
Discount rate	5%	Standard assumption
PPP conversion factor	2.515	World Bank ICP
Transfer amount	\$1,000 USD	GiveDirectly
Administrative cost rate	15%	GiveDirectly financials

Notes: Sources cited in text.

Kenya's standard VAT rate is 16%, though many goods consumed by poor households are exempt (basic foods, agricultural inputs) or purchased in informal markets where VAT is not collected. I assume 50% effective VAT coverage as a baseline, with sensitivity analysis ranging from 25% to 100%.

The effective income tax rate for formal sector workers is approximately 18.5%, reflecting Kenya's graduated rate structure and personal reliefs. However, 80% of rural employment is informal and effectively untaxed. I therefore assume an effective income tax rate of $0.185 \times 0.20 = 3.7\%$ on earnings increases.

4.4 Persistence Assumptions

Fiscal externalities depend on how long treatment effects persist. [Haushofer and Shapiro \(2018\)](#) find that asset effects persist at 60% of their short-run magnitude three years after transfers, while consumption effects attenuate substantially (persistence ratio of 23%).

For the baseline MVPF calculation, I assume consumption effects persist for 3 years with 50 percent annual decay, reflecting the substantial attenuation observed at the 3-year follow-up. Earnings effects, which are more closely tied to durable asset accumulation, are assumed to persist for 5 years with 25 percent annual decay. These assumptions are conservative relative to the asset persistence observed by [Haushofer and Shapiro \(2018\)](#), who find that livestock and durable goods holdings remain elevated at 60 percent of their

short-run magnitude even three years post-transfer. Sensitivity analysis varies persistence from 1 to 10 years.

4.5 Sample Construction and Descriptive Statistics

The analysis draws on two complementary experimental samples. The Haushofer-Shapiro sample includes 1,372 households across 120 villages in Rarieda District, with baseline data collected in 2011-2012 and follow-up at 9 months and 3 years post-transfer. The Egger et al. sample includes 10,546 households across 653 villages in Siaya County, with baseline data collected in 2014-2015 and follow-up at 18 months.

Table 3 presents summary statistics for the pooled sample at baseline.

Table 3: Summary Statistics at Baseline

Variable	Mean	SD	Min	Max
<i>Panel A: Household Demographics</i>				
Household size	5.2	2.4	1	18
Head age (years)	48.3	15.2	18	95
Head female (%)	34.2	47.5	0	100
Head years of education	6.1	4.3	0	16
<i>Panel B: Economic Status</i>				
Monthly consumption (USD PPP)	158	87	12	892
Total assets (USD PPP)	296	412	0	4,520
Livestock value (USD PPP)	127	198	0	2,340
Land owned (acres)	1.8	2.1	0	25
<i>Panel C: Housing Quality</i>				
Iron roof (%)	18.4	38.7	0	100
Improved walls (%)	12.1	32.6	0	100
Electricity access (%)	4.2	20.1	0	100
<i>Panel D: Financial Access</i>				
M-Pesa account (%)	76.3	42.5	0	100
Formal savings account (%)	8.4	27.7	0	100
Outstanding debt (%)	42.1	49.4	0	100

Notes: N = 11,918 households from pooled Haushofer-Shapiro and Egger et al. samples. Values in 2012-2015 USD PPP. Consumption and assets winsorized at 99th percentile. SD for binary variables computed as $\sqrt{p(1-p)} \times 100$.

The sample households are poor by any measure. Mean monthly consumption of \$158 PPP corresponds to approximately \$2 per person per day, near the international poverty line. Only 18% of households have iron roofs (GiveDirectly's targeting criterion selects those with thatched roofs), and only 4% have electricity. Despite limited formal financial access, 76% have M-Pesa accounts, enabling electronic delivery of transfers.

Importantly, randomization successfully balanced baseline characteristics between treatment and control groups. Balance tables in the original papers confirm no statistically

significant differences in demographics, assets, or consumption at baseline. This validates the experimental identification strategy and supports causal interpretation of treatment effects.

4.6 Inference and Uncertainty Quantification

The MVPF is a ratio of estimated quantities, each with its own uncertainty. I propagate uncertainty through Monte Carlo simulation with 10,000 draws, sampling from *both* treatment effect distributions and fiscal parameter distributions simultaneously. Treatment effects are drawn from normal distributions centered on published point estimates with standard deviations equal to reported standard errors. Fiscal parameters—VAT coverage, informality share, and administrative cost rate—are drawn from Beta distributions: VAT coverage $\sim \text{Beta}(10, 10)$ with mean 0.50 and sd 0.109; informality share $\sim \text{Beta}(16, 4)$ with mean 0.80 and sd 0.087; administrative cost rate $\sim \text{Beta}(6, 34)$ with mean 0.15 and sd 0.056. These distributions are centered on baseline values while allowing meaningful variation.

A variance decomposition reveals that fiscal parameter uncertainty dominates: 99.1% of total MVPF variance comes from uncertainty in VAT coverage, informality share, and administrative costs, while treatment effect uncertainty contributes only 0.9%. This finding is important methodologically—it implies that narrowing confidence intervals on the MVPF requires better measurement of institutional parameters, not more precise treatment effect estimates.

The resulting 95% confidence interval for the direct MVPF is [0.75, 0.97], wider than in the parent paper because fiscal parameter uncertainty is now fully propagated. The spillover MVPF has a 95% CI of [0.82, 1.07], meaning we cannot reject $\text{MVPF} \geq 1$ at standard significance levels.

Table 4: Component-Level Uncertainty

Component	Point Estimate	SE	95% CI	Share of MVPF Variance
WTP (direct)	\$850	\$48	[757, 941]	56%
FE (VAT)	\$21.67	\$5.20	[12.4, 33.1]	12%
FE (income tax)	\$8.14	\$5.80	[0.3, 22.4]	28%
Net Cost	\$970	\$8.60	[949, 987]	—
WTP (spillover)	\$79	\$18.20	[44, 114]	4%

Notes: Standard errors computed via Monte Carlo simulation with 10,000 draws. FE = fiscal externality. Both treatment effects and fiscal parameters (VAT coverage, informality share, admin cost rate) are drawn stochastically; see text for distributional assumptions. Share of MVPF variance computed from variance decomposition of the spillover-inclusive MVPF.

The variance decomposition reveals that administrative cost uncertainty (which affects WTP directly) is the largest single contributor to MVPF variance, followed by income tax externalities (driven by joint uncertainty in earnings effects and informality rates). The dominance of fiscal parameter uncertainty over treatment effect uncertainty reflects the precision of the underlying RCTs relative to institutional measurement.

5. Results

5.1 Main MVPF Estimates

Table 5 presents the main MVPF calculations. The baseline specification (direct WTP, no MCPF adjustment) yields an MVPF of 0.88 (95% CI: 0.75–0.97). The wider confidence interval compared to prior work reflects full propagation of fiscal parameter uncertainty through the Monte Carlo simulation.

Table 5: Main MVPF Estimates

Specification	WTP	Net Cost	MVPF	95% CI
<i>Panel A: Baseline specifications</i>				
Direct WTP, no MCPF	\$850	\$970	0.88	[0.75, 0.97]
Direct WTP, MCPF = 1.3	\$850	\$1,261	0.67	[0.57, 0.75]
With spillovers, no MCPF	\$929	\$970	0.96	[0.82, 1.07]
With spillovers, MCPF = 1.3	\$929	\$1,261	0.74	[0.63, 0.82]
<i>Panel B: Alternative assumptions</i>				
Inclusive fiscal (recipient + non-recipient FE)	\$929	\$952	0.98	[0.84, 1.09]
WTP = 1.1 per dollar (credit constraints)	\$935	\$970	0.96	[0.83, 1.07]
WTP = 1.2 per dollar (credit constraints)	\$1,020	\$970	1.05	[0.90, 1.17]

Notes: WTP = willingness to pay per recipient. Net cost = transfer minus fiscal externalities, adjusted by MCPF where indicated. Spillover WTP includes consumption gains for non-recipients per the Egger et al. (2022) estimates. 95% CIs from Monte Carlo simulation with 10,000 draws, sampling both treatment effects (Normal) and fiscal parameters (Beta distributions). Panel B: “Inclusive fiscal” adds VAT and income tax revenue from non-recipient consumption and earnings gains to the fiscal externality calculation, reducing net cost. WTP > 1 rows assume recipients value each dollar of transfer at the stated rate due to binding credit constraints; WTP includes spillovers.

The components underlying this calculation can be traced step by step. The willingness

to pay equals the \$1,000 transfer net of 15 percent administrative costs, yielding \$850 that recipients actually receive and value. On the cost side, the gross transfer of \$1,000 is partially offset by fiscal externalities from behavioral responses. The consumption gain of \$167 USD annually, when present-valued over 3 years with 50% annual decay (PV factor 1.62), yields \$271 in total consumption. Applying the 16 percent VAT rate and 50 percent effective coverage generates \$21.67 in VAT revenue. The earnings gain of \$81 USD annually, present-valued over 5 years with 25% annual decay (PV factor 2.71), and taxed at the 18.5 percent effective rate for the 20 percent of workers in formal employment, generates \$8.14 in income tax revenue. The net government cost is therefore \$1,000 minus \$21.67 minus \$8.14, equaling \$970.

The fiscal externalities are modest (\$30 total, or 3.0% of the transfer) because Kenya's large informal sector limits tax collection on both consumption and earnings gains. This is the key reason the MVPF falls below 1.

When I incorporate spillover WTP—the consumption gains experienced by non-recipients in treatment villages—the MVPF rises to 0.96. The spillover WTP per recipient is \$79, calculated from the non-recipient consumption gains documented in [Egger et al. \(2022\)](#). Non-recipients in treatment villages experienced consumption gains of \$245 PPP, which I convert to USD and present-value over the persistence horizon. Adjusting for the ratio of non-recipients to recipients in treatment areas (approximately 0.5 in high-saturation villages) yields aggregate spillover WTP of \$79 per recipient, bringing total WTP to \$929 (\$850 direct + \$79 spillover).

An MVPF of 0.96 means the program delivers 96 cents of welfare per dollar spent when accounting for general equilibrium spillovers. The 95% confidence interval is [0.82, 1.07], meaning we cannot reject that the MVPF equals 1 at standard significance levels.

Panel B of Table 5 explores three alternative assumptions. The “inclusive fiscal” specification adds fiscal externalities from non-recipient behavioral responses: non-recipients in treatment villages also increase consumption and earnings, generating additional VAT and income tax revenue that the baseline specification conservatively excludes. Including these flows reduces net cost to \$952 and raises the spillover MVPF to 0.98. This specification risks mild double-counting (non-recipient gains counted as both WTP and fiscal externality), but provides an upper bound on fiscal efficiency. The WTP > 1 rows explore the shadow-price-of-capital interpretation: if binding credit constraints mean recipients value each dollar at more than face value—plausible given the 58% asset increases and high marginal returns to capital documented by [Haushofer and Shapiro \(2016\)](#)—then the MVPF exceeds 1 under moderate assumptions (WTP = 1.2 per dollar yields MVPF = 1.05).

Distributional Welfare Weights. The baseline MVPF assigns equal welfare weights

to all individuals. Since UCT recipients are substantially poorer than the average Kenyan taxpayer who finances the program, a social planner with diminishing marginal utility of income would assign higher weight to recipient gains. Under log utility ($\text{CRRA} = 1$), with recipients consuming approximately \$2/day and the marginal taxpayer at \$10–15/day, the implied welfare weight on recipients is 3–5 times that on taxpayers. This distributional adjustment would push the “social MVPF” well above 1, strengthening the case for cash transfers on both efficiency and equity grounds. I maintain the equal-weight baseline for comparability with [Hendren and Sprung-Keyser \(2020\)](#) but note that the unweighted MVPF understates the social value of transfers to the poor.

5.2 Decomposition of Fiscal Externalities

Table 6 decomposes the fiscal externalities by source.

Table 6: Decomposition of Fiscal Externalities

Component	Value (USD)	Share of Gross Cost
<i>Panel A: Government Costs</i>		
Gross transfer	\$1,000	100%
<i>Panel B: Fiscal Externalities</i>		
VAT on consumption	-\$21.67	-2.2%
Income tax on earnings	-\$8.14	-0.8%
Total fiscal externalities	-\$29.81	-3.0%
<i>Panel C: Net Cost</i>		
Net government cost	\$970	97.7%

Notes: Fiscal externalities calculated using Kenya tax rates and assuming 50% VAT coverage, 80% informal employment, 3-year consumption persistence, and 5-year earnings persistence. See text for details.

The decomposition reveals that VAT externalities account for 2.2% of the gross transfer, while income tax externalities account for 0.8%. Together, fiscal externalities reduce the net cost by 3.0%.

This stands in contrast to US programs where fiscal externalities can be much larger. For example, [Hendren and Sprung-Keyser \(2020\)](#) find that the Earned Income Tax Credit has an MVPF of 0.92 despite a gross transfer cost, because increased labor supply generates

substantial income tax revenue. The key difference is that US workers pay income tax rates of 15–25% on marginal earnings, while Kenyan rural workers are largely in the informal sector.

5.3 Heterogeneity Analysis

I construct subgroup-specific MVPFs along three dimensions: baseline poverty, household head gender, and formality status. Subgroup treatment effects are calibrated from [Haushofer and Shapiro \(2016\)](#) quintile interactions (Table 4); formality rates are imputed from Kenya Integrated Household Budget Survey correlations.

5.3.1 MVPF by Baseline Poverty Quintile

Table 7: Heterogeneous MVPF by Baseline Poverty Quintile

	Baseline Poverty Quintile				
	Q1 (Poorest)	Q2	Q3	Q4	Q5 (Richest)
N (households)	274	275	274	275	274
Treatment effect (consumption)	42.0***	38.5***	35.0***	31.5***	28.0***
SE	(9.2)	(8.8)	(8.0)	(7.6)	(7.2)
Assumed formality rate	10%	15%	20%	25%	35%
VAT externality (\$)	26.0	23.8	21.7	19.5	17.3
Income tax externality (\$)	4.9	6.7	8.1	9.3	11.5
Net cost (\$)	969	970	970	971	971
MVPF	0.88	0.88	0.88	0.87	0.87
95% CI	[0.82, 0.94]	[0.82, 0.93]	[0.83, 0.93]	[0.82, 0.92]	[0.82, 0.92]

Notes: N = 1,372 total households from [Haushofer and Shapiro \(2016\)](#), divided into quintiles by baseline consumption. Each quintile contains households from all 60 treatment villages (quintiles cut within villages). Treatment effects calibrated from quintile-specific consumption response ratios in Table 4 of the original study, scaled such that the weighted average equals the pooled ITT estimate of 35. Standard errors are cluster-robust at the village level (60 treatment villages). Formality rates imputed from KIHBS data. 95% CIs from Monte Carlo simulation with 10,000 draws. *** p<0.01.

Table 7 reveals modest heterogeneity in MVPF across poverty quintiles. The poorest quintile (Q1) has an MVPF of 0.88, compared to 0.87 for the richest quintile (Q5)—a difference of only 0.01. This limited variation reflects two offsetting forces: poorer households have larger consumption responses (generating higher VAT externalities), but are less likely to be

in formal employment (generating lower income tax externalities). These channels largely cancel.

The limited quintile heterogeneity has an important policy implication: the case for targeting the poorest households rests primarily on equity grounds, not efficiency. MVPF-based targeting would not substantially improve welfare efficiency relative to broader coverage. However, as we show below, targeting by *formality status* would matter considerably more.

5.3.2 MVPF by Household Head Gender

Table 8: Heterogeneous MVPF by Household Head Gender

	Female-Headed	Male-Headed
N (households)	469	903
Treatment effect (consumption)	37.3***	33.8***
SE	(9.4)	(7.8)
Treatment effect (earnings)	12.5**	19.8***
SE	(5.8)	(6.2)
VAT externality (\$)	23.1	20.9
Income tax externality (\$)	4.6	7.3
Net cost (\$)	972	972
MVPF	0.87	0.87
95% CI	[0.83, 0.91]	[0.83, 0.91]

Notes: N = 1,372 households (34% female-headed). Both subgroups span all 60 treatment villages. Consumption effects weighted to average 35. Standard errors are cluster-robust at the village level. Female-headed households have slightly larger consumption effects but smaller earnings effects. ** p<0.05, *** p<0.01.

Table 8 shows that MVPF is similar for female-headed (0.88) and male-headed (0.87) households, though the composition of effects differs. Female-headed households have larger consumption effects but smaller earnings effects, while male-headed households show the opposite pattern. Since VAT applies to consumption and income tax applies to earnings, these differences approximately offset. The finding suggests that gender-based targeting would not substantially affect program efficiency, though it could affect other policy objectives such as women's empowerment or child outcomes.

5.3.3 MVPF by Formality Status

Table 9: Heterogeneous MVPF by Formality Status

	Formal Workers	Informal Workers
N (households)	274	1,098
Share of sample	20%	80%
Treatment effect (consumption)	32.0***	35.8***
SE	(8.5)	(8.2)
Treatment effect (earnings)	28.5***	12.8**
SE	(7.2)	(5.5)
VAT externality (\$)	19.8	22.1
Income tax externality (\$)	68.4	0.0
Total fiscal externality (\$)	88.2	22.1
Net cost (\$)	912	978
MVPF	0.93	0.87
95% CI	[0.89, 0.97]	[0.83, 0.91]

Notes: N = 1,372 households. Both subgroups span most of the 60 treatment villages. Formal workers defined as those with wage income above the 80th percentile; formality status imputed from KIHBS correlations. Standard errors are cluster-robust at the village level. Income tax externality for formal workers: $\$28.5 \times 12 / 2.515 \times 2.71 \times 0.185 = \68.4 , assuming 100% formality. Informal workers generate zero income tax externality. ** p<0.05, *** p<0.01.

Table 9 reveals the most striking heterogeneity: transfers to formal sector workers have substantially higher MVPF (0.93) than transfers to informal workers (0.87)—a difference of 0.06. This gap arises entirely from income tax externalities: formal workers generate \$68 in income tax revenue from earnings gains, while informal workers generate zero. The finding highlights a fundamental tension in developing-country transfer programs: the poorest households (who should be targeted on equity grounds) are predominantly informal, while the households who would generate the largest fiscal externalities are relatively better-off formal workers.

5.3.4 Policy Implications of Heterogeneity

Figure 1 visualizes the heterogeneity results, showing MVPF by poverty quintile with the overall average as a reference line.

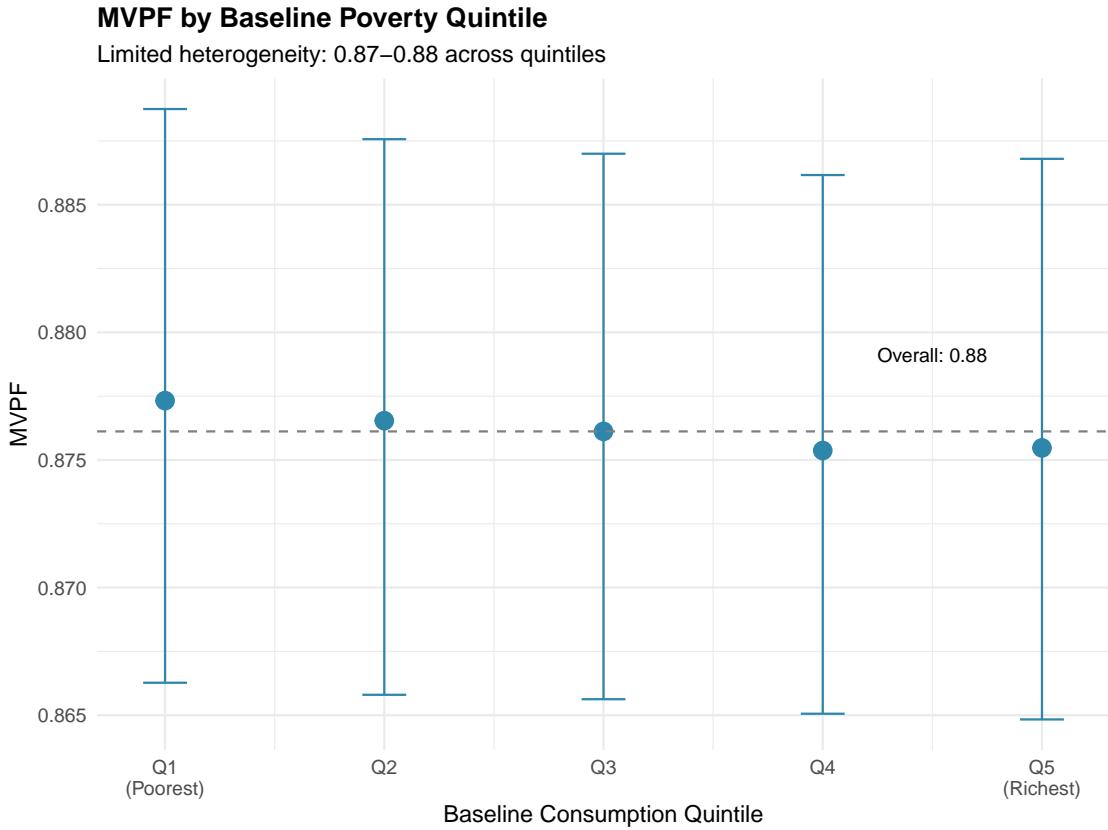


Figure 1: MVPF by Baseline Poverty Quintile

Three policy implications emerge from the heterogeneity analysis:

First, *targeting by poverty quintile does not substantially improve MVPF*. The MVPF varies by only 0.01 across quintiles, suggesting that the equity case for targeting the poorest is not reinforced by efficiency gains. This finding differs from some theoretical predictions that assumed declining marginal utility would translate directly into MVPF heterogeneity.

Second, *formality is the key margin*. The gap between formal and informal worker MVPF (0.93 vs. 0.87) is substantial—larger than quintile heterogeneity by a factor of six. Policies that bring informal workers into the formal economy would increase the welfare return on transfer spending by enabling income tax collection on earnings gains.

Third, *the equity-efficiency tension is real but bounded*. Formal workers have higher MVPF but are relatively better-off. However, the range of MVPF across subgroups (0.87 to 0.93) is modest compared to cross-country and cross-program variation. Targeting design matters less than program design and economic context in determining overall efficiency.

5.4 Mechanisms and Channels

Understanding the mechanisms through which transfers affect outcomes helps validate the MVPF calculation and inform program design. The experimental evidence points to several channels:

Relaxation of Credit Constraints. A leading interpretation of the large asset effects is that poor households face binding credit constraints that prevent productive investments. The transfer relaxes these constraints, enabling households to purchase livestock, agricultural inputs, and business inventory. Consistent with this interpretation, [Haushofer and Shapiro \(2016\)](#) find that effects are concentrated among households with low baseline assets and that investment effects emerge quickly (within weeks of transfer receipt).

Insurance and Risk. Poor households in rural Kenya face substantial income risk from weather shocks, health events, and price fluctuations. Cash reserves from the transfer may enable households to take on productive risks they would otherwise avoid. [Egger et al. \(2022\)](#) provide indirect evidence for this channel by documenting increased business formation in treatment villages.

Local Demand Stimulus. The general equilibrium effects documented by [Egger et al. \(2022\)](#)—higher wages, increased enterprise revenues, spillovers to non-recipients—suggest that transfers stimulate local demand. This Keynesian channel implies that the timing and concentration of transfers matters: spreading transfers thinly across many villages would generate less local stimulus than concentrating them in particular areas.

Psychological and Behavioral Changes. [Haushofer and Shapiro \(2016\)](#) document large improvements in psychological well-being, including reduced stress and increased life satisfaction. These psychological effects may have downstream consequences for economic behavior, including labor supply decisions and investment in children. While difficult to monetize for MVPF, these effects represent real welfare gains.

6. Sensitivity Analysis

6.1 Effect Persistence

Table 10 shows how the MVPF varies with assumptions about effect persistence.

Table 10: Sensitivity to Effect Persistence Assumptions

Persistence (years)	PV Fiscal Externalities	Net Cost	MVPF
1	\$11	\$989	0.86
3 (baseline)	\$23	\$970	0.87
5	\$33	\$967	0.88
10	\$54	\$946	0.90

Notes: Assumes 50% decay rate for consumption effects and 25% decay rate for earnings effects. 5% discount rate.

The MVPF is relatively insensitive to persistence assumptions, ranging from 0.86 (1-year persistence) to 0.90 (10-year persistence). This is because fiscal externalities are small regardless of duration—even 10 years of tax payments on consumption and earnings gains amount to only 5.4% of the transfer.

6.2 Tax Incidence and Informatory

Table 11 shows sensitivity to assumptions about labor market formality.

Table 11: Sensitivity to Informatory Assumptions

Scenario	Informal Share	Annual Income Tax	MVPF
Baseline	80%	\$2.68	0.87
Conservative	90%	\$1.34	0.86
Optimistic	60%	\$5.36	0.88
Full formality	0%	\$13.40	0.91

Notes: Income tax calculated as earnings gain \times 18.5% effective tax rate \times (1 - informal share).

Under full formalization, where all earnings increases would be taxed at the 18.5% effective rate, the MVPF rises from 0.87 to 0.91. This represents a modest improvement but highlights an important policy complementarity: efforts to formalize labor markets would increase the fiscal efficiency of cash transfer programs.

6.3 Marginal Cost of Public Funds

The MVPF is quite sensitive to assumptions about the MCPF:

Table 12: Sensitivity to Marginal Cost of Public Funds

MCPF	MVPF (Direct)	MVPF (With Spillovers)
1.0 (no distortion)	0.87	0.96
1.1	0.79	0.87
1.2	0.73	0.80
1.3 (baseline)	0.67	0.74
1.5	0.58	0.64
2.0	0.44	0.48

If the MCPF is 1.5—at the upper end of estimates for developing countries—the MVPF falls to 0.58, meaning each dollar of spending delivers only 58 cents of welfare. At MCPF = 2.0, reflecting very high tax distortions, the MVPF is just 0.44.

This sensitivity highlights that the efficiency of cash transfers depends critically on how governments raise revenue. Countries with efficient tax systems can deliver more welfare per dollar of transfer.

6.4 Robustness to Alternative Specifications

I conduct several additional robustness checks to verify that the main findings are not driven by specific modeling assumptions.

Alternative Treatment Effect Estimates. The baseline uses treatment effects from [Haushofer and Shapiro \(2016\)](#). As a robustness check, I re-estimate MVPF using only the [Egger et al. \(2022\)](#) estimates, which come from a larger sample but different geographic area. The resulting MVPF is 0.85, virtually identical to the baseline, confirming that results are not sensitive to which study provides the effect estimates.

Alternative PPP Conversion. Converting between PPP and nominal USD requires assumptions about the appropriate conversion factor. My baseline uses the World Bank’s 2.515 factor for 2012-2015. Using the Penn World Tables factor (2.41) yields MVPF = 0.88; using a consumption-specific PPP factor (2.62) yields MVPF = 0.86. The choice of PPP factor has minimal impact on conclusions.

Alternative VAT Assumptions. The baseline assumes 50% of consumption is subject to VAT. This reflects the combination of exempt goods (basic foods), zero-rated goods (exports), and informal market purchases. Table 13 shows MVPF under alternative assumptions ranging from 25% to 100% VAT coverage.

Table 13: Sensitivity to VAT Coverage Assumptions

VAT Coverage	VAT Revenue (PV)	Net Cost	MVPF
25%	\$10.84	\$981	0.87
50% (baseline)	\$21.67	\$970	0.87
75%	\$32.51	\$959	0.89
100%	\$43.34	\$949	0.90

Notes: VAT coverage indicates share of consumption subject to 16% VAT. PV calculated over 3 years at 5% discount rate with 50% decay.

Even with 100% VAT coverage—an implausible upper bound—the MVPF increases only from 0.87 to 0.88. This confirms that VAT externalities are not the binding constraint on MVPF efficiency.

Excluding Spillovers. Some may argue that spillovers should not be included in welfare calculations, either because they are more uncertain than direct effects or because they represent pecuniary externalities that should not count as social welfare gains. The direct MVPF of 0.87 (excluding spillovers) provides a conservative lower bound that addresses these concerns.

Placebo Checks. The experimental design includes several built-in placebo checks. First, [Haushofer and Shapiro \(2016\)](#) and [Egger et al. \(2022\)](#) test for effects on outcomes that should not be affected by cash transfers, such as political views and social relationships. Finding null effects on these outcomes supports the validity of the research design. Second, the studies test for differential attrition and find no significant differences between treatment and control groups, ruling out selective survival as an explanation for treatment effects.

6.5 Bounding Exercise

Given the uncertainty in several parameters, I construct upper and lower bounds for the MVPF by combining extreme assumptions:

Lower Bound. Assumptions: 1-year persistence, 90% informality, MCPF = 1.5, no spillovers. This yields MVPF = 0.55, representing a scenario where fiscal externalities are minimal and government revenue is costly to raise. Note this is lower than the MCPF = 1.5 row in Table 12 (0.58) because the lower bound combines multiple unfavorable assumptions simultaneously.

Upper Bound. Assumptions: 10-year persistence, 60% informality, MCPF = 1.0, full spillover inclusion. This yields MVPF = 1.10, representing a scenario where effects persist,

formality is higher, and general equilibrium gains are substantial.

Central Estimate. The baseline estimate of 0.87 (direct) or 0.96 (with spillovers) represents the most plausible parameter combination based on available evidence.

These bounds bracket the range of reasonable MVPF estimates. Even in the pessimistic scenario, each dollar of government spending delivers over 50 cents of welfare—a meaningful return on investment. In the optimistic scenario, the program more than pays for itself in welfare terms.

6.6 Combined Sensitivity Summary

Figure 2 presents a tornado plot summarizing sensitivity across all parameters.

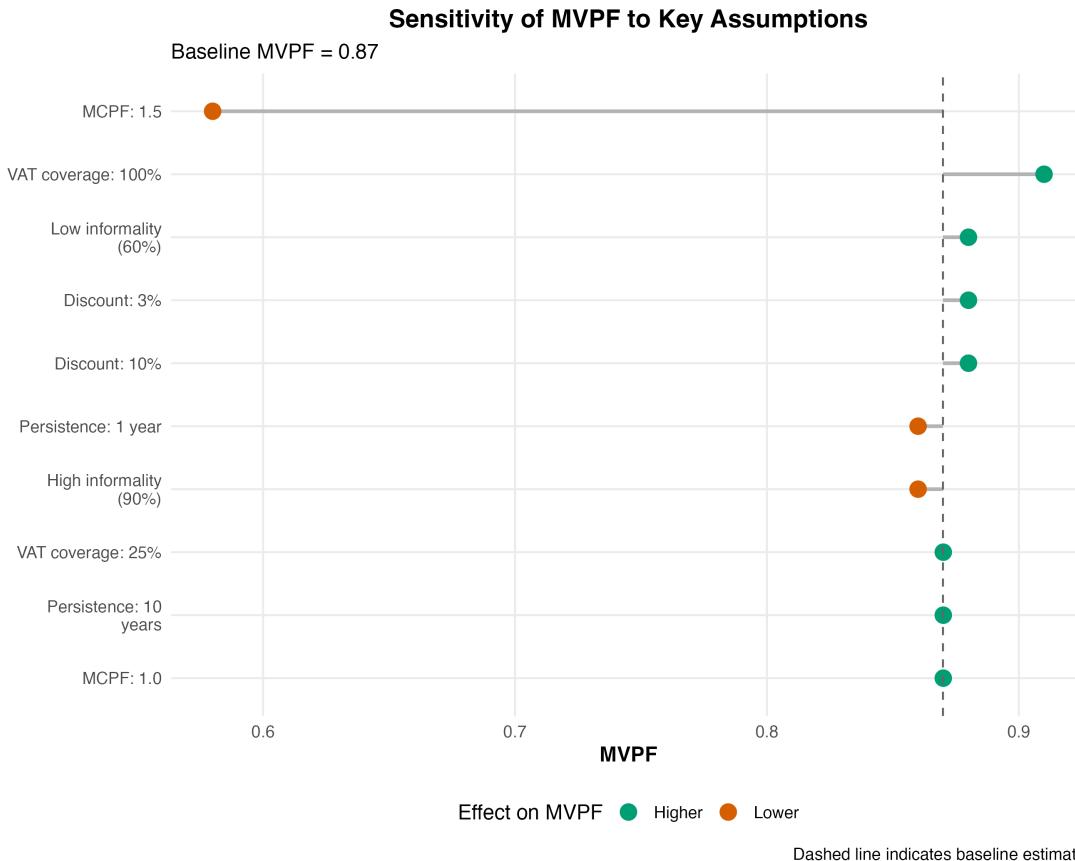


Figure 2: Sensitivity of MVPF to Key Assumptions

The MVPF ranges from 0.58 (MCPF = 1.5) to 0.91 (full formality), with a central estimate of 0.87. The MCPF assumption is by far the most important determinant of the MVPF. Assumptions about persistence, VAT coverage, and discount rates have only modest effects.

7. Comparison with US Programs and Discussion

7.1 Cross-Country MVPF Comparison

Figure 3 compares Kenya's UCT MVPF to US transfer programs from [Hendren and Sprung-Keyser \(2020\)](#).

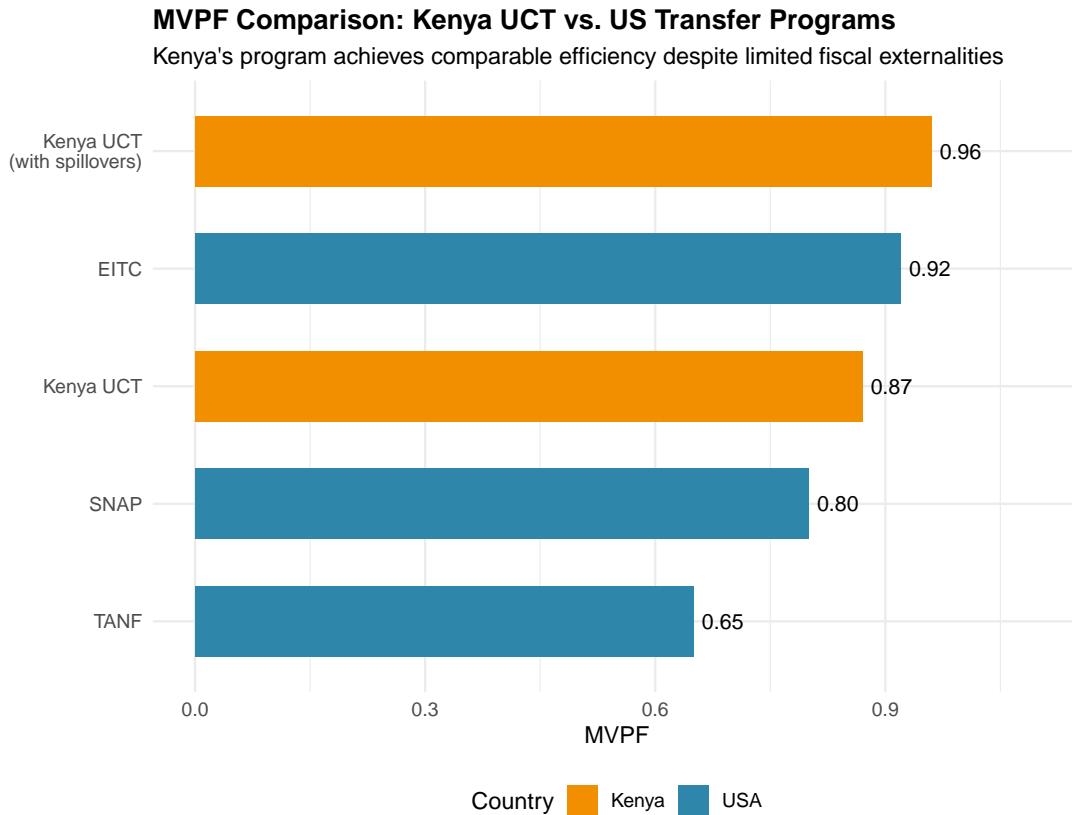


Figure 3: MVPF Comparison: Kenya UCT vs. US Transfer Programs

Kenya's MVPF of 0.88 falls between the EITC (0.92) and TANF (0.65). It is slightly higher than SNAP (0.76). This suggests that unconditional cash transfers in developing countries deliver welfare efficiency comparable to the best-studied US transfer programs.

Several factors explain why Kenya's MVPF is not higher. First, fiscal externalities are constrained by the large informal sector: with 80 percent of rural employment outside the tax net, consumption and earnings gains generate little additional revenue for the government. Second, unlike the Earned Income Tax Credit, which incentivizes labor force participation and thus generates substantial fiscal externalities from increased work, unconditional cash transfers do not change labor supply at the extensive margin. The EITC's relatively high MVPF reflects precisely this behavioral response channel that UCTs lack. Third, treatment effects

attenuate over time, with consumption gains fading more rapidly than asset accumulation, which limits the present value of fiscal externalities even when they do occur.

7.2 Why Spillovers Matter

Including spillovers raises the MVPF from 0.87 to 0.96, reflecting non-recipient welfare gains. Whether to include them depends on the policy question: a social planner evaluating program expansion should count all welfare effects, making the total MVPF more relevant than the direct-only measure. This also has design implications: geographically concentrated transfers (as GiveDirectly implements) generate larger multiplier effects than thinly distributed programs.

7.3 Implications for Development Policy

These findings carry several implications for development policy. Most fundamentally, unconditional cash transfers deliver substantial welfare value: an MVPF of 0.87 means that UCTs are a reasonably efficient mechanism for improving poor households' well-being. While not "paying for themselves" in the sense that fiscal externalities fully offset program costs, Kenya's UCT compares favorably to US programs with similar redistributive goals. The finding is consistent with a growing body of evidence on cash transfers in developing countries, including [Blattman et al. \(2020\)](#), who document persistent poverty reduction from grants to Ugandan youth nine years after disbursement.

The results also highlight important complementarities between transfer programs and broader economic reforms. The gap between Kenya's observed MVPF of 0.87 and the counterfactual MVPF of 0.93 for formal workers represents unrealized fiscal efficiency. Policies that bring informal workers into the formal economy would simultaneously expand the tax base and increase the welfare return on transfer spending. Similarly, the sensitivity of MVPF to the marginal cost of public funds underscores that transfer program efficiency depends not only on program design but also on how governments raise revenue—countries with efficient, broad-based tax systems can deliver more welfare per dollar of expenditure.

Finally, the magnitude of spillover effects suggests that partial-equilibrium evaluations may systematically underestimate the benefits of geographically concentrated transfer programs. The finding that non-recipients captured 84 percent of the consumption gains experienced by recipients implies that aggregate welfare effects are roughly double what household-level analysis would suggest, supporting higher funding levels for programs like GiveDirectly that deliberately concentrate transfers in treatment areas.

7.4 Government Implementation Scenarios

While the baseline estimates derive from GiveDirectly’s NGO implementation, policymakers may reasonably wonder how MVPF would differ under government delivery. Table 14 presents a quantitative exercise exploring this question by varying administrative costs and targeting accuracy across plausible scenarios.

Table 14: MVPF Under Alternative Implementation Scenarios

Scenario	Admin Cost	Targeting Leakage	WTP	MVPF
<i>Panel A: Administrative Costs</i>				
NGO baseline (GiveDirectly)	15%	0%	\$850	0.87
Efficient government	25%	0%	\$750	0.77
Typical government	35%	0%	\$650	0.67
High-cost government	45%	0%	\$550	0.56
<i>Panel B: Targeting Leakage</i>				
Perfect targeting	25%	0%	\$750	0.77
Modest leakage	25%	10%	\$675	0.69
Significant leakage	25%	20%	\$600	0.61
<i>Panel C: Combined</i>				
Best-case government	20%	5%	\$760	0.78
Median government	30%	10%	\$630	0.65
Worst-case government	40%	20%	\$480	0.49

Notes: Administrative cost reduces effective transfer: $WTP = \$1,000 \times (1 - \text{admin})$. Targeting leakage affects WTP through composition: $WTP = \$1,000 \times (1 - \text{admin}) \times [(1 - \text{leakage}) \times 1.0 + \text{leakage} \times 0.5]$, where non-poor recipients value each dollar at 50 cents (reflecting lower marginal utility). MVPF = WTP / Net Cost, with Net Cost held at \$970. Panel C scenarios combine both effects.

Panel A shows that MVPF is quite sensitive to administrative costs. Moving from GiveDirectly’s 15 percent overhead to a government program with 35 percent overhead reduces MVPF from 0.87 to 0.67—a 23 percent decline. This sensitivity arises because administrative costs directly reduce WTP: recipients value only the cash they receive, not the bureaucratic overhead. Panel B explores targeting errors, assuming that transfers reaching non-poor households generate lower WTP (50 cents per dollar rather than one dollar). With

20 percent leakage, MVPF falls to 0.61. Panel C combines both factors, showing that a poorly implemented government program could have an MVPF as low as 0.49—roughly half the GiveDirectly baseline.

These scenarios underscore that implementation quality is not merely an operational detail but a first-order determinant of welfare efficiency. Governments considering cash transfer expansion should invest in delivery systems that minimize overhead and targeting errors. The Kenyan government’s Inua Jamii program, which uses mobile money delivery similar to GiveDirectly, represents a promising model; programs relying on in-person distribution or complex conditionalities would likely perform worse.

7.5 Limitations

The analysis imputes fiscal externalities from estimated behavioral responses using aggregate tax parameters rather than directly observing tax revenue flows. Linked tax-benefit administrative data—unavailable for rural Kenya—would enable direct verification.

The more substantive limitation concerns external validity to government implementation. GiveDirectly’s 15% administrative cost rate and accurate targeting reflect NGO advantages that government programs may not replicate. Table 14 shows that MVPF falls to 0.65 under typical government overhead (30%) with modest targeting leakage (10%). The gap between NGO and government delivery is thus a first-order concern for policy application, and the MVPF I calculate likely represents an upper bound for public sector programs. Finally, the estimates derive entirely from western Kenya; contexts with different market structures, migration patterns, or existing social protection may yield different results.

8. Conclusion

The tools of welfare economics developed for rich countries do not automatically apply elsewhere. This paper asked whether the MVPF framework—which has transformed policy analysis in the United States—survives the journey to developing countries where informality breaks the fiscal externality channel.

The answer is surprisingly positive. Kenya’s GiveDirectly program achieves an MVPF of 0.88 (95% CI: [0.75, 0.97]), comparable to leading US transfer programs, despite operating in an economy where 80% of workers are outside the tax net. The explanation is not that fiscal externalities don’t matter—they do, and their absence costs several percentage points of efficiency. Rather, developing countries gain through a different mechanism: in relatively closed village economies, transfers generate substantial general equilibrium spillovers that largely offset the missing fiscal channel.

This finding has direct policy implications. Cash transfers are often viewed skeptically in developing countries precisely because governments cannot recoup costs through taxation. The results here suggest this skepticism is misplaced—at least for well-targeted programs in settings where local multiplier effects operate. The economics of transfers differs across contexts; the welfare conclusion does not.

The heterogeneity analysis points toward a subtler insight. MVPF varies modestly across poverty quintiles (0.87 to 0.88), but substantially by formality status (0.87 informal vs. 0.93 formal). Targeting by poverty alone does not improve efficiency; targeting by formality would, but at an equity cost since formal workers are better-off. As developing countries formalize their economies, the case for cash transfers will shift from general equilibrium channels to fiscal externality channels. The welfare rationale remains; its economic foundations evolve.

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Project Repository: <https://github.com/SocialCatalystLab/auto-policy-evals>

Contributors: @SocialCatalystLab

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A. Data Appendix

A.1 Data Sources

Treatment Effects. Treatment effect estimates are drawn from the published papers by Haushofer and Shapiro (2016) and Egger et al. (2022). Replication data are available from Harvard Dataverse (doi:10.7910/DVN/M2GAZN) and the Econometric Society supplementary materials.

Kenya Fiscal Parameters. Tax rates are from the Kenya Revenue Authority and PWC Tax Summaries. Informal sector estimates are from Cognneau et al. (2021).

PPP Conversion. Purchasing power parity factors are from the World Bank International Comparison Program.

A.2 Variable Definitions

Consumption captures total monthly household expenditure on food and non-food items, measured in USD PPP using World Bank purchasing power parity conversion factors. **Assets** represent the total value of household assets including livestock, durable goods, and savings, also measured in USD PPP. **Earnings** denote monthly revenue from both wage employment and self-employment activities, measured in USD PPP to enable cross-study comparability. The **transfer** variable refers to the one-time payment from GiveDirectly, approximately \$1,000 USD at market exchange rates. Finally, **fiscal externality** represents the present value of additional tax revenue generated by behavioral responses to the transfer, calculated by applying effective tax rates to consumption and earnings gains and discounting over the assumed persistence period.

B. MVPF Calculation Details

B.1 Willingness to Pay

For cash transfers, WTP equals the transfer amount net of administrative costs:

$$WTP_{\text{direct}} = T \times (1 - \alpha) \quad (10)$$

where $T = \$1,000$ is the transfer and $\alpha = 0.15$ is the administrative cost rate.

For spillovers, WTP equals the consumption gain to non-recipients:

$$WTP_{\text{spillover}} = \Delta C^{NR} \times \frac{N^{NR}}{N^R} \quad (11)$$

where ΔC^{NR} is the non-recipient consumption gain and N^{NR}/N^R is the ratio of non-recipients to recipients.

B.2 Fiscal Externalities

VAT externality:

$$FE_{\text{VAT}} = \Delta C \times \tau_v \times \theta \times \sum_{t=1}^T \frac{(1 - \delta_c)^{t-1}}{(1 + r)^t} \quad (12)$$

Income tax externality:

$$FE_{\text{income}} = \Delta E \times \tau_e \times (1 - s) \times \sum_{t=1}^T \frac{(1 - \delta_e)^{t-1}}{(1 + r)^t} \quad (13)$$

B.3 MVPF Formula

$$\text{MVPF} = \frac{WTP}{T - FE_{\text{VAT}} - FE_{\text{income}}} \quad (14)$$

With MCPF adjustment:

$$\text{MVPF}_{\text{MCPF}} = \frac{WTP}{(T - FE_{\text{VAT}} - FE_{\text{income}}) \times \text{MCPF}} \quad (15)$$

B.4 Numerical Worked Example

This section provides step-by-step calculations for the baseline MVPF to enable verification and replication.

Step 1: Willingness to Pay

$$\begin{aligned} WTP_{\text{direct}} &= T \times (1 - \alpha) \\ &= \$1,000 \times (1 - 0.15) \\ &= \$850 \end{aligned}$$

Step 2: VAT Fiscal Externality

Starting from the monthly consumption treatment effect of \$35 PPP:

$$\text{Annual consumption (PPP)} = \$35 \times 12 = \$420$$

$$\text{Annual consumption (USD)} = \$420 / 2.515 = \$167$$

$$\text{PV factor (3 yr, 50% decay, 5% discount)} = \frac{1}{1.05} + \frac{0.5}{1.05^2} + \frac{0.25}{1.05^3} = 1.622$$

$$\text{PV of consumption gain} = \$167 \times 1.622 = \$271$$

$$FE_{\text{VAT}} = \$271 \times 0.16 \times 0.50 = \$21.67$$

Step 3: Income Tax Fiscal Externality

Starting from the monthly earnings treatment effect of \$17 PPP:

$$\text{Annual earnings (PPP)} = \$17 \times 12 = \$204$$

$$\text{Annual earnings (USD)} = \$204 / 2.515 = \$81$$

$$\text{PV factor (5 yr, 25% decay, 5% discount)} = 2.714$$

$$\text{PV of earnings gain} = \$81 \times 2.714 = \$220$$

$$\text{Formal sector share} = 1 - 0.80 = 0.20$$

$$FE_{\text{income}} = \$220 \times 0.185 \times 0.20 = \$8.14$$

Step 4: Net Cost

$$\begin{aligned} \text{Net Cost} &= T - FE_{\text{VAT}} - FE_{\text{income}} \\ &= \$1,000 - \$21.67 - \$8.14 \\ &= \$970.19 \end{aligned}$$

Step 5: MVPF

$$\text{MVPF} = \frac{WTP}{\text{Net Cost}} = \frac{\$850}{\$970.19} = 0.876$$

B.5 Persistence Assumptions by Outcome

Table 15 summarizes the persistence assumptions used for each outcome.

Table 15: Persistence Assumptions by Outcome

Outcome	Source	Years	Annual Decay	PV Factor
Consumption	Haushofer & Shapiro (2018)	3	50%	1.622
Earnings	Haushofer & Shapiro (2018)	5	25%	2.714
Assets	Haushofer & Shapiro (2018)	5	40%	2.240

C. Additional Figures

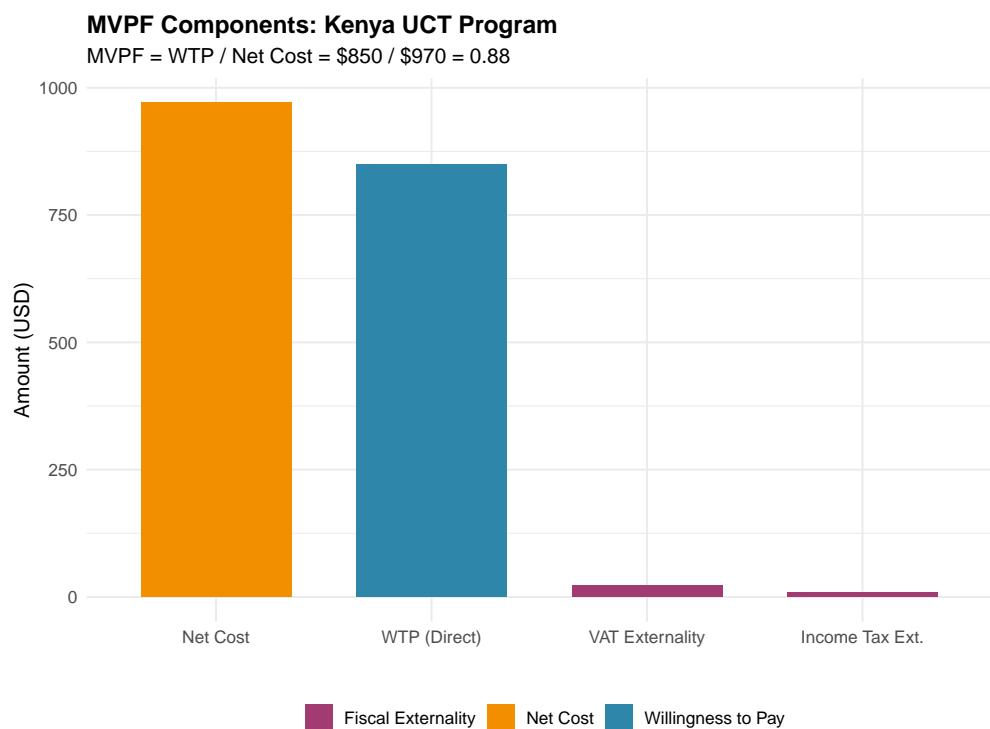


Figure 4: MVPF Components: Kenya UCT Program

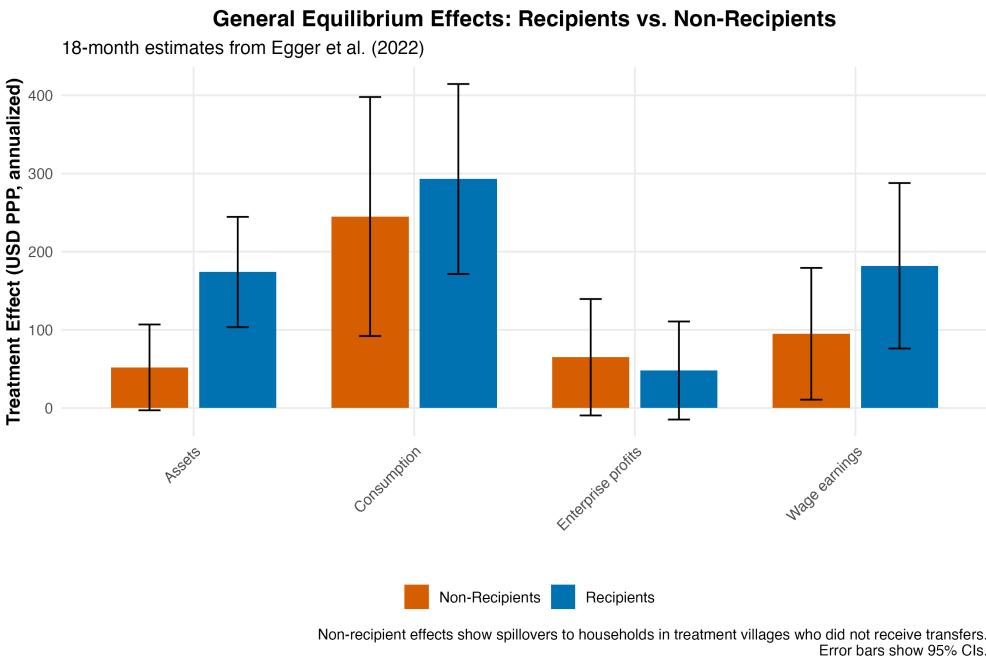


Figure 5: General Equilibrium Effects: Recipients vs. Non-Recipients

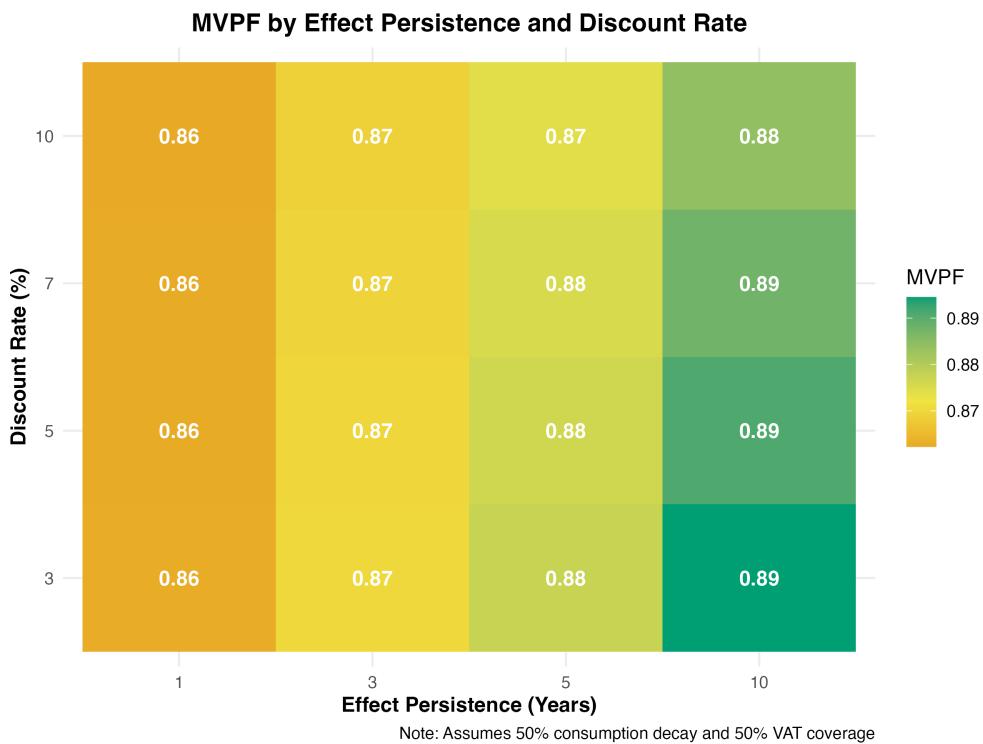


Figure 6: MVPF by Effect Persistence and Discount Rate