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Mobile Money Taxes: Knowledge, Perceptions and Politics. The Case of Ghana

Mary Abounabhan, Awa Diouf,
Fabrizio Santoro, Carlos Sakyi-Nyarko
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Summary

This study investigates the intricate dynamics surrounding the implementation and reception of mobile money taxes, focusing on Ghana as a case study. Consumer-level mobile money taxes, particularly controversial, have sparked large-scale protests, prompting policy revisions in various countries, including Uganda, Cote d'Ivoire and Benin. Ghana's electronic transfer levy (e-levy) not only followed this trend of public dissent, but also triggered the country's first budgetary rejection since 1981. The particularly strong reactions, followed by two rounds of revisions, makes understanding what lies behind public perceptions especially important to inform the ongoing debate within Ghana and the region.

From the literature on behavioural responses to taxation we know that behavioural change cannot be solely explained by changes in price, and that perceptions play an important part in understanding why people behave a certain way. Although other studies examine e-levy perceptions before or at implementation, no studies examine perceptions after the rate reduction, and how they may help in understanding this shift in behaviour.

Our study seeks to fill this gap by examining how knowledge, sentiments and behavioural change interact, and to answer two main questions: (i) What are people's perceptions of the e-levy one year after implementation, and what factors are associated with perceptions?; and (ii) How may perceptions of mobile money taxes correlate with how people use mobile money? The study draws on a mixed-methods approach, incorporating qualitative data from focus group discussions and stakeholder interviews, along with a novel data set collected from the first, and so far only, nationally representative survey on the e-levy.

We find that, despite widespread awareness, a significant knowledge gap exists, and reported behavioural changes reveal choices that go against rational economic decision-making. Our findings on sentiments reveal an overall disagreement with the e-levy with factors, such as political affiliation and knowledge of different specific design elements, interacting with sentiments and reported behavioural change in different ways. Our study has broader implications for understanding how different elements of perceptions, such as knowledge and sentiments, reveal information about unintended outcomes of tax design.

Keywords: mobile money; mobile money tax; perceptions; knowledge; Ghana; e-levy.

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Acronyms

EA	Enumeration area
FGD	Focus group discussion
GLS	Generalised least squares
NDC	National Democratic Congress
NPP	New Patriotic Party
OLS	Ordinary least squares
VAT	Value added tax

1 Introduction

Mobile money technology has been rapidly expanding over the past decade, reaching over 1.35 billion accounts in 2022, with Africa being the hotbed for development of the mobile money industry (Granryd 2022). Alongside the success and widespread expansion of the industry, another trend can be seen across several African countries – the adoption of different mobile money taxes (Diouf and Niesten 2023). These taxes have been met with debate regarding the extent of their benefit, and if revenue collected will outweigh potential negative effects on the industry and financial inclusion gains (Munoz et al. 2022). Mobile money taxes are often introduced in a hurry, without accurate scientific research around their potential impact. A particularly controversial form of mobile money taxes has been consumer-level taxes, where consumers are charged taxes on either the fee or value of transactions made. Large protests often follow soon after mobile money taxes are introduced, which have resulted in several instances of policy revision – as seen in different contexts, such as Uganda, Cote d'Ivoire and Benin (Clifford 2020; Lees and Akol 2021; Diouf and Niesten 2023). In 2021, another country joined the mobile money tax trend when the government of Ghana announced its intention to implement an electronic transfer levy (e-levy), leading to widespread public dissent and the rejection of the budget for the first time since 1981 (Punch 2021).

The e-levy's main purpose was to widen the tax net and capture new revenue streams (Ministry of Finance 2021). The e-levy would target electronic transfers, which would predominantly include mobile money transactions. In Ghana, mobile money accounts are more prevalent than the African average – as many as 60 per cent of adults had an account in 2021, up from 39 per cent four years earlier. By November 2021, Ghana had 47.3 million registered users, 18.4 active users and over GH¢80 billion (US\$13 billion) of mobile money transactions performed (Demirgüç-Kunt et al. 2022), becoming one of the fastest-growing mobile money markets in Africa. Due to the widespread adoption of mobile money, the implementation of the e-levy has been controversial. Indeed, in addition to rejection of the 2022 budget, the streets were filled with widespread citizen protests, with the e-levy being at the forefront of these actions (Punch 2021). Ghana has a rich history of tax bargaining where citizens have taken to the streets to express disapproval of a tax leading to its modification, such as during the introduction of the value added tax (VAT) (Prichard 2015). Interestingly, in the years prior to this announcement, the government of Ghana had introduced other indirect taxes, such as the COVID relief levy, which did not spark the same reaction.

According to mobile money usage trends in Ghana, there was a sharp decrease in overall volumes and values of mobile money transactions after implementation of the tax. This was followed by a gradual rise to usage before the e-levy (Carreras et al., forthcoming). The return to previous transaction values and volumes coincides with the second round of e-levy reviews, where the only change in policy was a reduction in rate. One explanation can be attributed to a rational economic response, where a lower rate prompts more consumption of the service. If this hypothesis were to hold, this implies consumers of mobile money are aware of rates, and their behaviour is a direct response to this reduction. The limited studies examining behavioural impacts of mobile money taxes align with this explanation, by focusing on price elasticity as an explanatory variable behind behavioural change (Ndung'u 2019). However, studies in the broader tax literature indicate a likelihood of biased perceptions of taxes and their distorting effect on decision-making (Slemrod and Yitzhaki et al. 1996; McCaffery and Baron 2004; Fochmann et al. 2010; Sussman and Olivola 2011). Pricing impact, although important for understanding regressivity and equity implications, is

not enough to explain **why** people do or do not change their behaviour in response to the implementation of these taxes without understanding **how** these taxes are perceived.

This leads us to a second potential explanation, where the increase in usage can be understood through changes in perceptions. Does this return to usage imply increased approval of the tax? And, if this is true, does the new rate imply an approval of the new rate? Given the extent of controversy generated by this type of tax, and echoing the likelihood for biased perceptions towards a tax, it is unlikely that this is the case. However, although many studies exist that evaluate sentiments during the early stages of pre- and post-implementation of the e-levy (Amoah and Amoah 2022; Akua Anyidoho et al. 2022; Djokoto et al. 2022; Agyeiwaa-Afrane et al. 2022; Nutassey et al., 2023), there are no studies to evaluate sentiments after these rate adjustments to test this hypothesis. Therefore, in this paper we seek to address the gap in testing these two potential explanations by investigating: (i) What are people's perceptions of the e-levy one year after implementation, and what are factors associated with perceptions?; and (ii) How may perceptions of mobile money taxes correlate with how people use mobile money?

In order to answer our research questions, we argue it is essential to explore three main elements and how they interact. In addition to behavioural change, the remaining two elements come from making a clear distinction between emotional perceptions, such as sentiments, agreement levels or fairness levels, and knowledge-based perception or misperception that involves what people know about something. More and more evidence in the tax literature shows the importance of understanding taxes by investigating taxpayer knowledge as a part of perceptions – what people know or think they know about a tax. A study conducted on VAT in the United Kingdom shows how perceptions of how VAT works have influenced tax policy adoption that goes against evidence of impacts (de la Feria and Walpole 2020). Another study on the abolition of the tampon tax shows how the popularity of removing this tax is highly influenced by narratives and myths rather than by actual evidence (Byrne 2023). Both these studies demonstrate how information asymmetry and lack of tax-specific knowledge can lead to biased perceptions about their impact that can have serious implications for how a tax continues to develop. For this reason, we choose to bring knowledge as well as sentiments to the forefront of our study of perceptions when answering our main research questions.

We start by explaining the context and background for our study in section 2. Here we map out the development of the e-levy, and propose the framework that will guide our research – establishing a mechanism that explains how knowledge, sentiments and behaviour interact. In section 3 we explain our data and methodologies. We employ a mixed-methods approach, using a novel data set from a nationally representative survey on the e-levy along with a series of focus group discussions (FGDs). The survey is, to our knowledge, the largest and most comprehensive survey on this topic, encompassing 1,500 households across all 16 regions of Ghana. In section 4 we discuss our results, and in section 5 we conclude and offer policy recommendations.

We find that, despite widespread awareness of the e-levy, a considerable number of respondents lack knowledge about key elements, such as the rate of the tax and its daily threshold, as well as other exemptions. Despite the limited knowledge about the policy, our findings suggest strong negative public sentiments toward the e-levy. Knowledge of specific tax design elements is also shown to play a part in influencing different components of agreement positively or negatively. Political dimensions also emerge as a key influencer, with political affiliation and perceptions of the e-levy as a driver of national development

consistently correlated with most agreement components. Regarding behavioural change, our results reveal that higher agreement levels are associated with less probability of reported changes of behaviour. Additionally, those who said that the purpose of the e-levy was to contribute to national development are less inclined to report a change in behaviour. Surprisingly, political affiliation is not significantly correlated with behavioural change, suggesting that agreement with the e-levy among government supporters does not necessarily translate into corresponding changes in behaviour. The focus group discussions also reveal that perceived self-reported increased use, or return to previous use patterns, is attributed to an embedded nature of mobile money. Finally, we found anecdotal evidence of how misperceptions or lack of understanding of the e-levy has a direct impact on self-reported mobile money usage that went against rational economic decision-making.

These findings underscore the importance of targeted educational campaigns, emphasising the diverse factors that contribute to a comprehensive understanding of public attitudes towards the e-levy. This study debunks simplistic explanations of mobile money behavioural changes relating to prices changes in the face of taxation, by revealing the many layers contributing to public perception and the overwhelming prevalence of misperception or lack of knowledge. Additionally, our study contributes to the growing strand of literature that showcases the prevalence of knowledge asymmetry, its links with overall perceptions, and its implications for tax policy.

2 Context and nature of the tax applied by Ghana

Like many countries around the world, Ghana struggled to recover economically, socially and financially from the COVID-19 pandemic (Mensah 2022). In anticipation of raising significant funds to help mitigate recovery from the pandemic, in November 2021 the e-levy was first announced in the Ghanaian parliament at a rate of 1.75 per cent on electronic money transfers, with a cumulative exemption of GH¢100 a day (Ministry of Finance 2021). The budget referred to the steep growth of electronic transactions and mobile money as a primary means of payment for goods and services as the main incentive for taxing this service. Taxing this ubiquitous service was also seen as a way to capture Ghana's large informal sector, and to bring in enough funds to allow the government to manage without further borrowing (Yeboah 2021). The e-levy proposal was accompanied by an intention to earmark part of the funds for road infrastructure development and public transportation, along with a withdrawal of the road toll fees that normally fund these activities. Despite the promise of high returns the proposal sparked controversy as representatives from the main opposition party rejected the proposed budget, referencing their disapproval of the e-levy as the rationale behind their decision (Emmanuel 2021).

The following months brought continuous debate and protest centred around the e-levy announcement. Citizens protested on the streets, and main stakeholders, such as mobile money agents, raised concerns with the policy and the impact it would have on their businesses (GBN 2021). A series of reforms to the design of the e-levy soon followed the public outcry. The changes included a reduction of the rate to 1.5 per cent of transacted values, along with a series of exemptions alongside the original cumulative exemption of GH¢100 a day (Electronic Transfer Levy Act 2022). The new proposal now exempted daily

cumulative bank transactions of GH¢20,000, transactions between principal and agent accounts, specified merchant payments, and transfers between different accounts of an individual (Electronic Transfer Levy Act 2022). Telecommunication companies also agreed their own mobile money transfer fees would be capped at 0.75 per cent of the transferred amount to decrease the e-levy burden on consumers (Lartey 2022). For MTN this agreement meant a reduction in charged fees from their typical 1 per cent; it did not mean a change for Vodafone, who did not charge a transfer fee. Despite attempts by the opposition to curtail approval of the levy the amended proposal was passed in parliament in March 2022, and set to be implemented as of 1 May 2022 (Naadi 2022).

The new design added several layers to the tax, and subsequently more questions to its implementation (Wales and Niesten 2022). Leading up to 1 May, many withdrew their money from mobile money wallets in protest or fear their balance was to be taxed (Santoro et al. 2022). For those who continued to use mobile money, faults in the implementation system caused exempted transfers to be charged, increasing frustration among the population (Santoro et al. 2022). This negative sentiment was soon to be made worse as disappointing revenue figures fell far below the projected revenue stream, despite adjustments to calculations of expected revenue (Ghanaian Times 2022).

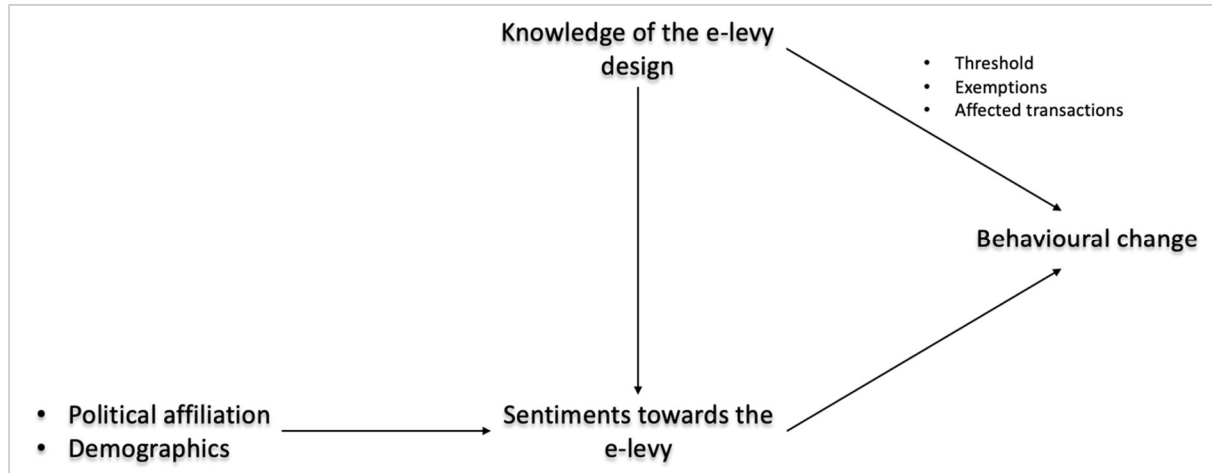
In January 2023 the e-levy was modified yet again, with a rate reduction to 1 per cent (Diouf et al. 2023). Although there was talk of removing the daily GH¢100 exemption, which had been meant to protect the poor, this amendment did not pass and the exemption remained (Diouf et al. 2023). After this reform revenue remained below projected amounts, leading to an announcement declaring an intention to revise the e-levy once again in the medium term to improve revenue collection (Ministry of Finance 2023). This announcement marks an important opportunity for research to inform future modifications of the e-levy.

Several studies have emerged investigating the e-levy, in light of the reaction it elicited. Most of these studies examined pre-implementation perceptions and their determinants (Amoah and Amoah 2022; Djokoto et al. 2022; Agyeiwaa-Afrane et al. 2022). These studies investigate different demographic and political variables, and show the majority had a negative reaction to the e-levy and were unwilling to pay at the proposed rate. Another study focuses on the impact of the tax on informal workers, a key target for the e-levy introduction, asking questions on their perceptions of the tax (Akua Anyidoho et al. 2022). The research reveals that a majority of informal workers express disapproval of the e-levy, particularly in relation to its effects on equity and the perceived inadequacies in government performance. It is important to note that the studies were conducted at peak instances of political discourse on the topic of the e-levy (soon after announcement and during implementation). Given the highly politicised nature of the e-levy, examining public perception when the e-levy was not at the forefront of public debate allows us to compare against the backdrop of these studies.

This study centres on understanding the perceptions individuals hold toward a specific tax. We have deconstructed this overarching concept into two primary components that we hypothesise to be interconnected. The first focal point is the knowledge individuals possess about the tax, encompassing the extent to which they are informed about its design and implications. This component aims to discern what is known or not known about the tax structure. The second critical aspect are sentiments or agreement levels. This component investigates the subjective responses individuals have towards the tax, gauging whether sentiments align with agreement or dissent. By dissecting perceptions into these two fundamental components – knowledge and sentiments – our study seeks to shed light on how these two components interact with each other, and ultimately how they may interact

with taxpayer decision-making. In order to study these interactions, we test the mechanism structure found in Figure 2.1. This structure highlights two main mechanisms – the first focuses on the interaction between knowledge and sentiments, and the second on how these two components impact behaviour.

Figure 2.1 Relationship between knowledge, perceptions and behavioural change



Source: Authors' own.

The first mechanism posits that knowledge plays an important role in shaping sentiments towards a tax, alongside other determinants such as political affiliation and demographics. This hypothesis suggests that individuals who possess a deeper understanding of the tax design are likely to form opinions based on an informed perspective. For instance, someone well-versed in the e-levy may appreciate the rationale behind it, leading to a more positive sentiment. On the other hand, increased knowledge of a regressive design element of a tax may leave people with negative sentiments. However, those with limited knowledge may rely more on external factors, such as political affiliation or demographic characteristics, to form their opinions. This hypothesis highlights the multifaceted nature of factors influencing public sentiment towards taxes, emphasising the significance of knowledge as a key component in shaping attitudes.

This mechanism builds on existing research emphasising the significant role of knowledge on impacting tax perceptions (Vogel 1974; White et al. 1990; Erikson and Fallan 1996). Although findings on the relationship between tax knowledge and tax fairness can be mixed, it is important to emphasise distinctions in definitions between the terms. For example, Tan and Chin-Fatt (2000) find that general tax knowledge does not affect perceptions of income tax system fairness, while Eriksen and Fallan (1996) observe that an increase in specific tax knowledge correlates with an increase in perceived fairness. In the first study, general tax knowledge refers to knowledge of tax principles, rather than specific knowledge of a certain tax which is the focus of the second study. For this mechanism structure we are focusing on the implications of knowledge of a specific tax, rather than general tax knowledge. It is important to note that most of these studies research these relationships in the context of income taxes. We are therefore contributing to understanding of the impact of knowledge on perceptions of fairness by extending the study into consumption taxes.

The second mechanism extends the enquiry into the impact of knowledge and sentiments towards a tax on behavioural change, specifically in the context of mobile money usage. This hypothesis suggests that awareness of tax-related information, such as affected transactions, exemptions or thresholds, can directly influence how individuals engage with

mobile money services. For example, someone aware of a daily threshold for tax exemptions may strategically structure their transactions to maximise benefits, and, more importantly, the opposite is also true. Considering the electronic nature of the e-levy, concerns arise about potentially inaccurate perceptions of the tax rate and liability. Finkelstein's (2009) research on road toll payments suggests that electronic payment users may have less accurate perceptions compared to cash payers. Studies on other consumption taxes in the European Union and the United States indicate common misperceptions, as seen in excise and value added taxes (Chetty et al. 2009; Taubinsky and Rees-Jones 2018; Blaufus et al. 2022). Ferber (1954) identifies imprecise perceptions of changes in excise taxes, highlighting potential implications for the e-levy, which has undergone multiple adjustments.

Additionally, sentiments towards a tax can also drive behavioural changes in mobile money usage. Individuals who disagree with a particular tax may choose to protest by altering their behaviour, such as ceasing to use mobile money, even if affordability is not the primary concern. Fochmann et al. (2010) review studies focusing on taxpayer perceptions and their impact on decision-making, finding substantial evidence of biases influencing taxpayer decisions. McCaffery and Baron (2004) also discuss various biases and heuristics affecting taxpayer behaviour, highlighting their significant implications for policy outcomes. Therefore, perceptions and their determinants play a crucial role in understanding potential behavioural outcomes. This mechanism underscores the interconnectedness of knowledge, sentiments and behaviour in the realm of taxation and mobile money usage.

3 Data and methodology

In this section, we present the data and methodology used to examine factors associated with people's perceptions of the Ghana e-levy. We combine qualitative and quantitative data. Qualitative data includes focus group discussions (FGDs) in Greater Accra and the Eastern region of Ghana, as well as in-depth interviews with main stakeholders. Quantitative data derives from a survey meant to capture, more accurately, information on mobile money usage, demographics, knowledge and agreement about the e-levy, among others. Qualitative and quantitative data was collected respectively in March 2023 and May 2023.

3.1 Data sources

Figure 3.1 presents the chronological sequence of our fieldwork in Ghana. A scoping trip was undertaken in Accra to start our exploration two months after the e-levy was introduced. After modification of the e-levy in January 2023, we conducted FGDs in March 2023. The collection of quantitative data took place in May 2023. This unique mix of surveys and FGDs represents the most exhaustive effort so far to gather information on mobile money taxes in Africa, with a particular emphasis on the e-levy and a dedicated focus on both mobile money users and non-users.

Figure 3.1 Timeline of the fieldwork on the e-levy



Source: Authors' own.

3.1.1 Scoping trip and interviews with key stakeholders

We started our investigation on knowledge of and perceptions on the e-levy with a scoping trip from 4-9 July 2022 to meet with main stakeholders. This included the Ghana Chamber of Telecommunications, Ghana Revenue Authority, Mobile Money Agent Association, Association of Informal Workers, 13 civil society organisations, and researchers. Valuable information on the design of the tax, its immediate effects, coping strategies from users, solutions and important research questions to address were collected and used in the research. We also conducted interviews with mobile money operators to have more information on users' reactions in the face of the e-levy, and how it impacted their activity.

3.1.2 Focus group discussions

The focus group discussions conducted within this research help to: (a) inform survey question design, and (b) provide valuable in-depth qualitative insights into some of the main research questions of this study from different groups of interest. A total of 14 FGDs were conducted across the Greater Accra region and Eastern region. The discussion focused on our three main points of study – knowledge of the e-levy, sentiments towards the e-levy over time, and self-reported behaviour over time. Questions were asked about **if** participants expressed change in any of these three areas, followed by **how**, **why**, and, if relevant, **when** their experience may or may not have changed. For sentiments that explored perceptions of fairness, participants were asked to describe or define their version of a fair tax, and were then prompted to discuss if, how and why the e-levy is a fair tax. The discussion closed with recommendations from participants to improve the tax design.

3.1.3 Survey data

We collected quantitative data from an original survey on mobile money users and non-users. The survey, for the duration of about an hour, was implemented in the field by a local research organisation, with a team of trained enumerators. The sampling strategy involved a two-stage cluster sampling approach to enable the research team to select households for the study. Stratification was based on the 16 regions of Ghana. Therefore, in the first stage, we selected rural and urban enumeration areas (EAs), already set from previous national-level survey exercises. EAs were selected randomly, and in proportion to the size of the 16 regions of Ghana to ensure representativeness. Once 100 EAs had been selected, 15 households in each of them were randomly picked and interviewed at the second stage. In

each household, we randomly identified one permanent member,¹ aged 18 or more, after a comprehensive census of all household members. Hence, 1,500 households and individuals were surveyed in total, as described in Table 3.1.

Table 3.1 Sample allocation of EAs by region of Ghana

	Rural	Urban	Total
Ahafo Region	15	15	30
Ashanti Region	120	151	271
Bono East Region	26	16	42
Bono Region	15	60	75
Central Region	45	102	147
Eastern Region	59	137	196
Greater Accra Region	15	214	229
Northeast Region	15	-	15
Northern Region	60	30	90
Oti Region	15	-	15
Savannah Region	60	30	90
Upper East Region	-	60	60
Upper West Region	15	-	15
Volta Region	59	16	75
Western North Region	11	49	60
Western Region	45	45	90
Total	575	925	1,500

Source: Authors' own.

The survey was run at two levels:

1. At the household level we collected information on main demographics, as well as the social and economic situation. The questionnaire starts with a detailed census of all household members – capturing their socio-demographic characteristics – to select permanent members, from whom we chose the random respondent. Then, we asked questions on access to basic services and items (water, electricity, mobile phone), as well as the tenancy holding, mobile money usage, among others.
2. For the randomly chosen individual respondent, we collected at the individual-level information on demographics, economic and social factors, political affiliation, mobile money usage patterns, knowledge about the e-levy through a quiz on the tax, agreement levels and perceptions about different aspects of the e-levy, as well as broader tax perceptions.

Appendix Table 4 presents the descriptive statistics of our sample. In Appendix Table 5 we present a comparison between the *Ghana 2021 Population and Housing Census* and our survey for main demographics (Ghana Statistical Service 2022), and do not find large discrepancies between the two surveys – given the difference in time period:

- Our sample is composed of 1,500 households located in 16 states of Ghana, with 18 per cent living in the Ashanti region, 15 per cent in Greater Accra and 13 per cent in the

¹ A permanent member had to satisfy one of the following conditions: (i) They had not been away from the household for more than 6 months during the last 12 months; (ii) If the member had spent less than 6 months in the house during the last 12 months, they are considered as a permanent member if they are: the head of household, a child under 9 months, considered as a permanent member by the household head, or intend to stay in the household for at least 6 months.

Eastern region; 62 per cent are located in urban areas, while 38 per cent live in rural areas of Ghana.

- 32 per cent of surveyed households are female-headed and household heads are on average 45 years old. Surveyed households have on average 4.5 members, with a minimum of 1 and a maximum 19 member(s) per household. Further, the average size is 5 members for rural areas and 4 for urban areas.
- 90 per cent of households have access to the main electricity grid.
- Random respondents are 59 per cent female and 41 per cent male, with an average age of 37. These numbers vary slightly with the last Ghana census carried out in 2021, which states that 52 per cent of individuals aged 18 or more are female, while 48 per cent are male (Appendix Table 5).²
- Our sample is relatively young, with 50 per cent of random respondents on mobile money usage aged between 18 and 34 years. In addition, 85 per cent of our sample went to school, and 68 per cent are employed or self-employed. Sampling weights for each household have been used in all regressions to make the results more applicable to the broader Ghanaian population.

3.2 Methodology

Qualitative data from the FGDs was thematically analysed focusing on knowledge of the e-levy, sentiments towards the e-levy, and reported behavioural changes in response to the e-levy. Two areas were selected: Greater Accra region and the Eastern region. The Greater Accra region was chosen first due to its diversity of representation within Ghana and a subsequent diversity of experience and opinion. Subsequently, the Eastern region was chosen for its comparability with the Greater Accra region, facilitating the establishment of analogous focus groups. Notably, the Eastern region has significance as the president of Ghana's natal and ancestral home during the study period, introducing a higher likelihood of endorsing the incumbent government. This strategic selection enables an examination of responses that takes into account the highly political nature of the e-levy, by juxtaposing individuals residing in environments more predisposed to supporting the government during the study period against those with more ambiguous political affiliations.

For each area, we included focus groups located in rural and urban areas to consider specificities linked to location. Further, within each area we conducted focus groups with individuals that capture a somewhat representative sample of the region, and important for understanding the impact of the e-levy. These characteristics include: (1) urban informal workers/formal workers, (2) rural agricultural informal workers/non-agricultural informal workers, (3) students, (4) rural/urban, (5) gender, (6) political affiliation, (7) age, (8) mobile money users/non-users, and (9) merchants/non-merchants. Within each of these groups there is a combination of gender representation and remittance receiver/senders. Due to the highly politicised nature of the e-levy policy, one consideration is to create safe spaces within focus groups to capture true sentiments rather than receiving information influenced by group dynamics. We also include specific groups for women to capture the differences within these demographics. Enumerators shared notes and quotations from each of the discussions. These notes were later organised based on the three identified topics, type of focus group, and region. This allowed us to compare across region in similar types of focus group.

² As mentioned before, the random individual has been selected from household members aged over 18 and present in the household during the survey. Hence, the larger percentage of women could be explained by the fact that men tend to be absent during the day, when women are more likely to be present in the household.

Findings were then used to help to inform the survey design by identifying emerging themes from the answers.

Quantitative data is used to measure the level of knowledge on the e-levy, the level of agreement, and behavioural changes in the face of the levy. We operationalise these outcomes in the following way. First, knowledge refers to different aspects of the e-levy, including the tax rate, exemption thresholds, and affected and non-affected transactions, for a total of 13 items. Hence, without prompting, we ask respondents if they know a given characteristic of the e-levy. For each of these questions, we build an indicator for whether the answer is correct, and then we calculate an index of overall e-levy knowledge equal to the percentage of the correct answers over all questions.³ With these variables, we quantify the level of knowledge on the e-levy, but also determine which respondent profile knows about which characteristics of the tax, using mainly a descriptive analysis.

Second, we capture the level of agreement with the levy across different characteristics of the tax. Using a battery of questions, we ask respondents about their level of agreement on seven aspects: (i) introduction of the tax, (ii) current tax rate, (iii) exemption threshold, (iv) perceived fairness of the e-levy, (v) transparency in the way revenue from the e-levy is used, (vi) policy change, and (vii) feasibility of the e-levy policy goals. These different components of agreement are used as outcomes. To mitigate noise and potential bias arising from testing multiple hypotheses related to seven distinct outcomes, we create an agreement index.⁴ This index aggregates variations across multiple outcomes, standardising them and reducing bias. The index is formulated as a standardised weighted composite of multiple agreement variables, employing a Generalised Least Squares (GLS) weighting procedure outlined in Anderson (2008). Further, we conduct separate regressions for each individual aspect of agreement with the e-levy, recognising the intricate nature of perceptions surrounding the tax.

This approach allows us to highlight the percentage of the population that (dis)approve of the e-levy. Since this survey took place one year after the first implementation, and five months after modification of the e-levy, we are able to compare our results to studies done before and just after implementation of the e-levy (Afrobarometer 2022; Amoah and Amoah 2022). Further, we try to highlight which aspects of the e-levy people (dis)agree with the most. Hence, we use a comparative approach to see if people's approval/disapproval of different aspects of the tax design differs according to respondent profiles – mainly socio-economic characteristics (gender, age, income, etc.), location (rural/urban), and according to different use cases.

Finally, we also analyse behavioural changes put in place by respondents to avoid paying the e-levy. As mentioned before, in the face of a tax on a specific service some taxpayers can change their behaviour to cope with the price increase; others could keep using the service and be less sensitive to the price increase. In the case of the e-levy, the design itself can enable behavioural change. Indeed, with the given exemption threshold, people can transact below the daily GH¢100 free of charge to avoid paying the e-levy. Further, since deposits are not taxed, people can also make a deposit in a recipient account instead of

³ The knowledge index includes knowledge on the following characteristics of the e-levy design: threshold for mobile money and bank transfers at implementation and currently; rate at implementation and currently; implementation and modification dates; and affected and non-affected transactions. The knowledge index is the percentage of correct answers for each individual, and gives the same importance to all these characteristics.

⁴ As shown by Appendix Table 7, all components of the agreement index are significantly and positively correlated.

making a normal transfer to avoid the e-levy tax burden.⁵ This coping mechanism is illegal but still used by mobile money users (Carreras et al. forthcoming). The e-levy policy also includes an exemption for formal businesses that can encourage people to change their transaction habits. To capture behavioural change, we ask respondents whether they applied different coping strategies to avoid the e-levy. Respondents could select one or more of the following options: (i) did not change behaviour – their usage is the same as the period before the e-levy; (ii) transact more in cash – they use cash instead of mobile money; (iii) transact more below the threshold in order to enjoy the exemption; (iv) transact with an agent account – in this case the transfer is accounted as a deposit so not charged with the e-levy; (v) transact more with exempted merchant businesses that are allowed to receive payments exempted from the e-levy; and (vi) implement any other strategy to avoid paying the e-levy.

Despite the valuable insights gained from examining behavioural changes related to the e-levy, it is crucial to acknowledge certain methodological challenges inherent in measuring these shifts. One notable concern is the potential for misreporting behaviour, particularly instances of over-reporting when individuals hold a negative view of the e-levy. For example, respondents who strongly disagree with the e-levy may be inclined to state that they have altered their behaviour, even if they have not. Additionally, a potential bias may arise from misunderstandings about coping mechanisms, such as individuals claiming to transact through agent accounts due to a misinterpretation of the process. Therefore, the results we show may represent an upper bound of the true estimates of behavioural change. To address these challenges, two key strategies have been implemented in the survey design. Firstly, the survey question explicitly emphasises that the coping strategies should be applied specifically to avoid paying the e-levy, providing clarity and context for respondents. Secondly, interviewers have been instructed not to guide responses, and to select options that align with participants' answers. In cases where no predefined option matches, the interviewer selects 'other,' contributing to increased confidence in respondents' comprehension of the questions and coping mechanisms.

Hence, knowledge, agreement and behaviour are the three aspects of the e-levy of particular interest in this study. As discussed in section 2, the quantitative and qualitative approaches aim to test two main hypotheses: (1) knowledge about the e-levy, political affiliation, and demographics are correlated with agreement levels; and (2) agreement levels and knowledge are correlated with behavioural change to avoid paying the e-levy. To test those hypotheses, we use standard descriptive statistics, including mean difference tests, as well as ordinary least squares (OLS), logistic and ordered logistic regressions, always considering district fixed effects. To identify the correlates of agreement with the e-levy, the following equation (1) is estimated:

$$\text{Log}(Y_i = s) = f(a + b \cdot K_i + c_x \cdot X_{xi} + d_m \cdot M_{mi} + e_p \cdot P_{pi} + f_n \cdot N_{ni} + g_l \cdot L_{li} + h_d \cdot D_{di}) \quad (1)$$

with $s = \{1,2,3,4,5\}$ or $s = \{0,1\}$

where Y_i is the measurement of agreement with the e-levy for respondent i . First, with an OLS design, we explain the agreement index with potential correlates of agreement as presented in equation 1. Second, to capture the correlates of agreement on different

⁵ This coping strategy allows mobile money users to avoid paying the e-levy by making a deposit in the recipient account (transaction not taxed) instead of making a transfer (taxed transaction). This strategy is not legal since mobile money users can only make deposits in their own accounts – proof of identification is required to do that transaction. However, users can do this at the discretion of mobil money agents, who would charge a fee lower than the sum of the e-levy and operator fees – making it a 'win-win' operation.

components of the e-levy and include different levels of agreement, we use an ordered logistic design. In the questionnaire, the respondent is asked to answer questions to assess their level of agreement on different components of the e-levy. For instance: 'How much do you agree with the introduction of the e-levy'. Thus, Y is a qualitative variable that can take five values: 1 'Disagree', 2 'Somewhat disagree', 3 'Neutral', 4 'Somewhat agree', and 5 'Strongly agree'. The same logic is used for other components of the agreement index as presented above. D_d is a vector of variables including district fixed effects. K_k is a vector of dummy variables measuring knowledge on different designs of the e-levy. We specifically consider knowledge about the current rate, the mobile money threshold, as well as affected and non-affected transactions as our variable of interest. X_x is a vector of social, economic and demographic variables collected at the household and individual levels that can be correlated with the level of vulnerability of the respondent. It includes, for instance: age, gender, employment, house ownership, access to basic services and social media use. We assume that less vulnerable people will be more able to absorb the price increase caused by the levy, and hence agree more with it. M_m is a vector of mobile money usage variables. It considers the different mobile money use cases. In fact, since not all transactions are targeted by the e-levy, agreement can also be correlated with the type of transactions usually performed by respondents. P_p is a vector of variables considering political affiliation. As mentioned earlier, the e-levy has been much politicised, hence political support could also be correlated with agreement. We hence include political affiliation variables, giving a particular interest to the party in power compared to others. E_e is a variable to capture one specific dimension of the e-levy, which is whether the respondent thinks that the e-levy has been implemented for the purpose of national development. Indeed, as shown by our interviews and FGDs, believing that the e-levy has been implemented for a 'noble' reason, and believing that it can achieve its purpose, can also be correlated with agreement.

The same approach is used to estimate the correlates of behavioural change in the face of the e-levy, considering specifically the role of agreement and knowledge, among other factors. With a logistic design, we regress the behavioural change variables, built from the survey questions discussed above, on agreement levels, e-levy knowledge, and other factors like mobile money usage and mobile money use cases. The corresponding equation (2) reads:

$$\text{Log}(Y_i = s) = f(a + j \cdot A_i + b_k \cdot K_k + c_x \cdot X_{xi} + d_m \cdot M_{mi} + e_p \cdot P_{pi} + f_n \cdot N_{ni} + g_l \cdot L_{li} + h_d \cdot D_{di}) \quad (2)$$

with $s = \{0, 1\}$

Where Y_i is a dichotomous variable equal to 1 if the respondent changed its behaviour to avoid paying the e-levy and 0 if the respondent did not change its behaviour. A is the agreement index calculated as presented above.

Sampling weights have been used in all regressions to adjust the geographic coverage of the sample and make the results more applicable to the broader Ghanaian population. Further, stepped regressions for main results are included in Appendix Tables 12-16 to measure the robustness of our results to a change in specification.

4 Results

This section presents results on the correlates of perceptions and behavioural change after introduction of the e-levy. It starts with a brief presentation of the main patterns of mobile money usage in Ghana, notably differences between users and non-users, and most popular use cases. Then, we present overall knowledge about the e-levy and the level of knowledge on different components of the policy. Finally, we highlight important correlates of agreement and behavioural change.

4.1 Mobile money usage in Ghana

The pervasive use of mobile money among Ghanaian citizens has positioned it as a focal point for governmental taxation efforts, as the case of the e-levy indicates. According to the latest *Findex survey*, with a sample of 1,000 individuals, a substantial 60 per cent of Ghanaians aged 15 and above possess a mobile money account, underscoring its prevalence in the country's financial landscape (Demirgüç-Kunt et al. 2022). Our survey, which concentrates on individuals aged 18 and above, reveals an even more pronounced reliance on mobile money, with a staggering 92.6 per cent reporting current usage,⁶ of which 6.5 per cent engage in a dual utilisation of mobile money and mobile banking services. Remarkably, only a mere 7.4 per cent of our surveyed sample had never engaged with mobile money before our study.

This section employs mean difference tests in Table 4.1 to scrutinise significant variations among mobile money users and non-users concerning key demographic and economic variables. Intriguingly, gender and employment status exhibit no significant disparities between mobile money users and non-users. However, the analysis reveals distinctive characteristics among mobile money users, who tend to be three years younger, substantially (+20 per cent) more educated, and economically affluent, as evidenced by factors such as higher access to utilities, urban residence, home ownership, a three times higher possession of smartphones, and reduced vulnerability (e.g. disability). Relatedly, mobile money users live in smaller households. Further, mobile money users exhibit higher access to both mobile money services, as they are much closer to an agent, and traditional banking services, as they are three times more likely to have a bank account. Users also feature a heightened engagement with social media platforms, painting a comprehensive picture of the multifaceted distinctions within the mobile money user demographic in Ghana.

⁶ The difference between Findex results and our survey could be explained by many points. First, our survey focused on individuals aged 18+, contrary to the Findex survey which focused on people aged 15+. Second, our survey was done in 2023 - with the increasing trend of mobile money adoption in Africa, mobile money could have increased significantly in 2023 compared to 2021.

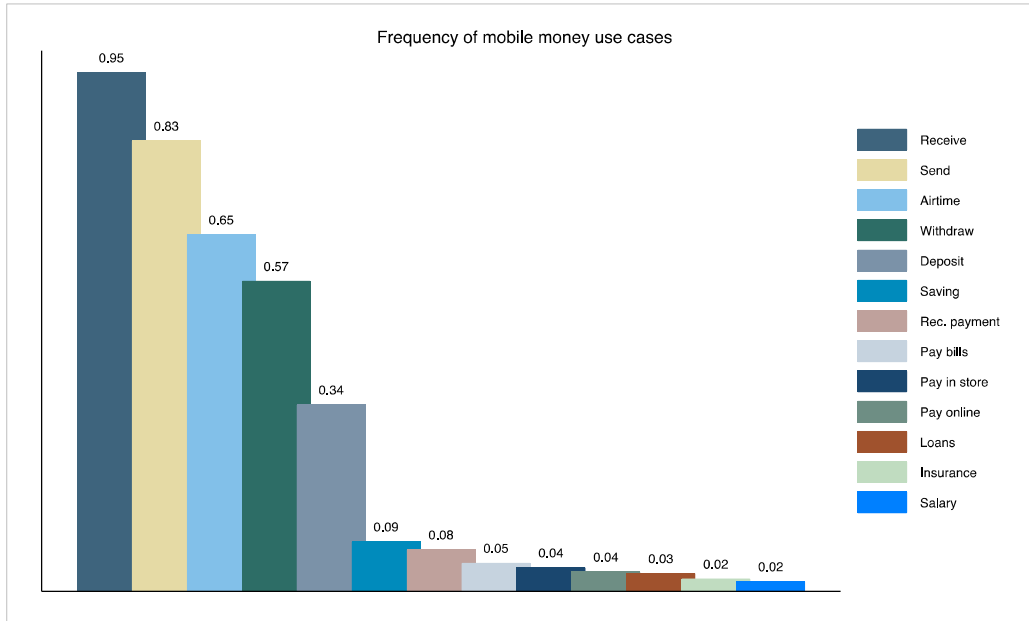
Table 4.1 Mean difference for main demographics by mobile money usage

Variables	Users	Non-users	Difference
Age	37.3146	40.991	3.6764***
Gender (1 if male)	0.4111	0.3784	-0.0327
Education	0.8632	0.6667	-0.1965***
Access to electricity	0.9028	0.8378	-0.0650**
Access to water	0.6335	0.4865	-0.1471***
Married	0.586	0.7027	0.1167**
Employed	0.6577	0.6760	-0.0184
Household size	4.3708	5.4955	1.1247***
Rural area	0.3701	0.5495	0.1795***
Own the house	0.5198	0.6757	0.1559***
No mobile phone	0.0274	0.3694	0.3420***
Smartphone	0.5673	0.1712	-0.3961***
Basic phone	0.4053	0.4595	0.0541
Disability	0.0101	0.036	0.0260**
Distance nearest mobile money agent	11.3136	19.8716	8.5580***
Distance nearest bank agency	737.0194	661.5225	-75.4969
Access to a bank account	0.4089	0.1802	-0.2287***
Social media usage	0.5385	0.1441	-0.3944***
N	1389	111	

Source: Authors' own calculations based on survey data. *** p<0.01, ** p<0.05, * p<0.1.

In the dynamic landscape of Ghana's mobile money services, operators offer a spectrum of services with a harmonised pricing structure, often influenced by the market dominance of a single operator. Recent forays into financial services like loans and insurance respectively in 2017 and 2018 show promising strides, although widespread adoption remains a work in progress. Despite these developments, transfers continue to dominate as the primary use case among the survey respondents (Figure 4.1), especially relevant considering the transactions targeted by the e-levy. Almost all respondents received money through the mobile money service, and as many as 83 per cent sent it to someone else. Relatedly, in 2022 a substantial volume of transactions (GH¢886.8 billion (US\$73 billion)) were conducted through transfers, surpassing payments, withdrawals and deposits. While functionalities like airtime (65 per cent), withdrawals (57 per cent), and deposits (34 per cent) are widely used, other use cases lag behind. Less than 10 per cent used mobile money to save, and a mere 4 per cent used mobile money to purchase goods or services in retail stores. Appendix Table 6 looks into demographic variations across use cases, revealing only subtle distinctions. Notably, individuals engaged in payment transactions emerge as distinctive, highlighting nuanced user profiles within Ghana's mobile money ecosystem.

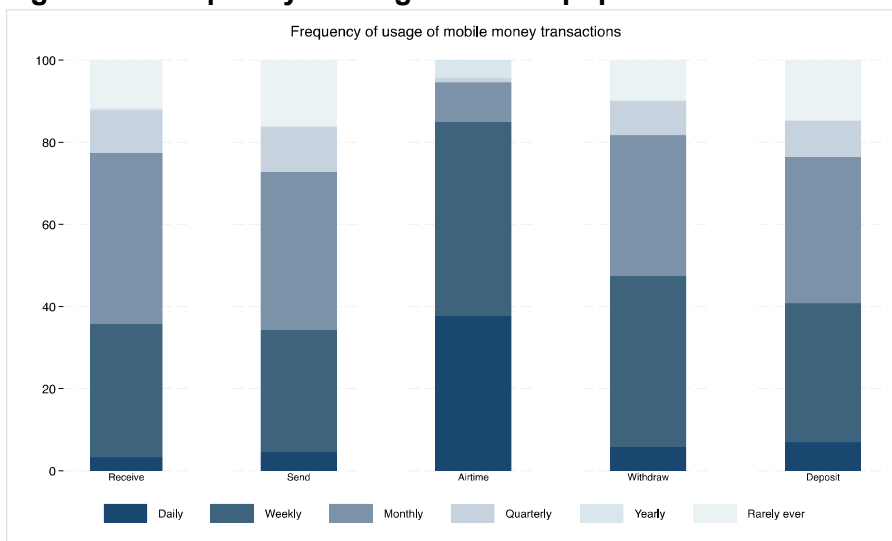
Figure 4.1 Most popular mobile money use cases



Source: Authors' own elaborations based on survey data.

Figure 4.2 presents the frequency of usage of most popular use cases in 2023 as reported by respondents. It shows that transfers, which are affected by the e-levy, are used weekly and monthly by the greatest share of mobile users in our sample (respectively 30 per cent and 38 per cent). Of the sample, 11 per cent send money quarterly, while only 5 per cent use it on a daily basis. A non-negligible 15 per cent of mobile money current users declared sending money rarely. The same pattern can be observed for deposits, while withdrawals are used more frequently – 42 per cent use it weekly compared to 34 per cent for deposits. The most frequent use case in our sample remains airtime purchasing, with 38 per cent and 47 per cent of our sample using this service respectively daily and weekly. As a last set of results on mobile money usage, we present in Appendix Figure 1 the frequency of different value bands for sending and receiving by mobile money. We find that the greatest share of mobile money users transacts below GH¢500 (78 per cent), with 34 per cent sending less than the mobile money exemption threshold (GH¢100).

Figure 4.2 Frequency of usage for most popular use cases



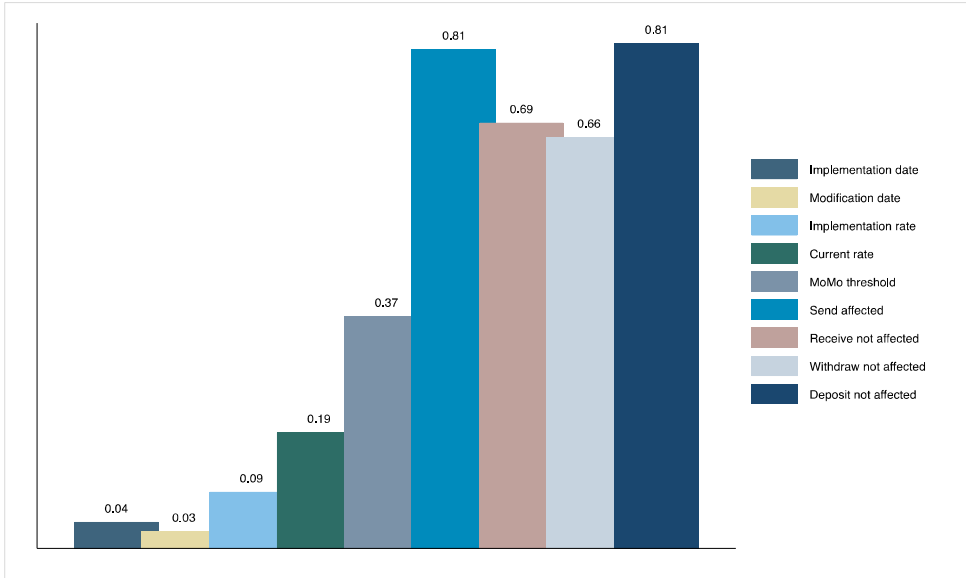
Source: Authors' own elaborations based on survey data.

4.2 How much do people know about the e-levy?

Evaluating public knowledge is crucial for a comprehensive understanding of perceptions and potential behavioural shifts. To this end, we looked into critical aspects of the e-levy, encompassing enquiries about dates, rates, thresholds and impacted transactions.

Despite a widespread acknowledgment of the e-levy's existence (86 per cent of the sample), predominantly disseminated through channels like radio, television and social media, our findings reveal a substantial deficit in knowing about the e-levy's design. In Figure 4.3, we explore knowledge about different e-levy aspects. Notably, a higher degree of awareness is observed regarding transactions that are subject to the tax, distinguishing between affected and non-affected transactions. For instance, almost everyone knows that sending money incurs the e-levy, while deposits are exempted. This suggests that a substantial portion of the Ghanaian population is aware of when they are subject to taxation.

Figure 4.3 Level of knowledge on design of the e-levy



Source: Authors' own elaboration based on survey data.

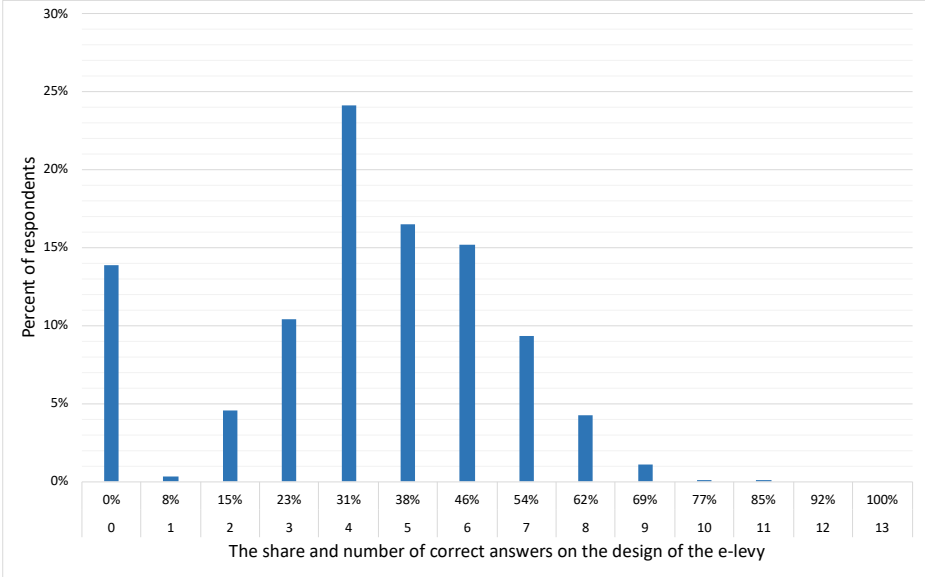
However, the depth of knowledge diminishes for other pivotal characteristics of the tax, such as the specific rate and exemption threshold. Within our sample, 37 per cent exhibit awareness of the amount of the e-levy threshold. Conversely, knowledge about the current rate stands at a lower rate of 19 per cent, while comprehension of the implementation rate is even lower, at 9 per cent. Recent policy changes in January 2023, which reduced the rate from 1.5 per cent to 1 per cent, could contribute to confusion, leading some to still believe the rate is 1.5 per cent. Interestingly, only 2 per cent of the sample believe the current rate to be 1.5 per cent, underscoring a concerning divergence between perceived and actual rates. More analysis shows the nature of incorrect answers, distinguishing between overestimation and underestimation of the e-levy rate and exemption threshold. Of those who thought they knew the current rate, 24 per cent and 3 per cent overestimated and underestimated it, respectively. Regarding the threshold, 6 per cent and 21 per cent of those who thought they knew the correct answer respectively overestimated and underestimated it. This shows that respondents who were unfamiliar with the correct rate and threshold tended to assume a higher rate and a lower exemption threshold. However, it is important to note that most respondents who did not know the right answers responded 'I do not know'— respectively 68 per cent and 28 per cent for the current rate and current threshold. Only two respondents

were acquainted with the bank threshold, a comprehensible outcome given the absence of a formal legal text implementing this threshold.

The mean differences, presented in Appendix Tables 8.1-8.4, illuminate variations in knowledge between those aware and not aware of distinct e-levy designs. Statistical significance is observed for characteristics such as the implementation date, rate and threshold, revealing that more knowledgeable individuals tend to be younger, male, possess higher education levels and exhibit greater wealth. Additionally, they are more likely to own smartphones and engage with social media platforms. More knowledgeable individuals are also more likely to be financially included, own a bank account, and, more importantly, actually use mobile money services. Further, linking these results with differences between mobile money users and non-users, we remark that factors such as age, education, economic status and technological engagement are correlated with both mobile money usage and knowledge about e-levy design. Interestingly, differences in knowledge are less pronounced when it comes to awareness regarding transactions affected by the levy. All these findings are confirmed in a regression framework, as shown for the overall knowledge index in Appendix Figure 2.

The formulation of a knowledge index offers a holistic assessment of public comprehension concerning the e-levy. However, recognising that certain characteristics may exert greater influence on agreement and behaviour, our analysis also extends to dissecting distinct components of this index. This nuanced approach aims to unearth deeper insights into the multifaceted nature of public understanding regarding the e-levy. The computed average knowledge index stands at 0.38, signifying that, on average, respondents provided correct answers to only 38 per cent of the survey questions – around 5 questions out of 13. Figure 4.4 visually portrays the distribution of knowledge indices within our sample, revealing that most participants answered 6 or fewer questions correctly out of 13. Strikingly, none of the respondents demonstrated full accuracy across all 13 questions, highlighting a pervasive gap in achieving comprehensive understanding across the spectrum of e-levy-related enquiries.

Figure 4.4 Distribution of index of knowledge



Source: Authors' own elaboration based on survey data.

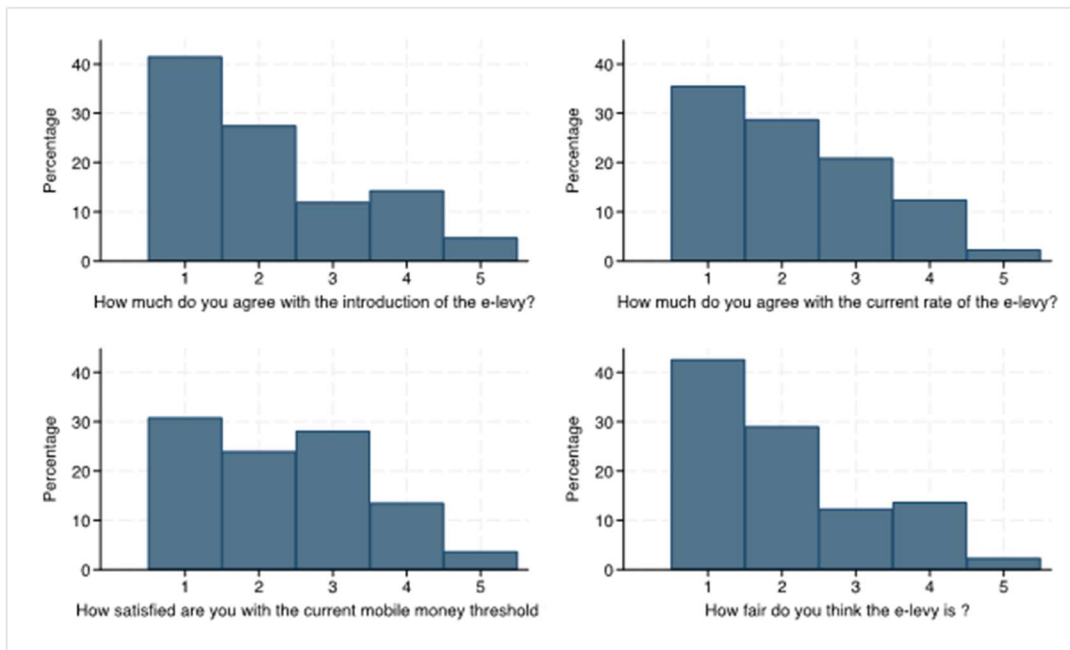
4.3 Agreement with the e-levy and role of knowledge

The implementation of the e-levy sparked widespread protests, and pre- and post-implementation surveys consistently reflected a prevailing sentiment of disagreement among most Ghanaians. There are numerous examples in these surveys, underscoring the public's disapproval of the e-levy.

In the FGDs participants' initial reactions to the e-levy were predominantly negative, characterised by sentiments of disappointment, betrayal by the government, and perceptions of double taxation. Common themes included the belief that the tax disproportionately impacted the poor, with participants expressing frustration over the existing tax burden. Despite some knowledge of rate changes, there was a prevailing sense of dissatisfaction, confusion, and a lack of trust in government institutions. Some participants, however, showed acceptance, recognising the necessity of contributing to national development, but quickly followed with disappointment in the lack of promised results. As discussions progressed varying opinions emerged, with factors such as political beliefs, trust in institutions, and perceptions of the tax's impact on personal finances influencing participants' perspectives. The study revealed a range of emotions and misconceptions surrounding the e-levy, underscoring the importance of transparent communication and addressing public concerns to foster better understanding and acceptance. When asked about sentiments of how fair participants perceive the e-levy to be, the tax was criticised for its perceived lack of benefits, regressive structure and impact on vulnerable groups, such as the elderly and the poor who rely on receiving funds. The general sentiment in all the FGDs suggests that the fairness of a tax is contingent on its perceived contribution to societal well-being and equitable distribution of the tax burden, instead of focusing on specific tax designs.

One year after imposition of the e-levy, marked by communication from the state and advocacy efforts from various stakeholders urging removal of the tax (see section 2), we scrutinise whether there has been a shift in public perceptions. Figure 4.5 depicts the distribution of agreement variables, where a higher value indicates stronger support for the e-levy. Strikingly, most of our sample continues to express disagreement with the e-levy, aligning with the sentiments observed in pre-implementation surveys. Average agreement values are respectively fixed at 2.13, 2.17, 2.35 and 2.04 for introduction of the levy, current rate, mobile money threshold, and fairness of the levy. This persistence of dissent suggests that, despite enhanced communication and advocacy, public opinion on the e-levy remains largely unchanged, raising the need for deeper analysis of the factors influencing public perception.

Figure 4.5 Agreement with characteristics of the e-levy



Source: Authors' own elaboration based on survey data.

1 'Not at all', 2 'Somewhat unsatisfied', 3 'Neutral', 4 'Somewhat satisfied', 5 'Completely satisfied'.

This result is confirmed by findings from the literature. A survey from Amoah and Amoah (2022) on 2,810 individuals before implementation of the levy suggested that 46.5 per cent of Ghanaian citizens would stop using mobile money if the e-levy is applied, 41.4 per cent would reduce their mobile money transactions, and 10.7 per cent would continue using mobile money services. Another survey from Afrobarometer (2022) before implementation of the e-levy highlights that most Ghanaian citizens (three-quarters) disagree, while only 19 per cent agree with the tax. Akua Anyidoho et al. (2022) examine the potential impacts of the e-levy and perceptions held by the informal sector in the Accra region, finding regressivity and a general disapproval of the tax regardless of political affiliation.

In assessing agreement with the e-levy, various components were considered to calculate the agreement index. The pairwise correlations among these variables revealed consistently positive and significant correlations at the 1 per cent threshold (Appendix Table 7). This indicates that levels of agreement on different aspects of the e-levy tended to move in the same direction. However, noteworthy exceptions exist. For instance, when examining respondents who disagree or strongly disagree with the introduction of the e-levy, a relatively low percentage of 9.43 per cent expressed satisfaction with the exemption threshold, allowing a daily maximum of GH¢100 to be transferred without the e-levy being applied. This finding suggests that, even among those opposing the e-levy, a minority acknowledges satisfaction with specific elements, highlighting the complexity of attitudes toward different facets of the policy.

In our examination of factors correlated with perceptions of the e-levy, we first focus on comparing key factors between those who express agreement (agree or strongly agree) and disagreement (disagree or strongly disagree), excluding individuals with a neutral stance on the tax introduction.⁷ Table 4.2 summarises these comparisons and provides t-tests for the statistical significance of the mean differences.

⁷ These variables comes from the following question: How much do you agree with the introduction of the e-levy?

Table 4.2 Who agrees with the introduction of the e-levy?

Variables	Disagree	Agree	MeanDiff
Knowledge index	0.3796	0.3918	-0.0122
Know current rate	0.2065	0.2927	-0.0862***
Know rate at implementation	0.1021	0.1504	-0.0483**
Know mobile money threshold	0.4501	0.4553	-0.0052
Know bank threshold	0.0022	0	0.0022
Know affected and non-affected trans	0.6016	0.6504	-0.0488
Age	36.8283	38.6789	-1.8506*
Gender (1 if male)	0.4198	0.5244	-0.1046***
Education (1 if ever attended school)	0.881	0.8902	-0.0092
Access to electricity	0.9259	0.9065	0.0194
Access to piped water	0.6184	0.6707	-0.0523
Married	0.587	0.6138	-0.0268
Employed (or self-employed)	0.6723	0.687	-0.0147
Do not support any party	0.3614	0.3455	0.0159
Support NDC	0.284	0.1626	0.1213***
Support NPP	0.229	0.3902	-0.1613***
Support Convention People's Party (CPP)	0.0022	0	0.0022
Mobile money user	0.9551	0.9593	-0.0042
Receive	0.9602	0.9596	0.0006
Send	0.8497	0.852	-0.0023
Airtime	0.6882	0.7265	-0.0383
Withdrawal	0.5839	0.5202	0.0637*
Deposit	0.3602	0.3812	-0.0209
Saving	0.0783	0.13	-0.0518**
Receive payment	0.0733	0.1345	-0.0612***
Pay bill	0.0522	0.0717	-0.0196
Payment in store	0.0522	0.0404	0.0118
Payment online	0.0323	0.0673	-0.0350**
Loan	0.0385	0.0314	0.0071
Insurance	0.0236	0.0404	-0.0168
Receive salary	0.0174	0.0224	-0.005
N	891	246	

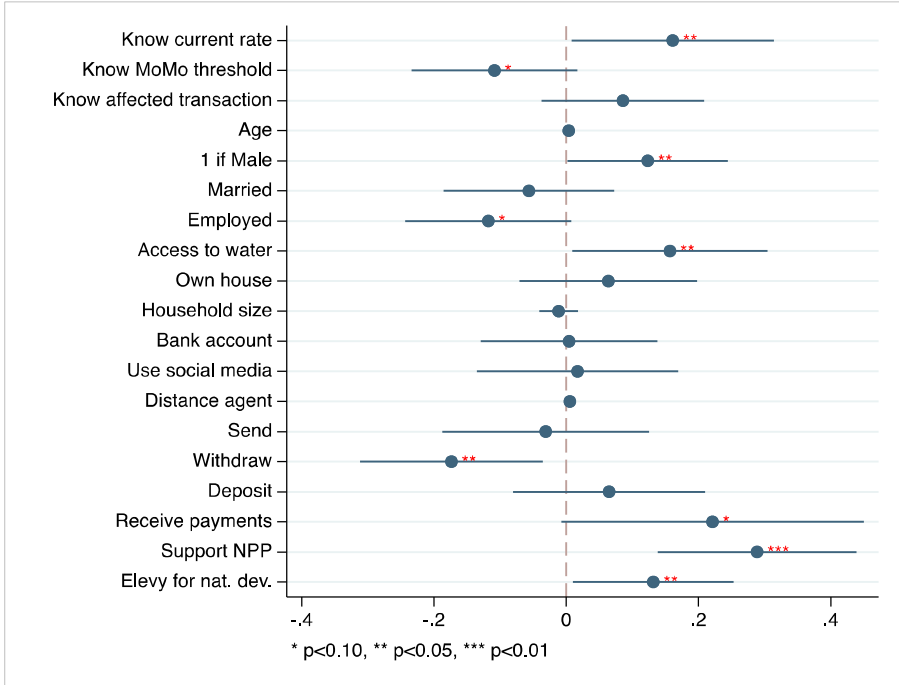
Source: Authors' own calculations based on survey data. *** p<0.01, ** p<0.05, * p<0.1.

On average, individuals expressing agreement with the e-levy tend to possess a higher understanding of the rate. Conversely, those who disagree with the e-levy are, on average, younger and more likely to be female compared to their counterparts who express agreement. Moreover, individuals in agreement generally have greater access to bank accounts. Additionally, those utilising mobile money for saving, receiving payments and online payments are more inclined to support the e-levy, potentially because these activities are less affected by the tax. However, no pronounced differences in agreement are observed for other significant use cases, such as sending and receiving money. A noteworthy pattern emerges in political affiliation, with a higher concentration of National Democratic Congress (NDC) supporters in the group that disagrees with the e-levy, and a prevalence of New Patriotic Party (NPP) supporters in the group expressing agreement. These findings, albeit descriptively, underscore the multifaceted nature of factors influencing perceptions of the e-levy, encompassing knowledge, demographic characteristics, financial behaviour and political allegiance. At this stage, we use a multivariate regression framework to understand the role of these different factors in a more robust way. We use OLS, logit and ordered logistic designs considering district fixed effects to include location specificities. Results show

that knowledge about the current rate, political factors and opinions on the reform are the main correlates of agreement.

As a first step, we use an OLS design considering the agreement index as an outcome. The agreement index measures overall level of agreement with the e-levy, and includes perceptions on different characteristics – the more the index value, the more the level of overall agreement. Figure 4.6 indicates some important patterns around the correlates of the level of agreement with the agreement index. First, knowledge of the current e-levy rate was identified as a significant correlate with individuals who possessed this knowledge, demonstrating an increased probability of supporting the tax. More specifically, knowing the current rate of the e-levy is correlated with a 0.16 increase in the agreement index. This underscores the pivotal role of transparency and informed decision-making in garnering public approval. Knowledge in turn is significantly correlated with demographics (gender, education, employment, location, etc.), but also usage of social media. Interestingly, knowledge is also positively and significantly correlated with mobile money usage, with respondents using mobile money being more likely to know different designs of the e-levy, as presented in Appendix Figure 2. Moreover, mobile money usage patterns played a crucial role, revealing that those who use mobile money for withdrawals are more likely to disagree with the e-levy, while those who leverage it for receiving payments tend to support it. Political affiliation emerged as a potent correlate, as individuals expressing support for the current government displayed a higher likelihood of agreeing with the e-levy. The perceived purpose of the e-levy also wielded influence, with respondents more likely to support the tax when they believed it contributed to national development. Notably, gender and access to piped water were identified as demographic factors correlated with agreement, with males and those with access to this utility tending to express higher levels of support.

Figure 4.6 Correlates of agreement index



Source: Authors' own elaboration based on survey data.

However, the agreement index includes several dimensions, necessitating a more detailed analysis to unveil the nuances of individual components. Hence, our next step involves scrutinising factors associated with each component of the agreement index. This approach

allows us to discern potential heterogeneity among the correlates of agreement. The detailed results of this analysis are presented in Table 4.3, offering insights into the specific drivers shaping attitudes towards distinct aspects of agreement with the e-levy. Further, we provide additional regression results in Appendix Table 9, utilising the OLS estimator. To enhance the interpretability of our results, we employ dummy variables in Appendix Tables 10 and 11. These variables take the value of 1 if the respondent strongly agrees or agrees with the considered component, and 0 otherwise.

Knowledge about the tax rate plays a crucial role in shaping agreement, including agreement with introduction of the levy, with the rate itself, with recent rate modification, and perceptions of fairness. Respondents who are well-informed about the current rate demonstrated more likelihood of expressing agreement across these dimensions. For instance, knowing the rate of the levy correlated with an increase of 0.59 in the agreement level with the rate (ranging from 1 to 5), a statistically significant effect at the 1 per cent level, as indicated by the coefficient in the regression results (Table 4.3). However, our findings show a nuanced relationship, as knowledge about the rate is not significantly correlated with agreement with the e-levy's capacity to achieve its intended purpose, the transparency of the policy reform, and satisfaction with the threshold. The connection between knowledge of the rate and opinions on the fairness of the levy underscores the importance of knowledge in shaping perceptions.

Knowledge about the mobile money exemption threshold is significantly and negatively correlated with two components – agreement with introduction, and agreement with the ability of the e-levy to achieve its purpose. Considering knowledge about affected and not-affected transactions, our analysis reveals that, in the context of overall agreement (agreement index), this variable does not emerge as a significant correlate. However, a closer examination of different components within the agreement index shows notable heterogeneity. Individuals who demonstrate correct knowledge of affected and not-affected transactions tend to express higher levels of agreement with key elements of the e-levy. Specifically, this group tend to agree more with the introduction of the e-levy, the rate and the threshold. Moreover, their perceptions of the policy's fairness and transparency were also positively associated with accurate understanding of affected and not-affected transactions.

Political affiliation continues to wield significant influence over various components of agreement, with individuals supporting the current government more likely to express agreement. This trend is consistent across most components, highlighting the strong link between political allegiance and perceptions of the e-levy. However, political affiliation does not emerge as a correlate when it comes to agreement with the threshold. Further, perceiving national development as the sole purpose of the e-levy tax reform emerges as a potent correlate of agreement. Individuals who hold this perception are more likely to express agreement with the introduction, rate, threshold and fairness of the reform. Finally, mobile money usage patterns persist as correlates for specific components of agreement. Those who use mobile money to withdraw tend to disagree with the levy, particularly in relation to the introduction, threshold, fairness and recent modifications. Conversely, using mobile money to receive payments is positively correlated with agreement on the threshold and recent modifications of the reform.

Table 4.3 Correlates of agreement on different components of agreement index

VARIABLES	(1) Introduction	(2) Rate	(3) Threshold	(4) Fairness	(5) Transparency	(6) Purpose	(7) Modification
Know current rate	0.520***	0.590***	0.271	0.402**	0.125	-0.00418	0.564***
Know mobile money threshold	-0.235*	-0.168	-0.0978	-0.214	-0.0999	-0.478**	-0.141
Know affected transactions	0.406***	0.250*	0.232*	0.299**	0.290**	-0.284	-0.00859
Age	0.00354	0.00227	0.00301	0.00513	0.000625	0.00920	0.00471
Gender	0.235*	0.0657	0.307**	0.317**	-0.0188	0.160	0.144
Married	-0.0804	0.115	-0.00205	-0.157	-0.188	-0.432*	-0.0784
Employed	-0.173	-0.251*	-0.182	-0.179	-0.264*	-0.194	-0.257*
Access to piped water	0.256*	0.262*	0.220	0.158	0.165	0.729***	0.138
Own the house	0.113	0.147	0.0944	0.112	0.152	-0.207	0.0541
Household size	-0.0167	-0.0545*	-0.0135	-0.0222	-0.0530	0.0753	-0.0306
Have a bank account	-0.0815	-0.0656	-0.157	-0.178	-0.158	0.527**	-0.109
Use social media	-0.0368	-0.0453	0.0388	-0.147	-0.0770	0.138	-0.0111
Distance from mobile money agent	-0.00334	0.000439	0.0135	-0.00123	0.0243**	0.000404	-0.00443
Send	-0.111	-0.0198	-0.0548	-0.0398	0.0268	0.01000	-0.123
Withdraw	-0.336**	-0.251	-0.373***	-0.335**	-0.146	-0.349	-0.471***
Deposit	0.285*	0.303*	0.141	0.107	-0.144	0.135	0.330*
Receive payment	0.375	0.231	0.618**	0.0327	-0.108	0.263	0.644**
Support NPP	0.461***	0.471***	0.221	0.545***	0.589***	0.775***	0.465***
E-levy for national development	0.362***	0.447***	0.340***	0.412***	0.0517	-0.0823	0.142
/cut1	-0.520	-0.803	-1.035**	-0.614	-0.814	2.334***	-0.883
/cut2	0.866	0.606	0.105	0.781	0.810		0.360
/cut3	1.546***	1.873***	1.694***	1.591***	1.883***		1.783***
/cut4	3.278***	3.968***	3.494***	3.752***	3.711***		4.216***
District fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,223	1,223	1,223	1,223	1,223	934	1,223
Pseudo R2	0.0882	0.0955	0.0871	0.0840	0.0873	0.213	0.100

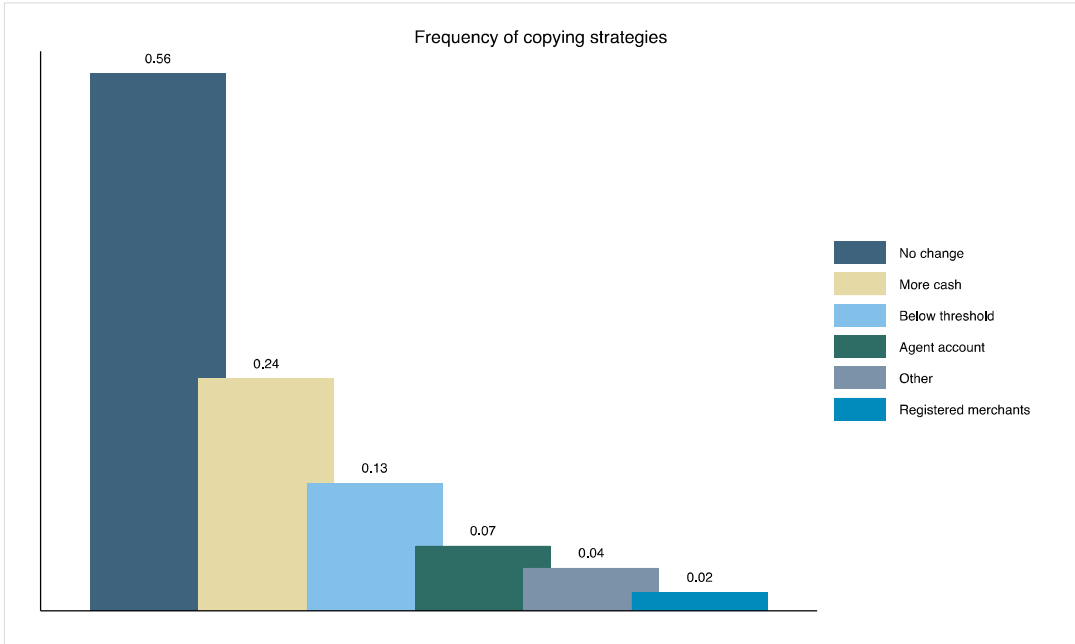
Source: Authors' own calculations based on survey data. *** p<0.01, ** p<0.05, * p<0.1.

4.4 Behavioural responses to the e-levy and role of agreement

In this section, our analysis looks into whether individuals' perceptions of the e-levy are correlated with their behaviour. To contextualise, we initially examine how people responded to the levy. Notably, more than half of mobile money users reported no alteration in their behaviour in response to the levy. However, 44 per cent of mobile money users employed a coping strategy to adapt to the tax, prompting an exploration into the characteristics of this particular group.

As highlighted in Carreras et al. (forthcoming), cash remains a formidable competitor to mobile money in Ghana. Figure 4.7 illustrates the primary coping mechanism adopted by individuals facing the e-levy, with 24 per cent of mobile money users indicating an increased reliance on cash transactions following the levy's implementation. Further, 13 per cent of mobile money users strategically transact below the established threshold to leverage the daily exemption introduced by the government, designed to benefit the poorest users. An additional 7 per cent of mobile money users resort to the illegal mechanism of sending funds through an agent account, involving a deposit to the recipient's account. Notably, a mere 2 per cent of mobile money users engage in arbitrage practices between registered and non-registered merchants to circumvent the e-levy. These findings shed light on the varied coping strategies employed by mobile money users in response to the e-levy, offering valuable insights into the nuanced ways individuals navigate the tax's impact on their financial transactions.

Figure 4.7 Self reported e-levy coping strategies



Source: Authors' own elaborations. Base: current mobile money users. N=1302.

The FGDs echo these findings, showing how the impact of the e-levy on individuals' reported behaviour in using mobile money varies, reflecting a range of coping strategies and adaptations. There is a prevalent sentiment of discontent and confusion among participants, with some completely resorting to cash or reducing their overall mobile money usage, waiting to send money in person, making smaller transactions to minimise e-levy charges, or even going to mobile money agents to deposit money into another user's account. However, there were several instances where behavioural changes or coping mechanisms did not lead to

any reduction in tax liability, and highlighted the extent of participants' misconceptions of the e-levy. For example, one participant shared that they withdrew all their money because, from their understanding, any money in their mobile wallet was subject to the tax. Another participant referred to the GH¢100 threshold and explained that they took advantage of it by sending GH¢100 from different agents in the same day. Several other examples of misunderstanding the tax exemptions emerged throughout discussions. These examples revealed the prevalence of misconceptions and their subsequent impact on behaviour.

Despite dissatisfaction, some participants find it challenging to entirely avoid mobile money usage due to its integral role in their daily lives, underscoring the embeddedness of mobile money as a factor influencing participants' behaviour. One student said,

It (the e-levy) has come to stay so we have to adapt to it. Most of the time, the e-levy, you can't do without it. So no matter what, you have to try and manage yourself to stay with it. Even with or without the e-levy, we will still live.

Another participant, an informal worker based in Accra also did not report a change their behaviour, but for a different reason. They said: 'I have not changed my behaviour because I don't understand how it works. We need education'.

Several other participants shared this sentiment, and emphasised their need for more education. This was echoed in response to questions about their recommendations for further reform. This quote directly links our knowledge to a behaviour mechanism, where in this case no self-reported behavioural change occurred due to a lack of understanding and knowledge of specific tax mechanisms.

Among mobile money users facing the e-levy, 56 per cent did not alter their behaviour to avoid paying the e-levy. This prompted an examination of the remaining 44 per cent, and whether they differ significantly from those who did not change their behaviour. This exploration serves as an initial step in understanding the factors contributing to behavioural changes in response to the e-levy. Table 4.4 below summarises these differences.

Individuals who did not report a change their behaviour have on average higher agreement with the e-levy design. Notably, the average level of agreement on aspects such as the rate, fairness of the tax, and the e-levy's efficacy in achieving its purpose, is significantly higher within this group. The aggregate agreement index is much higher for those who did not report an alteration in their behaviour to cope with the tax. All these differences across agreement items are statistically significant at the highest level, and indicate that behavioural change is correlated with disagreement and dislike of the e-levy.

Further, on average, the group that reported a change in their behaviour exhibits a higher level of knowledge about the e-levy, encompassing key characteristics such as the rate, mobile money exemption threshold, and implementation date. Most likely, knowing about the technical aspects of the e-levy also prompted individuals to find ways to cope with it. Interestingly, knowledge about the e-levy design is also positively correlated with agreement.

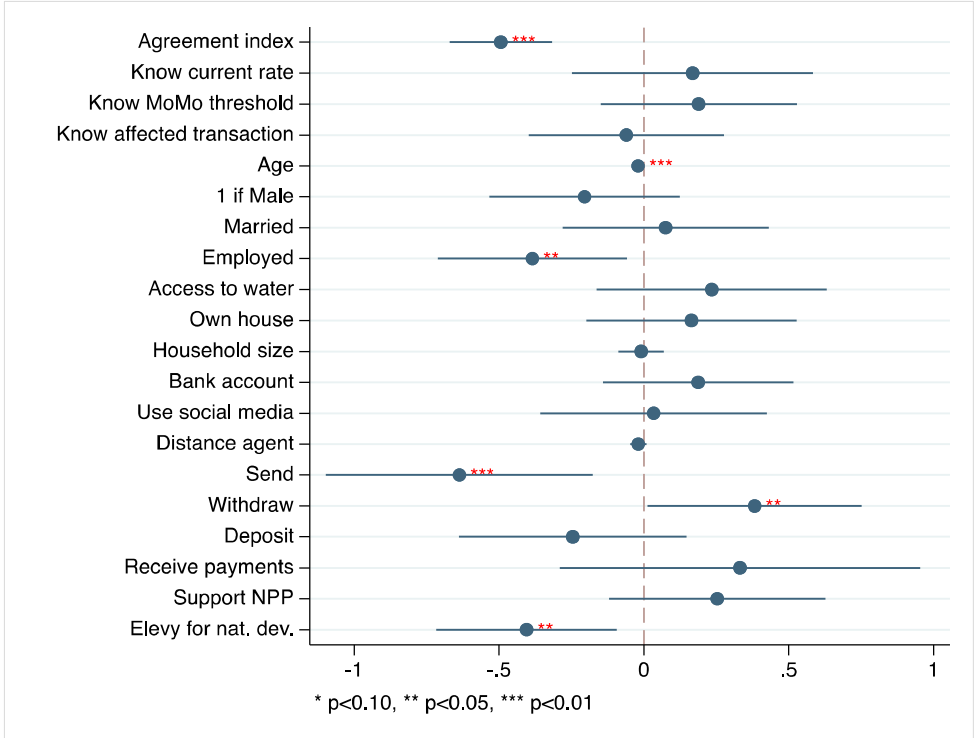
Table 4.4 Mean difference between mobile money users who changed/did not change their behaviour

	Changed behaviour	Did not change behaviour	Difference
Agree with introduction	1.8726	2.3261	-0.4534***
Agree with current rate	1.9468	2.3432	-0.3964***
Agreement index	-0.222	0.167	-0.3890***
Satisfied with threshold	2.1559	2.4883	-0.3324***
E-levy is fair	1.7909	2.2231	-0.4322***
E-levy can achieve purpose	0.1671	0.2714	-0.1043***
Index of knowledge	0.4208	0.3829	0.0380***
Know current rate	0.2504	0.1664	0.0840***
Know rate at implementation	0.1391	0.0702	0.0690***
Know current mobile money threshold	0.44	0.3686	0.0714***
Know bank threshold	0.0035	0	0.0035
Age	36.0504	38.3453	-2.2948***
Gender (1 if male)	0.3843	0.4443	-0.0599**
Educated	0.8765	0.8624	0.0141
Access to electricity	0.927	0.8858	0.0411**
Access to water	0.6591	0.6176	0.0415
Married	0.5774	0.5846	-0.0072
Employed	0.6591	-0.0314	-0.0314
Household size	4.3183	4.3714	-0.0531
Rural area	0.3409	0.3851	-0.0443*
Own the house	0.52	0.5199	0.0001
No mobile phone	0.0052	0.0124	-0.0072
Smartphone	0.6191	0.5653	0.0538*
Basic phone	0.3757	0.4223	-0.0466*
Have a disability	0.0052	0.0138	-0.0085
Distance from agent	9.9913	12.6279	-2.6366*
Distance from bank	751.7061	742.1939	9.5121
Have a bank account	0.4539	0.3975	0.0564**
Social media usage	0.593	0.5282	0.0648**
Receive	0.9461	0.956	-0.0099
Send	0.8209	0.8308	-0.0099
Airtime	0.7217	0.6011	0.1206***
Withdraw	0.6348	0.5172	0.1176***
Deposit	0.3843	0.3095	0.0749***
Saving	0.1009	0.0839	0.017
Receive payments	0.0974	0.0605	0.0369**
Pay utility bills	0.047	0.0564	-0.0094
Pay in store	0.0435	0.044	-0.0005
Pay online	0.0348	0.0371	-0.0024
Loan	0.033	0.033	0
Insurance	0.0174	0.0275	-0.0101
Get salary	0.0243	0.0138	0.0106
Do not support any party	0.3513	0.37	-0.0187
Supports NDC	0.2557	0.2242	0.0314
Supports NPP	0.2661	0.2834	-0.0173
N	575	727	

Source: Authors' own elaboration based on survey data. *** p<0.01, ** p<0.05, * p<0.1

Demographically, those who reported changes in their behaviour tend to be younger, more educated, economically affluent and less vulnerable (indicated by smartphone ownership, access to water and electricity, and disability status). Additionally, this group is predominantly situated in urban areas and has greater access to banking services, providing them with alternative transactional options, which inevitably come with their wealthier position. The descriptive findings above illuminate distinct demographic and attitudinal characteristics between those who reported adapting their behaviour in response to the e-levy, and those who did not. This insight lays the groundwork for a deeper understanding, through a regression framework, of the factors influencing behavioural changes in the context of the e-levy. In Figure 4.8, we present the outcomes of a logistic regression aimed at elucidating the correlates of any behavioural changes, incorporating factors such as agreement levels, e-levy knowledge, use cases and political affiliation.

Figure 4.8 Correlates of behavioural change in the face of the e-levy



Source: Authors' own elaboration based on survey data.

The results underscore a significant inverse correlation between agreement with the tax and the likelihood of changing behaviour to cope with it – as agreement levels increase, the probability of behavioural change decreases. This implies that individuals who express overall agreement with various facets of the e-levy are statistically significantly less inclined to alter their behaviour. Relatedly, the perception of the e-levy’s purpose plays a crucial role. Individuals who believe the purpose is national development are less likely to change their behaviour, compared to those attributing alternative motivations.⁸

Certain use cases exhibit a negative correlation with the likelihood of behavioural change, notably sending. Conversely, withdrawals are positively linked with behavioural change. Further, political affiliation does not emerge as a significant factor associated with behavioural change. This result shows that, even if supporters of the current government are

⁸ Examples of alternative purposes could include revenue generation, promoting financial inclusion, or distributing the tax burden.

more likely to show agreement with the e-levy, this agreement does not correlate with any reported behavioural change as there is no significant difference between supporters of the current government and other respondents when it comes to behavioural change. Additional demographic factors, such as age (negative correlation) and employment status (negative correlation), further contribute to the complexity of understanding the dynamics influencing behavioural changes in the context of the e-levy.

5 Discussion and conclusion

This study has examined factors associated with perceptions and behavioural changes following implementation of the e-levy in Ghana. Central to our analysis were key factors such as knowledge, political affiliation and mobile money usage, which played crucial roles in elucidating the complexities of public attitudes and actions in response to the levy. Leveraging a unique combination of qualitative data – including interviews with key stakeholder and FGDs, as well as original nationally-representative survey data – we conducted an in-depth analysis, capturing a diverse range of information on individuals' characteristics, their knowledge about various components of the levy, agreement levels on different aspects, and behavioural changes prompted by the e-levy.

Despite widespread acknowledgment of the e-levy's existence, our findings reveal a substantial deficit in knowing its design, with a considerable proportion of respondents not knowing key components of the reform. The formulation of a knowledge index, revealing an average correctness rate of 38 per cent, highlights a pervasive gap in achieving comprehensive knowledge of the reform. However, awareness is higher regarding transactions subject to the tax, such as sending money, compared to other crucial characteristics like the rate and exemption threshold. Differences in knowledge are pronounced across various demographics, with more knowledgeable individuals tending to be younger, male, possess higher education levels and exhibit greater wealth. However, despite a low level of knowledge about the policy, our findings indicate that people harbour strong opinions. The initial implementation of the levy triggered widespread protests and disapproval, a sentiment that persisted one year later. Indeed, our survey reveals that a substantial 70 per cent of the sample continues to disagree or strongly disagree with introduction of the levy. Hence, even with communication and advocacy efforts from the government, our analysis shows that disagreement remains prevalent. The average agreement values for various components of the e-levy, such as the introduction, current rate, mobile money threshold and fairness, consistently reflect a leaning towards disagreement among respondents. This persistence of disagreement prompts critical reflections on the efficiency of communication strategies from the government, and the imperative for a deeper analysis of the factors influencing public perceptions.

Our examination of factors associated with agreement with the e-levy provides insights into the multifaceted elements shaping public opinion. Knowledge about the tax rate emerges as a pivotal factor, positively correlated with overall agreement, including perceptions of the rate, recent modifications and fairness. In contrast, knowledge about the mobile money threshold displayed negative correlations with agreement components, correlating with perceptions of the e-levy's capacity to achieve its purpose and overall introduction agreement. Knowledge of affected and not-affected transactions correlates positively with agreement on various components, including rate, threshold, transparency and fairness. Political affiliation and perceptions of the e-levy as a driver of national development

consistently correlate with most agreement components, which shows the importance of the political dimension. Mobile money usage patterns, particularly withdrawals and receiving payments, are also significantly correlated with agreement. These findings underscore the need for targeted information campaigns, emphasising the diverse factors that contribute to a comprehensive understanding of public attitudes and perceptions towards the e-levy.

The findings on factors associated with behavioural change reveal a negative correlation between overall agreement with the e-levy and the likelihood of behavioural change, indicating that higher agreement levels are associated with a decreased probability of changing behaviour. Moreover, the perceived purpose of the e-levy plays a crucial role, with individuals attributing the tax to national development being less inclined to report a change in behaviour than those assigning alternative motivations. Specific use cases, such as sending, exhibit a negative correlation with the likelihood of behavioural change, while withdrawals are positively linked with changes in behaviour. Surprisingly, political affiliation is not significantly correlated with behavioural change, suggesting that agreement with the e-levy among supporters of the current government does not translate into corresponding changes in behaviour. Additional demographic factors, including age and employment status, contribute to explanation of behavioural changes in response to the e-levy.

Our analysis sheds light on the intricate relationship between knowledge of different e-levy designs and the level of agreement among respondents. Notably, knowledge of the e-levy rate exhibits a positive correlation with agreement, suggesting that individuals who are informed about the relatively low rate are more likely to express agreement with the tax. Conversely, knowledge of the fixed exemption threshold at GH¢100 shows a negative correlation with overall agreement, indicating that this threshold might be perceived as too low and is associated with reduced levels of agreement. These findings emphasise the need to interpret results in the context of the key characteristics of individuals who possess knowledge about the e-levy rate and threshold. Respondents informed about the current rate of the e-levy are revealed to have better living conditions, including higher levels of education, access to electricity, smartphones and bank accounts. Consequently, these individuals may be better equipped to bear the e-levy charge, elucidating the positive correlation between knowledge of the rate and agreement. Similar patterns emerge for knowledge about the threshold, revealing that individuals aware of it also tend to enjoy better living conditions. This suggests that the threshold could be negatively perceived by users who view it as insufficient to protect low-income individuals.

While the study offers insights to better understand perceptions on the e-levy, it is essential to acknowledge its inherent limitations. The correlational nature of our analysis, stemming from the nature of the available data, restricts the establishment of a causal link between identified factors and perceptions. This limitation underscores the need for caution in interpreting the observed relationships, as they do not imply direct causal effects. Further, the absence of a baseline data set on mobile money usage before the e-levy's implementation necessitated reliance on self-reported behavioural changes, introducing potential biases and recall errors. Despite these constraints, the study represents a valuable starting point, providing initial insights into the primary factors correlated with agreement and behavioural changes regarding the e-levy. These insights can serve as a foundation for future research and policy-making, facilitating a more nuanced understanding of the complex dynamics surrounding the e-levy in Ghana.

Policy-making concerning mobile money taxation in Ghana must carefully consider its potential negative implications for financial inclusion. The fact that half of our sample altered

their mobile money usage to adapt to the e-levy, and that the most used coping strategy is using more cash, highlights the threat it poses to mobile money adoption, particularly in the short term. To mitigate this risk and safeguard financial inclusion, policy-makers should focus on enhancing public agreement with the e-levy. This involves leveraging the identified correlates of people's perceptions on the e-levy to inform targeted actions that foster agreement. Recognising that knowledge plays a crucial role in driving agreement, policy-makers should prioritise the development and implementation of robust communication strategies. These strategies should be designed to disseminate clear and accessible information about the e-levy design, covering key components such as the tax rate, exemption thresholds and affected transactions. Moreover, engagement with various stakeholders in the policy-making process is essential to increase agreement, and earmarking the usage of tax revenue from the e-levy can contribute to building trust and garnering support for the policy.

The low level of knowledge about the design of the e-levy, coupled with a high level of disagreement, raises questions about the drivers of the general dissatisfaction and protests following the announcement of the e-levy. Some participants in focus group discussions suggested that the e-levy may be the 'last straw' after a series of fiscal policies implemented by the government to increase tax revenue. Additionally, the e-levy has been introduced during a challenging economic situation, including a high inflation rate, further causing general dissatisfaction beyond the scope of tax reform. This gives an important role of political and economic factors in determining the level of agreement with the e-levy, and context for the implementation and improvement of tax policy reforms.

Further, decision-makers must carefully consider several key points to ensure the effectiveness and acceptance of such policies. One crucial aspect pertains to the identification of affected transactions and the tax base, as the e-levy primarily aims to maximise revenue derived from mobile money usage. Policy-makers should be attentive to the fact that the tax design must not disrupt the normal flow of mobile money transactions. Given that this is a tax on transaction values, fewer transactions at lower values could imply lower revenue streams, especially if individuals revert back to cash transactions. Ideally, consumers should be incentivised to maintain or even increase their usage of mobile money, avoiding reverting to cash transactions or engaging in evasion strategies, whether legal or illegal. A strategic option for decision-makers involves a careful selection of the tax base and affected transactions. Stakeholders argue for a focus on the value created by mobile money transactions, specifically targeting fees rather than transaction values – mirroring the approach adopted by Kenya. Additionally, industry operators advocate for taxing withdrawals instead of transfers, stressing that this approach not only generates tax revenue, but also promotes digital payments by encouraging individuals to utilise funds directly from their mobile money wallets. These considerations highlight the complexity of designing taxes on mobile money, and emphasise the importance of aligning policies with the broader goal of fostering financial inclusion and adoption of digital payment.

Finally, given the embeddedness of mobile money in the daily lives of individuals, there is a critical need to prioritise the welfare of vulnerable populations. The widespread use of mobile money, and its continued usage despite disagreement with the tax, underscores the potentially negative implications that taxation could have, especially among vulnerable populations. In designing taxation policies, the government must ensure that the objective of revenue collection aligns with the well-being of the population. Therefore, policy-makers should adopt a balanced approach, recognising the importance of revenue generation while minimising adverse effects on vulnerable groups and emphasising the overall welfare of the

population. This nuanced strategy will be pivotal in designing a tax policy that is both economically viable and socially responsible, considering the diverse needs of citizens.

While this study provides an initial exploration into understanding people's perceptions and reactions to the e-levy, further research is imperative to provide more comprehensive guidance for policy-making. Future analyses should look deeper into the national-level impact of the e-levy on mobile money adoption, shedding light on potential implications for financial inclusion. Moreover, it is crucial to conduct a detailed examination of the distribution of the tax burden among different segments of the population to unveil equity implications associated with the levy. Given widespread disagreement on the reform and its perceived impact on adoption of mobile money, it becomes paramount to assess the efficiency of the e-levy in collecting tax revenue. A comparative analysis of the tax's revenue collection efficiency against potential welfare losses would contribute valuable insights, helping policymakers to make informed decisions for the benefit of both the government's fiscal objectives and the financial well-being of the population. These avenues for future studies are essential for fostering a more nuanced understanding of the e-levy's multifaceted implications, and refining strategies that improve the policy.

Appendix

Appendix Table 1 Definition of variables of interest

Variable	Role in the study and definition	Question asked to collect information
Knowledge variables	Knowledge variables are used to explain agreement and behavioural change. Tell whether the respondent knows about different characteristics of the e-levy. It is equal to 1 if response is correct, and 0 if not.	<p>Please answer these following questions about the e-levy:</p> <ul style="list-style-type: none"> • Implementation date • Modification date • Current daily threshold for mobile money • Current daily threshold for bank transfers • Tax rate at implementation • Current tax rate <p>Please select all the statements that are true: The current tax rate is applied to</p> <ul style="list-style-type: none"> • Sending • Receiving • Payments • Withdrawals • Deposits
Agreement variables	<p>Agreement variables are used as outcomes. Agreement variables are also used to estimate perceptions on different factors about the e-levy. We use them to explain behavioural change. These responses are possible:</p> <p>1: Strongly disagree 2: Disagree 3: Neutral 4: Agree 5: Strongly agree</p>	<p>How much do you agree with the introduction of the tax on a scale of 1 to 5, where 1 means strongly disagree and 5 means completely agree?</p> <p>How much do you agree with the current rate of the e-levy?</p> <p>How satisfied are you with the exemption threshold?</p> <p>How fair do you think the e-levy is?</p> <p>How transparent do you think the usage of revenue from the e-levy is?</p> <p>Do you think the e-levy can achieve these purposes?</p> <p>How satisfied are you with the policy change?</p>
Behavioural change variable	This variable is used to assess behavioural change in the face of the e-levy. It is used as an outcome equal to 1 if a coping strategy has been applied to avoid paying the e-levy, and 0 if not.	<p>What strategies have you been applying to avoid paying the e-levy?</p> <ul style="list-style-type: none"> • I did not change my behaviour • I use more cash to transact • I make transfers from an agent account • I only buy from traders when e-levy is not applied • I transact below the daily threshold/spread my transaction over many days to remain below the daily threshold limit • Other
E-levy for national development	We include this variable in regressions to explain agreement and behavioural change in order to compare respondents who think the e-levy is for national development to other respondents. It is equal to 1 if the respondent thinks that the only purpose of the e-levy is national development, and 0 if not.	<p>What do you think the purposes of the e-levy are?</p> <ul style="list-style-type: none"> • To expand the tax base • To stop borrowing from the International Monetary Fund • To tax the informal sector • To contribute to national development • Other
Political affiliation variables	Used as control variables to explain agreement and behavioural change. These variables allow us to measure the importance of political preferences to explain agreement and behavioural change in the face of the e-levy.	<p>Which political party are you supporting?</p> <ul style="list-style-type: none"> • National Democratic Congress (NDC) • New Patriotic Party (NPP) • Convention People's Party (CPP) • None of them • Other • Refuse to say
Mobile money user	This variable is equal to 1 if the respondent ever used mobile money before, and 0 if not.	<p>Have you ever used mobile money before?</p> <ul style="list-style-type: none"> • No • Yes, mobile banking • Yes, mobile money • Yes, both

Receive	Refers to transfers but from the point of view of the receiving account.	<p>What do you use mobile money services for?</p> <p>1 Airtime/data</p> <p>2 Receive money</p> <p>3 Send money</p> <p>4 Receive salary payments</p> <p>5 Bill and utility payments</p> <p>6 Receive payments (for business or services)</p> <p>7 Make deposits</p> <p>8 Withdraw money</p> <p>9 Savings</p> <p>10 Insurance</p> <p>11 Loans</p> <p>12 Online shopping</p> <p>13 Payments in store</p> <p>99 Other</p> <p>A respondent can select multiple use cases.</p>	
Send	Equal to 1 if the respondent uses mobile money to send money.		
Airtime	Airtime purchasing through a mobile money account.		
Withdrawal	Withdraw money from a mobile money account through a mobile money agent.		
Deposit	Incorporate money in a mobile money wallet that can be used to make payment or make transfers.		
Saving	Store money in a mobile money wallet.		
Receive payment	Receive a payment for a good/service through a mobile money account (merchant account or personal account).		
Pay bill	Use a mobile money account to pay utility bills.		
Payment in store	Make a merchant payment to pay in store.		
Payment online	Make a merchant payment to pay online.		
Loan	Borrow money from a mobile money account.		
Insurance	Subscribe to insurance services provided by mobile money operators.		
Receive salary	Receive salary by mobile money.		
Age	Age of the respondent		What is your age?
Gender	Gender of the respondent, equal to 1 if male, and 0 if female.		<p>What is your gender?</p> <ul style="list-style-type: none"> • Male • Female
Education (1 if ever attended school)	Tells whether the respondent ever attended school or not. Equal to 1 if yes, 0 if not.	Have you ever attended school?	
Access to main electricity grid	Used to analyse economic situation of the responded. Equal to 1 if household has access to the main electricity grid, and 0 if not.	<p>What is your main power source for light?</p> <ul style="list-style-type: none"> • Candles and lanterns • National electricity grid • Mains generator • Solar • Rechargeable battery • Other 	
Access to piped water	Equal to 1 if the household has access to piped water (in house or communal), and 0 if not.	<p>Do you have access to piped water?</p> <ul style="list-style-type: none"> • No • Yes, in the house • Yes, communal access 	
Married	Equal to 1 if the respondent is married or in a consensual union, and 0 if not.	<p>What is your marital status</p> <ul style="list-style-type: none"> • Married (or consensual union) • Single • Widowed • Separated • Divorced • Other 	
Employed (or self-employed)	Equal to 1 if the respondent is a farmer, employed or self-employed, and 0 if not.	<p>What is your economic status?</p> <ul style="list-style-type: none"> • Farmer • Employer or self-employed • Employee • Pensioner • Unemployed 	

		<ul style="list-style-type: none"> • Student • Inactive • Sick or disabled • Other
Social media usage	Equal to 1 if social media is among the preferred information sources of the respondent.	What are the two information sources that you use the most? <ul style="list-style-type: none"> • TV • Radio • Newspapers • Social media • None
Mobile phone ownership	Equal to 1 if the respondent has a mobile phone, and 0 if not.	Do you personally own a mobile phone? <ul style="list-style-type: none"> • No • Yes, basic or feature phone • Yes, smartphone

Source: Authors' own.

Appendix Table 2 Summary of focus groups

Geographical areas	Focus group identifiers	Participant considerations	Number of focus groups
Greater Accra	<ul style="list-style-type: none"> • 1 group of (urban) students • 1 group of (urban) formal workers • 1 group of (urban) informal workers • 1 group of (rural) farmers • 1 group of (rural) non-agri workers PLUS: <ul style="list-style-type: none"> • Merchants • 1 group only of women 	Inclusive of different genders, age, and mobile money users/non-users, political affiliation, merchants/non-merchants	7
Eastern Region	<ul style="list-style-type: none"> • 1 group of (urban) students • 1 group of (urban) formal workers • 1 group of (urban) informal workers • 1 group of (rural) farmers • 1 group of (rural) non-agri workers PLUS: <ul style="list-style-type: none"> • Merchants • 1 group only of women 	Inclusive of different genders, age, and mobile money users/non-users, political affiliation, merchants/non-merchants	7

Source: Authors' own.

Appendix Table 3 Questions for FGDs

Key issues and follow-up questions	Rationale and logic for additional questions and guidance
<p>How do you (the FGD participants) use mobile money and other electronic money transfers in your everyday lives?</p> <ul style="list-style-type: none"> • Do you use only mobile money or also other electronic payments? Which ones? • How often do you use them? When do you use them? • Can you give some examples of what purposes you use digital payments for? • Which purposes do you consider the most important? Why? • What did you do before you used digital payments for these purposes? 	<p>A broader introductory question on mobile money usage. The follow-up questions are looking for specific examples beyond just money transfer or savings, and to understand why and for what purpose these transactions are being used. Are there transactions that have become particularly important in their lives, or ones for which there is no alternative? Are there transfers that are tied to social or cultural obligations that have implications beyond economic need?</p>
<p>Do you know what the e-levy is? What do you know about it? How did you first learn about it? And how did you continue to learn about it?</p>	<p>This question is meant to objectively understand what people know about the e-levy and how they received information around it. If participants indicate multiple sources of information, we ask which sources were the most and least helpful. We made sure to capture especially incorrect information and misperceptions around the e-levy.</p>
<p>After the e-levy came in in 2022, have you changed or adapted your DFS usage behaviour in any way?</p> <ul style="list-style-type: none"> • Are you using DFS more or less now? • For what purposes are you using them more/less? • Are there any areas of your life in which the e-levy has had a particularly strong effect? 	<p>We made sure this question was as open as possible, to factor in adaptation strategies we have not considered (this also includes shifts between mobile money and banking). Follow-up questions encouraged participants to explore impacts that extend beyond mobile money usage and paint a broader picture within economic, political and social behaviour frames.</p>
<p>Did the e-levy exemptions lead to change in your behaviour?</p> <ul style="list-style-type: none"> • For non-merchants: Did the e-levy exemption change where you normally buy things? Or how you use mobile money? • For merchants: Did you see any changes in your c'ients' behaviour due to the e-levy and its exemptions? Do you think the merchant exemption is enough incentive to register with the GRA? Why or why not? 	<p>Follow-up to previous question focusing on merchants' exemptions.</p>
<p>What were your reactions when you first heard about the e-levy?</p> <ul style="list-style-type: none"> • What did you think about it? Did you think there would be good sides or bad sides to it? • How did you feel? Was there an instance or aspect that was particularly emotional for you? • Do you think the same now as you did when you first heard about it? • Has your perception changed in any way? (If so) Why? (Or) Why not? <p>Note: Make sure to follow up with the most recent reactions with the latest change in policy if not brought up naturally.</p>	<p>Follow-up questions tried to paint a picture of perceptions with specific examples of what exactly was the reason behind their reaction. If not naturally brought up by the participants, facilitators referred to moments of policy change with the e-levy, most importantly the recent change in rate. We made sure to frame the question in a way that allows for both positive and negative reactions.</p>
<p>In your view: How does the e-levy fit into the overall situation of the country?</p> <ul style="list-style-type: none"> • Think about issues like inflation, national debt, and so on. Do you see the e-levy connected to these in any way? • Why do you think the government imposed the e-levy? Do you believe it was reasonable? • Would you have preferred the government use other means to achieve the same goals? Which ones? 	<p>Follow-up questions are to focus on participant's knowledge of the rationale for the e-levy. We did not correct participants about any incorrect information as it was important to assess how much knowledge around this topic actually exists. We made sure to follow up on how they perceive the e-levy policy in relation to Ghana's problems and possible solutions.</p>
<p>Do you think the e-levy is a fair or unfair tax?</p> <ul style="list-style-type: none"> • Why? In what ways is it fair or unfair? • Who in society do they think the e-levy burdens most or least? 	<p>Follow-up questions should ask for concrete examples of what participants consider fair/unfair taxes are. We asked them to elaborate on their criteria for fairness, and what elements of the e-levy fit into being fair/unfair.</p>
<p>What, in your view, makes a tax fair or unfair? Are there any taxes you see as particularly fair, or are happy to pay?</p>	
<p>What changes would you like to see to improve the e-levy?</p>	<p>Follow-up questions should ask for specific examples with comparison to other taxes in the country or other taxes they</p>

-
- If the government were to redesign taxes on mobile money, and you (the participants) were allowed to decide how, what would you change?
 - Would you like the government to keep the e-levy, remove it, or change it?
-

are aware of. The more detailed participants are about rates, length of policy, revenue use, etc., the better. We used the flow from the previous question to inform how follow-up questions were asked.

Source: Authors' own.

Appendix Table 4 Descriptive statistics of the survey sample

Variable	Obs	Mean	Std. Dev.	Min	Max
Gender of household head					
Female	1497	.321	.467	0	1
Male	1497	.679	.467	0	1
Age of household head	1497	45.21	14.881	18	98
Household size					
Household size	1500	4.454	2.636	1	19
Rural area	575	5.047	3.073924	1	19
Urban area	925	4.085	2.246752	1	15
Access to piped water	1500	.623	.485	0	1
Source of light					
National electricity grid	1500	.898	.303	0	1
Candles and lanterns	1500	.039	.193	0	1
Mains generator	1500	.002	.045	0	1
Solar	1500	.005	.073	0	1
Rechargeable battery	1500	.014	.118	0	1
Other	1500	.042	.201	0	1
Location - area					
Rural	1500	.383	.486	0	1
Urban	1500	.617	.486	0	1
Location - region					
Ahafo Region	1500	.02	.14	0	1
Ashanti Region	1500	.181	.385	0	1
Bono East Region	1500	.028	.165	0	1
Bono Region	1500	.05	.218	0	1
Central Region	1500	.098	.297	0	1
Eastern Region	1500	.131	.337	0	1
Greater Accra Region	1500	.153	.36	0	1
North East Region	1500	.01	.1	0	1
Northern Region	1500	.06	.238	0	1
Oti Region	1500	.01	.1	0	1
Savannah Region	1500	.06	.238	0	1
Upper East Region	1500	.04	.196	0	1
Upper West Region	1500	.01	.1	0	1
Volta Region	1500	.05	.218	0	1
Western North Region	1500	.04	.196	0	1
Western Region	1500	.06	.238	0	1
Gender of RR					
Female	1500	.591	.492	0	1
Male	1500	.409	.492	0	1
Age of RR	1500	37.587	14.091	18	92
Age group of RR					
18-34 years	1500	.497	.5	0	1
35-50 years	1500	.325	.468	0	1
50+ years	1500	.178	.383	0	1
Employed	1500	.675	.469	0	1
Educated	1500	.849	.358	0	1

Source: Authors' own.

Appendix Table 5 Ghana National Census vs. DIGITAX survey

	2021 Census	DIGITAX survey
Population aged 18+		
Male	48%	41%
Female	52%	59%
Location		
Urban	56.7%	61.7%
Rural	43.3%	38.3%
Average household size	3.8	4.5
Urban	3.3	4.1
Rural	4.0	5.0
Location - region		
Ahafo Region	2%	2%
Ashanti Region	18%	18%
Bono East Region	3%	4%
Bono Region	5%	4%
Central Region	10%	9%
Eastern Region	13%	10%
Greater Accra Region	15%	18%
North East Region	1%	2%
Northern Region	6%	8%
Oti Region	1%	2%
Savannah Region	6%	2%
Upper East Region	4%	4%
Upper West Region	1%	3%
Volta Region	5%	5%
Western North Region	4%	3%
Western Region	6%	7%

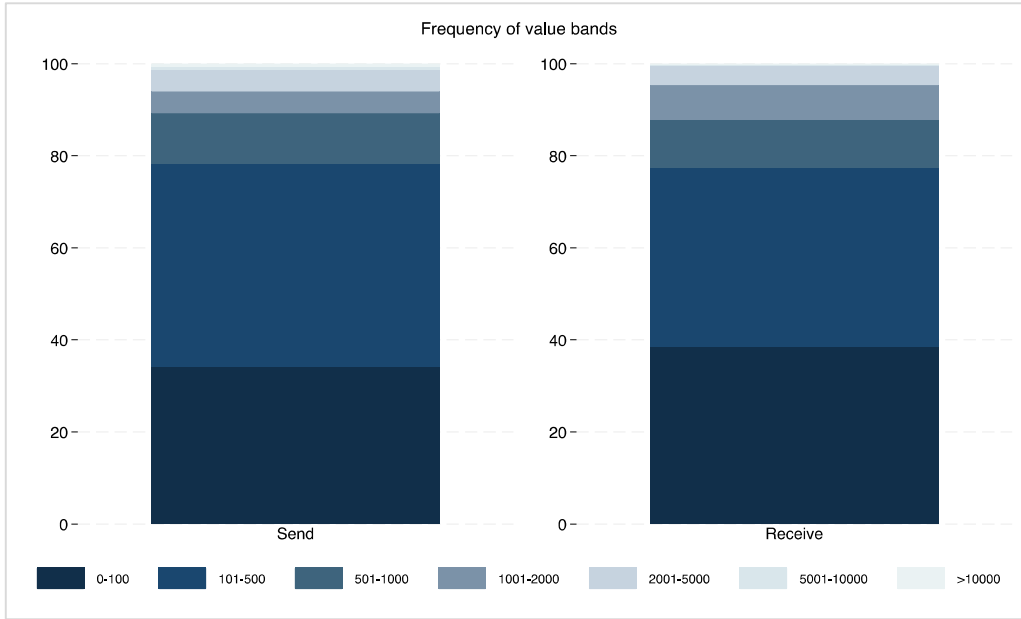
Source: Ghana 2021 Population and Housing Census – General Report (2021); DIGITAX Survey (2023).

Appendix Table 6 Demographics by mobile money use cases

	All	Send	Receive	Pay bills	Withdraw	Deposit	Airtime
Age	37.59	36.65	37.36	34.54	36.55	34.03	34.79
Gender: 1 if male	0.41	0.45	0.42	0.53	0.41	0.44	0.44
Education	0.85	0.88	0.87	1	0.89	0.92	0.9
Access to electricity	0.9	0.91	0.91	1	0.92	0.94	0.93
Access to piped water	0.62	0.62	0.64	0.68	0.69	0.65	0.64
Married	0.59	0.57	0.58	0.49	0.56	0.51	0.53
Employed	0.67	0.69	0.68	0.66	0.68	0.67	0.66
Household size	4.45	4.34	4.36	3.85	4.28	4.29	4.22
Rural area	0.38	0.36	0.37	0.16	0.35	0.32	0.34
Own the house	0.53	0.52	0.52	0.53	0.52	0.51	0.51
No mobile phone	0.05	0.01	0.01	0	0.01	0	0.01
Smartphone	0.54	0.64	0.59	0.91	0.62	0.73	0.71
Basic phone	0.41	0.36	0.4	0.09	0.38	0.27	0.28
Have a disability	0.01	0.01	0.01	0	0.01	0.01	0.01
Distance nearest agent	11.94	10.78	11.21	6.34	9.83	7.04	10.15
Distance nearest bank agency	731.43	765.8	718.58	314.44	883.71	1069.57	842.55
Have a bank account	0.39	0.46	0.43	0.81	0.46	0.51	0.51
Use social media	0.51	0.62	0.56	0.94	0.59	0.72	0.71
N	1500	1076	1239	68	741	446	852

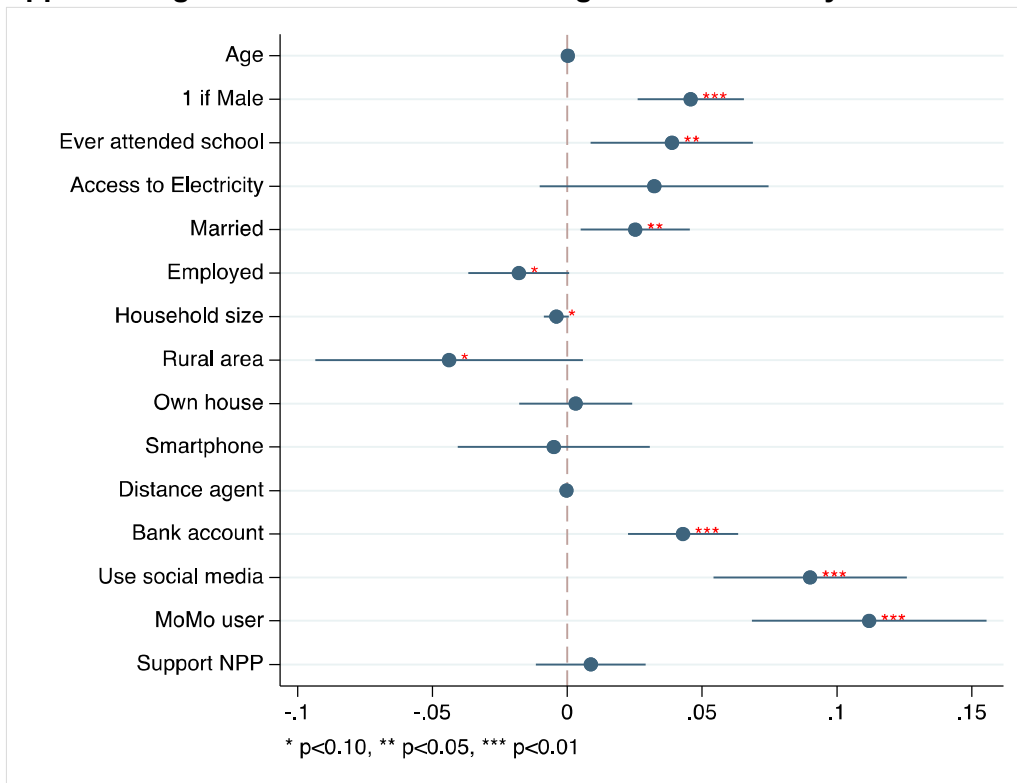
Source: Authors' own.

Appendix Figure 1 Transaction amounts



Source: Authors' own.

Appendix Figure 2 Correlates of knowledge about the e-levy – index of knowledge



Source: Authors' own.

Appendix Table 7 Pairwise correlation of different components of the agreement index

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1) Agreement with introduction	1.000						
(2) Agreement with rate	0.691*	1.000					
(3) Satisfaction with threshold	0.524*	0.619*	1.000				
(4) Fairness	0.679*	0.682*	0.543*	1.000			
(5) Transparency	0.451*	0.460*	0.400*	0.560*	1.000		
(6) Capacity to achieve purpose	0.420*	0.400*	0.299*	0.440*	0.433*	1.000	
(7) Satisfaction with modification	0.555*	0.638*	0.589*	0.630*	0.519*	0.492*	1.000

* $p < 0.01$

Source: Authors' own.

Appendix Table 8 Who knows about different designs of the e-levy: mean difference

Appendix Table 8.1 Knowledge about current rate

Variables	Do not know the current rate	Know the current rate	Mean difference
Age	37.9975	35.8043	2.1933**
Gender (1 if male)	0.3938	0.4733	-0.0795**
Educated	0.8335	0.9146	-0.0811***
Access to electricity	0.8901	0.9324	-0.0423**
Access to water	0.6218	0.6263	-0.0045
Married	0.5874	0.6263	-0.039
Employed	0.6694	0.6975	-0.0281
Household size	4.5554	4.0142	0.5411***
Rural area	0.3888	0.3594	0.0294
Own the house	0.5275	0.548	-0.0206
No mobile phone	0.0632	0.0071	0.0560***
Smartphone	0.4996	0.7046	-0.2050***
Basic phone	0.4372	0.2883	0.1490***
Have a disability	0.0131	0.0071	0.006
Distance nearest agent	12.0734	11.3536	0.7198
Distance nearest bank	657.6349	1051.573	-393.9380**
Access to a bank account	0.3634	0.516	-0.1526***
Social media usage	0.4676	0.6904	-0.2228***
No party	0.3437	0.3843	-0.0406
Support NDC	0.2592	0.2491	0.0101
Support NPP	0.2748	0.2491	0.0257
Support CPP	0.0016	0.0036	-0.0019
Mobile money user	0.9163	0.968	-0.0516***
N	1219	281	

Source: Authors' own. *** p<0.01, ** p<0.05, * p<0.1

Appendix Table 8.2 Knowledge about mobile money threshold

Variables	Do not know mobile money threshold	Know mobile money threshold	Mean difference
Age	37.6663	37.4537	0.2126
Gender (1 if male)	0.3539	0.5	-0.1461***
Educated	0.8241	0.8897	-0.0656***
Access to electricity	0.8817	0.9253	-0.0436***
Access to water	0.6258	0.6174	0.0084
Married	0.5906	0.6014	-0.0108
Employed	0.6812	0.6637	0.0175
Household size	4.5117	4.3577	0.1541
Rural area	0.3923	0.3683	0.024
Own the house	0.5245	0.5427	-0.0182
No mobile phone	0.0704	0.0231	0.0472***
Smartphone	0.4691	0.653	-0.1839***
Basic phone	0.4606	0.3238	0.1367***
Have a disability	0.0128	0.0107	0.0021
Distance nearest agent	12.2133	11.4804	0.7329
Distance nearest bank	720.3945	749.8559	-29.4614
Access to a bank account	0.3241	0.5053	-0.1812***
Social media usage	0.4307	0.6406,	-0.2099***
No party	0.3571	0.3416	0.0155
Support NDC	0.2623	0.2491	0.0131
Support NPP	0.2591	0.2883	-0.0292
Support CPP	0.0021	0.0018	0.0004
Mobile money user	0.8998	0.9698	-0.0700***
N	938	562	

Source: Authors' own. *** p<0.01, ** p<0.05, * p<0.1

Appendix Table 8.3 Knowledge about affected transactions: sending

Variables	Do not know that sending is affected	Know that sending is affected	Mean difference
Age	39.6541	37.0869	2.5672***
Gender (1 if male)	0.2808	0.4396	-0.1587***
Educated	0.7021	0.8841	-0.1821***
Access to electricity	0.8116	0.9189	-0.1072***
Access to water	0.6027	0.6275	-0.0247
Married	0.6541	0.5803	0.0738**
Employed	0.7123	0.6656	0.0468
Household size	5.1164	4.2939	0.8226***
Rural area	0.4863	0.3584	0.1279***
Own the house	0.6233	0.5091	0.1142***
No mobile phone	0.1267	0.0348	0.0919***
Smartphone	0.25	0.6076	-0.3576***
Basic phone	0.6233	0.3576	0.2657***
Have a disability	0.0068	0.0132	-0.0064
Distance nearest agent	19.1828	10.192	8.9907***
Distance nearest bank	756.613	725.346	31.267
Access to a bank account	0.1336	0.4545	-0.3209***
Use social media	0.2055	0.5828	-0.3773***
No party	0.3116	0.3609	-0.0493
Support NDC	0.3253	0.2409	0.0844***
Support NPP	0.2842	0.2666	0.0177
Support CPP	0	0.0025	-0.0025
Mobile money user	0.7911	0.9586	-0.1675***
N	292	1208	

Source: Authors' own. *** p<0.01, ** p<0.05, * p<0.1

Appendix Table 8.4 Knowledge about implementation date

Variables	Do not know implementation date	Know implementation date	Mean difference
Age	37.672	35.6719	2.0001
Gender (1 if male)	0.4018	0.5625	-0.1607**
Educated	0.8454	0.9219	-0.0765*
Access to electricity	0.8948	0.9688	-0.0739*
Access to water	0.6253	0.5625	0.0628
Married	0.5996	0.4844	0.1152*
Employed	0.679	0.5781	0.1008*
Household size	4.4944	3.5469	0.9476***
Rural area	0.3844	0.3594	0.025
Own the house	0.5313	0.5312	0.0001
No mobile phone	0.0543	0.0156	0.0387
Smartphone	0.5244	0.8438	-0.3194***
Basic phone	0.4213	0.1406	0.2807***
Have a disability	0.0104	0.0469	-0.0364***
Distance nearest agent	12.1442	7.3438	4.8004
Distance nearest bank	749.1031	334.9531	414.1499
Access to a bank account	0.3823	0.6094	-0.2271***
No party	0.493	0.875	-0.3820***
Social media usage	0.3482	0.4219	-0.0737
Support NDC	0.2584	0.2344	0.024
Support NPP	0.2737	0.1875	0.0862
Support CPP	0.0014	0.0156	-0.0142**
Mobile money user	0.9248	0.9531	-0.0283
N	1436	64	

Source: Authors' own. *** p<0.01, ** p<0.05, * p<0.1

Appendix Table 9 Correlates of agreement variables (5 level variables and OLS estimator)

VARIABLES	(1) Index	(2) Introduction	(3) Rate	(4) Threshold	(5) Fairness	(6) Transparency	(7) Purpose	(8) Modification
Know current rate	0.161**	0.315***	0.334***	0.155	0.250***	0.0931	-0.00818	0.308***
Know mobile money threshold	-0.109*	-0.121	-0.0717	-0.0515	-0.121	-0.0507	-0.0619**	-0.0841
Know affected transactions	0.0856	0.206***	0.102	0.107	0.121	0.116*	-0.0449	-0.0117
Age	0.00363	0.00357	0.00194	0.00179	0.00474	0.00249	0.00131	0.00416
Gender	0.123**	0.183**	0.0617	0.198***	0.192***	0.0139	0.0180	0.102
Married	-0.0566	-0.0286	0.0531	-0.00396	-0.104	-0.0380	-0.0640*	-0.0468
Employed	-0.118*	-0.111	-0.140**	-0.0886	-0.0867	-0.0971	-0.0282	-0.136*
Access to piped water	0.157**	0.134	0.127	0.121	0.0905	0.0903	0.102***	0.0554
Own the house	0.0635	0.0758	0.0964	0.0645	0.0491	0.0390	-0.0226	0.0132
Household size	-0.0117	-0.0121	-0.0323*	-0.00593	-0.0115	-0.0179	0.00934	-0.0170
Have a bank account	0.00416	-0.0223	-0.00172	-0.0694	-0.0778	-0.0620	0.0682**	-0.0597
Use social media	0.0169	-0.0362	-0.0193	0.0336	-0.0840	0.00861	0.0207	-0.00648
Distance from mobile money agent	0.00529	-0.00401	-0.00181	0.00659	-0.000812	0.0118**	0.000372	-0.00197
Send	-0.0312	-0.0655	-0.0158	-0.0372	-0.0328	-0.0183	8.08e-06	-0.0429
Withdraw	-0.174**	-0.194**	-0.152*	-0.220***	-0.181**	-0.0664	-0.0460	-0.247***
Deposit	0.0647	0.152*	0.164*	0.109	0.0884	-0.0394	0.0140	0.179**
Receive payment	0.221*	0.328**	0.149	0.335**	0.0779	-0.000216	0.0541	0.347**
Support NPP	0.288***	0.298***	0.246***	0.115	0.316***	0.340***	0.106***	0.254***
E-levy for national development	0.131**	0.219***	0.261***	0.193***	0.241***	0.0181	-0.00672	0.0734
Constant	-0.0577	2.116***	2.200***	2.400***	2.070***	1.938***	0.0931	2.214***
Observations	1,223	1,223	1,223	1,223	1,223	1,223	934	1,223
R-squared	0.207	0.183	0.195	0.194	0.177	0.159	0.193	0.220

Source: Authors' own. *** p<0.01, ** p<0.05, * p<0.1

Appendix Table 10 Correlates of agreement variables (dummy variables and logistic estimator)

VARIABLES	(1) Introduction	(2) Rate	(3) Threshold	(4) Fairness	(5) Transparency	(6) Purpose	(7) Modification
Know current rate	0.778***	0.931***	0.493**	0.851***	0.484	-0.00418	0.651***
Know mobile money threshold	-0.161	0.116	0.189	-0.216	0.0560	-0.478**	0.184
Know affected transactions	0.366*	-0.0182	0.0599	0.238	0.159	-0.284	-0.0861
Age	0.0149*	0.00883	0.00110	0.0165*	0.00930	0.00920	0.0249***
Gender	0.456***	0.157	0.646***	0.530***	0.431*	0.160	0.588***
Married	0.0444	0.0835	0.00492	-0.341	0.132	-0.432*	-0.136
Employed	0.0307	-0.0159	-0.264	0.102	0.0233	-0.194	-0.252
Access to piped water	0.377*	0.358	0.282	0.506**	0.355	0.729***	-0.0662
Own the house	0.209	0.470**	0.113	0.00746	-0.258	-0.207	-0.144
Household size	-0.0227	-0.0816	0.0113	-0.000574	-0.0233	0.0753	-0.0889
Have a bank account	0.0148	0.388*	-0.102	-0.204	-0.0923	0.527**	0.105
Use social media	0.174	0.0289	0.500**	-0.0964	0.531	0.138	0.0921
Distance from mobile money agent	-0.0343**	-0.0536**	-0.0167	-0.0158	0.0294	0.000404	-0.0254
Send	-0.272	0.0624	-0.224	0.0474	-0.215	0.01000	0.161
Withdraw	-0.513**	-0.593**	-0.836***	-0.496**	-0.581*	-0.349	-0.539**
Deposit	0.285	0.173	0.592**	0.233	-0.0195	0.135	0.490*
Receive payment	0.994***	0.643**	0.623**	0.519*	0.443	0.263	0.978***
Support NPP	0.675***	0.511**	0.289	0.868***	1.527***	0.775***	0.727***
E-levy for national development	0.568***	0.610***	0.462**	0.750***	0.391	-0.0823	0.212
/cut1	2.610***	2.711***	2.369***	3.025***	3.372***	2.334***	3.920***
Observations	1,223	1,223	1,223	1,223	1,223	934	1,223
Pseudo R2	0.161	0.179	0.193	0.180	0.238	0.213	0.207

Source: Authors' own. *** p<0.01, ** p<0.05, * p<0.1.

Appendix Table 11 Correlates of agreement (dummy variables and OLS estimator)

VARIABLES	(1) Index	(2) Introduction	(3) Rate	(4) Threshold	(5) Fairness	(6) Transparency	(7) Purpose	(8) Modification
Know current rate	0.161**	0.315***	0.334***	0.155	0.250***	0.0931	-0.00818	0.308***
Know mobile money threshold	-0.109*	-0.121	-0.0717	-0.0515	-0.121	-0.0507	-0.0619**	-0.0841
Know affected transactions	0.0856	0.206***	0.102	0.107	0.121	0.116*	-0.0449	-0.0117
Age	0.00363	0.00357	0.00194	0.00179	0.00474	0.00249	0.00131	0.00416
Gender	0.123**	0.183**	0.0617	0.198***	0.192***	0.0139	0.0180	0.102
Married	-0.0566	-0.0286	0.0531	-0.00396	-0.104	-0.0380	-0.0640*	-0.0468
Employed	-0.118*	-0.111	-0.140**	-0.0886	-0.0867	-0.0971	-0.0282	-0.136*
Access to piped water	0.157**	0.134	0.127	0.121	0.0905	0.0903	0.102***	0.0554
Own the house	0.0635	0.0758	0.0964	0.0645	0.0491	0.0390	-0.0226	0.0132
Household size	-0.0117	-0.0121	-0.0323*	-0.00593	-0.0115	-0.0179	0.00934	-0.0170
Have a bank account	0.00416	-0.0223	-0.00172	-0.0694	-0.0778	-0.0620	0.0682**	-0.0597
Use social media	0.0169	-0.0362	-0.0193	0.0336	-0.0840	0.00861	0.0207	-0.00648
Distance from mobile money agent	0.00529	-0.00401	-0.00181	0.00659	-0.000812	0.0118**	0.000372	-0.00197
Send	-0.0312	-0.0655	-0.0158	-0.0372	-0.0328	-0.0183	8.08e-06	-0.0429
Withdraw	-0.174**	-0.194**	-0.152*	-0.220***	-0.181**	-0.0664	-0.0460	-0.247***
Deposit	0.0647	0.152*	0.164*	0.109	0.0884	-0.0394	0.0140	0.179**
Receive payment	0.221*	0.328**	0.149	0.335**	0.0779	-0.000216	0.0541	0.347**
Support NPP	0.288***	0.298***	0.246***	0.115	0.316***	0.340***	0.106***	0.254***
E-levy for national development	0.131**	0.219***	0.261***	0.193***	0.241***	0.0181	-0.00672	0.0734
Constant	-0.0577	2.116***	2.200***	2.400***	2.070***	1.938***	0.0931	2.214***
Observations	1,223	1,223	1,223	1,223	1,223	1,223	934	1,223
R-squared	0.207	0.183	0.195	0.194	0.177	0.159	0.193	0.220

Source: Authors' own. *** p<0.01, ** p<0.05, * p<0.1

Appendix Table 12 Step regressions: correlates of the agreement index

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Know current rate	0.138*	0.164**	0.162**	0.161**	0.168**	0.166**	0.161**
	(0.0744)	(0.0767)	(0.0769)	(0.0778)	(0.0774)	(0.0774)	(0.0779)
Know mobile money threshold		-0.103	-0.111*	-0.123*	-0.110*	-0.113*	-0.109*
		(0.0645)	(0.0645)	(0.0638)	(0.0646)	(0.0639)	(0.0640)
Know affected			0.110*	0.102	0.0930	0.0909	0.0856
			(0.0638)	(0.0632)	(0.0633)	(0.0628)	(0.0626)
Age				0.00416	0.00419	0.00366	0.00363
				(0.00273)	(0.00278)	(0.00277)	(0.00278)
Gender				0.134**	0.133**	0.126**	0.123**
				(0.0617)	(0.0623)	(0.0618)	(0.0618)
Married				-0.0242	-0.0281	-0.0560	-0.0566
				(0.0678)	(0.0672)	(0.0660)	(0.0657)
Employed				-0.113*	-0.114*	-0.117*	-0.118*
				(0.0654)	(0.0653)	(0.0643)	(0.0640)
Access to water				0.144*	0.143*	0.159**	0.157**
				(0.0759)	(0.0756)	(0.0753)	(0.0752)
Own the house				0.0696	0.0706	0.0633	0.0635
				(0.0686)	(0.0689)	(0.0685)	(0.0684)
Household size				-0.0101	-0.0101	-0.0100	-0.0117
				(0.0149)	(0.0149)	(0.0148)	(0.0148)
Have a bank account				0.0161	0.0173	0.00661	0.00416
				(0.0692)	(0.0689)	(0.0683)	(0.0681)
Use social media				0.0254	0.0102	0.0211	0.0169
				(0.0747)	(0.0776)	(0.0777)	(0.0775)
Distance from mobile money agent				0.00548	0.00376	0.00450	0.00529
				(0.00446)	(0.00457)	(0.00463)	(0.00462)
Send					-0.0202	-0.0265	-0.0312
					(0.0811)	(0.0802)	(0.0796)
Withdraw					-0.188***	-0.184***	-0.174**
					(0.0716)	(0.0712)	(0.0705)
Deposit					0.0868	0.0571	0.0647
					(0.0739)	(0.0741)	(0.0741)
Receive payment					0.225*	0.226*	0.221*
					(0.117)	(0.116)	(0.116)
Support NPP						0.297***	0.288***
						(0.0774)	(0.0766)
National development							0.131**
							(0.0620)
Constant	0.192	0.249	0.160	-0.0678	0.0324	0.0167	-0.0577
	(0.274)	(0.280)	(0.296)	(0.323)	(0.327)	(0.304)	(0.300)
Observations	1,230	1,230	1,230	1,223	1,223	1,223	1,223
R-squared	0.162	0.164	0.166	0.181	0.189	0.203	0.207

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: Authors' own.

Appendix Table 13 Step regression: correlates of agreement with introduction

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Know current rate	0.462*** (0.161)	0.517*** (0.163)	0.507*** (0.164)	0.511*** (0.168)	0.526*** (0.171)	0.528*** (0.170)	0.520*** (0.173)
Know mobile money threshold		-0.207 (0.130)	-0.246* (0.131)	-0.269** (0.133)	-0.237* (0.136)	-0.251* (0.135)	-0.235* (0.136)
Know transactions			0.438*** (0.134)	0.438*** (0.139)	0.427*** (0.141)	0.427*** (0.141)	0.406*** (0.142)
Age				0.00429 (0.00543)	0.00496 (0.00559)	0.00392 (0.00565)	0.00354 (0.00579)
Gender				0.246** (0.126)	0.251* (0.128)	0.247* (0.128)	0.235* (0.129)
Married				-0.0250 (0.134)	-0.0405 (0.135)	-0.0790 (0.135)	-0.0804 (0.136)
Employed				-0.170 (0.126)	-0.162 (0.127)	-0.165 (0.126)	-0.173 (0.126)
Access to water				0.263* (0.147)	0.245* (0.148)	0.272* (0.149)	0.256* (0.149)
Own the house				0.119 (0.138)	0.114 (0.140)	0.112 (0.140)	0.113 (0.141)
Household size				-0.0119 (0.0311)	-0.0104 (0.0316)	-0.0113 (0.0318)	-0.0167 (0.0320)
Have a bank account				-0.0552 (0.129)	-0.0523 (0.130)	-0.0778 (0.131)	-0.0815 (0.132)
Use social media				-0.00192 (0.142)	-0.0368 (0.151)	-0.0253 (0.152)	-0.0368 (0.151)
Distance mobile money agent				-0.00378 (0.00920)	-0.00661 (0.00944)	-0.00522 (0.00942)	-0.00334 (0.00936)
Send					-0.0877 (0.170)	-0.0920 (0.170)	-0.111 (0.170)
Withdraw					-0.374** (0.152)	-0.368** (0.154)	-0.336** (0.154)
Deposit					0.301* (0.164)	0.254 (0.165)	0.285* (0.167)
Receive payment					0.398 (0.276)	0.398 (0.277)	0.375 (0.279)
Support NPP						0.476*** (0.145)	0.461*** (0.143)
National development							0.362*** (0.134)
/cut1	-1.026** (0.426)	-1.152*** (0.444)	-0.803* (0.484)	-0.582 (0.565)	-0.720 (0.577)	-0.723 (0.552)	-0.520 (0.548)
/cut2	0.307 (0.423)	0.185 (0.440)	0.546 (0.480)	0.783 (0.561)	0.650 (0.574)	0.656 (0.548)	0.866 (0.543)
/cut3	0.976** (0.423)	0.855* (0.440)	1.219** (0.481)	1.452*** (0.559)	1.322** (0.573)	1.334** (0.546)	1.546*** (0.542)
/cut4	2.662*** (0.432)	2.541*** (0.448)	2.909*** (0.492)	3.155*** (0.579)	3.034*** (0.590)	3.059*** (0.564)	3.278*** (0.560)
Observations	1,230	1,230	1,230	1,223	1,223	1,223	1,223

Source: Authors' own. *** p<0.01, ** p<0.05, * p<0.1

Appendix Table 14 Step regressions: correlates of agreement with the rate

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Know current rate	0.558*** (0.154)	0.602*** (0.159)	0.599*** (0.159)	0.574*** (0.165)	0.586*** (0.167)	0.593*** (0.166)	0.590*** (0.168)
Know mobile money threshold		-0.160 (0.132)	-0.187 (0.132)	-0.190 (0.133)	-0.172 (0.135)	-0.180 (0.134)	-0.168 (0.135)
Know transactions			0.303** (0.138)	0.276* (0.145)	0.271* (0.145)	0.270* (0.145)	0.250* (0.146)
Age				0.00223 (0.00554)	0.00334 (0.00559)	0.00254 (0.00569)	0.00227 (0.00578)
Gender				0.104 (0.128)	0.101 (0.129)	0.0879 (0.129)	0.0657 (0.131)
Married				0.165 (0.143)	0.157 (0.142)	0.110 (0.144)	0.115 (0.146)
Employed				-0.238* (0.127)	-0.238* (0.128)	-0.248* (0.128)	-0.251* (0.129)
Access to water				0.278* (0.151)	0.254* (0.153)	0.284* (0.152)	0.262* (0.153)
Own the house				0.155 (0.142)	0.146 (0.144)	0.145 (0.144)	0.147 (0.144)
Household size				-0.0474 (0.0312)	-0.0492 (0.0317)	-0.0490 (0.0319)	-0.0545* (0.0322)
Have a bank account				-0.0258 (0.135)	-0.0268 (0.134)	-0.0547 (0.135)	-0.0656 (0.136)
Use social media				0.0191 (0.146)	-0.0351 (0.150)	-0.0257 (0.152)	-0.0453 (0.151)
Distance mobile money agent				-0.000792 (0.00955)	-0.00254 (0.00964)	-0.00134 (0.00976)	0.000439 (0.00977)
Send					0.00305 (0.168)	-0.00405 (0.169)	-0.0198 (0.169)
Withdraw					-0.301** (0.151)	-0.296* (0.153)	-0.251 (0.154)
Deposit					0.328** (0.158)	0.281* (0.159)	0.303* (0.160)
Receive payment					0.243 (0.286)	0.247 (0.288)	0.231 (0.295)
Support NPP						0.492*** (0.141)	0.471*** (0.140)
National development							0.447*** (0.134)
/cut1	-1.217*** (0.430)	-1.311*** (0.445)	-1.061** (0.480)	-0.997* (0.561)	-1.036* (0.558)	-1.043* (0.534)	-0.803 (0.529)
/cut2	0.136 (0.427)	0.0455 (0.442)	0.303 (0.478)	0.385 (0.559)	0.350 (0.557)	0.356 (0.532)	0.606 (0.528)
/cut3	1.372*** (0.429)	1.283*** (0.442)	1.543*** (0.480)	1.629*** (0.559)	1.598*** (0.560)	1.614*** (0.534)	1.873*** (0.529)
/cut4	3.440*** (0.455)	3.349*** (0.467)	3.611*** (0.507)	3.699*** (0.592)	3.675*** (0.589)	3.699*** (0.566)	3.968*** (0.559)
Observations	1,230	1,230	1,230	1,223	1,223	1,223	1,223

Source: Authors' own. *** p<0.01, ** p<0.05, * p<0.1

Appendix Table 15 Step regressions: correlates of agreement with threshold

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Know current rate	0.217 (0.155)	0.246 (0.166)	0.249 (0.168)	0.257 (0.171)	0.274 (0.172)	0.284 (0.173)	0.271 (0.174)
Know mobile money threshold		-0.0971 (0.132)	-0.130 (0.136)	-0.145 (0.140)	-0.107 (0.142)	-0.111 (0.143)	-0.0978 (0.144)
Know transactions			0.288** (0.135)	0.271* (0.138)	0.256* (0.140)	0.254* (0.140)	0.232* (0.140)
Age				0.00359 (0.00544)	0.00381 (0.00556)	0.00323 (0.00561)	0.00301 (0.00562)
Gender				0.323** (0.130)	0.328** (0.131)	0.322** (0.131)	0.307** (0.132)
Married				0.0348 (0.140)	0.0142 (0.141)	-0.00905 (0.141)	-0.00205 (0.141)
Employed				-0.177 (0.131)	-0.178 (0.131)	-0.178 (0.131)	-0.182 (0.131)
Access water				0.232 (0.159)	0.218 (0.163)	0.229 (0.163)	0.220 (0.166)
Own the house				0.0969 (0.141)	0.0912 (0.145)	0.0878 (0.146)	0.0944 (0.147)
Household size				-0.00940 (0.0326)	-0.00824 (0.0329)	-0.00865 (0.0330)	-0.0135 (0.0329)
Have a bank account				-0.151 (0.136)	-0.136 (0.135)	-0.151 (0.136)	-0.157 (0.136)
Use social media				0.0861 (0.146)	0.0400 (0.150)	0.0466 (0.151)	0.0388 (0.150)
Distance mobile money agent				0.0149* (0.00894)	0.0111 (0.00902)	0.0121 (0.00912)	0.0135 (0.00916)
Send					-0.0285 (0.167)	-0.0360 (0.167)	-0.0548 (0.168)
Withdraw					-0.400*** (0.143)	-0.399*** (0.143)	-0.373*** (0.144)
Deposit					0.136 (0.152)	0.114 (0.153)	0.141 (0.154)
Receive payment					0.633** (0.268)	0.628** (0.269)	0.618** (0.267)
Support NPP						0.241* (0.140)	0.221 (0.140)
National development							0.340*** (0.128)
/cut1	-1.433*** (0.380)	-1.489*** (0.388)	-1.254*** (0.423)	-0.970* (0.505)	-1.198** (0.533)	-1.212** (0.521)	-1.035** (0.514)
/cut2	-0.321 (0.379)	-0.376 (0.387)	-0.136 (0.423)	0.156 (0.505)	-0.0641 (0.533)	-0.0760 (0.521)	0.105 (0.514)
/cut3	1.222*** (0.381)	1.167*** (0.388)	1.413*** (0.426)	1.724*** (0.509)	1.518*** (0.536)	1.507*** (0.524)	1.694*** (0.518)
/cut4	2.979*** (0.398)	2.925*** (0.405)	3.173*** (0.444)	3.504*** (0.521)	3.309*** (0.545)	3.301*** (0.532)	3.494*** (0.525)
Observations	1,230	1,230	1,230	1,223	1,223	1,223	1,223

Source: Authors' own. *** p<0.01, ** p<0.05, * p<0.1

Appendix Table 16 Step regression: correlates of behavioural change

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Index of agreement	-0.470*** (0.0854)		-0.469*** (0.0864)	-0.492*** (0.0885)	-0.496*** (0.0888)	-0.509*** (0.0902)	-0.494*** (0.0900)
Know current rate		0.228 (0.189)	0.228 (0.204)	0.199 (0.210)	0.169 (0.211)	0.165 (0.213)	0.168 (0.212)
Know mobile money threshold		0.165 (0.155)	0.141 (0.163)	0.173 (0.170)	0.210 (0.173)	0.213 (0.174)	0.189 (0.173)
Know transactions		-0.130 (0.149)	-0.100 (0.167)	-0.0958 (0.170)	-0.0649 (0.171)	-0.0706 (0.171)	-0.0609 (0.172)
Age				-0.0184*** (0.00699)	-0.0194*** (0.00712)	-0.0197*** (0.00712)	-0.0202*** (0.00719)
Gender				-0.259 (0.168)	-0.195 (0.168)	-0.205 (0.168)	-0.205 (0.168)
Married				0.0872 (0.179)	0.0759 (0.181)	0.0557 (0.180)	0.0748 (0.181)
Employed				-0.395** (0.163)	-0.384** (0.165)	-0.384** (0.165)	-0.385** (0.167)
Access water				0.205 (0.197)	0.197 (0.204)	0.219 (0.204)	0.234 (0.202)
Own the house				0.178 (0.183)	0.162 (0.184)	0.159 (0.185)	0.164 (0.185)
Household size				-0.0279 (0.0397)	-0.0157 (0.0399)	-0.0166 (0.0401)	-0.00970 (0.0401)
Have a bank account				0.179 (0.166)	0.183 (0.167)	0.177 (0.167)	0.187 (0.168)
Use social media				-0.127 (0.191)	0.0129 (0.198)	0.0264 (0.200)	0.0333 (0.200)
Distance mobile money agent				-0.0206 (0.0137)	-0.0164 (0.0141)	-0.0159 (0.0141)	-0.0193 (0.0144)
Send					-0.651*** (0.235)	-0.658*** (0.236)	-0.637*** (0.235)
Withdraw					0.417** (0.189)	0.423** (0.189)	0.382** (0.189)
Deposit					-0.207 (0.200)	-0.234 (0.201)	-0.246 (0.201)
Receive payment					0.303 (0.324)	0.301 (0.323)	0.331 (0.317)
Support NPP						0.227 (0.192)	0.253 (0.191)
National development							-0.405** (0.159)
Constant	-0.849 (0.627)	-1.089* (0.584)	-0.935 (0.637)	-0.0960 (0.754)	-0.0112 (0.800)	-0.0149 (0.794)	0.201 (0.828)
Observations	1,101	1,213	1,101	1,096	1,096	1,096	1,096

*** p<0.01, ** p<0.05, * p<0.1

Source: Authors' own.

Appendix Table 17 Regressions with interaction terms

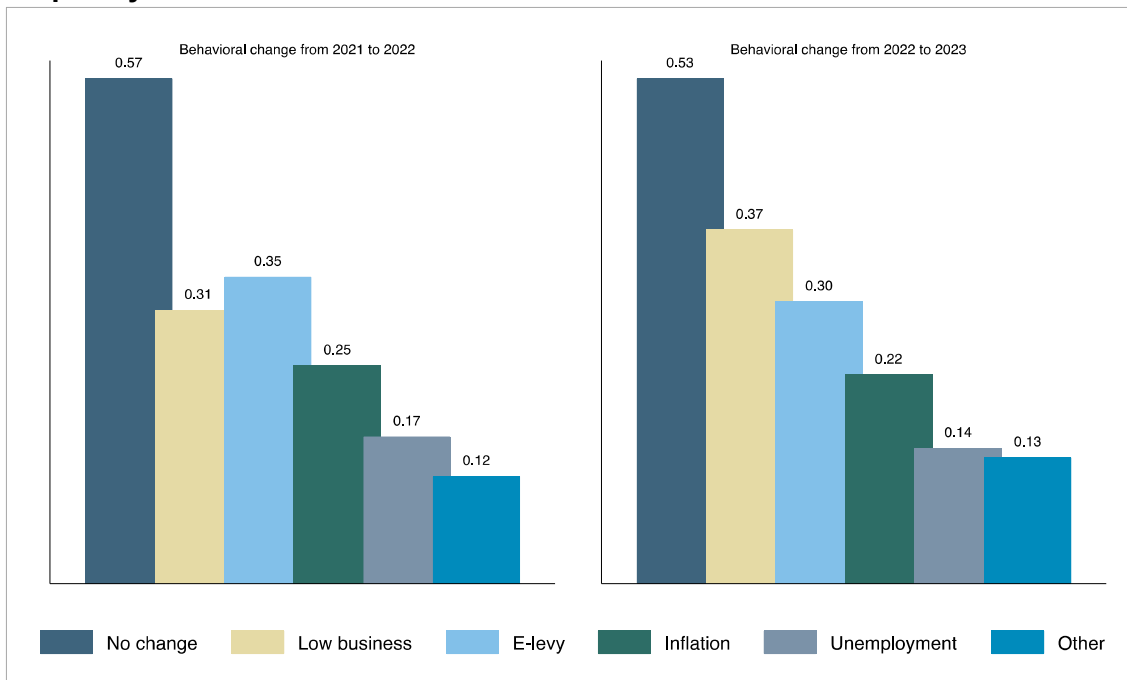
VARIABLES	(1) Index of agreement	(2) 1 if agrees on introduction of e-levy; 0 if disagrees	(3) m7q4_agree_in t
Know current rate	-0.309	-0.0767	-0.145
Know mobile money threshold	-0.162	-0.544	-0.670*
Know affected and not-affected transactions	-0.0418	0.0688	0.289
Age	-0.00137	-0.00361	-0.0100
Gender	0.0879	0.585*	0.481**
1.know_rate_cur#c.age	0.00999*	0.0174	0.0129
1.know_threshold_mm#c.age	0.000693	0.00841	0.0153*
1.know_trans#c.age	0.00425	0.0120	0.00669
1.know_rate_cur#c.gender	0.230	0.296	0.410
1.know_threshold_mm#c.gender	0.0489	-0.0599	-0.307
1.know_trans#c.gender	-0.0768	-0.272	-0.330
Married	-0.0706	0.0305	-0.0920
Employed	-0.114*	-0.0614	-0.178
Do you have access to piped water?	0.146*	0.428*	0.244
Own the house	0.0578	0.219	0.107
Household size	-0.0103	-0.0235	-0.0174
Have a bank account	0.00210	-0.0211	-0.0833
Use social media	0.0134	0.0766	-0.0539
Distance from mobile money agent	0.00596	-0.0300*	-0.00209
Send	-0.0114	-0.178	-0.0640
Withdraw	-0.175**	-0.458**	-0.351**
Deposit	0.0715	0.268	0.291*
Receive payment	0.236**	0.975***	0.406
Support NPP	0.286***	0.706***	0.456***
E-levy for national development	0.141**	0.576***	0.366***
/cut1			-0.960
/cut2			0.437
/cut3			1.123*
/cut4			2.866***
Constant	0.164	-1.551*	
Observations	1,223	1,022	1,223
R-squared	0.214		

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

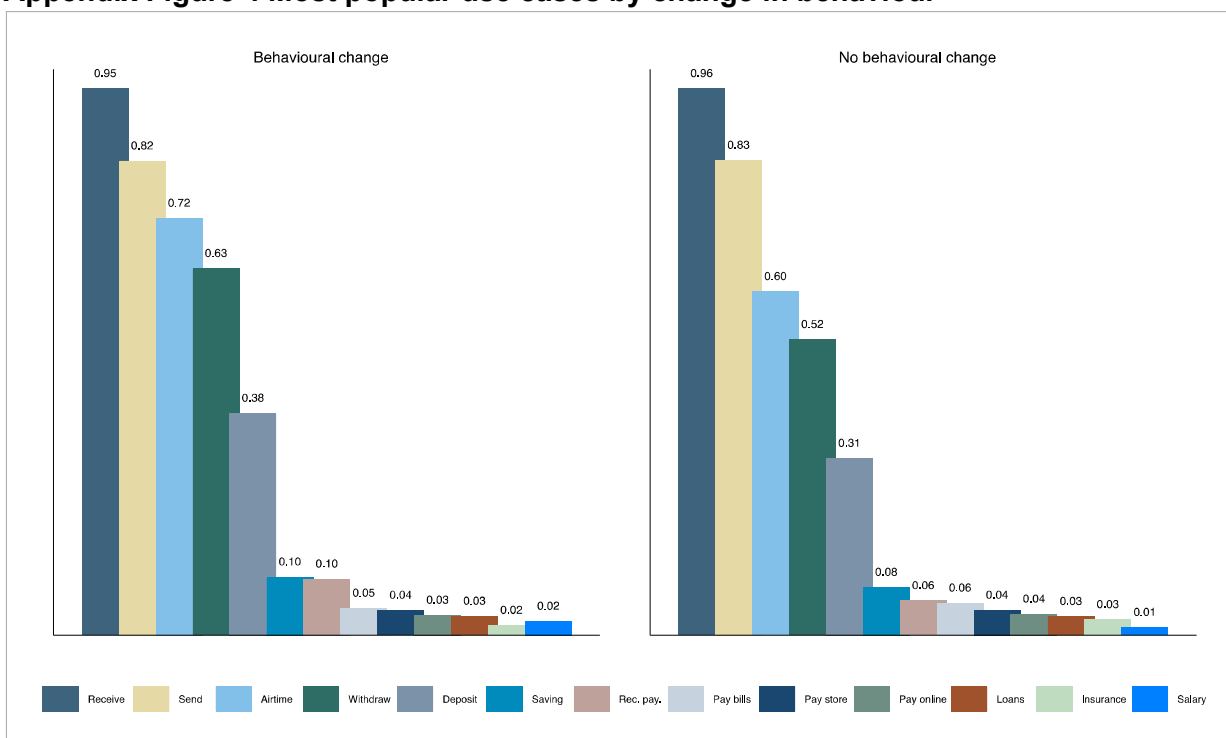
Source: Authors' own.

Appendix Figure 3 Main reasons why Ghanaians changed mobile money usage frequency



Source: Authors' own.

Appendix Figure 4 Most popular use cases by change in behaviour



Source: Authors' own.

Appendix Table 18 Total volumes, values of mobile money transactions and total agents at national level, by year

	2019	2020	2021	2022	2023 ⁹
GDP current prices (GH¢ bn)	356.5	391.1	459.1	610.2	-
Value sending (GH¢ bn)	355.9	636.7	854.5	886.8	199.6
Value receiving (GH¢ bn)	144.2	262.2	473.5	556.0	136.4
Value payment (GH¢ bn)	99.5	51.0	126.3	79.0	17.3
Value withdrawal (GH¢ bn)	55.7	75.0	93.4	136.1	37.7
Volume sending (mil)	336.5	538.0	931.7	1001.7	185.5
Volume receiving (mil)	340.2	548.0	954.8	1030.8	192.7
Volume payment (mil)	48.6	98.5	220.1	269.7	49.7
Volume withdrawal (mil)	418.3	498.2	533.9	673.7	137.1
Active agents (thousand)	4.3	8.3	48.4	86.3	93.2

Source: Authors' own elaboration.

⁹ Until February 2023 (included).

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