Disbursing Emergency Relief through Utilities: Evidence from Ghana

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This version: January 18, 2022
Latest version available **here**.

Abstract

We provide descriptive evidence on the challenges in efficiently, effectively, and fairly distributing in-kind electricity transfers to households. We collect panel data from 1,200 households eligible for Ghana's COVID-19 electricity relief program. Distributing relief through electricity transfers enabled an immediate response to the crisis. Theoretical efficiency concerns are mitigated because transfers were inframarginal and storable for most households. Transfer receipt may have increased support for the governing party, possibly due to obfuscation of the program's financial burden. However, the program was regressive in design, and implementation challenges—delays, technological hurdles, information constraints, and the targeting of meters rather than households—add to inefficiency and regressivity. Households receiving the least average relief are those who use less electricity, pay a landlord or other intermediary for electricity, or share an electricity meter—characteristics of low-income households. Program implementation challenges were just as important as design features in determining program costs and benefits.

JEL: D04, O12, O13, H23, L94, Q48

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1 Introduction

Governments often take steps to provide for a society's most vulnerable members, particularly during economic downturns or other unanticipated crises. As the COVID-19 public health crisis spread, often closely followed by deep economic downturns that disproportionately affected the poor, many governments responded by expanding or introducing transfer programs. These were often in the form of energy subsidies: the Gentilini, Almenfi, and Dale (2020) global database reports that 112 countries—including Ghana—increased financial support for utility payments or other financial obligations in response to the COVID-19 pandemic. Support in the energy sector included payment deferrals, electricity transfers, and price reductions and freezes. Energy subsidies were already common before 2020 (Coady et al. 2015), and in Ghana their structures were often regressive,[1] but the design and on-the-ground implementation of these programs can also meaningfully affect their impacts.

In this paper, we study the results of expanding energy subsidies for the specific purpose of providing social support during unanticipated crises. We surveyed households before, during, and after the electricity relief program announced by the government of Ghana in April 2020. Our detailed household-level panel data allow us to assess the program's efficiency, distributional, and political implications as directly experienced by intended recipients, factoring in not only design decisions but also on-the-ground logistical challenges that affect the program's impact. While the program was largely implemented as designed, we find that some of the most needy households—such as renters and low consumers—received the lowest benefits. And, the program may have served as clientelism prior to a presidential election.

Ghana's electricity subsidy program promised monthly transfers of 50kWh (worth 3.50 USD) for April-June 2020 to 'lifeline' customers (those who used less than 50kWh per month at baseline), and monthly transfers worth 50% of baseline usage for all other residential customers (ECG 2020b). The government eventually extended the 50kWh transfers for lifeline customers through March 2021. We use survey data related to energy consumption and political perspectives collected during a baseline round in 2018-2019 and across three rounds of surveys between May and October 2020, each with more than 1,200 respondents connected to electricity in Accra.

First, we consider how program design and implementation affect the efficiency and expediency of transfers. Theoretically, in-kind transfers may constrain consumption away from the welfare maximizing bundle. But this concern may not hold in practice (Bruce and Waldman 1991; Currie and Gahvari 2008; Gadenne et al. 2021; Hirvonen and Hoddinott 2021), especially when transfers are inframarginal (Southworth 1945; Cunha 2014). This was largely the case in Ghana, since transfers were based on March electricity usage and could be saved indefinitely. We find that 45% of households valued electricity more than an equivalent amount of cash, many noting that they would have used the money for electricity anyway. This is encouraging because by leveraging the existing

[1] Keener and Banerjee (2005) provide a detailed account of tariff reforms, including household impacts of tariff increases and the national targeting of Ghana's lifeline tariff. Younger (2016) simulates policy changes to Ghana's electricity tariffs and subsidies to approximate their distributional impacts on household income.

electricity payments infrastructure, the government avoided the cost and time of establishing or expanding an alternative distribution system (Allotey 2020; IPA 2020). Still, this did not preclude delays or exclusion of designated recipients. Only 46% of households had received a transfer after the first month of the program, and one-third of households still reported never having received any transfers after the third month.

Second, building on a large literature studying the distributional impacts of energy transfers (Komives et al. 2008; Basurto, Dupas, and Robinson 2020; Borenstein 2012; Younger 2016), we identify numerous channels of regressivity, not only in the program's design but also in its implementation. A transfer proportional to baseline usage implies larger transfers to bigger users, who are likely wealthier. Households without electricity, who are generally poorer, did not receive a cash substitute. Importantly, even among connected households, lower-income households are less likely to have ever received any relief. Lifeline customers are 19 percentage points less likely to have ever received the transfer even though they were eligible the longest. Households that pay for electricity through an intermediary such as a landlord do not receive the transfer if it is not passed through: they are 13 percentage points less likely to have ever received relief.

Finally, building on existing evidence on the political economy of energy support programs (Briggs 2021; Kojima, Bacon, and Trimble 2014; Strand 2013; Wolfram et al. 2021), we consider the program's clientelistic government objectives prior to Ghana's closely contested December 2020 Presidential election. Satisfaction with the program was 94% among respondents who had received the transfer, and 72% even among those who had not. Support for the incumbent party is 7% higher among those who had received the transfer. Ex ante political affiliation does not predict receipt, and the results persist even when including respondent fixed effects. While we cannot directly establish causality, these results suggest that the subsidies increased support for the government.

Financial sustainability is a widespread concern among electric utilities in Africa—companies in only two out of 39 countries are recovering their operational and capital costs (Kojima and Trimble 2016)—yet little attention was paid to the program's significant cost. The government may have gained political support by emphasizing the benefits without discussing the costs. To quantify this, we prompted respondents to consider that the cost may need to be recovered through higher electricity tariffs in future years. Satisfaction with the transfers fell by nearly 50%. In fact, 52% of respondents would prefer not to receive any relief even if their electricity costs next year increase by only a *quarter* as much as the transfers they receive this year. Government decisions and household beliefs about cost recovery therefore have important implications for relief program support.

2 Context and data

The first cases of COVID-19 were confirmed in Ghana on March 12, 2020. On April 9th, the government announced electricity and water relief programs in response to associated economic challenges, with the goal of *"mitigating the effects of the pandemic on the social and economic life of the country"* (Akufo-Addo 2020). During the strictest lockdown period, the government

provided free food and other essentials to some households in Accra and Kumasi. But Ghana's Deputy Minister of Finance noted that the government lacked "*a formalized means that allows [it] to deploy cash or intangible benefits to the needy in society,*" and that electricity was among the only channels available (Allotey 2020).[2] If the government's goal was to rapidly transfer resources to all Ghanaians, with the strongest support for the poorest and those worst affected by Covid, then these logistical and technological constraints may have forced the government to make trade-offs between these goals.

Electricity transfers would reach most households in Ghana: 82% are connected to electricity, including 94% in Accra. The Electricity Company of Ghana (ECG) distributes electricity to 4 million customers in Southern Ghana (ECG 2020c). Customers are defined at the meter level: one individual might have two meters, one at their home and one at their business, and conversely, a single meter may serve multiple households.

ECG registers post-paid and pre-paid meters, but most meters in Accra are pre-paid. Customers with a post-paid meter may use any amount of electricity, and are billed ex-post. Customers with a pre-paid meter may only use electricity paid for in advance by purchasing electricity credit from ECG branches or local shops that act as vendors. A minority of pre-paid meters—7% in our sample—are 'smart' meters: these customers can buy credit online. Once customers use up their pre-paid electricity, their electricity is shut off until they buy credit; most customers avoid this by preemptively 'topping up'.

2.1 The COVID electricity relief program

The transfer amount for each customer was based on their March 2020 electricity usage (ECG 2020b). 'Lifeline' customers, who used less than 50 kWh in March, would receive a transfer of 50 kWh in free electricity monthly (worth 3.50 USD) for April through June.[3] All other customers would receive a transfer worth 50% of their March usage. For example, a customer who used 30 kWh of electricity in March would be eligible to receive transfers worth 50 kWh of electricity each month, while a customer who used 120 kWh of electricity in March would be eligible for 60 kWh each month.[4] In July, the government extended electricity relief for lifeline customers through December 2020, later extended through March 2021. Around 28% of ECG customers are lifeline households (Amoh 2020), compared to 13% in our sample, due to our focus on urban Accra.

Post-paid customers would see the transfer applied automatically to their bill. Since bills often arrive with a delay of two or three months, the transfers were also frequently delayed. While ECG did not implement a formal moratorium on disconnections, it is common for post-paid customers to carry over a negative balance on their accounts—even for multiple months—without being disconnected.

[2] Ghana's Livelihood Empowerment Against Poverty (LEAP) Program, introduced in 2008, provides bimonthly cash transfers to over 330,000 households, targeting the extreme poor and mostly focused on northern Ghana. LEAP provided an additional one-off round of transfers to beneficiaries in May (Dadzie and Raju 2020). It is not clear if any expansion of this program during the pandemic would have been feasible.

[3] For comparison, monthly household energy spending in Ghana averages 10 USD (Ghana Statistical Service 2019).

[4] Figure A3 shows the distribution of monthly transfer amounts among recipients.

For pre-paid customers, the transfer would be applied as credit each month. Accounts for customers on 'smart' pre-paid meters would be automatically credited. Customers on 'non-smart' pre-paid meters would receive the transfer the first time they purchased credit at a shop or branch office each month. For these customers, transfer eligibility was determined by having them swipe a card on their meter and present that card at the time of purchase for the vendor to read their usage (ECG 2020f). This is a standard requirement for topping up that customers were already familiar with. For both types of customers, if any credited transfer amount remained unused at the end of the month, it would be carried over to the next month. Electricity credit cannot be refunded for cash.

2.2 Sample and data

We survey 1,245 ECG customers in Accra who had participated in a related study in 2018-2019 (Klugman et al. 2019).[5] Each respondent was surveyed two or three times across three rounds of data collection between May-October 2020.[6] The survey collected data on demographics, electricity usage and spending, consumption, credit, government relief, and government perceptions (see Appendix C for more detail).

We compare our sample to households in Accra surveyed by the Ghana Statistical Service (GSS) across three surveys designed to be representative. Our respondents are somewhat younger, as the GSS surveys household heads; otherwise our sample is roughly representative of Accra (see Table A1).

91% of households in our sample have a pre-paid meter, and 13% would be considered lifeline customers using reported electricity expenditures in March to proxy usage. 26% pay an intermediary (often a landlord—we use these terms interchangeably) for electricity—the remainder pays ECG directly. 46% of households share a meter, with around 3-4 other users (Table A2 contains sample summary statistics). Lifeline customers are significantly more likely to pay an intermediary for electricity and to share a meter (Table A3).

In each round, we ask respondents whether they have ever received an electricity transfer, and the amount they received in the last 30 days. While these self-reports could be inaccurate if households receive the transfer without knowing it, this is unlikely for several reasons. First, awareness of the program is high (97% in round 1). Second, respondents have a good sense of their electricity spending, so they should notice a sizeable reduction in electricity costs. Finally, customers' itemized receipts or bills would clearly show additional credit.

3 Efficiency

In-kind transfers can be inefficient if they constrain the consumer away from the optimal consumption bundle, but this can be avoided if the transfer is inframarginal. And, absent a direct financial

[5] Figure A2 shows approximate respondent locations.

[6] 87% of respondents are surveyed in all three rounds; 13% in two rounds. Figure A1 displays a timeline.

relationship between government and households, in-kind transfers can leverage existing distribution infrastructure. In-kind transfers may also offer protection against price volatility, though that is less important for goods whose prices do not typically fluctuate, such as electricity. The efficiency of in-kind transfers is thus an empirical question.

3.1 Transfer inframarginality

Ghana's electricity transfers are unlikely to be inframarginal for most lifeline customers, who used less than 50 kWh in March but received 50 kWh each month. While they should be inframarginal for non-lifeline customers, who received 50% of baseline electricity usage in relief each month, they may not be inframarginal if usage falls significantly, which may happen during an economic crisis.

That said, the sum of electricity purchases and transfers received does not change relative to March 2020, and if anything increases slightly, suggesting limited reductions in electricity use. Furthermore, 98% of households that report receiving electricity transfers in the last 30 days still purchased electricity in that period. Though some of these purchases may have preceded transfer receipt, spending on top of the transfer amount indicates that transfers were inframarginal for most customers.

Importantly, electricity credit can be stored indefinitely. For recipients with access to liquidity, even transfers that exceed monthly usage may thus be inframarginal. However, for recipients with liquidity constraints, stored electricity credit cannot fund non-electricity consumption in the short term.

To investigate whether households' optimal consumption is constrained by offering electricity rather than cash transfers, we use contingent valuation to elicit respondent willingness to pay (WTP) for electricity.[7] Figure 1 shows the results. 45% of respondents prefer the electricity transfer to an equivalent or larger amount of cash. The median household values 50 GHS of electricity at 35-50 GHS in cash,[8] and the mean value across households is 50.1 GHS.

[Figure 1]

Respondents who prefer the electricity transfer provide several reasons. 62% "*would use the money for electricity anyway*", indicating that an electricity transfer covers inframarginal expenditures. Second, some see it as a commitment device: 37% stated "*I worry that I will spend the money on something else*". Third, transaction costs are high: 21% state that "*it takes too much time/effort to top up electricity*". Further discussion of reported preferences for electricity over cash is included in Appendix C.

On the other hand, 20% of respondents would prefer even just 25 GHS in cash to 50 GHS in electricity. These may be liquidity-constrained or low users of electricity. Lifeline customers appear more likely to prefer cash to an electricity transfer, but the difference is not large or significant.

[7] Appendix C provides more information on the elicitation method.

[8] In other words, the respondent prefers 50 GHS in cash to 50 GHS in electricity, but prefers 50 GHS in electricity to 35 GHS in cash. We did not offer choices between 35-50 GHS.

Those who had never received the electricity relief have a greater preference for cash—they may not trust that they will receive the transfer. Respondents who pay a landlord or other intermediary for electricity strongly prefer cash over electricity, which we explore more in Section 4.2.

We discuss how transaction costs may drive preferences between cash and electricity transfers in more detail in Berkouwer et al. (2021). For the purpose of studying efficiency, in aggregate households do not clearly prefer cash over electricity, suggesting limited efficiency losses from providing relief through an electricity transfer.

3.2 Implementation efficiencies

After implementing strong restrictions on movement and business when the pandemic hit Ghana, the government sought to distribute relief as quickly and broadly as possible. By working through existing transfer systems, governments without existing cash transfer structures circumvent the need to set up novel transfer systems, which could hasten relief. Ghana does not have existing systems to easily and broadly provide cash transfers to households (Allotey 2020; IPA 2020), meaning cash transfers would have been costly and slow.[9] ECG has a direct financial relationship with about 4 million customers (ECG 2020c), which allowed some households to begin receiving relief on May 1, only 1.5 months after the first confirmed COVID-19 case in Ghana.[10]. By the end of May, 46% of respondents had received a transfer.

Still, most households experienced delays and many never received relief. By the final survey round in September-October, 31% of respondents reported still having never received any relief (Figure 2). This contradicts ECG reports, which by late May claimed "99.98%" of pre-paid customers had received their benefits (ECG 2020c). While 50% of households who had not received any transfers in May stated they thought their transfer was likely delayed, by September fewer than 20% attributed their non-receipt to delays. Instead, almost half of respondents thought it was due to government incompetence, and 8.5% of respondents who never received a transfer attributed this to government corruption.

[Figure 2]

In July the program was extended for lifeline customers, but the sharp drop in transfer receipt starting in August includes lifeline customers, raising questions about the implementation of this rule (Figure 2).[11]

It is unclear whether attempts to provide relief through a different channel would have been more effective. The lack of existing alternatives suggests any other mechanism would also have suffered from delays and limited receipt. Indeed, according to the GSS, 78% of communities did not receive free water despite this being the government's other main relief program (Ammah 2020).

[9] Livelihood Empowerment Against Poverty (LEAP) provides monthly cash transfers to over 330,000 poor households (primarily in northern Ghana), but reaching this population required many years of outreach. The costs of expanding this program during the pandemic may have been high.

[10] For comparison, CARES relief checks were distributed 1.5 months after the first COVID-19 case in the U.S.

[11] We proxy lifeline status with March electricity expenditures for households, while actual lifeline status was determined at the meter level based on March usage.

Technical hurdles in the distribution process may have contributed moderately to non-universal receipt. First, ECG notes that some pre-paid customers failed to swipe their cards on their meters to verify their transfer eligibility (ECG 2020c). But this was already a requirement for pre-paid topups before the pandemic, and an experiment where we provide this information to a random subset of participants did not increase receipt. Second, slow billing may have delayed transfers initially, but only half of post-paid customers had received any transfers by October, even though by then nearly all post-paid customers had received bills for April, and surveyors encouraged respondents to review their bills to check if they had received it. Third, ECG indicated that customers who had tampered with their meters did not receive transfers (ECG 2020d), however there is no indication that meter tampering is widespread. Finally, relief for pre-paid customers was conditional on purchasing credit, but pre-paid respondents report topping up electricity twice monthly, and fewer than 6% indicated that it had been more than a month since their last purchase, with no difference in the mean number of days since the last electricity purchase between those that did and did not receive the transfer. While these technical difficulties were specific to ECG's infrastructure, utilities elsewhere may face similar difficulties that could meaningfully affect implementation. That said, it appears unlikely that they can account for the large share of households yet to receive any transfers after 5 months in Accra.

In addition to these technical aspects, the targeting of transfers to electricity meters rather than households may also account for incomplete receipt, as intermediaries may have skimmed part of the transfer. We discuss this further in Section 4.2.

Despite these shortcomings in implementation, the program successfully transferred aid to many households in Accra in a reasonable timeframe. A cash transfer program to disburse aid in response to the pandemic rapidly and to such a large population might not have been feasible.

4 Distributional implications

Next we consider the program's distributional implications. An obvious concern with providing relief through electricity is that unconnected households are excluded. 18% of Ghanaian households, and 25% of rural communities, are unconnected, and they did not receive a substitute for the electricity transfer (Ammah 2020; The World Bank 2018). According to Afrobarometer (2017) Round 7 data for Ghana, unconnected households are more likely to be located in rural areas, go without food, water, or cash income more frequently, and have received no or limited formal schooling. Thus, eligibility for this form of transfer is regressive.

4.1 Regressivity in transfer amount and receipt

As with any proportional subsidy, the program design was regressive: those with baseline usage above 100 kWh per month—who are likely also wealthier—were to receive the largest transfers. This is particularly inefficient if the utility of electricity use is concave. In this respect, the extension of the relief program after the first three months for lifeline customers only is less regressive, but

as discussed in Section 3.2, the gap in transfer receipt by lifeline status narrowed only slightly in practice. Table 1 shows that lifeline customers are 18 percentage points less likely to have ever received the electricity transfer. Ownership of electric appliance types—a proxy for household wealth—is also positively associated with transfer receipt.[12]

[Table 1]

By the third survey round, lifeline households had been eligible for five months of transfers while non-lifeline households had been eligible for only three months. Despite this, expected non-lifeline transfers exceed lifeline transfers, and actual transfers are increasing in baseline electricity spending (Figure A4).

4.2 Distribution via an intermediary

When transfers are distributed via an intermediary (e.g., food transported by distributors, water flowing via utilities and landlords, or agricultural inputs distributed by community leaders), the risk exists that they skim part or all of the transfer value. Households that do not directly pay ECG for electricity will not receive the transfer unless it is passed through. In our sample, 46% of respondents share a meter and 26% pay an intermediary for electricity, meaning another party may capture the transfer for the meter used by these households. In this case, while the transfer may reach the meter as intended, it does not reach all households using the meter. By August-October 74% of households that pay for electricity directly had received relief, compared to 53% of households that pay an intermediary (Figure 2).

Table 1 shows that respondents who pay a landlord or another household for electricity are 12.5 percentage points less likely to have ever received the transfer controlling for indicators of wealth, including appliance ownership and lifeline status. Figure 2 shows that this gap persists over time, suggesting intermediaries do not merely delay the transfer. This exacerbates regressivity since households that pay a landlord have less wealth on average than landlords or households that manage meters: they own fewer appliance types and generators, a reasonable proxy for wealth in the absence of wealth measurements, and are more likely to be lifeline customers. This negative correlation between renter status and socioeconomic well-being holds in our sample (Table A3) and across Ghana more broadly: according to the GSS (2019), households that rent their dwelling have fewer rooms, lower likelihood of having their own bathroom, lower likelihood of having a cement wall, lower monthly electricity spending per capita, fewer mobile phones, and lower likelihood of having a computer (all with $p<0.05$), relative to households that own their dwelling.

Imperfect pass-through may occur for several reasons. Households depend on their intermediary to accurately report transfer receipt: only the intermediary observes this. And, 53% of households that pay an intermediary for electricity report paying a fixed periodic amount. Even if some households know to ask for a lower payment, the terms of their rental or meter use agreement may rule out a rebate, such that the benefit will accrue entirely to the landlord.

[12] Because all surveys were conducted over the phone, direct questions on household wealth were excluded.

This result also applies to the government's water relief program. Respondents who pay a landlord for electricity—assumed more likely to also pay the landlord for water—are 10 percentage points less likely to have ever received the water transfer (Table A4). Capture of government relief by intermediaries will particularly exacerbate regressivity in urban areas: 39% of urban households in Ghana rent their dwelling compared to 14% of rural households (GSS 2019).

4.3 Shared electricity connections

Additional regressivity may arise through local housing structures. It is common in Accra for multiple families to share a meter. 29% of respondents who pay ECG for electricity share a meter with at least one other user (5% share with five or more other users), while 98% of households who pay an intermediary share their meter with other users (32% share with 5 or more other users). 72% of lifeline households share a meter with at least one other user, compared to 42% of non-lifeline customers. These households might individually be considered lifeline and therefore be eligible for the full transfer if they had their own meter. However, their combined monthly usage at the meter level may exceed the lifeline threshold, warranting only 50% relief rather than the 50 kWh transfer that their individual household usage would warrant.

5 Political Implications

The provision of public goods prior to an election has frequently been found to serve clientelistic goals by increasing support for the incumbent (Ferraz and Finan 2008; Golden and Min 2013; Min 2019; Casey 2015; MacLean et al. 2016; Wolfram et al. 2021). There was widespread support for Ghana's relief program, and our surveys suggest there was partial obfuscation of its significant costs. By implementing a large multi-month electricity relief program, the government of Ghana may have gained significant political support in the months before the December 2020 presidential election.

5.1 Program support

Support for the program is high: 94% of respondents who had received transfers, and 72% of those who hadn't, indicated satisfaction with the program (Figure A5). While we find no evidence that transfer receipt significantly increases household consumption or improves food security (Table A5), it does appear to decrease electricity spending, the amount of times customers need to top up their meter, and instances of households losing power due to lack of electricity credit (Table A6).

Columns 1-3 of Table 2 show that support for the incumbent—the New Patriotic Party (NPP)—is 7-8% higher among households who had received a transfer relative to households that never received one. The association among those receiving the transfer in the last 30 days on government support is slightly larger than the effect of receiving it earlier. These correlations appear to be driven by neutral respondents shifting towards favoring NPP, with a smaller reduction in pro-opposition attitudes, rather than increased support among existing supporters (Table A7). Data from a short follow-up survey indicates that measures of government support are correlated with

whether respondents voted in the November 2020 election (Table A10). Given that the NPP won the election by about 4 percentage points nationally, the political gains from the relief program are substantial.

[Table 2]

Three additional results help interpret the correlation between government support and transfer receipt. First, to account for the potential bias introduced by household characteristics that are correlated with political perspectives—Table 1 shows that these are associated with transfer receipt—the regressions in Table 2 control for all of these variables. Second, fixed effects regressions take advantage of variation in when households received relief. Even within households, transfer receipt increases government support, though the magnitudes are smaller (column 4 of Table 2), alleviating concerns about omitted variables that vary across recipients. Fixed effects estimates are also unchanged after including the same controls as in columns 1-3. Third, Table A11 replicates column 4 of Table 1 adding controls for political perspectives collected during 2018-2019 surveys.[13] Baseline political support does not predict transfer receipt, ruling out reverse causality, and estimated impacts are similar with and without controlling for prior support for NPP. While our empirical design does not let us establish causality, the results suggest transfer receipt affected political support.

5.2 The aversion to cost recovery

The government expected to spend 510 million USD between April and December on the relief program (ECG 2020a; GhanaWeb 2020; ECG 2020f), representing 1% of Ghana's 2019 GDP, 3.4% of 2019 government expenditures and 44% of ECG annual revenues (Ofori-Atta 2019; ECG 2020e).[14] The government has not publicly discussed how it will finance this. Does public attention to the program's costs affect its broad support? To test this, we present households with a hypothetical scenario in which ECG increases future electricity tariffs to recover costs. We use an incremental guided search to elicit WTP for electricity transfers in terms of increased electricity costs next year. The approach is described in detail in Appendix C. Respondents choose whether they prefer to receive an electricity transfer today and repay some proportion in one year through temporary increases in electricity costs, or to not receive anything. The highest proportion of the transfer the respondent is willing to pay through increased electricity costs is taken as their WTP for the transfer.

When prompted with the possibility of future tariff increases, program satisfaction falls by nearly 50% (Figure A5), 79% of respondents would not want any electricity relief if the amount received this year is exactly offset by an increase in electricity costs next year (Table A12). In

[13] The sample size is lower because only a randomly selected half of respondents completed these surveys. Mean transfer receipt and correlations between household characteristics and transfer receipt are similar for this subset compared to the rest of the sample.

[14] The US Government spent over 2 trillion USD on the CARES Act COVID-19 relief program, 45% of total government spending in the fiscal year ending September 2019 Berger 2020.

fact, most respondents (52%) would not even accept paying a *quarter* of the transfer amount in extra electricity costs next year to receive relief (Figure 3). Respondents exhibit strong negative reactions to reminders that the government will somehow need to recover the program's costs, and display greater aversion to future electricity cost increases than on decreasing their current electricity spending. The initial widespread satisfaction with the relief program indicates inattention to potential future costs, or the hope that those costs would be borne by others.

[Figure 3]

The aversion to increased future costs could reflect generic intertemporal preferences or be specific to electricity. To test this, we offer respondents numerically equivalent options for a cash loan. WTP for a cash loan is substantially higher than for an electricity "loan". Fewer households reject a cash loan if they have to repay the same amount next year (41%) than reject electricity relief under the same conditions (79%). 50% of respondents are willing to take a loan even if repayment includes interest: 12% of respondents are willing to take a loan even with 75% annual interest. Aversion to debt or uncertainty about future liquidity therefore cannot fully explain the rejection of electricity transfers under repayment.

Those who reject electricity transfers if the same amount must be repaid are much more likely to cite uncertainty about their financial situation next year than those who reject the loan (51% to 6%; Table A12). The flexibility of cash may be preferred under uncertainty as it preserves more consumption choices. The result may also reflect mental accounting—respondents may budget for fixed monthly electricity spending (Thaler 1999)—or higher disutility from unpaid bills than delays in loan repayment. Finally, this reaction also reflects dislike for unfairness (Kahneman, Knetsch, and Thaler 1986): 47% report objections to having to repay something presented to them as free.

It is unlikely that this result is due to differential expectations about delivery of the transfer. Very few respondents (6%) reject the electricity transfer because they do not believe they would receive the full amount, and the distribution of responses does not vary with transfer receipt or by whether the respondent pays for electricity directly or via an intermediary.[15] Furthermore, while bill arrears represent utility debt for post-paid customers, which could lower demand for intertemporal borrowing of electricity, only 9% of respondents in our sample are connected through a post-paid meter and this is not correlated with the decision to reject electricity transfer that must be repaid.

The greater WTP for cash than electricity when there is repayment involved contrasts with the finding that 45% of households prefer electricity to cash when there is no repayment. This suggests households are reacting to something particular to electricity. Customers may believe that an increase in electricity charges by ECG would become permanent, or that their future electricity use will be greater than at present.

This result has important governance and political implications. Government decisions and public beliefs about cost recovery will have significant implications for political support for relief

[15]Transfer receipt and amount have no significant relationship with transfer tradeoff decisions, but respondents that are more satisfied with the relief program are less likely to reject the transfer (Table A13).

programs. The Africa Centre for Energy Policy feared the transfers would exacerbate ECG's existing financial challenges (GhanaWeb 2020). Critics argued that it was a populist move by the government ahead of elections, made with little regard for its impact on government expenditures (Allotey 2020).

6 Conclusion

We evaluate the efficiency, distributional, and political implications of an electricity relief program in Ghana that was implemented in response to the economic distress caused by the COVID-19 health crisis. Our unique data on transfer receipt allow us to study these dimensions of the program in a manner that incorporates not only the statutory design but also the on-the-ground implementation. The implementation complexities strike us as fairly fundamental in their nature and may be present in many of the countries that use energy subsidies to provide relief to vulnerable members of society.

We find that electricity transfers are largely inframarginal to counterfactual electricity use, and leveraging the utility's existing customer relationships circumvented the need to establish a novel cash transfer infrastructure. Despite this expediency advantage, we identify several logistical, technological, and informational challenges that affected on-the-ground implementation. As a result, a large proportion of households report never receiving any electricity transfer, and transfer receipt is regressive. Households using more electricity receive larger transfers, and the poorest households are less likely to have ever received electricity transfers. Households paying an intermediary for electricity, sharing a meter, spending below the lifeline amount for electricity in March, and having fewer different appliance types—all correlated with lower household wealth—are less likely to have ever received any transfers. Incomplete pass-through of transfer to households who pay an intermediary for electricity may account for part of the gap in transfer receipt, and may apply to other government relief programs that do not target households directly.

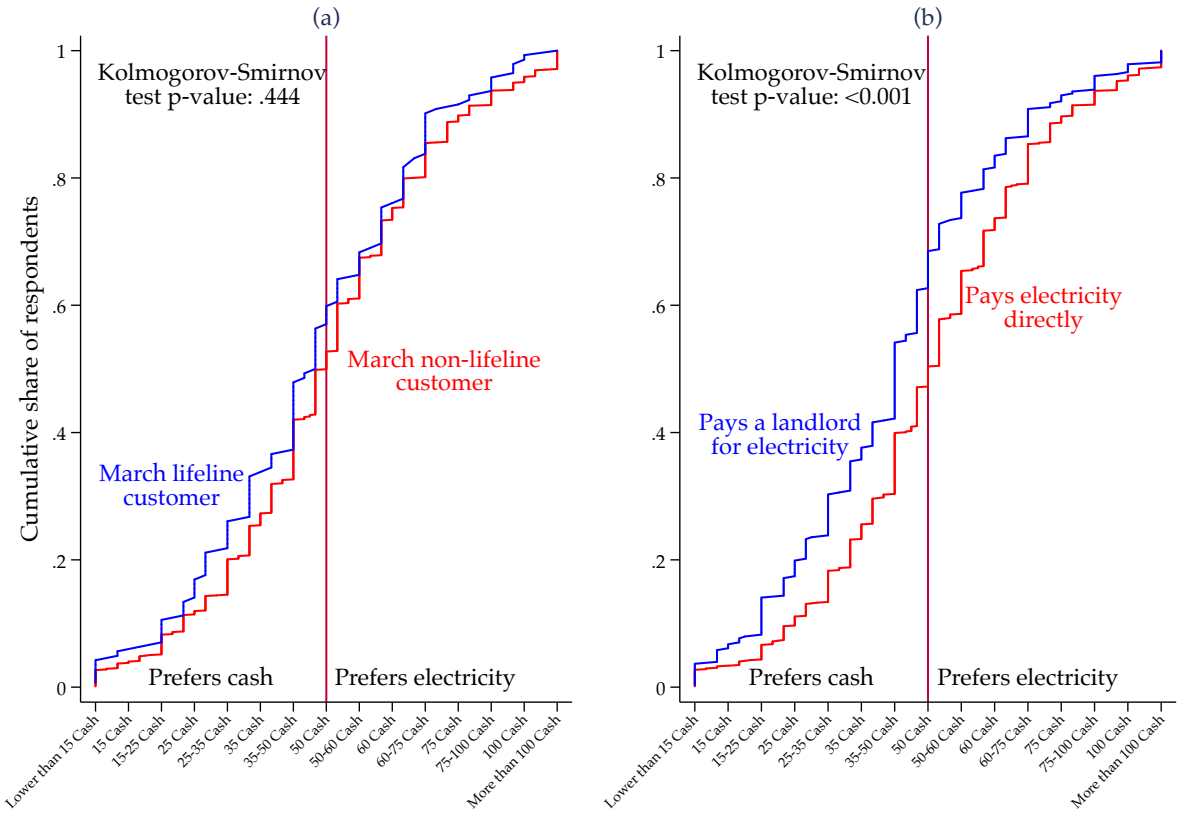
Finally, the program increased support for the incumbent party in an election year. This support wanes when respondents are prompted with the possibility that future electricity tariffs may increase to fund program costs. Most respondents would prefer to not receive any electricity transfers this year if they have to repay even a fraction of it next year. This is important given the severe financial constraints faced by many African utilities.

This analysis generates several tangible policy findings. First, a uniform rather than a proportional electricity transfer would be more progressive, and possibly easier and less costly to implement. Households would know the amount they were entitled to, which might provide accountability and increase pass-through by intermediaries. Inframarginal transfers are less likely to be distortionary, which is an advantage of goods that can be stored. Second, programs where transfers are disbursed to units other than households should attend to the possible exclusion of certain categories of households. Mechanisms incentivizing intermediaries to pass on aid to households would improve the reach of such programs. Third, relief programs' political support and welfare impacts depend on how the costs are eventually distributed. If energy subsidies worsen the financial situation of utili-

ties, leading to issues with energy supply to customers or to price increases passed on to consumers, some households may be worse off. Further research is needed to determine how design features and implementation constraints affect the costs and benefits of a government electricity transfer program during an economic crisis, particularly when the need for immediate, well-targeted relief is high but government options for providing support are limited.

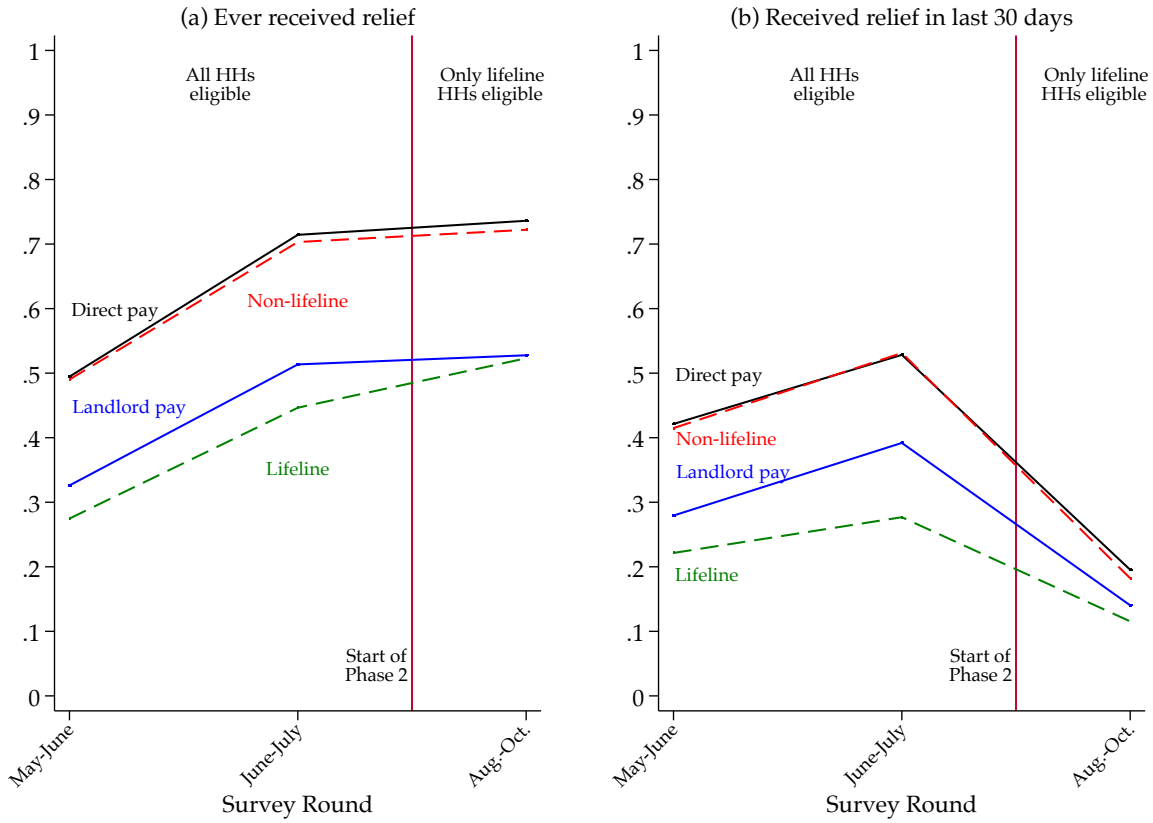
Figures

Figure 1: Distribution of willingness to pay for a 50 GHS electricity transfer



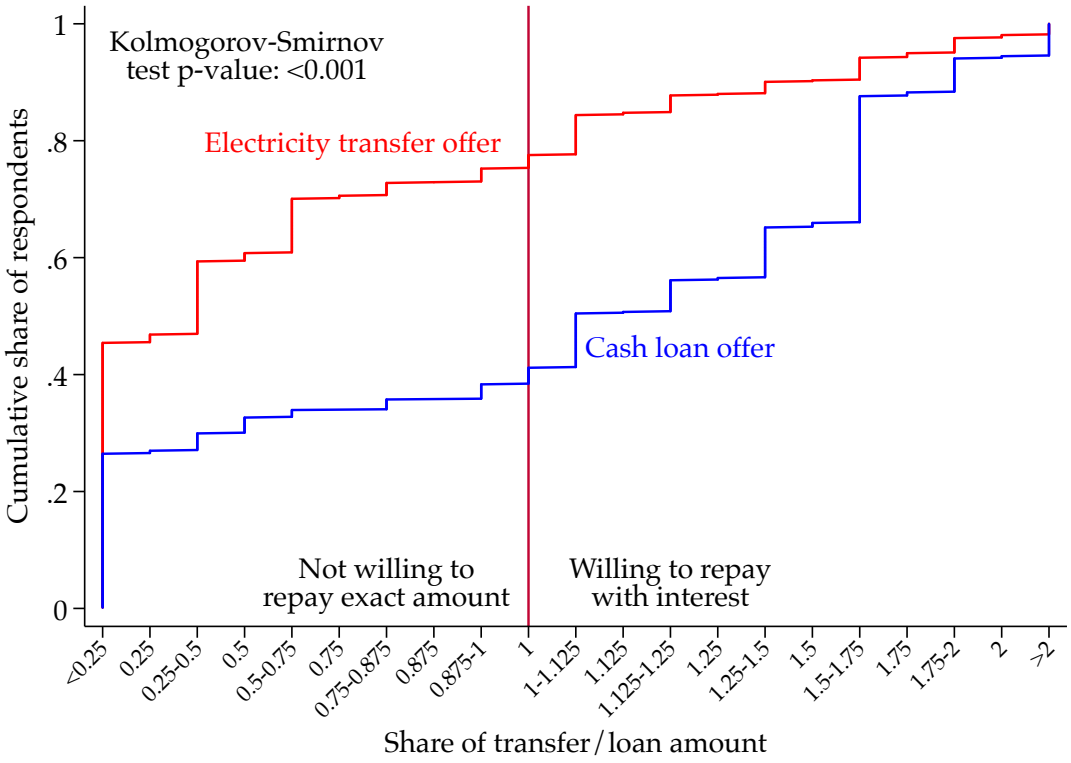
The figures show the distribution of the highest offered cash transfer amount which respondents would **reject** in favor of a 50 GHS electricity transfer, during an elicitation exercise where respondents are prompted with a series of hypothetical choices between receiving a 50 GHS electricity cash transfer or receiving a specific cash transfer amount. The red bar indicates valuing cash and an electricity transfer equally. Households to the right of the red bar rejected cash transfers larger than 50 GHS, preferring a 50 GHS electricity transfer. Values are mean willingness to pay within households across rounds. Panel (a) compares the distribution by whether households are considered 'lifeline' based on their March 2020 electricity spending. Panel (b) compares the distribution by whether households pay for their electricity directly to ECG or via an intermediary such as a landlord. The p-values in the top left are the results of Kolmogorov-Smirnov test of equality of distribution functions.

Figure 2: Share of respondents receiving electricity relief, by payment method and lifeline status



The relief program was announced April 9, 2020 and the first transfers were made on May 1. The red bar indicates the transition from phase 1 to phase 2 of the program. Lifeline status is proxied by reported March electricity expenditures being below the cost of 50 kWh, the lifeline threshold. 'Landlord pay' indicates payment to any intermediary for electricity, while 'Direct pay' indicates paying for electricity directly to the utility or their agent.

Figure 3: Distribution of highest amount willing to repay in one year's time for a cash loan or electricity transfer today



Respondents are presented an iterated sequence of dichotomous choices between either receiving a cash loan or electricity transfer today and repaying some share in one year's time, or receiving nothing. The red bar indicates being willing to repay the exact amount of the transfer or loan in one year. Households to the right of the red bar are willing to repay the loan or transfer today with interest in next year while households to the left of the red bar are only willing to accept the loan or transfer today if they repay less than the principal. The offered transfer amount in the electricity repayment scenario varied by respondent to reflect their actual or expected relief under the government pandemic relief program. The median amount offered was 240 GHS and the mean was 300 GHS. In the generic loan scenario, respondents were randomly offered a loan of either 120, 240, or 360 GHS. The p-value in the top left is the result of a Kolmogorov-Smirnov test of equality of distribution functions.

Tables

Table 1: Correlates of electricity transfer receipt

	(1)	(2)	(3)	(4)	(5)	(6)
Pays landlord/other household for electricity	-0.190***	-0.160***	-0.145***	-0.145***	-0.125***	
	(0.029)	(0.033)	(0.032)	(0.033)	(0.034)	
Prepaid meter		0.203***	0.198***	0.195***	0.214***	0.248***
		(0.049)	(0.049)	(0.049)	(0.052)	(0.066)
Electricity spending in March (USD)		0.001	0.000	0.000	-0.001	-0.001
		(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Sum of appliance types held			0.016***	0.016***	0.015***	0.018***
			(0.004)	(0.004)	(0.004)	(0.004)
Lifeline customer according to March spending					-0.186***	-0.198***
					(0.043)	(0.045)
Shares meter with other users						-0.062**
						(0.028)
Observations	3339	3098	3098	3092	3055	2898
Dep. Var. Mean	0.594	0.603	0.603	0.603	0.604	0.604
Additional Controls	No	No	No	Yes	Yes	Yes

The dependent variable is a dummy for ever having received an electricity transfer at the time of the survey. SEs clustered at household level. Week and day of week fixed effects included but not shown. Additional controls included in columns 4-6 include respondent gender and age, counts of adults and children in the household, whether the household also operated a business at the same location when the household was originally surveyed in 2018-19, and whether the household has a generator.

Table 2: Respondent support for governing party and transfer receipt

	(1)	(2)	(3)	(4)
Received electricity relief in last 30 days	0.271***	0.293***	0.308***	0.111**
	(0.046)	(0.076)	(0.074)	(0.052)
Received electricity relief but not in last 30 days	0.230***	0.242***	0.240***	0.058
	(0.050)	(0.074)	(0.072)	(0.057)
Baseline - Overall Govt/NPP support (1-5)			0.215***	
			(0.036)	
Observations	3065	1406	1406	3311
No Transfer Mean	3.486	3.412	3.412	3.506
Household Controls	Yes	Yes	Yes	No
Household Fixed Effects	No	No	No	Yes
Sample	All Households	Households with Baseline	Households with Baseline	All Households

SEs clustered at household level. Week and day of week fixed effects included but not shown. The dependent variable is the enumerator's overall assessment of the respondent's support for the governing political party NPP, based on their responses to questions on the government's performance on specific issues. The assessment is on a scale from 1 to 5 where 1 reflects very unfavorable views of NPP (or alternatively very favorable views of the opposition) and 5 reflects very favorable views of NPP. The control variable for the respondent's baseline political perspective during 2018-2019 surveys is defined similarly. A description of the political variables included in our analysis is included in Appendix C. The magnitudes are similar when considering other measures of respondent political perspectives (Table A8). Considering impacts of transfer amount received instead of dummies for receiving a transfer also gives similar results (Table A9).

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