

# Research Memo: Evaluating strategies to increase in enrollment in privatized garbage collection services in Monrovia, Liberia

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## Abstract

This memo reports on a discrete choice experiment designed in collaboration with the Monrovia City Corporation (MCC) and the Center for Action Research and Training, Liberia. The purpose of the experiment is to evaluate different strategies for increasing enrollment in garbage collection services MCC administers through private-public partnerships. These collection services, delivered by “community-based enterprised” (CBEs), are failing due to low enrollment numbers, with dire consequences for environmental and public health. We embed our experiment in an original survey deployed to over 2000 households in Liberia’s capital city of Monrovia in Spring 2024. All else equal, we show that lowering subscription rates, offering opportunities for recycling, promising an uptick in enforcement of garbage ordinances, requiring community-based hiring practices, and securing the endorsement of local leaders called “community chairpeople” increase respondents willingness to enroll in CBEs’ collection services. Further analyses suggest that broader concerns about corruption, representation, and accountability attenuate the benefits of community-based hiring practices and chairpeoples’ endorsements on enrollment. Our results extend existing research regarding (1) how political actors who govern via customary authority affect state-society relations and (2) the challenges of commercializing public service provision in settings where political power is decentralized.

*\*Very\* preliminary draft; please do not cite or circulate without authors’ permission.*

**Date:** January 24, 2025

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# Introduction

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## Research Design

We embed a discrete choice experiment in an original survey deployed across 2109 households in Liberia’s capital city of Monrovia to evaluate public preferences for privatized service provision. In particular, we assess public preferences for household garbage collection services delivered under a private-public partnership (PPP). Garbage collection services offered by the Monrovia City Corporation (MCC) – the capital’s municipal government – have become remarkably limited in recent years. Less than one third of the estimated 756 tons of waste generated in Monrovia per day is disposed of at formal disposal sites, reflecting how poorly-funded formal garbage collection services fail to reach many of the city’s residents ([Kaza et al. 2018](#)). In the absence of formal garbage collection services, many Monrovia residents bury and/or burn their waste at informal dumpsites often located along the city’s storm-water infrastructure or in the mangrove swamps surrounding the city’s borders. These practices have dire implications for environmental health. Waste burning alone causes roughly ten percent of the premature mortalities attributable to air pollution in Africa ([Gordon et al. 2023](#)). For Monrovia specifically, garbage clogs the capital’s buffers to storm surges made worse by climate change, increasing the frequency of floods that directly expose residents to contaminated water ([The World Bank Group 2021](#); [Doe 2022](#); [Mehnpaine 2023](#)).

In response to these challenges, MCC recently leveraged technical and financial assistance from Cities Alliance and the European Union to support “community-based enterprises” (CBEs) ([Cities Alliance 2021](#)). CBEs are small businesses MCC licenses to collect and transport garbage from households to a network of “skip buckets” (i.e., large dumpsters) in the Greater Monrovia area, from which MCC transports the collected garbage to one of its

two landfills. Residents of Monrovia are not required to enroll in CBEs' garbage collection services, though doing so ostensibly should help Monrovia comply with the city's various garbage dumping ordinances (). The World Bank worked with MCC to establish this PPP model for household garbage collection in 2007, as part of the Emergency Monrovia Urban Sanitation Project. Over 55 CBEs have been established since the project's launch (add cite).

It remains unclear whether CBEs have meaningfully improved access to household garbage collection services in Monrovia. The number and size of CBEs operating in Monrovia has increased dramatically since project launch, as has the number of communities serviced by CBEs (add cite). Yet the total number of households CBEs service make up less than one percent of all households in Monrovia (add cite). Additionally, almost all active CBEs in Monrovia report difficulties in maintaining a subscriber base capable of generating sustainable levels of revenue, reflecting how nearly 40 percent of households falling within CBEs' services areas refuse to pay for their waste collection services (add cite). Post-hoc evaluations of the CBE program attribute these low subscription rates to a variety of factors, such as the high price of CBEs' collection services relative to cost of paying unemployed community members to collect garbage (add cite).

The research team began working with MCC in June 2023 to investigate more formally why subscription rates for its CBE program remain so low. Subsequently, two research activities were co-designed and implemented: (1) a set of focus group discussions meant to measure what Monrovia's residents perceive as barriers to enrolling in CBEs' services and (2) a discrete choice experiment meant to test which aspects of CBEs' garbage collection services could be modified to increase enrollment. Both research activities were implemented by staff at the Center for Action Research and Training (CART) – a Liberian research organization operating out of Monrovia. We describe each research activity below before turning to our results.

## Focus Group Discussions

The research team conducted 12 focus group discussions across 11 communities in the Greater Monrovia area between June and July 2023. Three communities were selected purposively, due to the presence of an active CBE and their proximity to waste infrastructure (e.g., landfills) MCC manages. The remaining 8 communities were selected at random from the population of communities in Monrovia where CBEs are active. CART staff used a random walk protocol (see SI XX) to obtain the contact information of approximately 20 residents from each selected community. Then, the research team randomly selected 10 residents per community to attend their respective focus group.<sup>1</sup> A CART staff member served as the moderator for each of the focus groups, while members of the research team served as note takers. All focus groups lasted between 45 and 90 minutes.

Focus group questions prompted participants to reflect on three aspects of waste management in Monrovia: how people in their community manage waste, the consequences of being exposed to mismanaged garbage, and why people might be hesitant to enroll in CBEs' services. We use focus group participants' responses to these questions to help design our discrete choice experiment, as responses identified salient aspects of CBEs' operations that might deter future enrollment.

## Discrete Choice Experiment

Following focus group enumeration, the research team worked with MCC to design a discrete choice experiment seeking to evaluate public preferences for CBEs' garbage collection services. Social scientists use discrete choice experiments (DCE) (or, "conjoint experiments) to evaluate how individuals navigate multi-dimensional decisions, such as voting for presidential candidates ([Hainmueller and Hopkins 2015](#)), evaluating applications for immigrants

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<sup>1</sup>SI XX provides a breakdown of recruited participants' demographic information.

and asylum seekers (Bansak, Hainmueller and Hangartner 2016), supporting different climate (Bergquist, Mildenerger and Stokes 2020) and anti-corruption policies (Angell et al. 2023), and deploying different systems of environmental management (Cooperman, McLarty and Seim 2022). DCEs have two advantages over traditional survey experiments. First, they boost external validity (Hainmueller, Hangartner and Yamamoto 2015; Auerbach and Thachil 2018). DCEs mimic real-world decision-making whereby individuals must navigate trade-offs between choices that vary along multiple dimensions, whereas traditional survey experiments restrict individuals' decision-making to a single dimension. Second, DCEs are less susceptible to social desirability bias than traditional survey experiments (Horiuchi, Markovich and Yamamoto 2022). Little research uses DCEs to evaluate public preferences for differently configured PPPs, especially in conflict-affected settings (Leigland 2020).

MCC collaborated with the research team to design the DCE in two phases. First, the research team shared with MCC staff findings from the focus group discussions in September 2023, at a workshop hosted in CART's Monrovia office. The research team also presented a preliminary set of attributes to be included in the DCE during this workshop, after which it invited feedback from MCC staff on the proposed design. Second, the research team met regularly with the [Jerome's title] between January and February 2024, to refine further the attributes featured in the DCE and to identify a set of communities with active CBEs from which survey respondents could be sampled.

We pair data from our focus group discussions with insights from the literature and feedback from the MCC staff members tasked with regulating CBEs' operations to develop our experiment's attributes. Our approach to attribute development is in line with best practices (CBPR, other conjoints), offering two advantages. First, it helps ensure the experiment produces actionable information our partners at MCC can use to improve solid waste management in Monrovia via the CBE program. Second, it ensures that the choice sets presented to survey respondents are both realistic – i.e., differ along aspects of CBEs' operations that

MCC can change – and salient – i.e., feature aspects of CBEs’ operations that residents of Monrovia report to factor into their decision to enroll. This inductive process led to the development of five attributes, each with two levels:

## 1. Pricing

- Rationale for Inclusion: Focus group participants stated that the price of CBEs’ garbage collection services were prohibitively high relative to alternatives for garbage collection, e.g., paying unemployed youth in the community (SI [A.2](#)).
- Level 1 Text: CBE [profile number] will charge you \$500 LD (\$2.65 USD) a month to collect your garbage three times a week.
- Level 2 Text: CBE [profile number] will charge you \$1000 LD (\$5.30 USD) a month to collect your garbage three times a week.

## 2. Waste Separation

- Rationale for Inclusion: MCC staff expressed interest in requiring CBEs and their customers to separate their waste, in support of the city’s current efforts to promote recycling. MCC staff were uncertain, however, whether the additional labor waste separation requires of CBEs’ customers would deter them from enrolling in CBEs’ services.
- Level 1 Text: CBE [profile number] will provide you with a single bin to store all your garbage, because you do not need to separate your garbage before they collect it.
- Level 2 Text: CBE [profile number] will provide you with two bins to store your garbage, because you need to separate your garbage before they collect it. You would fill one bin with items for the landfill and the other bin with recyclable items.

### 3. Local Endorsement

- Rationale for Inclusion: Informal political leaders called “community chairpeople” are responsible for coordinating service delivery at the community level in Monrovia ([Hunnicutt and Gbaintor-Johnson 2023](#)). Knowing this, MCC coordinated with community chairpeople while rolling out the CBE program, including securing chairpeople’s endorsements of individual CBEs. Prior research suggests such endorsements and similar interventions can improve service delivery in settings like Monrovia ([Baldwin and Raffler 2019](#); [Balan et al. 2022](#)). Low levels of current enrollment in CBEs’ service might reflect a lack of awareness among community members regarding chairpeople’s prior endorsements of CBEs. Low enrollment might also reflect how some community members have come to distrust community chairpeople due to their handling of mismanaged waste, as some focus group participants suggested (SI [A.2](#)).
- Level 1 Text: CBE [profile number] will work with your community chairman to design their services. So, your chairman has said using this CBE’s services is the right way for people in your community to get rid of their garbage.
- Level 2 Text: CBE [profile number] will not work with your community chairman to design their services. So, your chairman has not said whether using this CBE’s services is the right or wrong way for people in your community to get rid of their garbage.

### 4. Hiring Practices

- Rationale for Inclusion: MCC requires CBEs to hire workers exclusively from the community they serve, believing that households will be more likely to enroll in CBEs’ services if they see how privatizing garbage collection generates opportunities for employment in their community. This intervention is in line with

broader guidance from large international financial institutions seeking to make PPPs more “community engaged”.<sup>2</sup>

- Level 1 Text: CBE [profile number] will only hire workers who live in your community.
- Level 2 Text: CBE [profile number] will only hire workers who live outside of your community.

## 5. Enforcement

- Rationale for Inclusion: MCC is responsible for coordinating with the Monrovia City Police to enforce various ordinances regarding waste management in Monrovia, such as bans on littering. Focus group participants overwhelmingly stressed that recent failures to enforce these ordinances undermine households’ willingness to enroll in CBEs’ services (SI A.2).
- Level 1 Text: CBE [profile number] will start working, and then MCC inspectors will pass through your community often to check whether people are dumping garbage illegally. People caught dumping garbage illegally will be fined.
- Level 2 Text: CBE [profile number] will start working, and then MCC inspectors will stop passing through your community to check whether are dumping garbage illegally.

CART staff used handheld tablets to enumerate surveys containing the DCE to over 2100 households across 21 communities in the Greater Monrovia area (see map of sampled communities in SI XX). Approximately 100 survey respondents were recruited per community using a random walk protocol (SI XX), leading to a final sample of 2109. We targeted a sample

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<sup>2</sup>See [World Bank report](#), accessed 26-August-2024.



size of 2100 to ensure sufficient power to detect heterogeneity in preferences across different respondent characteristics, following prior applications of DCEs investigating preference heterogeneity ( ).

CART enumerators presented survey respondents with a pair of hypothetical CBE profiles that randomly varied along the attributes described above.<sup>3</sup> Some CBE pairs were similar along all but one of the attributes, while other varied across all attributes. After reading each CBE's profiles to the survey respondent and ensuring the respondent understood the differences between each CBE within the pair, respondents were prompted to select which CBE from the pair they would rather pay to collect their garbage on a weekly basis. This choice task was repeated three times, with each task featuring a different pair of CBE profiles. SI XX provides an example of the CBE profiles CART enumerators presented to respondents.

We embed the DCE in a larger survey measuring four sets of background conditions likely to moderate households' decisions to enroll in CBEs' services independent of their design. First, we measure respondents' experiences of basic service provision, such as their satisfaction with government service providers. Second, we measure respondents' perceptions of various political leaders and institutions in Monrovia that are responsible for coordinating basic service provision, such as MCC. Third, we measure respondents' perceptions of community cohesion. Fourth, we measure respondents' reported exposure to flooding, given the link between mismanaged waste and increased flooding in Monrovia. A copy of our survey instrument is available in SI XX.

We use the method introduced in [Hainmueller, Hopkins and Yamamoto \(2014\)](#) to analyze data from our DCE. Our effective sample size is 12,654 because each of our 2109 respondents chose between three different pairs of CBE profiles. We use Ordinary Least Squares (OLS) regression to estimate the following model:

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<sup>3</sup>We uniformly randomized attribute levels because none of our attributes are dependent on each other. We also randomize attribute order at the respondent level to mitigate pure order effects.

$$Y_p = \alpha + \beta_1 P_p + \beta_2 S_p + \beta_3 H_p + \beta_4 L_p + \beta_5 E_p + \gamma O_z + \epsilon_i \quad (1)$$

$Y$  is a binary indicator representing whether respondent  $i$  selected CBE profile  $p$  from choice set  $z$ .  $P$ ,  $S$ ,  $H$ ,  $L$ , and  $E$  are indicators of CBE profile  $p$ 's price, requirements for waste separation, hiring practices, local endorsement, enforcement, respectively.  $O$  is a categorical variable denoting whether CBE profile  $p$  appeared in the first, second, or third choice sets presented to each respondent. Finally,  $\epsilon$  is an error term clustered at the respondent level.

Our causal quantity of interest is the Average Marginal Component-Specific Effect (AMCE).  $\beta_1$  through  $\beta_5$  represent the AMCE for each attribute featured in the pairs of hypothetical CBEs respondents are asked to evaluate. In our DCE, the AMCE indicates how much a respondent's willingness to enroll in a CBE's services would change at the margin given a change in one aspect CBEs' service provision. For example,  $\beta_3$  estimates how much a CBE engaging in community-based hiring practices affects respondents' willingness to enroll in its services holding all other aspects of its operations constant, relative to the counterfactual where the CBE did not use community-based hiring practices. Additionally, we estimate the Average Component Interaction Effect (ACIE) to identify interactions between CBEs' attributes, such as the possibility that respondents would tolerate higher subscription prices conditional on the inclusion of community-based hiring practices and the enforcement of existing garbage ordinances. We also re-estimate 1 within subgroups defined by the moderating variables described above to investigate heterogeneous effects.

## Results

Figure C1 reports the AMCE for each attribute featured in our DCE. Overall, our findings are consistent with theoretical expectations and data collected during focus groups discussions regarding the perceived barriers to enrolling in CBEs' garbage collection services:

- **Pricing:** All else equal, raising the subscription fee for CBEs' garbage collection services from \$500 LD (\$2.65 USD) per month to \$1000 LD (\$5.30 USD) per month reduced respondents willingness to enroll in CBEs' services by approximately 21 percentage points (p.p.) ( $p < 0.001$ ).
- **Waste Separation:** All else equal, requiring CBEs to provide customers with two bins to separate their waste into – one for recycling, the other for the landfill – increased respondents willingness to enroll in CBEs' services by approximately 11 p.p. ( $p < 0.001$ ), relative to the counterfactual where CBEs only provided their customers with a single bin for waste storage and did not require waste separation.
- **Local Endorsement:** All else equal, respondents are approximately 6 p.p. more likely to enroll in the services of a CBE that has secured the endorsement of their chairperson ( $p < 0.001$ ) than they are to enroll in the services of a CBE that has not secured the endorsement of their chairperson.
- **Hiring Practices:** All else equal, engaging in community-based hiring practices increases respondents' willingness to enroll in CBEs' services by approximately 5 p.p. ( $p < 0.001$ ), relative to the baseline condition of a CBE only hiring workers from outside of the communities they serve.
- **Enforcement:** All else equal, promising the continued enforcement of existing garbage ordinances by MCC increased respondents willingness to enroll in CBEs' garbage collection services by approximately 12 p.p. ( $p < 0.001$ ), relative to the counterfactual where the onset of CBEs' services would be accompanied by the termination of enforcement.

Figure C2 report the ACIE for each pairwise combination of attributes featured in our DCE. These ACIEs allow us to determine which aspects of CBEs' services function as com-

plements – i.e., leading to a greater willingness to enroll when featured simultaneously than when featured independently – and substitutes – i.e., reducing willingness to enroll when featured simultaneously than when featured independently. Negative and statistically significant ACIE estimates suggest that attributes are substitutes, and positive ACIE estimates suggest that attributes are complements (Egami and Imai 2018).

We find two statistically significant interactions between CBEs’ attributes in our DCE. First, we find that the use of community-based hiring practices complements higher subscription prices (Figures C2a, C2c). Respondents’ willingness to enroll in the services of a CBE charging \$1000 LD/month are 3.4 p.p. higher when the CBE also commits to hiring employees exclusively from the community it serves, relative to the counterfactual where a CBE would charge the same rate but exclusively hire employees from outside of the community it serves ( $p = 0.04$ ). Second, we find that securing the endorsement of a community chairperson complements community-based hiring practices, and vice versa (Figures C2d, C2e). Respondents’ willingness to enroll in the services of a CBE engaged in community-based hiring practices increases by approximately 3.6 p.p. when the CBE also obtains the endorsement of the respondent’s community chairperson ( $p = 0.04$ ), relative to a CBE committing to engage in community-based hiring practices but lacking an chairperson endorsement.

Figures C3 - C7 visualize heterogeneity in the AMCE estimates presented in Figure C1. We begin by exploring heterogeneity driven by respondents’ experiences of service provision. This decision reflects how some focus group participants’ rationale for (not) engaging with CBEs was rooted in their prior interactions with MCC and how their community has managed garbage informally absent formal service provision (SI A.2). We measure respondents’ experiences of service provision in the following ways<sup>4</sup>:

1. Prior use of garbage collection services provided by MCC or CBEs

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<sup>4</sup>Survey items used to construct each measure are provided in SI XX

2. Reliability of access to any garbage collection services
3. Satisfaction with government-provided garbage collection services
4. Satisfaction with community-provided garbage collection services
5. Paid bribe to access garbage collection services

We find surprisingly little evidence that respondents' experiences of basic service provision induce heterogeneity in the effects of CBEs' attributes on willingness to enroll. A few exceptions are of note, however:

- The positive effect of promising an uptick in MCC enforcement concurrent with the rollout of CBEs' services on enrollment is weaker among respondents who report having unreliable access to some form of waste collection service, relative to respondents who report having reliable access to some form of waste collection service (Figure C4, AMCE diff. =  $-4.0$  p.p.,  $p < 0.05$ ).
- The positive effect of CBEs' requiring customers to separate their waste is stronger among respondents with negative evaluations of the Liberian governments' efforts to provide basic services, relative to respondents who offer positive evaluations (Figure C5, AMCE diff. =  $+6.6$  p.p.,  $p < 0.05$ ).
- The negative effect of increasing CBEs' monthly subscription rates from \$500 LD to \$1000 LD is weaker among respondents who report either personally paying a bribe to have their garbage collected or knowing someone to have paid a similar bribe, relative to respondent who have no experience with paying bribes for garbage collection services (Figure C7, AMCE diff. =  $+6.6$  p.p.,  $p < 0.05$ )

Next, we explore heterogeneity explained by respondents' perceptions of community cohesion. Higher levels of community cohesion may reduce the barriers to collective action; in

this case, concerns about some members of the community benefiting from higher rates of garbage collection despite not enrolling in CBEs themselves (SI A.2). We measure community cohesion in two ways<sup>5</sup>:

1. Respondents' perception of how many other members of their community share the same vision for change in Liberia.
2. Respondents' beliefs about how responsible individual community members are for upholding community well-being.

It also seems that respondents' perception of community cohesion do not systematically moderate their responses to different CBE design elements (Figure C9). Again, though, there are notable exceptions:

- The negative effect of increasing CBEs' subscription rates on enrollment (counterintuitively) decreases as respondents believe fewer members of their community share the same vision for change (row 1, Figure C8a) and feel a weaker sense of personal responsibility for the well-being of the community (row 1, Figure C8).
- The positive effect of CBEs requiring customers to separate their waste weakens as respondents feel less personal responsibility for the well-being of their community (row 2, Figure C8).
- Securing a community chairperson's endorsement has a larger positive effect on willingness to enroll among respondents who believe only about 25 percent of their community shares the same vision for change, relative to the effect among respondents who believes almost everyone in their community shares the same vision for change (row 4, Figure C8, AMCE diff. = +6.4 p.p.,  $p < 0.1$ ).

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<sup>5</sup>Survey items used to construct each measure are provided in SI XX

Finally, we test for heterogeneity based on respondents’ attitudes towards the political actors responsible for coordinating service provision in Monrovia; specifically, community chairpeople, district representatives, and MCC. Attitudes towards these actors appeared to influence some focus group respondents’ expectations about the quality of private garbage collection services and its purported co-benefits under the CBE scheme, such as increased community employment (SI A.2). We measure attitudes towards each political actor listed above in four ways<sup>6</sup>:

1. Respondents’ perceptions about how frequently the political actor engages in corruption.
2. Respondents’ stated trust in the political actor.
3. Respondents’ beliefs about whether the political actor wants the same for their community as they do.
4. Respondents’ beliefs about whether the political actor can solve a problem in their community when one emerges.

We find comparatively more evidence that respondents’ perceptions of the political actors and institutions responsible for coordinating service provision substantially moderate their responses to changing the design of CBEs (Figures C9 - C12). Let us first focus heterogeneity rooted in respondents’ perceptions of community chairpeople – the informal community leaders MCC sometimes collaborated with to launch CBEs. To summarize, chairpeople who respondents perceive as corrupt and untrustworthy seem to attenuate the benefits of the more “community-oriented” CBE design elements on enrollment. Specifically:

- The positive effect of requiring CBEs to hire exclusively from the communities they serve is weaker among respondents who believe their community chairperson engages

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<sup>6</sup>Survey items used to construct each measure are provided in SI XX

in corruption, compared to respondents who do not believe their chairperson engages in any corruption (left panel, row 3, Figure C9).

- The positive effect of CBEs’ securing an endorsement from a respondents’ community chairperson is weaker among respondents who believe their chairperson “almost always” engages in corruption, relative to respondents who believe their chairperson “almost never” engages in corruption (left panel, row 4, Figure C9, AMCE diff. =  $-7.1$  p.p.,  $p < 0.05$ ).
- The positive effect of promising an uptick in MCC enforcement upon the beginning of CBEs’ services is weaker among respondents who believe their community chairperson engages in corruption, compared to respondents who do not believe their chairperson engages in any corruption (left panel, row 5, Figure C9).
- The positive effect of requiring CBEs to hire exclusively from the communities they serve is marginally weaker among respondents who trust their chairperson either only “just a little” or “not at all”, compared to respondents who trust their chairperson “a lot” (left panel, row 3, Figure C10).

We also find that the negative effect of increasing CBEs’ subscription prices on enrollment is even more negative as respondents are less confident in their chairperson’s ability to address problems in their community (left panel, row 1, Figure C12).

We observe similar heterogeneity in our core results across respondents who vary in their perceptions of district representatives – elected officials charged with representing their constituents’ interest in the Liberian Congress. Specifically:

- The positive effect of requiring CBEs to hire exclusively from the communities they serve is weaker among respondents who believe their district representative engages in corruption, though the differences in these conditional AMCEs is not statistically significant among the “Often” subgroup (center panel, row 3, Figure C9).



- The positive effect of promising an uptick in MCC enforcement upon the beginning of CBEs’ services is weaker among respondents who believe their district representative engages in corruption “often”, compared to respondents who believe their district representative “almost never” engages in corruption (center panel, row 5, Figure C9, AMCE diff. =  $-6.6$  p.p.,  $p < 0.1$ ).
- The positive effect of requiring CBEs to hire exclusively from the communities they serve is weaker among respondents who believe their district representative is untrustworthy, though the difference in these conditional AMCEs is not statistically significant among subgroup of respondents who do not trust their district representative at all (center panel, row 3, Figure C10).
- The positive effect of requiring CBEs to hire exclusively from the communities they serve is weaker among respondents who are very unconfident that their district representative wants the same change for their community as they do, compared to respondents who believe their district representative shares their interests (center panel, row 3, Figure C11, AMCE diff. =  $-13.8$  p.p.,  $p < 0.05$ ).

We also find that the negative effect of raising CBEs’ subscription prices on enrollment is weaker as respondents increasingly perceive their district representative as corrupt (center panel, row 1, Figure C9).

Additionally, we characterize heterogeneity in our core results driven by respondents’ perceptions of MCC – the public entity charged with delivering solid waste services in the Greater Monrovia area. There are two noteworthy findings, both related to the benefits of promising an uptick in MCC enforcement. First, we show that the positive effect of promising an uptick in MCC enforcement once CBEs’ operations begin is weaker among the subgroups of respondents who believe MCC to engage in corruption either “rarely” or “almost always” relative to respondents who believe MCC never engages in corruption (right panel,

row 5, Figure C9). Second, we show that the positive effect of promising an uptick in MCC enforcement once CBEs’ operations begin is weaker among the subgroups of respondents who lack confidence in MCC’s ability to address waste-related problems in their community (right panel, row 5, Figure C12).

## Discussion & Conclusion

Our results seem relevant to three literatures. First, we contribute to ongoing discussions of how political elites who govern via customary authority – primarily, “traditional” or “customary” leaders – shape state-society relations. Much research documents how customary leaders function as complements to the state (Baldwin 2013, 2015; Murtazashvili 2016; ?; Henn 2023; Hunnicutt and Gbaintor-Johnson 2023), despite the conventional wisdom that political actors who operate outside of the state erode its legitimacy and authority (Migdal 1988). One pathway through which customary leaders restore state-society relations is by helping restore basic government functions such as providing services (Baldwin and Raffer 2019). To that point, Balan et al. (2022) find that traditional chiefs in Congo increase tax compliance without decreasing trust in government by helping government officials identify households with high payment capacities.

We extend this body of evidence, showing how securing the endorsement of local leaders who govern partially via customary authority can build support for the policy instruments governments design. At the same time, our results are novel because they demonstrate how customary leaders’ capacities as complements is conditional on how their constituents perceive them. When customary leaders are perceived as corrupt, their ability to persuade citizens to engage with nascent government policies is limited.

Second, our results are in dialogue with research identifying the challenges of outsourcing public service delivery in settings where political decision-making is not highly centralized.

Large international financial institutions like the World Bank have promoted reform agendas aiming to “bring the government closer to the people” by divesting power from the national government to local authorities while simultaneously isolating the bureaucracies responsible for governance (mainly, providing public services) from political interference ([Camdessus 1997](#); [Grindle 2009](#); [Andrews 2013](#)). These reforms have been especially prolific in the water and sanitation sector, where reformers believed out-of-touch national bureaucracies unduly influenced by elected officials undermined service delivery ([Herrera and Post 2014](#)). Shifting the authority for water and sanitation to the local, and then utilizing neoliberal policy instruments to expand service delivery (e.g., engaging in private-public partnerships), was assumed to improve waste and sanitation services. Yet recent research contests this claim, demonstrating how local leaders struggle to implement neoliberal reforms for service provision because of their distributive effects (e.g., higher rates for services) ([Herrera and Post 2014](#); [Herrera 2014](#)).

We show how the de-facto decentralized political environments violent conflict can leave behind – whereby local authorities engage in governance absent a strong state – create similar challenges to commercializing public service delivery. Additionally, our results help evaluate strategies for making PPPs more “community-engaged”.<sup>7</sup> Relational interventions to build grassroots support for PPPs, such as community-based hiring and securing the endorsement of local leaders, can be beneficial but are no panacea. In particular, their benefits can be attenuated by local political dynamics which undermine the credibility of promises to improve community well-being through privatized service delivery. Notably, existing studies of why PPPs fail limit their analysis of political dynamics to the macro-level ([Leigland 2020](#)), e.g., corruption during the procurement process ([Loxley 2013](#); [Pusok 2016](#)).

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<sup>7</sup>See [World Bank report](#), accessed 26-August-2024.

## References

- Andrews, Matt. 2013. *The limits of institutional reform in development: Changing rules for realistic solutions*. Cambridge University Press.
- Angell, Blake, Obinna Onwujekwe, Pallavi Roy, Chukwudi Nwokolo, Martin McKee, Kate Mandeville, Divine Obodoechi, Prince Agwu, Aloysius Odii, Charles Orjiakor et al. 2023. “Designing feasible anti-corruption strategies in the Nigerian health system: A latent class analysis of a discrete choice experiment.” *World Development* 166.
- Auerbach, Adam Michael and Tariq Thachil. 2018. “How clients select brokers: Competition and choice in India’s slums.” *American Political Science Review* 112(4):775–791.
- Balan, Pablo, Augustin Bergeron, Gabriel Tourek and Jonathan L Weigel. 2022. “Local Elites as State Capacity: How City Chiefs Use Local Information to Increase Tax Compliance in the Democratic Republic of the Congo.” *American Economic Review* 112(3):762–797.
- Baldwin, Kate. 2013. “Why Vote with the Chief? Political Connections and Public Goods Provision in Zambia.” *American Journal of Political Science* 57:794–809.
- Baldwin, Kate. 2015. *The Paradox of Traditional Chiefs in Africa*. Cambridge University Press.
- Baldwin, Kate and Pia Raffler. 2019. *Traditional Leaders, Service Delivery, and Electoral Accountability*. Cambridge University Press p. 61–90.
- Bansak, Kirk, Jens Hainmueller and Dominik Hangartner. 2016. “How economic, humanitarian, and religious concerns shape European attitudes toward asylum seekers.” *Science* 354(6309):217–222.

- Bergquist, Parrish, Matto Mildenberger and Leah C Stokes. 2020. “Combining climate, economic, and social policy builds public support for climate action in the US.” *Environmental Research Letters* 15(5).
- Camdessus, Michel. 1997. Fostering an enabling environment for development. In *High-Level Meeting of the UN Economic and Social Council, Geneva, Switzerland*, <https://www.imf.org/en/News/Articles/2015/09/28/04/53/spmds9710>.
- Cities Alliance. 2021. “End of project evaluation: EU-funded project “Delivering climate resilient solid waste management services in Greater Monrovia, Liberia through Community Based Enterprises.”.”
- Cooperman, Alicia, Alexandra R McLarty and Brigitte Seim. 2022. “Drivers of successful common-pool resource management: A conjoint experiment on groundwater management in Brazil.” *Global Environmental Change* 74:102512.
- Doe, Carielle. 2022. “‘Our hands are tied’: Liberia grapples with heaps of city waste.”  
**URL:** <https://www.reuters.com/world/africa/our-hands-are-tied-liberia-grapples-with-heaps-city-waste-2022-04-28/>
- Egami, Naoki and Kosuke Imai. 2018. “Causal interaction in factorial experiments: Application to conjoint analysis.” *Journal of the American Statistical Association* .
- Gordon, Janica ND, Kelsey R Bilsback, Marc N Fiddler, Rudra P Pokhrel, Emily V Fischer, Jeffrey R Pierce and Solomon Bililign. 2023. “The effects of trash, residential biofuel, and open biomass burning emissions on local and transported PM<sub>2.5</sub> and its attributed mortality in Africa.” *GeoHealth* 7(2).
- Grindle, Merilee S. 2009. *Going local: decentralization, democratization, and the promise of good governance*. Princeton University Press.

- Hainmueller, Jens and Daniel J Hopkins. 2015. "The hidden American immigration consensus: A conjoint analysis of attitudes toward immigrants." *American Journal of Political Science* 59(3):529–548.
- Hainmueller, Jens, Daniel J Hopkins and Teppei Yamamoto. 2014. "Causal inference in conjoint analysis: Understanding multidimensional choices via stated preference experiments." *Political Analysis* 22(1):1–30.
- Hainmueller, Jens, Dominik Hangartner and Teppei Yamamoto. 2015. "Validating vignette and conjoint survey experiments against real-world behavior." *Proceedings of the National Academy of Sciences* 112(8):2395–2400.
- Henn, Soeren J. 2023. "Complements or substitutes? How institutional arrangements bind traditional authorities and the state in Africa." *American Political Science Review* 117(3):871–890.
- Herrera, Veronica. 2014. "Does commercialization undermine the benefits of decentralization for local services provision? Evidence from Mexico's urban water and sanitation sector." *World Development* 56:16–31.
- Herrera, Veronica and Alison E Post. 2014. "Can developing countries both decentralize and depoliticize urban water services? Evaluating the legacy of the 1990s reform wave." *World Development* 64:621–641.
- Horiuchi, Yusaku, Zachary Markovich and Teppei Yamamoto. 2022. "Does conjoint analysis mitigate social desirability bias?" *Political Analysis* 30(4):535–549.
- Hunnicut, Patrick and Kou Gbaintor-Johnson. 2023. "The Missing Link: Informal Political Elites and Protest in Areas of Limited Statehood." *Journal of Conflict Resolution* p. 00220027231211530.

- Kaza, Silpa, Lisa Yao, Perinaz Bhada-Tata and Frank Van Woerden. 2018. *What a Waste 2.0: A Global Snapshot of Solid Waste Management to 2050*. World Bank Publications.
- Leigland, James. 2020. *Public-private partnerships in Sub-Saharan Africa: the evidence-based critique*. Oxford University Press, USA.
- Loxley, John. 2013. “Are public–private partnerships (PPPs) the answer to Africa’s infrastructure needs?” *Review of African Political Economy* 40(137):485–495.
- Mehnpaine, Tina S. 2023. “Liberia: Communities Drowning in Trash Furious Over Failed US \$3M Waste Management Project.”
- URL:** <https://www.liberianobserver.com/liberia-communities-drowning-trash-furious-over-failed-us3m-waste-management-project>
- Migdal, Joel S. 1988. *Strong societies and weak states: state-society relations and state capabilities in the Third World*. Princeton University Press.
- Murtazashvili, Jennifer Brick. 2016. *Informal Order and the State in Afghanistan*. Cambridge University Press.
- Pusok, Krisztina. 2016. “Public-private partnerships and corruption in the water and sanitation sectors in developing countries.” *Political Research Quarterly* 69(4):678–691.
- The World Bank Group. 2021. “Climate Risk Profile: Liberia.”

# Appendices

“Research Memo: Evaluating strategies to increase in enrollment in privatized garbage collection services in Monrovia, Liberia”

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## A Focus Group Discussions

### A.1 Sampling

INSERT DESCRIPTION OF RANDOM WALK PROTOCOL

INSERT DESCRIPTION OF SAMPLE CHARACTERISTICS

### A.2 Select Responses

Here we present responses from our focus group discussions that are relevant to the design and analysis of our discrete choice experiment. Responses are grouped into three thematic areas: (1) status of household garbage collection services, (2) sociopolitical consequences of poor garbage collection services, and (3) determinants of enrollment in community-based enterprises' (CBEs) garbage collection services.

#### 1. Status of Garbage Collection Services

- Congotown, respondent 1: "...we used to depend on MCC [to carry away our garbage]. They had a garbage bin here, we used to collect garbage and carry it there. But since [former Monrovia Mayor] Mary Broh left, everything went helter skelter. [We] just collect our own garbage and dispose it [now]."
- Congotown, respondent 4: "We had a garbage area here that we used to [store] the dirt [Liberian English for garbage], when it gets plenty, the whole place can be polluted. Depending on Government to come or the MCC to come, no way, so we just stop carrying it there."
- Fiama, respondent 1: "We gather our dirt side our houses. For me it is what I can do. Either I take it to the swamp to fill their places [i.e., property of people trying to construct homes in Monrovia's mangrove swamps]. For me this is what I can do. Either we put it on the [informal] dump site or we carry it to the dirt

factory [i.e., one of Monrovia's two garbage transfer stations, managed by MCC with funding from the World Bank].”

- Fiama, respondent 2: “The dirt from my home, the dirt where I sweep around my house I put it in the bucket. Sometimes these Zogos [Liberian slang for unemployed youth] pass around give them fifty dollars and take our dirt away...we [also] used to bury the dirt. When the dirt get plenty, we dig a hole and put it inside. That’s how we used to get rid of our dirt because we were not living near swamp.”
- Fiama, respondent 1: “From my area where I live, it not far from the dirt factory but we got our swamp land so when the dirt is high up we will spread it and put sand over it...[we] hide the dirt because some people use the dirt to fill the land. So that is what we can normally do.”
- Fiama, respondent 5: “...I live in Fiama community let say about eighteen years now. We have one other company that was there, we call them Zoom Lion. Yeah, they really used to take care of the dirt. You know like every Saturday they used to spray, clean the road. But this time you know everything just turn around. Since this other company [a CBE] take over I can’t see anything. The dirt, the flies. Sometimes the dirt take five-six, seven months [to get collected]...”
- 4th Street, respondent 4: “The dirt sometimes when we give it to zogos to carry it, they can stop it to our area. And before then, they used to send MCC to come for the dirt. Certain time reached, MCC stop taking the dirt.”
- 4th Street, respondent 6: “We have said it all, for the market, we have a place where we can put the dirt, but MCC will not go there to take the dirt from there.”
- Freeport, respondent 5: “Concerning the dirt business in Freeport, they brought

in MCC to be collecting the dirt, and after one week, we give them \$100LD. But when the rain come to our place, they don't collect our dirt. The zogos will take the dirt and dash it all behind our houses. So we are facing serious problem with the dirt business when it comes to rainy season.”

- Freeport, respondent 3: “MCC cannot carry my dirt. Since I moved here, I can't see them.”
- Jamaica Road, respondent 2: “As for me, the way I can get rid of it, for example when we put the dirt down, MCC people can't come for it. So, we can give it to the zogos. They are the ones that can come for it and we can also pay them for it.”
- Jamaica Road, respondent 4: “For us when we see the dirt plenty, we will rely on the fire.”
- Newport Street: “Sometimes when Ocean CBE do not come, the zogos that can collect the dirt and dump it right under someone window that's the problem I got with them.”
- Popo Beach, respondent 9: “...sometimes we just throw [garbage] in the neighborhood. We can throw it in an unfinished building.”
- Popo Beach, respondent 2: “We can throw the dirt in the sea.”
- Popo Beach: “ In Liberia we don't have anywhere to carry dirt. So even if you give the dirt to Zogos they will take it to different people place and leave it there. So it will be good for people to come and help us so we will be able to pay.”
- Stockton Creek, respondent 5: “MCC is responsible to clean the dirt [in our community]. I don't know why lagging to take the dirt out. Because all over Monrovia, you will see dirt pile up. We are talking about our community but the various communities now, when you move, places that you never used to see

dirt, you will see dirt packed there.”

## 2. Sociopolitical Consequences of Poor Garbage Collection Services

- Congotown, respondent 4: “Actually, we feel bad [Liberian English for critical of] because we pay taxes and we expect our money to be working. You don’t have to create area where to be carrying dirt, when we carry the dirt where citizens supposed to carry the dirt, and you don’t come for the dirt, it will make people sick. We won’t feel fine about the Government. Secondly, the community leader, who supposed to go and meet with the Government, sometimes they are not functional. So all these things get us to where we are today.”
- Congotown, respondent 2: “We are not satisfied with our community leaders because they are not working [to clean up our garbage]. MCC too not working...”
- Congotown, respondent 5: “We the community people, we will gather together and come to our community leader to find means to help us [get our garbage collected].”
- Congotown, respondent 1: “You know, our [community chairman] like violence. So, when [they don’t work with MCC to have our garbage collected], we will gather ourselves and go to them and petition them...[describes potential protest].”
- Congotown, respondent 5: “...right behind my cookbowl shop, I and some people have made palava [Liberian English for an altercation] for dirt business.”
- Fiama, respondent 2: “The dirt is embarrassing us actually. We can’t sleep from the mosquitos in the night. In the day the flies. And when people carrying the dirt, when you put the dirt in the trucks before the rain fall in the day it can’t be easy on the road. The water from the truck; sometime you not even able to pass around because I live right on the road there. You can be to my house and you looking at the dump site. The water from the truck and sometimes the truck can

be running with real speed. The dirt can be wasting all on the road and that dirt that can fall on the road people can't sweep it. It will stay there it get muddy and it just remain there. Sun come it shines on it when rain comes it fall on it. So the dirt is really-really embarrassing us."

- Fiama, respondent 3: "The drainage we had in front our house, the dirt have filled the place and water can't pass there. That is our community road there. The water have block the road. The water that can come from on the road is so-so popo so nobody can't pass on the road. Last year the dirt made it some of us ran from our houses...The water enter all over. We move."
- Fiama, respondent 1: "I feel like [my community leaders] are not working [when I see issues with garbage in my community]...because when I first move in the community, the people used to go around to spray the community. It went down and the people are not doing it. Our community leader is supposed to go around and see but the community is crowded and why this time you do not spray. So I believe they are not asking that question so they are not working. If they were on the people back I believe they would have start sharing mosquito nets, spraying the community for mosquitos because the people are not doing so I believe that our leadership is not working."
- Fiama, respondent 5: "...sometimes in the night some people are not able to carry the dirt on the dump site. So they will just sweep in the night and carry to their friend own of house when the person is sleeping or between houses and just dump the dirt there. So when you wake up and see the dirt, the person who living side you will ask why you came to put dirt in their house. You and that person will jump into heavy confusion [Liberian English for altercation, similar to "palava"]. Sometime that is how the confusion can come in the community. On the same dirt issue, sometimes too the problem is from ourselves.

- 4th Street, respondent 1: “Even time came, they can give the students first Saturday to clean up. MCC came up to say that, when we clean the community, we should put the dirt on the road they will come and pick it up. That thing brought serious problem. We cleaned the dirt, put it on the road, and they refused to come pick it up. The community chairman had to come in and block the street; that if they can’t pick up the dirt, car will not pass. That’s the only time they came, and it ended in noise [i.e., altercations].”
- Freeport, respondent 1: “The other time, I and my colleague were cleaning the drainage, certain area we reached, a lot of toilet were there, and so we started having confusion with the people that are living around there. Through that confusion, fighting broke up from there.”
- Jamaica Road, respondent 7: “What can cause the confusion, when I see this lady dirt very plenty, and she pay the zogo and this zogo do not carry her dirt, and zogo place it to the next neighbour house and this next neighbour know its not her dirt, she will go to her and say, you are the one that pay the zogo to carry your dirt, but the zogo didn’t carry your dirt. Another confusion can be in the house, I didn’t sweep today, it’s your dirt from your room. So, it can bring confusion.”
- Newport Street: “The way the chairman is responding [to the garbage problem], the only thing we can thing is to remove the chairman.”
- Newport Street: “When the dirt gets pile up, maybe then we can block the road. We will have to do something for Government to intervene. We have to call the Government attention or we will just put the dirt on the road because Government is not intervening to help with the dirt issue in the community.”
- Popo Beach, respondent 1: “.in Liberia anything you do is by protest so we as a community the only thing we can do [to get the garbage problem fixed] is to

get together and talk to our representative or the governor to help us.”

- Stockton Creek, respondent 7: “They should remove [the dump site] and find solution for the water [polluted by the dump site]. But I am not seeing anything working, so the only solution to it is to protest. Because I think yesterday, New Georgia did the same thing. Because before reaching the estate, there’s a lil drainage there. That place cluck, so the rain that fell, it entered all in the people houses. So, the people been calling the Representative to help fix the road and open the drainage. Because that old pipe they put there (in the drainage), the dirt fill in it and it spoiled. So what the people did yesterday, they dug the whole road, no car coming, no car going. They only left small side there. The Representative was force yesterday to talk to the people yesterday to see what to do. This week, they will know what to do next. So, maybe the people want us to do the same.”

### **3. Determinants of Enrollment in CBEs’ Garbage Collection Services**

- Congotown, respondent 1: “There are lots of factors involve. Probably the person don’t even have food to eat, they will come pay for garbage?”
- Congotown, respondent 3: “Maybe the community is not together. Because if the community is together, they will say, ok, let this person do it for us, we will pay, certain amount. Whether the dirt plenty, or its small, and every one of them agreed to it, by the grace of God, things will work it.”
- Congotown, respondent 4: “Some people might say, they don’t want to pay based upon some other reason. Because there are some things in the community and if the leadership is not straight, people will say, they don’t want to pay, because I am paying my money and thing not happening. , Because there are lots of things happening in my community I have contributed to and things don’t work. So

sometimes, the leadership can be the problem. So the person can say, I am not paying for my dirt again due to corruption.”

- Fiama, respondent 2: “Actually for the dirt business we know we supposed to be paying...if [CBEs] come with a favorable price and they come to your house every time like Friday or Saturday, you guys will pay so and so amount. When it is reasonable for us we can pay because we know the dirt is embarrassing us.”
- 4th Street, respondent 2: “The only thing we can do [to fix the garbage problem], the community leadership need to form a team to at least help in the process to help the MCC too.”
- 4th Street, respondent 3: “The Government needs to step in fully [to solve the garbage problem]. If the Government put a law down, they need to implement that law. Another idea for the Government, number, if the Government put a law down that every hour, a community should bring the dirt, because dirt is not something to keep actually.”
- 4th Street, respondent 5: “Before, I can remember, during Taylor time, MCC used to send City Police around. When they come to your house, they will observe, and if house don’t have bathroom, they will lock your door. But it is no longer happening so that’s what causing serious problem. Sometimes when you are passing, you will just see chamber open, with toilet fill it up. Really, MCC not working. If is MCC working, this dirt business, will stop...the Government just relax, so it’s not happening [i.e., people aren’t following existing waste and sanitation regulations].”
- 4th Street, respondent 1: “f MCC is working and fining people, things will work out.”
- 4th Street, respondent 6: “If MCC coming and carrying the dirt, John Brown



don't want to pay, bring City Police and carry him. And when they carried you, you should pay more money.”

- 4th Street, respondent 1: “...if the community chairman step into it and Government step into it, to say, if you put dirt here and someone tell you to move it and you refused to move it, bring that person complain to the chairman, and the chairman go and see the dirt and tell you to take the dirt from there, and you refused to do it, he (the chairman) should go and call city police. City Police will come and carry you. Things will be getting into order.”
- 4th Street, respondent 3: “We will be happy [if CBEs start working in the community]. Because most often we pay more money to the zogos.”
- Freeport, respondent 3: “It is true we will rely on the chairman [to get our garbage collected], but the chairman got part to play, but we rely on the Government. Because when the Government speak, he speaks. He is able to send people p the field so they can put garbage can down to put our dirt in it, the Chairman is there to keep eye on us. So that when they sent it, our dirt, we should be able to put it inside [the garbage can]. Then he [the government] will be sending people to come to the chairman to take the dirt from the area. So that's the reason I am relying on the Government because the Government and the Chairman can work together.”
- Jamaica Road, respondent 3: “Some people will say no. Because in this kind of time hungry time.”
- Jamaica Road, respondent 4: “They had certain group that used to come to collect the dirt. They used to charge every week, \$50LD per week when they come for the dirt. But some people used to cry (complain) that, that \$50LD was plenty. They used to refuse to pay. So that's what spoil it.”

- Jamaica Road, respondent 7: “I will like to tell people who will come for it [i.e., garbage] to enforce it [i.e., ordinances about garbage disposal]. There should be a law to enforce it. That if you catch anybody from this house, and zogos carrying it, they should arrest the landlord or the owner of that house. They should enforce it.”
- Popo Beach, respondent 10: “Other people used to come here and take dirt but some people used to say they don’t have money. Like for my sister to the house, since three days her dirt is piling up and when the dirt boy comes to collect money she will say that she don’t have money.”
- Popo Beach: “If the County authorities inspect in the community and say this house is crack, cleaning of bush road they are in line. I am not saying they don’t put dirt but if you put dirt there is enforcement. Even if somebody dirty is place and you try to take them to magistrate court it becomes a problem. So enforcement in the city is very hard because everybody know.”
- Stockton Creek, respondent 1: “The reason why some people will not do it is, if the people can’t move the dirt that is right in front of us, then the small dirt there in our community that we can burn, we should pay them? That’s why they won’t do it. So if MCC want to move dirt from the community, let them move that one yet first [the old dirt].”

## **B Survey**

### **B.1 Sampling**

INSERT DESCRIPTION OF RANDOM WALK PROTOCOL + SAMPLING FRAME  
(MAP)

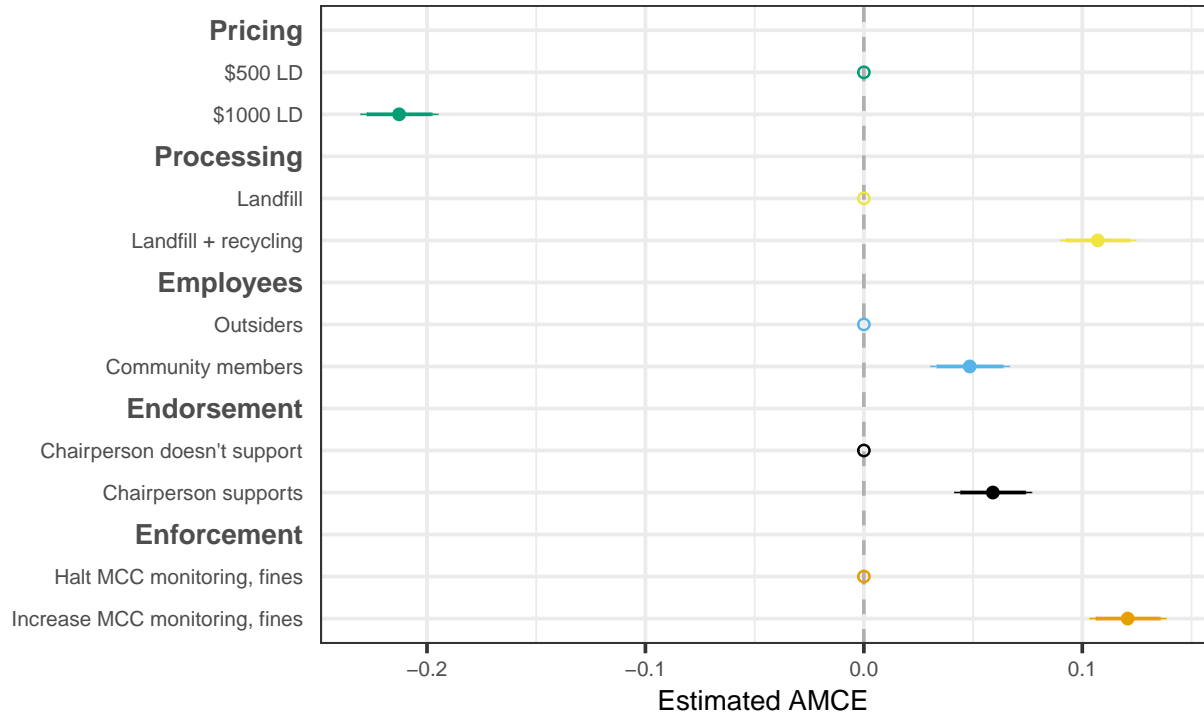
### **B.2 Instrument**

INSERT RELEVANT ITEMS FROM SURVEY INSTRUMENT

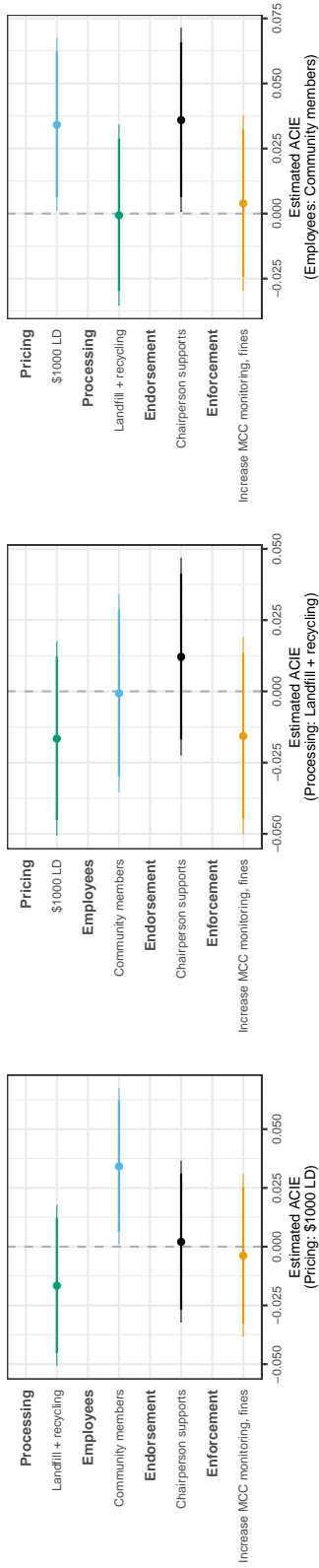
### **B.3 Example CBE Profiles**

INSERT PROFILES HERE

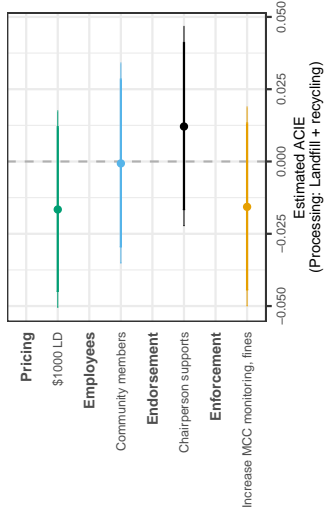
## C Tables & Figures



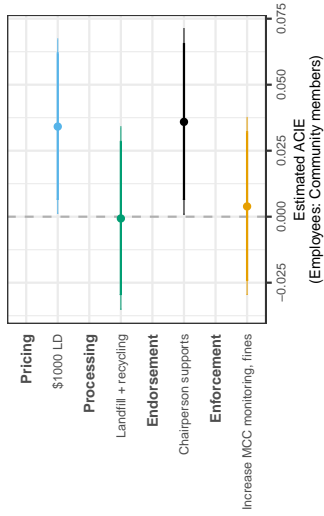
**Figure C1: Determinants of enrollment in privatized garbage collection services.** Displays point estimates of average marginal component effects (AMCE) with 90 and 95-percent confidence intervals (thin and thick error bars, respectively) for five attributes of privatized garbage collection services (Pricing, Processing, Employees, Endorsement, and Enforcement). Each point estimate estimates how changing the level of an attribute affects respondents' willingness to enroll in privatized garbage collection services. All estimates are compared against a reference level of each attribute, displayed as open circles.



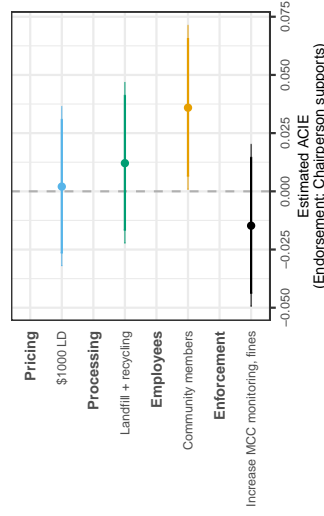
(a) Pricing  $\times$  Other Attributes



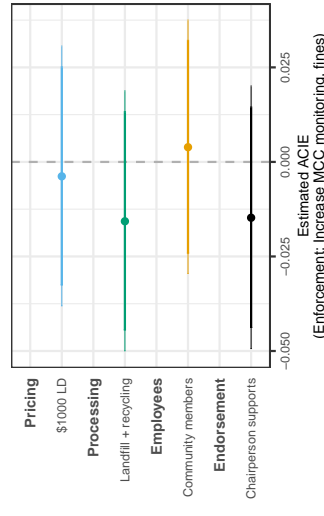
(b) Processing  $\times$  Other Attributes



(c) Employees  $\times$  Other Attributes

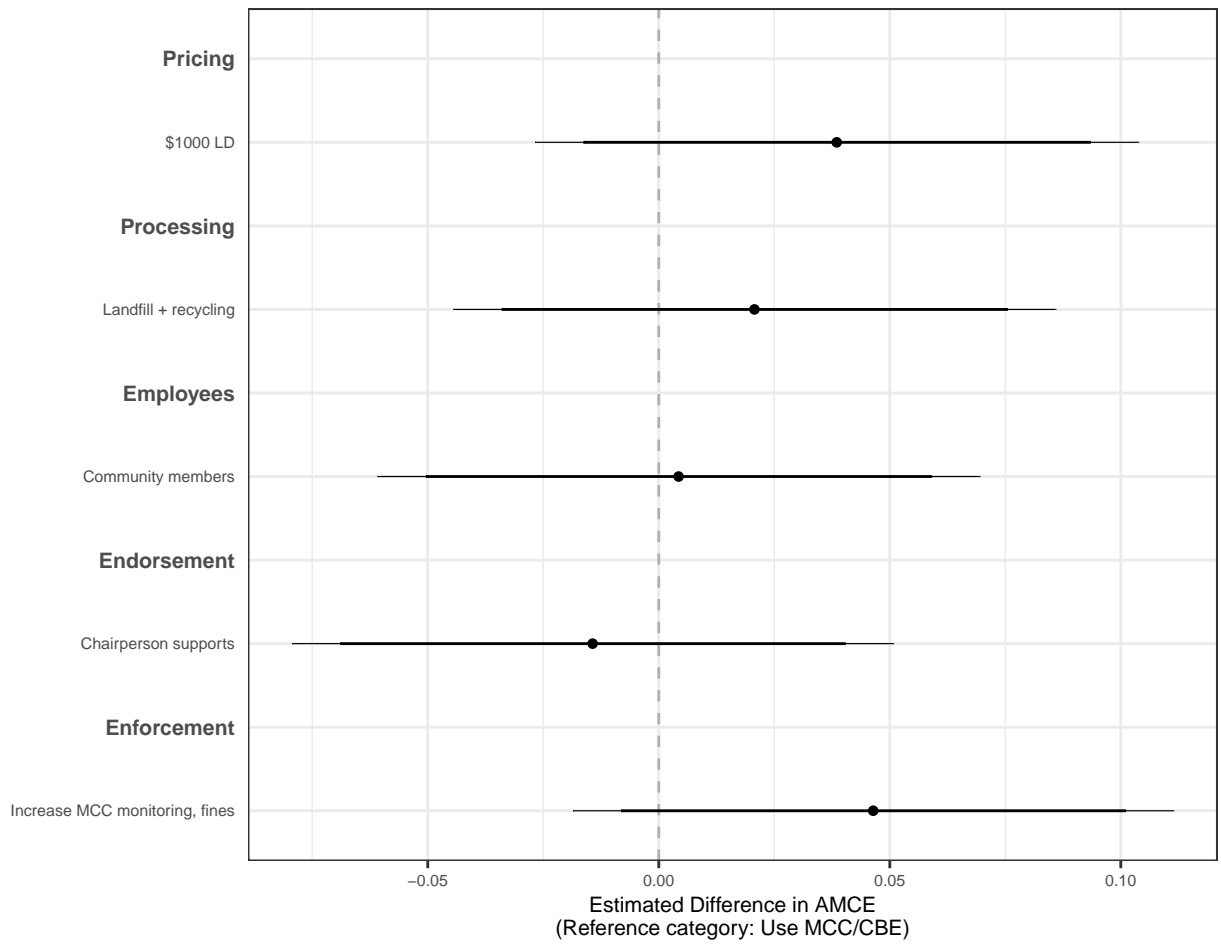


(d) Endorsement  $\times$  Other Attributes

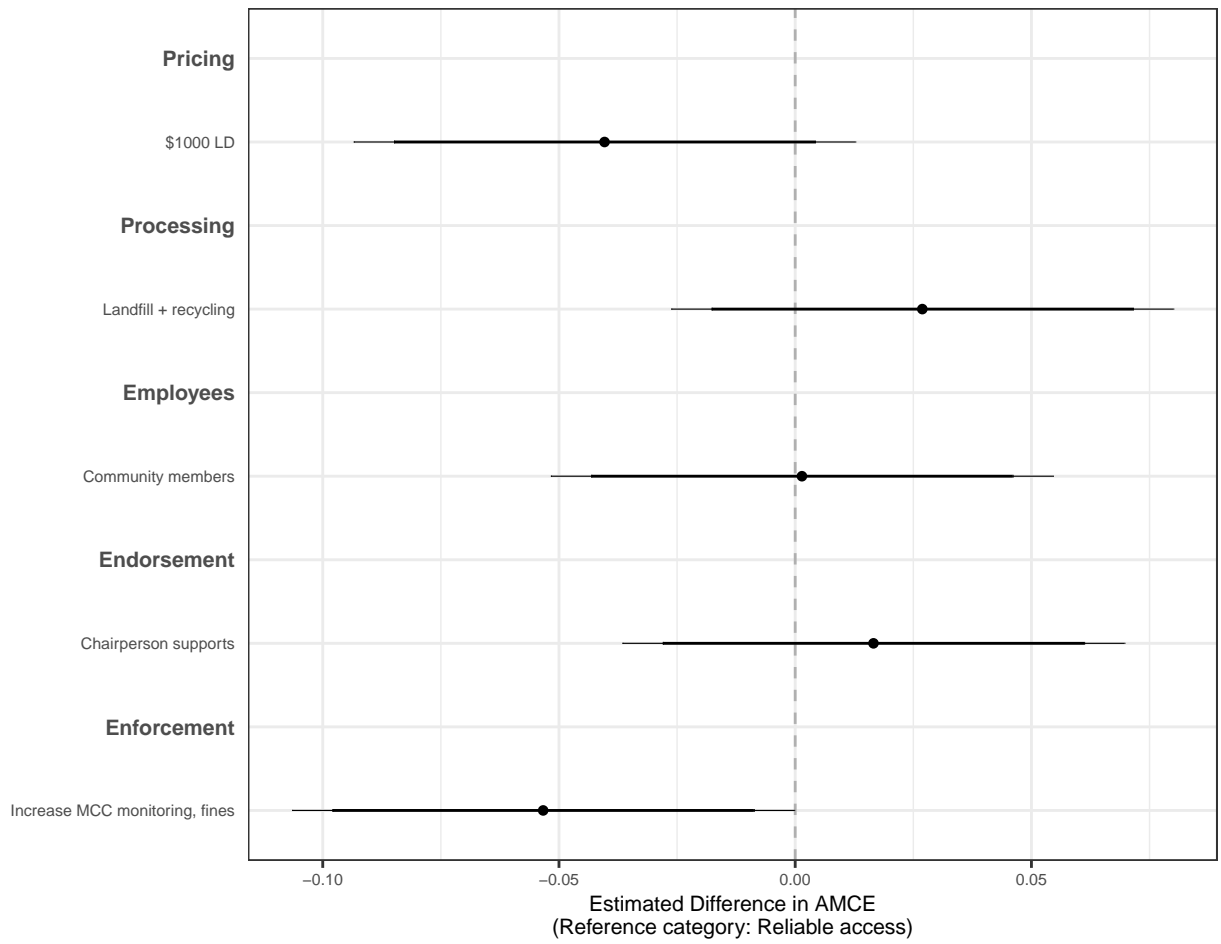


(e) Enforcement  $\times$  Other Attributes

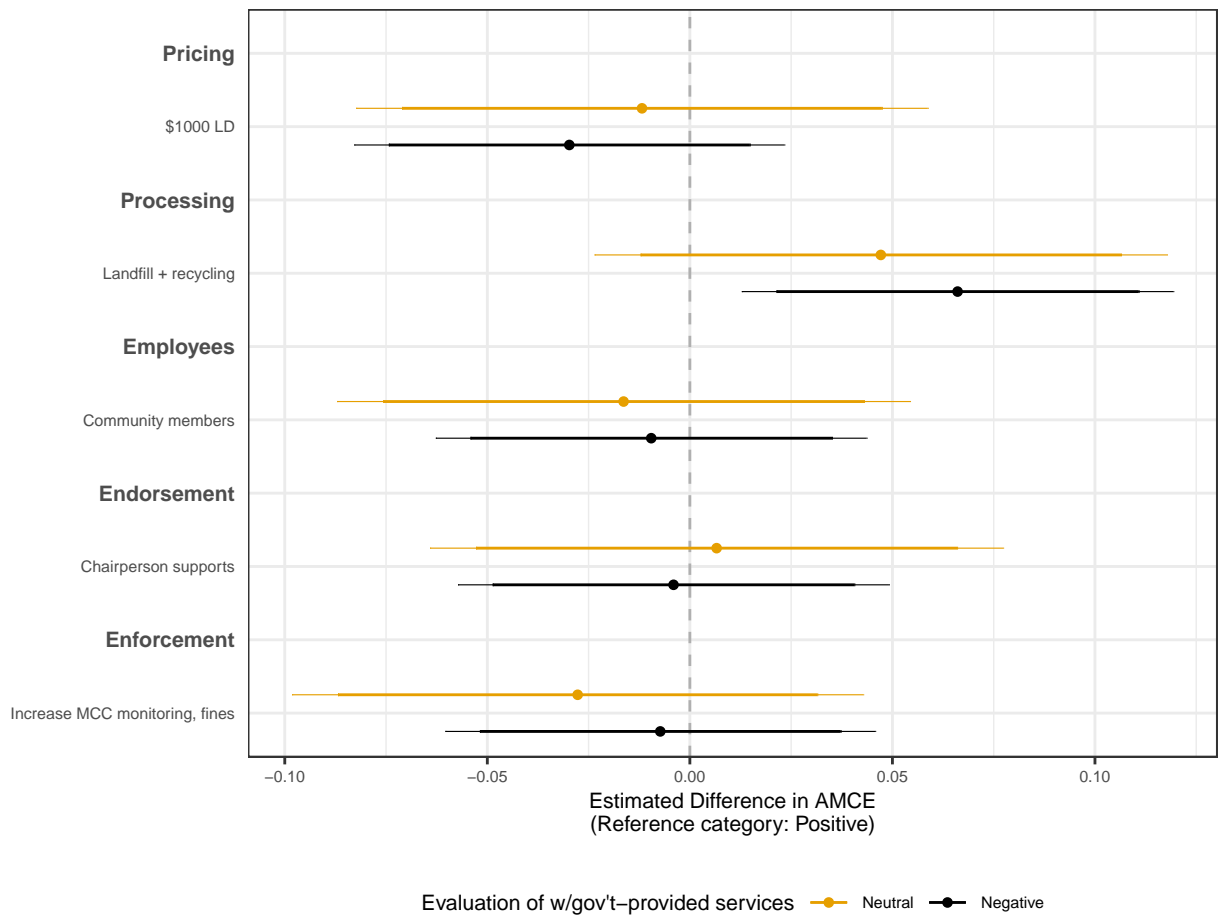
**Figure C2: Interactions between design elements of privatized garbage collection services.** Displays point estimates of average component interaction effects (ACIE) with 90 and 95-percent confidence intervals (thick and thin error bars, respectively) for all pairwise combinations of privatized garbage collection services' attributes. (a) Visualizes how shifting a CBE's Processing, Employees, Endorsement, and Enforcement attributes from the reference level affects respondents' willingness to enroll, conditional on the CBE's subscription prices being fixed at \$1000 LD/month. (b) Visualizes how shifting a CBE's Pricing, Employees, Endorsement, and Enforcement attributes from the reference level affects respondents' willingness to enroll, conditional on the CBE's requiring customers to separate their waste. (c) Visualizes how shifting a CBE's Pricing, Processing, Endorsement, and Enforcement attributes from the reference level affects respondents' willingness to enroll, conditional on the CBE's exclusively hiring from the respondent's community. (d) Visualizes how shifting a CBE's Pricing, Processing, Employees, and Enforcement attributes from the reference level affects respondents' willingness to enroll, conditional on the CBE securing an endorsement from the respondent's community chairperson. (e) Visualizes how shifting a CBE's Pricing, Processing, Employees, and Enforcement attributes from the reference level affects respondents' willingness to enroll, conditional on the MCC promising an increase in enforcement once the CBE begins operations.



**Figure C3: Estimated differences in AMCE between respondents who report actively using and not using MCC/CBEs to dispose of their waste.FINISH.**

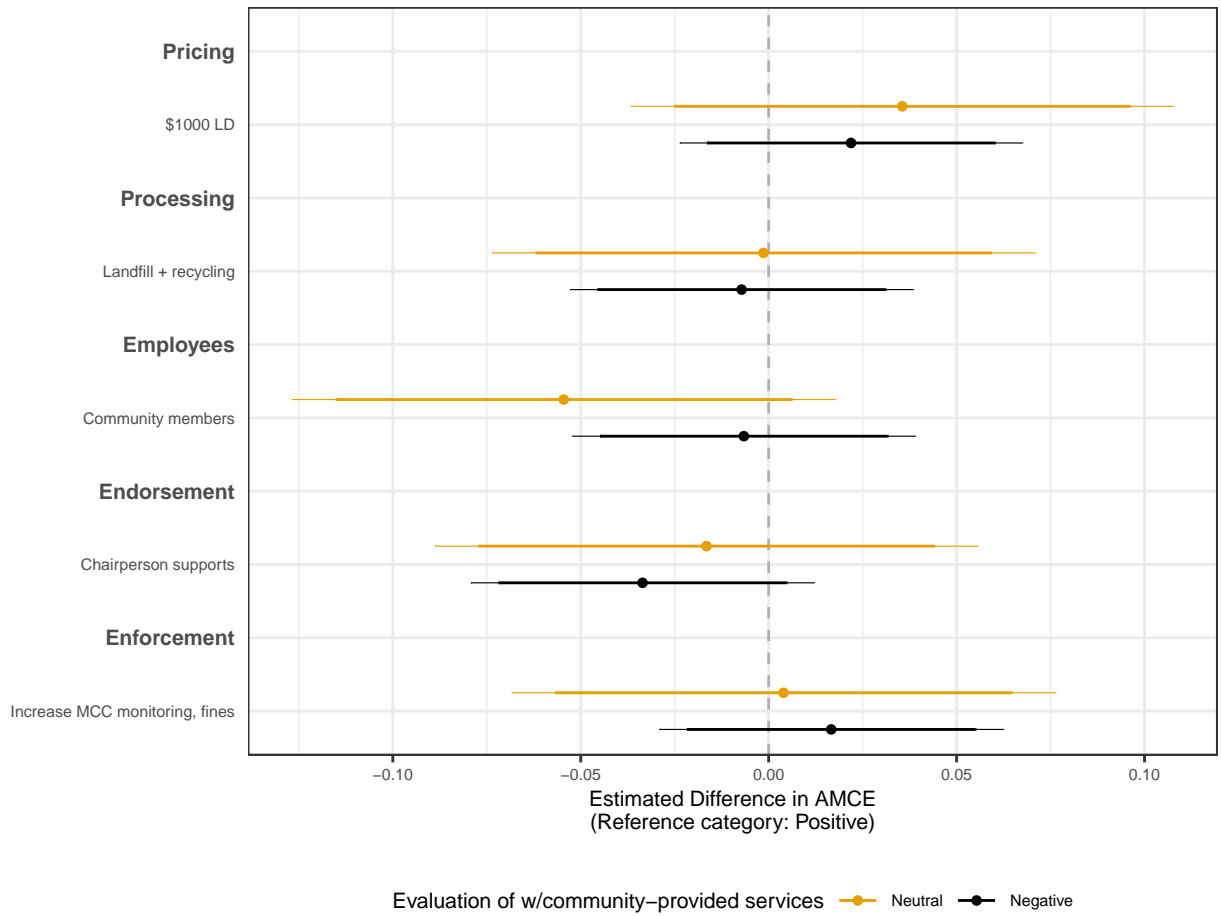


**Figure C4: How respondents' access to garbage collection services moderates the effect of privatized garbage collection services' design elements on enrollment.**<sup>FINISH.</sup>

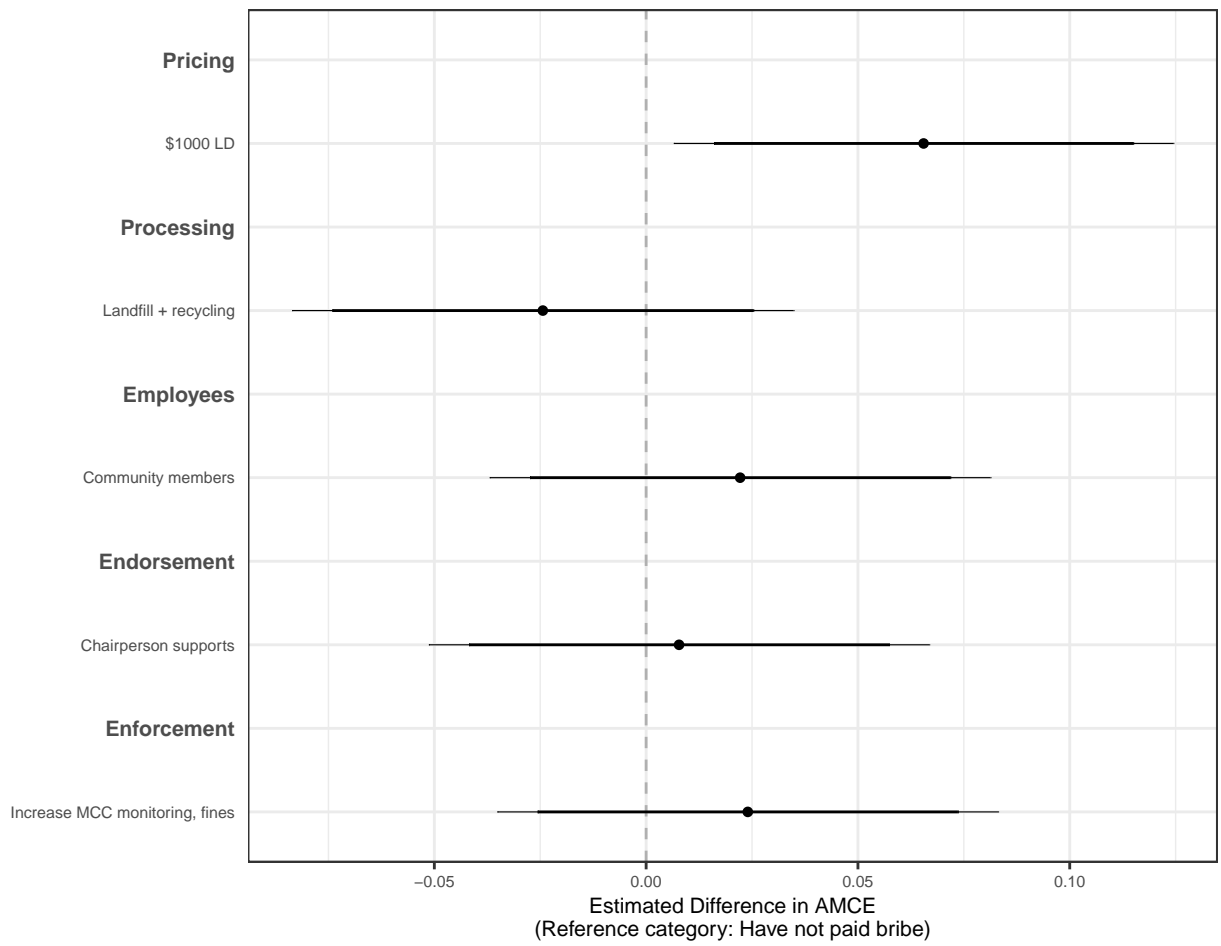


**Figure C5: How respondents' evaluations of government-provided services moderates the effect of privatized garbage collection services' design elements on enrollment.FINISH.**

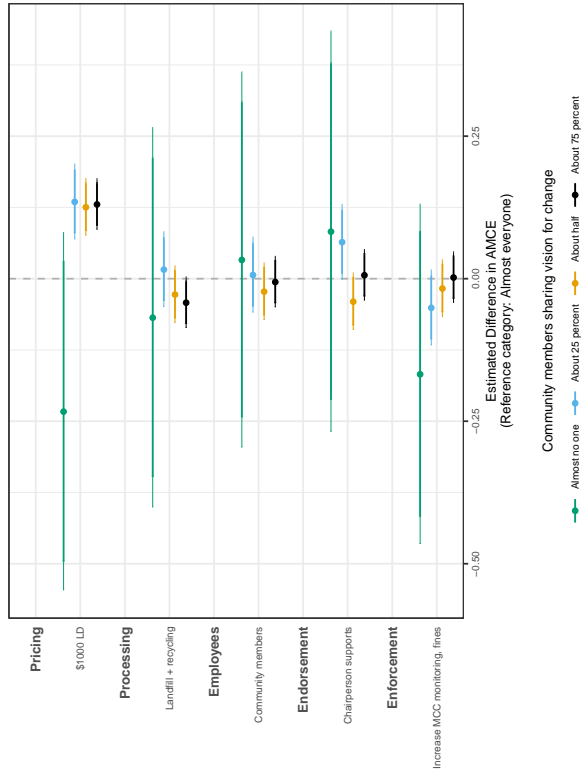




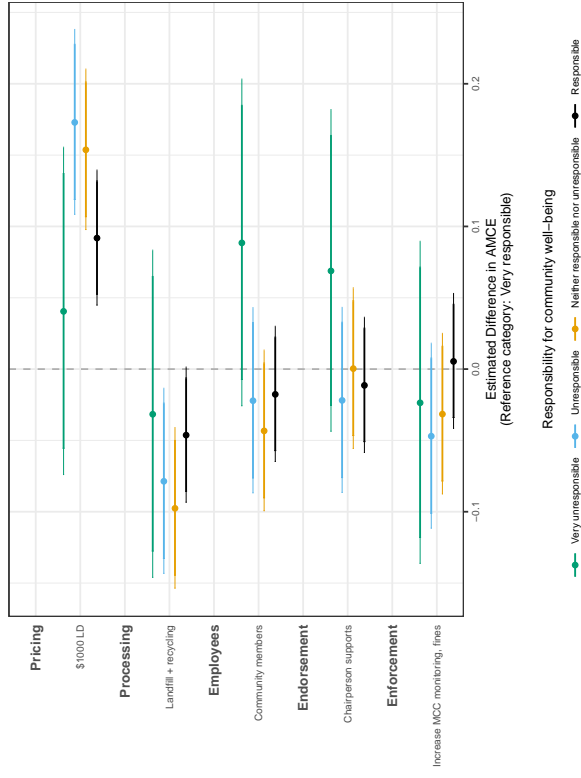
**Figure C6: How respondents' evaluations of community-provided services moderates the effect of privatized garbage collection services' design elements on enrollment.FINISH.**



**Figure C7: How respondents' experiences with bribery moderates the effect of privatized garbage collection services' design elements on enrollment.FINISH.**



(a) Shared interests among community members



(b) Sense of personal responsibility for community

Figure C8: How perceptions of community cohesion moderates the effect of privatized garbage collection services' design elements on enrollment. FINISH

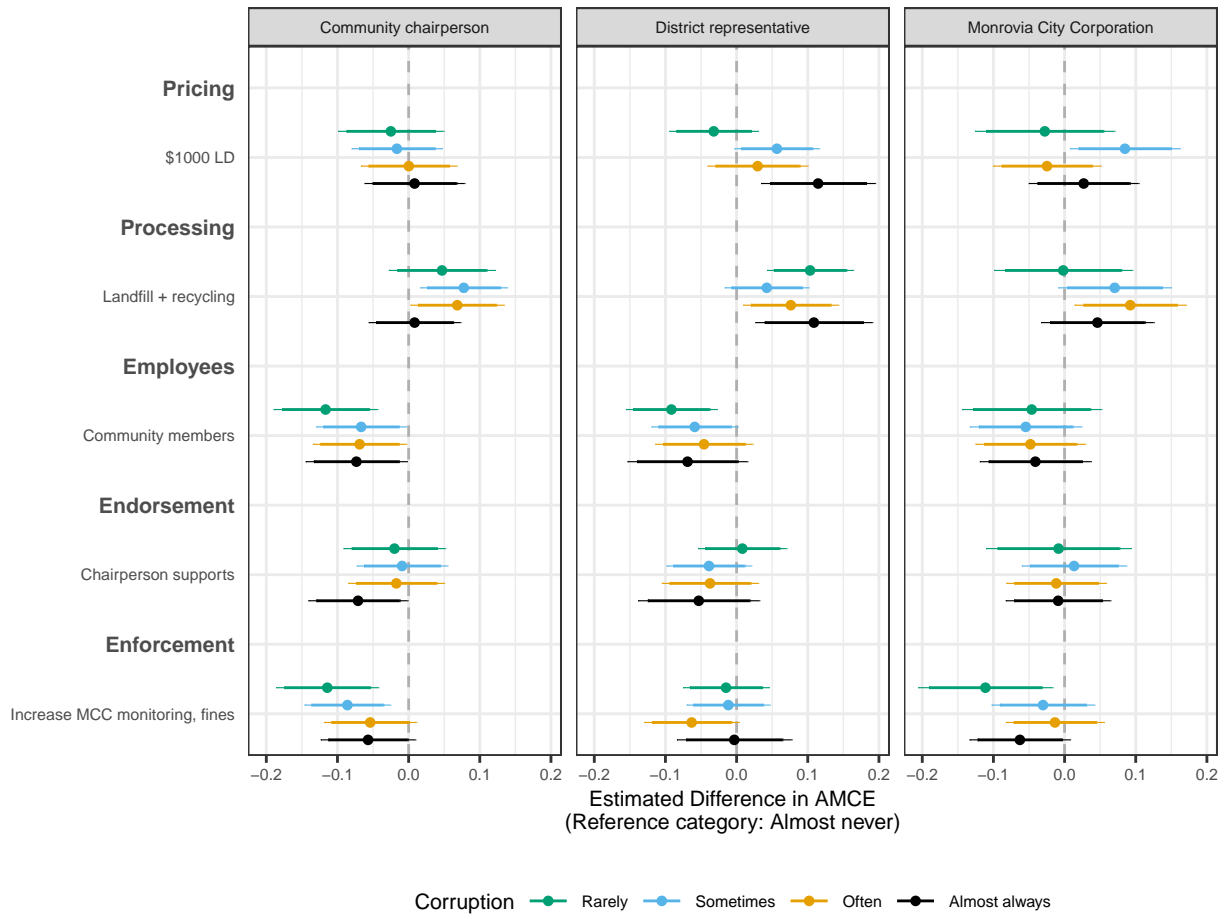


Figure C9: How perceptions of corruption moderate effects of privatized garbage collection services' design elements on enrollment. FINISH.

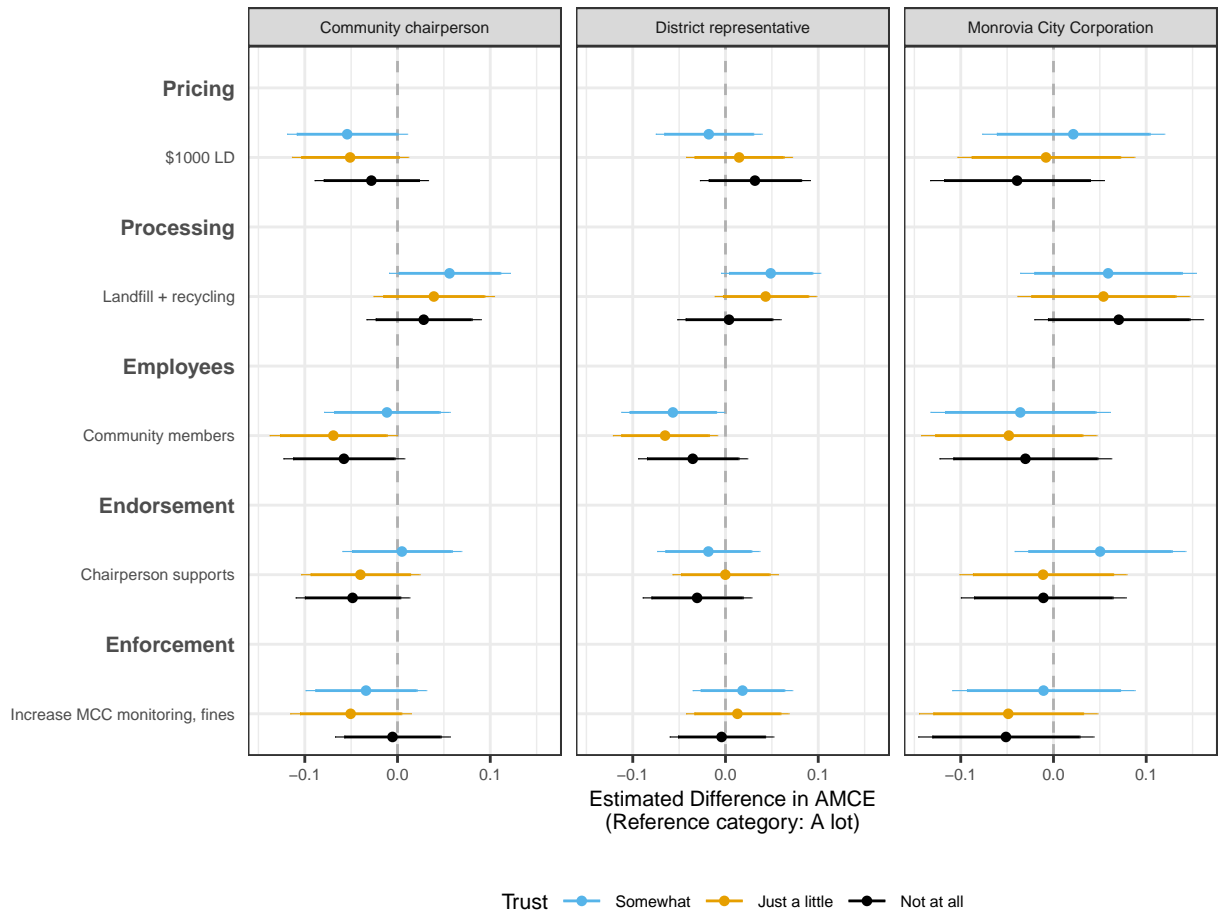


Figure C10: How perceptions of trust moderate effects of privatized garbage collection services' design elements on enrollment. FINISH.

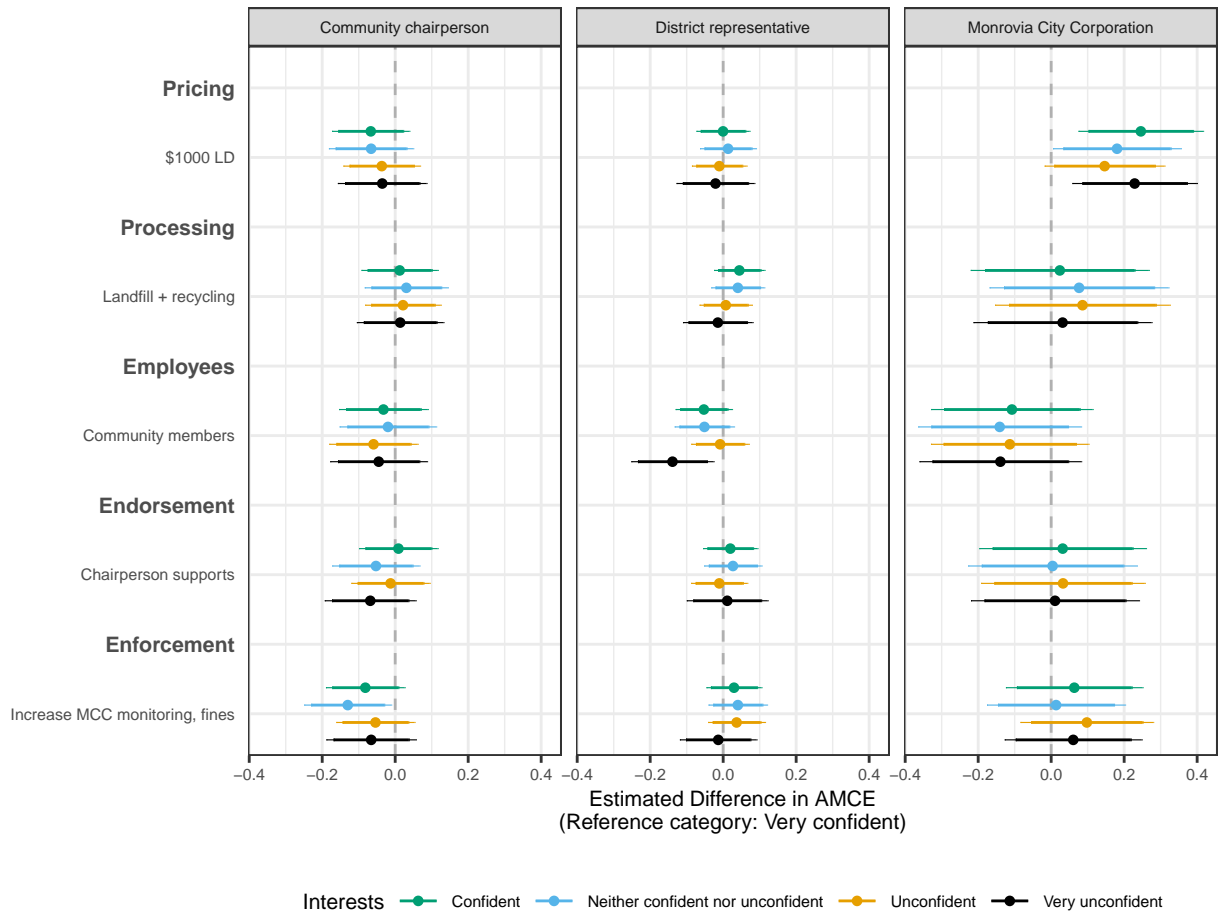


Figure C11: How perceptions of shared interests moderate effects of privatized garbage collection services' design elements on enrollment. FINISH.

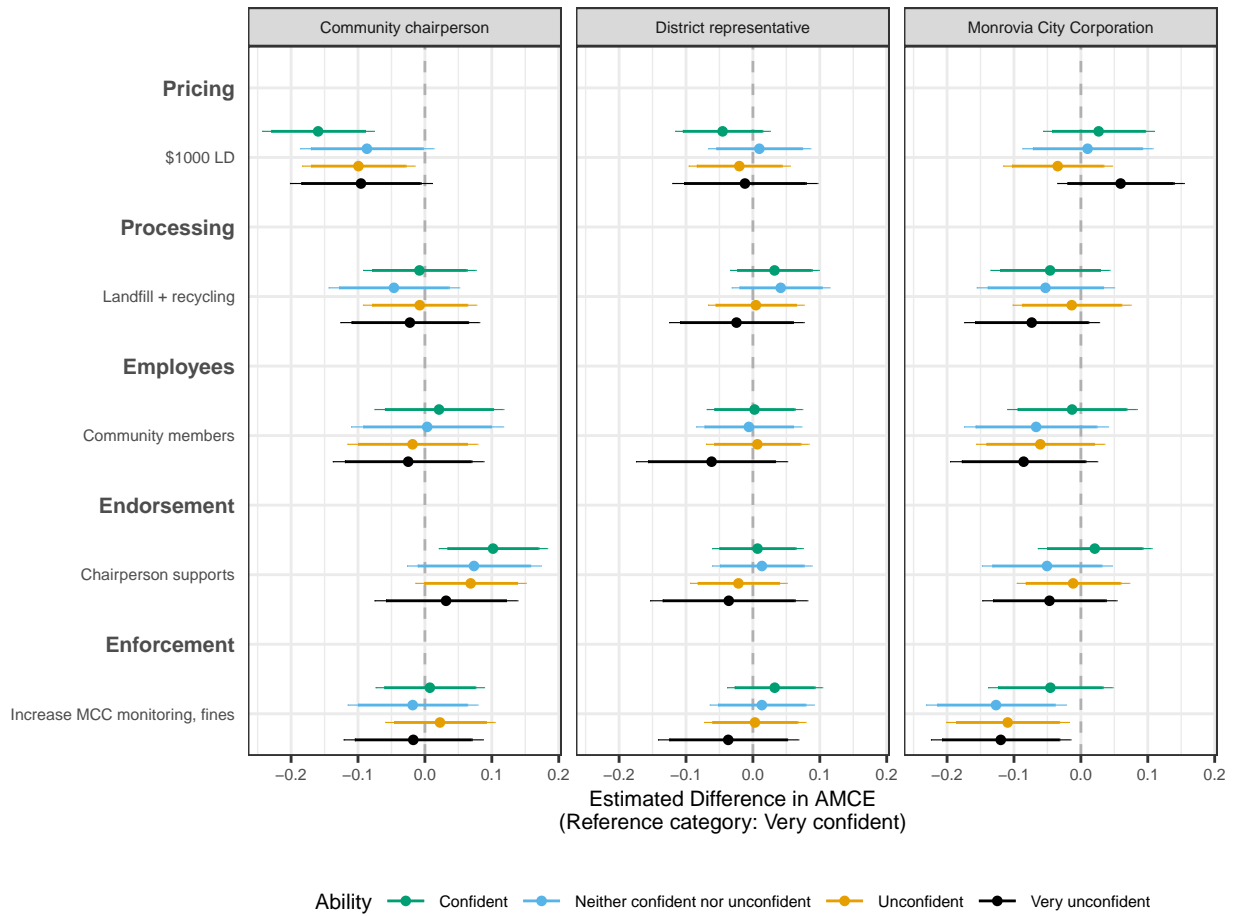


Figure C12: How perceptions of ability moderate effects of privatized garbage collection services' design elements on enrollment. FINISH.