




Drivers of Ghanaians' approval of the electronic levy

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Abstract

The government of Ghana proposed an electronic levy (E-LEVY) in the 2022 budget and economic policy statement to increase revenue in the wake of dwindling opportunities for borrowing from the external market. Whilst existing studies found that most Ghanaians did not support the E-LEVY, the factors that explain the decision were not studied. We contribute to the literature on the E-LEVY by examining the drivers of approval of the E-LEVY in Ghana. We used data of 600 respondents and fitted it to a cloglog model selected based on a battery of tests. We found that older persons were more likely to approve of the E-LEVY than younger people. Persons affiliated with the ruling party, the NPP, were more likely to approve of the E-LEVY than persons not affiliated with the party. Level of education, gender, size of household, monthly income and marital status did not distinguish the tendency to approve of the E-LEVY. Although the ruling party-affiliated respondents were more likely to approve of the E-LEVY, the low probability requires that the government engages not only its party supporters but independents, about the need to support and pay the E-LEVY.

Keywords Complementary loglog · Electronic levy · Electronic tax · Ghana · Mobile money tax · Online survey

JEL Classification H 24 · 25 · 27

Introduction

In 2004 and 2006, Ghana secured external public debt relief under the Highly Indebted Poor Countries Initiative and the Multilateral Debt Relief Initiative, respectively. This reduced the public debt-to-GDP ratio from 58.35% in 2003 to 45.02% in

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2004 and from 37.20% in 2005 to 19.86% in 2006 (Aimola and Odhiambo 2021; Bank of Ghana 2019). In 2013, Ghana raised US\$1 billion in Eurobonds (Ministry of Finance 2014). Subsequently, the Eurobond roadshow has been a common funding option for Ghana. Following the inability to pay mature domestic debt instruments, and the mounting external debt with the possibility of default, international rating agencies downgraded Ghana. Standard and Poor's and Fitch gave B- with a positive and negative outlook respectively, in 2021. The rating was worsened by Moody's Caa1 with a stable outlook. Together with the increasing debt-to-GDP ratio and budget deficit, the government announced a new revenue item in the 2022 Budget and Policy statement, the electronic levy at a rate of 1.75%. The incident transaction includes mobile money transfers, mobile money merchant payments, in-store payments using point-of-sale (POS) devices or QR, e-commerce/online payments and bank-to-mobile money transfers. Transactions excluded from the levy are cheques, a tax-free-transaction limit of up to GHS100/day, and transfers between own accounts. The electronic levy is expected to yield GHS6.963b. 'The proceeds will be used to tackle the intractable problems of rising debt, high youth unemployment, inadequate digital infrastructure and diminished entrepreneurship culture while maintaining the flagship programmes' (Parliament of Ghana 2021, p. 1).

However, many Ghanaians have rejected the electronic levy (Amoah and Amoah 2022; Djokoto et al. 2022). Some news portals have also posted poll results that show respondents are not in favour of the electronic levy.¹ The opposition party in the Parliament, the National Democratic Congress (NDC), remained opposed to the electronic levy. The vehemence of the NDC Members of Parliament (MPs) and the insistence of the ruling party, the New Patriotic Party (NPP) MPs, resulted in a brawl between the MPs on both sides during voting on the Bill. The bill was subsequently withdrawn by the government. As an alternative, some have called for the Government to block the leakages in the nation's finances. For example, Ghana Audit Service (2021) found that irregularities in government finances amounted to more than GHS 20b over 5 years. Also, the government should cut expenditure by eliminating waste, disincentivising corruption, merging some ministries and reducing the size of the government (Amoah and Amoah 2022; Djokoto et al. 2022). As the issue of the electronic levy proposal became topical, persons of various levels of education, university professors, students and the less educated as well as business experts and groups, expressed their views. Men and women alike have shared their views on the electronic and print media. Whilst some expressed concern about the effect of the electronic levy on their household, others have worried about how the electronic levy will 'eat away' their income. The debate about the electronic levy has raged on in much of the electronic and print media outside of the Parliament of Ghana. The Government re-introduced the electronic levy at 1.50% with other conditions

¹ Some of the web portals include: <https://www.ghanamma.com/2022/01/31/ghanaweb-poll-over-91-of-ghanaians-do-not-support-e-levy/>, <https://www.myjoyonline.com/poll-will-you-support-approval-of-2022-budget-with-the-e-levy/>, <https://www.ghanaweb.com/GhanaHomePage/business/GhanaWeb-Poll-70-38-of-respondents-to-stop-using-MoMo-if-E-Levy-bill-is-passed-1469515>.

unchanged, which has now been signed into law. What factors have been responsible for the support or otherwise of the electronic levy in Ghana?

Amoah and Amoah (2022) and Djokoto et al. (2022) assessed the views of Ghanaians on the proposed electronic levy. They found that most respondents disagreed with the electronic levy. Whilst the former did not provide the demographics of the respondents, the latter provided these but failed to assess the effects of these demographics on the decision of respondents regarding approval or otherwise of the introduction of the electronic levy. As the incidence of the levy will be on persons, the important role of demographics in the approval of the levy cannot be understated. Given the political wranglings in the Ghanaian Parliament and the fact that the MPs are the representatives of the voters, the political factor must be assessed. In this study, we revisit the approval or disapproval of the electronic levy using a larger sample than Djokoto et al. (2022) and identify the drivers of approval or disapproval. Knowing the views of the respondents would inform the government about the views of Ghanaians. The outcome will also show whether the actions of the MPs reflect the views of the people they represent. The drivers would inform stakeholders, especially the government, on how to formulate strategies that will enhance the probability of support and payment of the electronic levy and, possibly, other levies. When implemented, the levy could reduce the usage of mobile money services that will have implications for financial inclusion, an enabler of the 17 Sustainable Development Goals (Bongomin et al. 2019; Djokoto et al. 2022; Kuada 2019; UN Capital Development Fund 2021; UNSGSA 2018; Whitehead 2018; World Bank 2022).

For the rest of the paper, the literature review is next. This is followed by the data and methods section. The results are presented and discussed in the following section. The paper concludes with some recommendations.

Literature review

The technology environment of the electronic levy (mobile money)

The technology underlying mobile money (momo) is Unstructured Supplementary Service Data (USSD). This technology allows a client's computer to communicate with a service provider's computers using simple, raw, unencoded text (Taskin 2012). The technology provides the user with a menu-based interface. The choices the user makes will determine which service the user can access. The service provider usually makes available a code that the user can use to activate the menu. The process of activating the menu through the code establishes a connection between the user's device and the service provider's computer.

At the backend, the service provider's computer has a means of checking the "identity" of the device being used to communicate with the computer. This is usually the user's telephone number. The computer enhances the identity check by asking for other pre-arranged codes to establish the bona fides of the user.

Table 1 Global overview of mobile money transactions

Item	Amount	CAGR (%)
Registered accounts (b)	1.2	13
Active 30-day accounts (m)	300	17
Transaction volume (b)	41	15
Transaction value (US\$b)	767	22
Registered agents (m)	9.1	14
Active agents (m)	4.8	18

Source: Andersson-Manjang and Naghavi (2021)

CAGR cumulative annual growth rate

Any transaction between the user's device and the service provider's computer is recorded securely for future reference.

In the specific case of mobile money (*momo*) transactions, the service provider's computer creates an "account" for first-time users. The detail of the account is collected when a user signs up to use the service. Two important pieces of information are the user's telephone number and a personal identification number (PIN). These two are linked and used as the primary means of identifying the user anytime (s)he transacts any *momo* business with the service providers.

Deposits or withdrawals made by the user are checked against the telephone number and the PIN to avoid fraud, abuse or misuse. Upon registration, the telephone number and PIN combination are valued at zero amount by the service provider's computer. By using USSD, any deposit made by the user into the *momo* wallet is added up to the initial zero amount, while any withdrawal is deducted from any balance.

By using the USSD technology, the transactions between the user's device and the service provider's computer occur in real time. The transactions are encapsulated into atomic units to ensure that no transactions are left partially completed. The atomicity of the transactions helps in avoiding incomplete or semi-completed transactions. Either the entire process completes successfully, or it is cancelled entirely. If the transaction is not completed successfully, then it never happened.

The USSD technology imposes a message length of 182 characters on any message in the *momo* transaction. To allow users to work within this limit, the USSD technology uses the menu system to communicate with the user. This allows the user to make single character-length entries and avoid long messages. Moreover, as the USSD transactions are done in real time, there is a time limit imposed on the user within which (s)he must respond to questions or make menu choices.

The electronic transaction environment

Globally, the number of registered *momo* accounts grew by 12.7% to 1.21 billion accounts—double the forecasted growth rate in 2020 (Andersson-Manjang and Naghavi 2021) (Table 1). Whilst the volume of transactions stood at 41b, the value of transactions was worth US\$2,339b. Whilst Africa constituted 562 m of the

Table 2 Growth analysis in Africa

Item	West Africa	Southern Africa	North Africa	Central Africa	East Africa	Africa
Registered accounts (m)	1.2	11	14	46	293	562
Active 30-day accounts (m)	300	3	1	16	94	161
Transaction volume (b)	41	0.28	0.77	2.2	18.6	27.5
Transaction value (US\$b)	767	3	5.4	35.7	275	495

Source: Andersson-Manjang and Naghavi (2021)

Table 3 Electronic tax in Africa

Country	Introduction	Rate (%)	Current rate (%)	Current incidence
Cameroon	Jan 2022	0.2	0.2	Mobile money, electronic and bank transfers
Côte d'Ivoire	Jan 2018	0.5	0.54	Payment and cash transfer
Kenya	Jan 2013	10.0	12.0	On transaction fees
Malawi	Sept 2019	1.0	0.0	–
Tanzania	Jul 2021	3.0	2.0	Sending, transfer, withdrawal
Uganda	Jun 2018	1.0	0.5	Withdrawals only
Zimbabwe	Oct 2018	2.0	2.0	Mobile money, electronic and bank transfers

From Djokoto et al. (2022)

registered accounts, East Africa took the largest share of 293 m accounts (Table 2). West Africa topped the transaction value by US\$767b with Southern Africa, the least at US\$3.0b. In Ghana, registered accounts were 48.3 m in 2021, rising from 38.5 m in 2020 (Bank of Ghana 2022). The total value of transactions rose from GHS67.7b (US\$10.10b) in December 2020 to GHS82.9b (US\$12.37b) in December 2021. The declaration of the intention by the Government in November 2021 to introduce the electronic levy led to a decline of GHS3.2b (US\$44.78 m) in *momo* transactions by the close of December 2021. The decline grew to GHS9.9b by January 2022 (US\$1.19b) (Bank of Ghana 2022). The number of transactions rose to 398 m in November compared to 376 m and 391 m in September and October 2021, respectively, preceding the announcement of the electronic levy. By December 2021, the number of transactions grew to 401 m, but declined to 372 m by January 2022. It would be observed that before the actual implementation, both the number and value of transactions experienced declines.

Ghana is not alone in the electronic levy quest. Other African countries have made similar moves (Bongomin et al. 2019; Fehling 2019; Lees and Akol 2021; Ndung'u 2018; Silue 2021). Kenya was the first to introduce a tax on *momo* in 2013 (Table 3). The tax is an excise tax on transaction fees at 10%. This was later increased to 12%. In Malawi, the *momo* levy was introduced in September 2019, but it was withdrawn by the Government after several agitations from the citizens. In

Uganda, there had been calls for a withdrawal of the tax bill as well as non-implementation after the tax bill was passed (Abuka 2018; Bongomin et al. 2019). The latest country to pass the electronic tax into law in 2022 is Cameroon, in January 2022. Whilst in Kenya, Tanzania and Uganda, the levy is on the amount transferred, the levy covered bank transfers in Cameroon and Zimbabwe just as in the case of Ghana. Currently, Tanzania and Zimbabwe are charging the highest electronic levy rates at 2.0% whilst Cameroon has pegged its rate at 0.2%. At 1.75%, Ghana's proposed electronic levy rate as well as that of the new rate in the recent law, Act 1072, of 1.50% is above the African average of 1.05%.

Whilst focusing on the gains in tax revenue, the effect on the electronic money industry cannot be ignored. In Uganda, within 3 months of the introduction of the mobile money levy, transactions declined by US\$192 m. In 2 weeks, mobile money transaction taxes records showed that 44% transacted less, and 47% completely stopped using mobile money services (Bongomin et al. 2019; Djokoto et al. 2022; Whitehead 2018). Further, more than 40% of mobile money users discontinued using the services after the introduction of the *momo* tax in 2021 (UN Capital Development Fund 2021). As noted earlier, ahead of the implementation of the electronic tax, transaction volumes and values have declined in Ghana. It is not hard to expect that the actual implementation would dip these indicators further.

Some empirical evidence

In an earlier study on the electronic levy, Djokoto et al. (2022) found that the average age of the 460 respondents was 43.50 years, whilst the average household size was 5.88. The national average household size for Ghana was pegged at 3.6 (GSS 2021). The modal level of academic qualification was postgraduate (master's degree) (38.7%). Whilst 81% of the respondents were males, more than 70% of the respondents were married. About 30% of the respondents were affiliated with the New Patriotic Party (NPP), the ruling party. More than 96% of the 460 respondents rejected the electronic levy at 1.75%. In the only bivariate analysis conducted, Djokoto et al. (2022) found that the approval or otherwise of the electronic levy was not associated with political party affiliation.

In the absence of specific literature on the determinants of electronic levy approval, we review pieces of literature on the determinants of willingness to pay tax (Olajube et al. 2018; Park and Yoon 2017) and tax compliance (Yulianto et al. 2019). The study of Olajube et al. (2018) focused on Nigeria, whilst Park and Yoon (2017) examined China, Japan and Korea. The country of focus of Yulianto et al. (2019) was Indonesia.

Park and Yoon (2017) found that females in China and Japan were more willing to pay taxes than males. In the case of Korea, the willingness to pay tax was not distinguished along gender lines. Olajube et al. (2018) made similar findings for Nigeria. In Japan, older people were more willing to pay taxes than younger people (Park and Yoon 2017). Yulianto et al. (2019) made similar findings regarding tax compliance. No reasons were assigned for these findings.

In China, Japan and Korea, the level of education did not explain the willingness to pay tax (Park and Yoon 2017). However, Yulianto et al. (2019) found that persons with a higher level of academic attainment were more tax compliant than respondents with lower academic qualifications. The understanding was that the higher the level of education, the higher was the level of knowledge and level of awareness of taxpayers to pay taxes (Yulianto et al. 2019).

In China, higher-income earners were less willing to pay taxes than lower-income persons (Park and Yoon 2017). For Japan, however, higher-income earners were more likely to pay tax than lower-income earners. Park and Yoon (2017) further found that income did not influence willingness to pay tax in Korea. No reasons were adduced for the conclusions on the effect of income on willingness to pay tax. It is apparent from the review that the drivers of willingness to pay tax and compliance with tax payment have been influenced by age, gender, education and income. Whilst the role of others such as marital status and household size on one hand and political affiliation on the other was not studied, these studies were not on the introduction of the electronic or mobile money levy, which has been a recent revenue option in Africa. We, therefore, contribute to the electronic levy literature by identifying the drivers of the approval of the electronic levy in Ghana.

Data and methods

Data

As the incidence of the proposed electronic levy will be the users of *momo* and bank transfer services, we considered users of these services as the target population. The number of mobile phone subscribers was 40,454,073 as of December 2021, according to the National Communications Authority (NCA 2022). This exceeds the 30.8 m population of the country because some have subscribed to more than one mobile phone line. Using the national population data of 30.8 m, a confidence level of 95% and a margin of error of 5%, the Yamane (1967) sample size formula produces a computed sample size of 400.

The instrument for the data collection was a questionnaire. This consisted of three sets of questions, whether one approves of the electronic levy, biodata and political affiliation. These were composed into items in a Google form that required less than 8 min to complete. The Google form was distributed via electronic mail and social media including WhatsApp and Twitter. The recipients were encouraged to complete the form and share the link with their network (snowballing). This approach was justified on some grounds. First, there is a need to minimise person-to-person interactions as much as possible considering the COVID-19 pandemic. Second, the use of virtual interactions has become acceptable to many. Thirdly, the services being taxed are electronic, and hence many potential respondents will have access to electronic communication services. Further, other advantages of the approach include access to individuals in distant locations, the ability to reach difficult-to-contact participants, and the convenience of having automated data collection, which reduce

Table 4 Variables, descriptions, measurements and measures

Variables	Description	Measurement	Measure
<i>ELEVY</i>	Approval for the electronic levy	Yes = 1, no = 0	Nominal
<i>AGE</i>	Age of respondents	Years since birth	Scale
<i>EDUC</i>	Highest educational qualification	JSS/JHS = 1, ..., Doctoral = 6	Ordinal
<i>GENDER</i>	Gender	Female = 1, male = 0	Nominal
<i>HHS</i>	Size of household	Persons in household	Scale
<i>MS</i>	Marital status	Married = 1, otherwise = 0	Nominal
<i>POL_AF</i>	Political affiliation	NPP = 1, otherwise = 0	Nominal

researcher time and effort (Akintunde et al. 2021; Andrade 2020; Hlatshwako et al. 2021; Singh and Sagar 2021; Wright 2005).

Although efforts were made to share the link of the Google form to our networks across the country, it must be noted that the approach adopted in this survey to reach respondents may not guarantee even distribution across geographical regions in Ghana. Such limitations have been acknowledged in the literature (Djokoto et al. 2022; Hlatshwako et al. 2021; Singh and Sagar 2021; Wright 2005). This could affect the distribution of the bio characteristics of respondents as well. We note that the data used here is an extension of that collected by Djokoto et al. (2022). The first response was received at 18:38:40GMT on 31st December 2021. The 600th response was recorded at 17:08:47 GMT on February 3, 2022. We exceeded 400 to account for non-response to some items as well as enhance the efficiency of the regression estimates.

Analysis and modelling

To assess whether the respondents approve or disapprove of the electronic levy, the frequency of the responses was computed whilst a fractional regression model (using the boundary values of the unit interval) was estimated to evaluate the drivers of the approval of the electronic levy. This modelling was chosen because of the binary nature of the dependent variable. Fractional regression analyses require that the dependent variable is within the unit interval, 0 to 1, inclusive of the boundary values. The authors relied on the existence of the boundary values as well as the opportunity to explore the plausible link functions. It is important to note that although there may be similarities, several papers have demonstrated that there could be differences in the magnitude and statistical significance of the elasticities or marginal effects.

We specified

$$ELEVY = f(X), \quad (1)$$

where *ELEVY* is whether the respondent approved of the electronic levy or not. *X* are explanatory variables: bio characteristics and political affiliation of respondents (Table 4). The description of *ELEVY* is binary, that is, 1 if the respondents approve

of the electronic levy and 0, otherwise. Modelling such variables requires a family of link functions such as logit and probit. Although logit and probit link functions have been popular in the literature (Bandhu et al. 2020; Batalova et al. 2020; Djokoto 2015; Greene 2012; González Chapela 2021; Lu 2020; Xue et al. 2018), others such as loglog, cloglog and cauchit have also been employed (Djokoto and Afari-Sefa 2017; Djokoto and Gidiglo 2016; Djokoto et al. 2016, 2017; Greene 2012; Ramalho et al. 2010, 2011). The link functions, logit, probit, loglog, cloglog and cauchit, transform 0 and 1 into a continuous variable that can be modelled.

The binary values, 0 and 1, that define our dependent variable happen to be the boundary values of the unit interval in the fractional number space. Therefore, we used the fractional regression modelling procedure. Following Papke and Wooldridge (1996), the conditional expectation of y given x is $E(y|x)$, so that

$$E(y|x) = G(x\theta), \tag{2}$$

and $G(\cdot)$ could be any cumulative distribution function that satisfies $0 \leq G(\cdot) \leq 1$. $G(\cdot)$ could be specified as logit and probit.

Logit:

$$G(x\theta) = \frac{e^{x\theta}}{1 + e^{x\theta}}. \tag{3}$$

Probit:

$$G(x\theta) = \Phi(x\theta). \tag{4}$$

Loglog, cloglog and cauchit link functions are also plausible (Ramalho et al. 2010, 2011).

Loglog:

$$G(x\theta) = e^{-e^{-x\theta}}. \tag{5}$$

Cloglog:

$$G(x\theta) = 1 - e^{-e^{x\theta}}. \tag{6}$$

Cauchit:

$$G(x\theta) = \frac{1}{2} + \frac{1}{\pi} \arctan(x\theta). \tag{7}$$

The general derivative is:

$$\frac{\partial E(y|x)}{\partial x_j} = \theta_j g(x\theta). \tag{8}$$

For the cloglog specifically,

$$\frac{\partial E(y|x)}{\partial x_j} = e^{x\theta} [1 - G(x\theta)]. \tag{9}$$

Table 5 Summary statistics of scale variables

Variable	Observations	Mean	Standard deviation	Minimum	Maximum
AGE (Age)	512	43.5273	11.3024	18	73
HHS (size of household)	512	6.0996	3.8601	1	50

Selection of the link function

The link functions conform to different distributions of the dependent variable. Thus, there must be a selection among them. Three sets of tests were employed to choose one out of the five-link functions, Ramsey RESET tests (Ramsey 1969), a family of the goodness-of-functional-form tests (GOFF1, GOFF2 and GGOFF) (Ramalho et al. 2014) and P test (Davidson and McKinnon 1981). The RESET test was initially advanced for use with linear functions. However, it applies to any type of index model (Pagan and Vella 1989; Ramalho et al. 2010, 2011; Cameron and Trivedi 2013, p. 52). The RESET test assesses the specification of models. The null hypothesis is that there is no misspecification in the model. Just as the RESET test, the model fits well if the null hypothesis cannot be rejected regarding the generalised goodness-of-functional-form test (GGOFF), a generalisation of GOFF1 and GOFF2 tests. As more than one link function could be selected based on the RESET and the GOFFs, the P test is useful for one-on-one (pairwise) comparison to select one link function in case more than one is selected from the results of the RESET and the GOFFs. The interpretation of the P test follows the usual hypothesis test.

Results and discussions

Background of the data

The data were collected from 600 respondents. However, owing to non-responses on some of the variables, especially *POL_AF*, the data set was reduced to 512 (Table 5). Although this is lower than the estimated 600 sample size, it exceeds 400 based on the confidence level of 95% and margin of error of 5% (Yamane 1967). Indeed, the 512 constitutes oversampling considering the 400.

The average age of respondents is 43.5 years (Table 5). This lies within the active working age. This is not surprising, because the minimum is 18 years with a maximum of 73 years. The standard deviation of 11.30 implies variance will exceed the average, suggesting an overdispersion of the age of respondents. The 43.5 years is like that found by Djokoto et al. (2022).

The average household size is 6.1. A maximum of 50 may have pulled the average upwards. It must be noted that estimation is based on the averaging of the household sizes provided by respondents. Our results relate to the occupants of each household, and that of the Ghana Statistical Service divides the total population by

Table 6 Summary statistics of nominally and ordinaly measured variables

	Frequency		
	Count	Percent	Cumulative
<i>ELEVY</i> (approval of electronic levy)			
No	491	95.90	95.90
Yes	21	4.10	100.00
Total	512	100.00	
<i>EDUC</i> (highest academic qualification)			
Basic school (JSS/JHS)	3	0.59	0.59
Secondary (SSSCE/WSSCE/NVTI)	32	6.25	6.84
HND	39	7.62	14.46
Bachelor's	192	37.50	51.96
Master's	208	40.63	92.59
Doctoral	38	7.42	100.00
Total	512	100.00	
<i>GENDER</i> (gender)			
Male	420	82.03	82.03
Female	92	17.97	100.00
Total	512	100.00	
<i>INCOME</i> (income per month)			
GHS1–1000	83	16.21	16.21
GHS1001–2500	144	28.13	44.34
GHS2501–5000	115	22.46	66.80
GHS5001–10,000	86	16.80	83.60
Above GHS10,000	84	16.40	100.00
Total	512	100.00	
<i>MS</i> (marital status)			
Married	392	76.56	76.56
Otherwise (single, divorced, widowed)	120	23.44	100.00
Total	512	100.00	
<i>POL_AF</i> (political affiliation)			
Non-NPP (NDC, other parties, floating)	324	63.28	63.28
NPP	188	36.72	100.00
Total	512	100.00	

the number of households yielding 3.5 (GSS 2021). Our finding is similar to that found by Djokoto et al. (2022). The 6.1 is, however, like the above 6.0 found by GSS (2021) for the northern region of Ghana.

About 96% of the respondents disapprove of the electronic levy (Table 6). This overwhelming proportion is similar to that found by Djokoto et al. (2022). This departs from the near 50–50 position found in the Ghanaian Parliament where the MPs affiliated to the ruling party are all for the approval of the electronic levy, whilst the opposition MPs are completely opposed to it. Whilst the position of the

opposition MPs may be aligned to the preference of the respondents in the study, the ruling party MPs do not follow the sentiments of the respondents (Djokoto et al. 2022). Some respondents noted that after paying for the services of using *momo* services or bank transfer services for which the Government receives taxes on these from the service providers, paying taxes on the amount transferred is seen as extortion. Some respondents also noted that the Government lost GHS12b in financial irregularities according to the Ghana Audit Service (2021), but the government has done nothing to neither retrieve nor plug those leakages. Thus, seeking to raise about half of that amount in taxes is considered unacceptable. The electronic levy is also being proposed in the wake of bi-weekly hikes in petroleum fuel prices, which has a rippling effect on many things including transportation and food.

The highest level of education is postgraduate (master's degree) (41%). This may have arisen from the respondent's willingness to participate in the survey. This is slightly higher than the 38.7% found by Djokoto et al. (2022). There are more male respondents in the data (82%) than females, similar to that found by Djokoto et al. (2022). The modal income is GHS1001–2,5000 (USD 149.40–373.13).

Regarding marital status, most of the respondents are married (76.6%) (Table 6), similar to the finding of Djokoto et al. (2022). For political affiliation, 36.7% of the respondents are affiliated with the ruling political party, the NPP. The other group, non-NPP affiliates constitute 63.3%. This group is made up of affiliates of the National Democratic Congress (NDC), the main opposition party, smaller parties and respondents not affiliated with any political party. The 36.7% affiliated with the NPP is a slight increase above the 30% reported by Djokoto et al. (2022) using a sample size of 460. The NDC constitutes about 31% (not reported in the table). The proportions of the two main political parties suggest they need the support of the independents as well as those of smaller parties, in the case of a runoff, to secure victory in an election.

Link function selection

From Table 7, the RESET test statistic for cauchit is 3.389 and statistically significant at 1%. Thus, the null hypothesis that there is no misspecification is rejected. This result suggests the cauchit link function is misspecified. The GOFFs tests for cauchit and P test statistics have, therefore, become reductant. Based on the goodness-of-functional-form tests, the remaining link functions have an acceptable fit. Thus, the choice is now among the four: logit, probit, loglog and cloglog. Using logit as the alternative hypothesis, H_{Alogit} , logit is preferred to probit and loglog leaving logit and cloglog. Based on the P test statistic for H_{Alogit} and $H_{Acloglog}$, none rejects the other. However, the magnitude for the logit is smaller than that of the cloglog, as an alternate hypothesis. This suggests that the cloglog fails to reject the logit stronger than the logit fails to reject the cloglog. Therefore, the cloglog link function is chosen.

Table 7 Specification tests for the link function selection

	Logit	Probit	Loglog	Cloglog	Cauchit
Misspecification					
RESET	2.327	1.958	1.358	2.174	3.389**
Goodness-of-functional-form test					
GOFF1	2.537	2.175	-	2.163	2.008
GOFF2	2.083	2.153	1.488	-	0.025
GGOFF	3.027	2.180	1.488	2.163	9.606***
<i>P</i> test					
H_{ALogit}	-	2.968*	2.991*	1.701	1.420
$H_{AProbit}$	1.467	-	2.149	1.260	1.658
$H_{ALoglog}$	0.639	1.163	-	0.495	1.854
$H_{ACloglog}$	2.017	3.054*	3.092*	-	1.364
$H_{ACauchit}$	8.037***	7.660***	7.338***	8.096***	-

Drivers of approval of the electronic levy

The estimates of the cloglog model estimation are presented in Table 8. As the estimates provide limited information, the marginal effects that provide more information have been computed (Table 9). To assist in assessing the robustness of the estimates, the cloglog model was estimated for each explanatory variable at a time (Table 9).

The marginal effect of *AGE* in model 9 is like that in model 16. Also, the marginal effect of *POL_AF* in model 15 is similar to that in model 16. Whilst the estimate of *INCOME* is statistically significant in model 13, it is statistically insignificant in model 16; however, the magnitudes are similar. Turning to the statistically insignificant marginal effects, that of *HHS* in model 12 is similar in magnitude and statistical significance, but not in sign to that in the full model (model 16). For *MS*, there is a similarity in statistical significance and signs of the marginal effects. In the case of the estimates for *EDUC*, the magnitudes and the statistical significance are similar, but the signs differ from each other. As these differences relate to statistically insignificant marginal effects, their difference is irrelevant. From the foregoing, the estimates of the marginal effects of the drivers of approval of the electronic levy are robust.

The marginal effect of *AGE* as 0.0019 suggests that a 1% increase in age would increase the probability of approving the electronic levy by 0.19%. Essentially, as the age of the respondents increase, the likelihood of voting ‘yes’ to the electronic levy proposal increases. As the respondents age beyond 18 years, they are more likely to acquire more knowledge about the usefulness of paying taxes. Also, they are more likely to become more responsible citizens as they move along the organisational ladder. The finding is consistent with the willingness to pay taxes in Japan (Park and Yoon 2017) and compliance with paying taxes in Indonesia (Yulianto et al. 2019).

Although the sign for the marginal effect of *EDUC* is negative, the magnitude is not statistically significant. This implies that the level of academic qualification does

Table 8 Estimates of socio-political variables of approval/disapproval of the electronic levy

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
VARIABLES	Approval	Approval	Approval	Approval	Approval	Approval	Approval	Approval
AGE	0.0494*** (0.0183)							0.0489*** (0.0185)
EDUC		0.1009 (0.2067)						-0.0709 (0.2354)
GENDER			-1.4961 (1.0257)					-1.4988 (0.9864)
HHS				0.0029 (0.0494)				-0.0089 (0.0775)
INCOME					0.3714*** (0.1738)			0.2662 (0.1696)
MS						-0.0211 (0.5129)		-0.7779 (0.4752)
POL_AF							0.8507* (0.4414)	1.0485** (0.4781)
Constant	-5.4795*** (0.9433)	-3.6151*** (0.9409)	-3.0202*** (0.2238)	-3.1905*** (0.3740)	-4.3622*** (0.6508)	-3.1568*** (0.4477)	-3.5695*** (0.3337)	-5.6800*** 1.8074
Model diagnostics								
Observations	512	512	512	512	512	512	512	512
Log-likelihood function	-84.0664	-87.5310	-85.9229	-87.63178	-85.15437	-87.6323	-85.7525	-79.74351
Deviance	168.1239	175.0685	171.8457	175.2636	170.2559	175.2647	171.5050	156.4225
Pearson	515.0479	511.5299	512	511.9940	513.4797	512	512	555.33304
Pseudo-R squared	0.0151	0.0003	0.0051	0.0000	0.0112	0.0000	0.077	0.0781

Standard errors in parentheses
 *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 9 Marginal effects of socio-political variables of approval/disapproval of the electronic levy

	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
VARIABLES	Margins	Margins	Margins	Margins	Margins	Margins	Margins	Margins
AGE	0.0020** (0.0008)							0.0019** (0.0008)
EDUC		0.0041 (0.0093)						-0.0028 (0.0099)
GENDER			-0.0599 (0.0427)					-0.0588 (0.0422)
HHS				0.0001 (0.0022)				-0.0004 (0.0026)
INCOME					0.0148** (0.0073)			0.0104 (0.0077)
MS						-0.0008 (0.0206)		-0.0305 (0.0217)
POL_AF							0.0340** (0.0188)	0.0411** (0.0191)
Model properties								
Observations	512	512	512	512	512	512	512	512

Robust standard errors in parentheses

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

not influence the approval of the electronic levy. As more people disapprove of the electronic levy than those who approved of it, the finding suggests that irrespective of academic qualification most respondents disapproved of the electronic levy. The respondents may well have had a negative impression of the electronic levy, across the levels of academic attainment. Yulianto et al. (2019) noted that the higher the level of education, the higher are the level of knowledge and the level of awareness of taxpayers to pay taxes. This did not seem to reflect in the case of our results. Consequently, our finding departs from that of Yulianto et al. (2019). However, there is a congruence with the conclusions of Park and Yoon (2017) for China, Japan and Korea.

The variable for gender was measured as female=1 and 0 otherwise. A negative and statistically insignificant marginal effect of *GENDER* of 0.0451 implies that gender does not distinguish approval of the government's electronic levy proposal. The finding is consistent with the gender-neutral finding of Olajube et al. (2018) and Park and Yoon (2017) for Korea. Our result differs from that of Park and Yoon (2017) for China and Japan. Thus, females and males alike do not favour the electronic levy. In the case of those who approve of the electronic levy, females and males do so alike.

The marginal effect of *INCOME* is positive in model 13. This suggests that an increase in the income category from one to the other will increase the probability of approving the electronic levy by 1.48%. However, the increase in the magnitude of the marginal effect in model 16 coupled with the increase in the robust standard error resulted in a statistically insignificant marginal effect. Thus, there is some inclination for higher-income earners to approve the electronic levy. This is understandable as persons with more income can afford to part with some in taxes, whilst those with less may not easily do so. However, this effect is not statistically significant. The finding is consistent with the conclusion of Park and Yoon (2017) for Korea, but departs for Japan and China.

The marginal effects of *HHS* and *MS* do not distinguish those who approve of the electronic levy from those who approved of the electronic levy. If implemented, the electronic levy may have a similar effect irrespective of household size and marital status, hence the finding.

The 4.11% marginal effect of *POL_AF* means that being affiliated with the NPP will increase the probability of approving the electronic levy by 4.11%. This happened to be higher than that of *AGE*. The higher of the two marginal effects reflects the stronger political undertone regarding the electronic levy approval than the *AGE* effect. This has been demonstrated in the Ghanaian Parliament where each side is unwavering in their quest to approve (NPP MPs) and disapprove (NDC MPs) the electronic levy Bill. In a bivariate association between political affiliation and approval of the electronic levy, Djokoto et al. (2022) found no significant association between political affiliation and approval of the electronic levy. The current results depart from Djokoto et al. (2022). Djokoto et al. (2022) noted that more NPP supporters disapprove of the electronic levy than the opposition party. Whilst this explains the low probability, it brings to the fore, the need for government to engage the NDC supporters on why the electronic levy should be passed. However, this may be a tall order.

Conclusions and recommendations

In this paper, we contribute to the literature on the electronic levy by examining the drivers of approval of the levy in Ghana. Few respondents approve of the electronic levy. Older persons were more likely to approve of the electronic levy than younger persons. Persons affiliated with the ruling party, the NPP, were more likely to approve of the electronic levy than persons not affiliated with the party. Level of education, gender, size of household, monthly income and marital status did not distinguish those who approved of the electronic levy from those who did not approve of the electronic levy. This paper used an online survey for which we could not guarantee the extent of national coverage. A subsequent study on the subject could ensure national coverage of the data. Further, an impact assessment would help inform rates of the electronic levy other than the 1.50% passed into law.

Whilst the parliamentarians of the ruling party, the NPP, failed to reconsider their position in support of the electronic levy, the position of the opposition party parliamentarians rhymes with that of the findings of the study. Indeed, the opposition MPs' resolve to resist the electronic levy is borne out by most of the respondents who disapprove of the electronic levy.

As younger people disapprove of the electronic levy, the government must direct its effort to engaging the youth. Perhaps, increased employment for the youth could place them in a position to approve of and willingly pay the electronic levy. The amount raised from the electronic levy must be directed at employment generation. This would make the employed pay the electronic levy as concluded.

Although NPP-affiliated persons were more likely to approve of the electronic levy, the low probability requires that the government engages not only its party supporters, but also independents about the need to approve the electronic levy.

Following the overwhelming disapproval of the electronic levy, the government must address concerns such as recovering lost monies as noted in the Auditor General's reports, tackling the matter of public sector corruption, prudent use of public funds and cuts in frivolous expenditures.

Apart from reducing disposable income, especially for the poor, the electronic levy will discourage the use of electronic money services and would derail the surge in the digital drive and financial inclusion that have resulted from the use of digital money services. Government must consider alternative approaches to mitigating these drawbacks. In the long term, the government must find alternative tax revenue items to replace the electronic levy.

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Declarations

Conflict of interest The authors declare that they have no competing interests.

Ethical approval We confirm that all research was performed in accordance with relevant guidelines/regulations applicable when human participants are involved.

Informed consent All respondents had the option to opt in or opt out of the study.

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