Extended Abstract
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Paper Title	The Effect of Digital Finance Use on Savings Amount: Evidence from Ghanaian Cocoa Farmers

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Abstract	***200 words max***
The poor and rural population in Sub Saharan Africa suffers from low financial inclusion. Yet, excluding population parts from accessing formal financial services means lost opportunity for household level, as well as for the whole economy. Evidence suggests that formal saving helps to accumulate larger amounts: Recent studies show how the saving contributes to smoothing consumption and increasing resilience. A powerful tool for enhancing marginalized groups' financial inclusion is digital finance. While extensive research was conducted in the East African digital finance market, the developing Western African market offers open questions. We investigate factors affecting Ghanaian cocoa farmers decision to save, as well as their savings amount. Among other factors, we focus on different savings instruments such as digital saving on the phone, bank accounts or the traditional group saving method Susu. We employ data from a structured telephone survey conducted in 2021 among 405 randomly sampled cocoa farmers. The results of a two-step Heckman approach show that while Susu or a bank account enhance savings, saving on the phone decreases the amount. In the light of a rapidly developing digital finance sector in Ghana, our results provide valuable information for governments and the private sector.	

Keywords	Digital Finance, Mobile Financial Services, Gender, Micro Savings, Interval regression, Sample Selection, Ghana
JEL Code	D14, I3, Q14, O16, O33

Introduction	***100 – 250 words***
Despite efforts to eradicate financial exclusion, the rural poor in Sub Saharan Africa suffer from low financial inclusion. However, excluding marginalized groups from	

accessing formal financial services has consequences for the economy on a macro level, as well as on household level. Digital finance, first introduced in Kenya, is a powerful tool for enhancing financial inclusion, building resilience and lifting households out of poverty (Suri et al., 2021; Sekabira & Qaim, 2017).

Recently, governments of West African countries, among them Ghana, start to recognize the potential and issue new policies directed at easing the digitalization of the banking sector. While research on digital finance has been conducted extensively in Eastern African countries, open questions in Western Africa persist. The same holds for digital saving tools: Although publications dealt with savings determinants in Ghana (Baidoo et al., 2018), it remains unclear whether smallholder farmers save more when using digital tools.

Due to its relative economic stability, perfect conditions for the upscaling of digital finance and a long tradition of savings, Ghana offers an interesting field for research. Ghanaian cocoa is mostly produced by smallholder farmers who don't earn a living income and would profit from our findings. As the countries' government launched policies in 2020 to accelerate the digital finance sector growth, our insights into the financial behavior of Ghanaian farmers are important for policy-makers and the fintech industry. We contribute to the debate by providing new evidence on the effect of different savings instruments on Ghanaian smallholder farmers savings amounts.

Methodology	***100 – 250 words***

We collected the data in Eastern Region in Ghana from April to August 2021. In collaboration with a data collection company in Accra, we employed computer-assisted telephone interviews to gather data on household information, utilization of digital finance and savings tools. We exclusively focused on Eastern Region because of the relevance for cocoa production and our reliance on English and Twi to verify the information. For the selection of participants, the data collection company gave us access to their database, and we employed a random sampling technique. As we realized that more men than women answered the phone, we oversampled women to achieve a more balanced composition of respondents.

Given the characteristic of the dependent variable, zero savings for a significant part of the population might result in a sample selection bias. Considering the nature of

our independent variable (interval outcome), we apply an interval regression model accounting for sample selection bias to investigate the factors that affect both the decision to have savings and the amount of savings. Following the Heckman two-step approach in the first step, we apply a probit model to estimate a farmer's decision to save any amount of money. In the second step, the interval regression models how much the farmers save after deciding to save. We group our explaining variables into saving instruments, access to services, household characteristics and income shocks in relation to Covid19. Among these, we put specific attention on the use of savings instruments (bank account, mobile money, Susu).

Results	***100 – 250 words***

Farmers employing their phones accumulate 21% less savings than farmers not using it for this purpose. Contrarily, those using a bank account or Susu increase their savings by 129% and 22%, respectively. Yet, coefficients for mobile saving and Susu are not statistically significant at 10%. A better network quality decreases the savings likelihood at a 10% significance level. When the bank is further away, the respondent's likelihood to save decreases. These effects are statistically significant at 5% and 10%, respectively.

Looking at socioeconomic characteristics, gender is negative in both the selection and outcome equations. However, it is only statistically significant at 10% for selection, meaning that gender is important in deciding to save, but there is no difference in the savings amount. Education is positive and significant for the decision of saving (selection); educated respondents save more. Our results suggest that age is positively associated with the savings probability but not with the amount. The more land a respondent cultivates, the higher their likelihood to save and the more savings they accumulate. This is statistically significant at 5%. An additional household member decreases a respondent's likelihood to save and reduces the savings by 2%. This effect is not statistically significant at 10%. Being married or widowed increases the likelihood of savings; a divorce decreases it. When Covid19 affected the household negatively in the past months, the savings decreased. However, his effect is not statistically significant at 10%.

Discussion and Conclusion	***100 – 250 words***

Our results indicate that respondents who use their mobile phones to save, tend to accumulate less than those owning a bank account or engaging in the traditional saving method Susu. An explanation might be that those owning a bank account are wealthier in the first place. Also, we find that better network connectivity and closer walking distance to the mobile money agent decrease a respondent's savings amount. We speculate that a better connection to the market results in the obligation to send remittances, being exposed to tempting goods, resulting in an increased risk of spending money instead of saving.

Further, our results suggest that female household heads positively affect the decision to save. Yet, we do not observe any statistically significant difference between genders in the savings amount. A striking finding is that education seems to be negatively associated with the savings amount. However, at a certain point in life, a high level of education will increase the savings amount. We presume that education might be an investment paying off later in life.

Given the Covid19 pandemic, data collection in the field is limited, and telephone interviews offer a valid approach. We conclude that digital finance is multifaceted and not per se beneficial for smallholder farmers. To the Ghanaian government and private sector, we recommend continuing with the spread of digital financial technologies, accompanying the development with financial education for smallholder farmers and female household heads. Post-pandemic research could add robustness and apply the research question to other regions.

References

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