THE INFLUENCE OF MOBILE MONEY ON SAVINGS BEHAVIOR: A CASE STUDY OF KENYAN YOUTH.

By

OCHIENG, Kevin Oluoch

THESIS

Submitted to

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ABSTRACT

THE INFLUENCE OF MOBILE MONEY ON SAVINGS BEHAVIOR: A CASE STUDY OF KENYAN YOUTH

By

Kevin Oluoch Ochieng

Mobile Money is a technology that facilitates financial service transactions via mobile phone without necessarily having internet connection. Registered users can send, receive, withdraw, deposit, and save money electronically in their phone which then eases financial access. In the African continent, Kenya is the pioneer of mobile money invention since 2007 when Kenyan telco giant Safaricom PLC launched the flagship Mobile Money service called "*MPESA*". This research, therefore, explores how mobile money influences savings behavior paying attention to the financially disadvantaged group in Kenya, the youth. Using a four-wave FinAccess household survey data collected between 2006 and 2016 to estimate the demand and access of monetary services among adults in Kenya, the study runs a logistic regression model to measure the likelihood that a mobile money user has a savings product and analyzes commonly used savings platforms among mobile money users. As a robustness check and to deal with endogeneity concerns, the study employs the use of 2SLS IV model instrumenting proximity to mobile money agents against mobile money use. Results show that, there is 0.56 times likelihood that users of Mobile Money have a savings product compared to non-users. Secondly, Mobile Money users are also more inclined to savings in informal savings platforms such as ROSCAs and ASCAs compared to formal platforms such as banks, MFIs, and Saccos. As a policy issue therefore, formal financial institutions need to redesign their financial products to shift the youth's preference from savings in informal platforms to formal platforms.

Mobile network operators also need to capitalize on the youth's preference to Mobile Money system to expand service provision and access even in the rural settings.

DEDICATION

Gratitude to my lovely partner Beldine Achieng for standing with me during my studies abroad by ensuring that everything was in order back home taking care of our two boys. This gave me piece of mind to be able to work hard while at school and managed to finish this project. Special dedication to my sister Justine Auma who believed in me and kept encouraging me to soldier on despite myriads of challenges I faced along the way.

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CHAPTER 1: INTRODUCTION

1.1 Introduction

Savings are increasingly recognized as a key financial tool for sustainable and inclusive socio-economic development (Van Hove & Dubus, 2019). However, savings limitations are a big challenge for underdeveloped and developing countries, especially individuals without traditional bank accounts (Rijab & Mexhuani, 2021). In Kenya, 17.4% of the population does not have accounts of which 28% are youths (Central Bank of Kenya, Kenya National Bureau of Statistics, & Financial Sector Deepening Kenya, 2016). Increasing savings is of paramount importance for addressing financial vulnerability[1] in Kenya (Kenya F.S.D, 2016). USAID (2022) projects that 70% of Kenyans are at risk of regular financial vulnerability leaving only 30% with a financial plan. Thus, only a few households have mechanisms for smoothing consumption implying that savings become key as an alternative to rely on (Steinert et al., 2018). Hulme et al. (2009) point out that micro-savings assist the poor to reduce vulnerability through "*protective*" and "*promotive*" functions. The former is when one accumulates savings for use in the event of a disturbance while the latter is when one accumulates assets to minimize the chances of a shock happening.

In developing economies, such as Kenya, limited access to formal financial institutions increases the reliance on informal savings mechanisms for example "under the bed", livestock, or ornaments but these channels are risky, inappropriate, and incomplete (Steinert et al., 2018). Given that Kenya has a youth bulge in its population (Kenya National Bureau of Statistics, 2019), finding ways to optimize financial inclusion to ensure that youths acquire financial amenities to encourage saving behavior is a growing policy concern. Thanks to the growing financial innovation of mobile money which enables holding e-money and to carry out other

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[1] Vulnerability is the chance of falling into extreme poverty (Pritchett, Suryahadi & Sumarto, 2000)

financial transactions. This rapid growth of mobile banking technology in the country has improved financial inclusion to include previously unbanked youths (Steinert et al., 2018). Although 28% of youths do not have bank accounts, Mobile Financial Services (MFS) present an opportunity for increased access to financial services and hence increased savings (Kenya F.S.D, 2016). However, there is insufficient evidence on the extent to which this financial innovation has influenced the saving behavior of youths.

A body of research works have analyzed how mobile money influences financial inclusion. Much of the literature posit that the use of mobile phones has not only improved financial inclusion but significantly influences the savings behavior of households (Ouma et al., 2017; Loaba, 2021). However, there is little exploration on how significant Mobile Financial Services (MFS) have shaped savings behaviors, especially of endangered groups such as the youth in Kenya. This research investigates how the use of mobile money, a proxy for MFS has influenced saving behavior among youths. This kind of analysis is important for governments and international organizations when formulating policies aimed at enhancing people's lives through financial inclusion, particularly the youths who are the future of Kenya.

1.2 Background Overview

1.2.1 Mobile Money in Kenya

Mobile Money has positively impacted financial inclusion initiatives in developing economies (GSMA, 2018). It has become the most favored means of accessing financial products and services, particularly in economies with limited financial infrastructure and banking penetration (Shirono, 2021). Mothobi and Grzybowski (2017) define Mobile Money as the financial transactions conducted through mobile phones where the e-money value is stored in an account linked with a registered SIM card. The increase in financial inclusion[2] in

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[2]Financial inclusion is the ways through which individuals and firms adequately access economical monetary services and products that satisfy their necessities (WorldBank 2022, Singh & Singh Kondan, 2011).

some developing nations as observed by Demirguc-Kunt et al. (2018) is attributed to the rise of Mobile Money. For example, 69% of the adult population globally opened new financial accounts in 2017 which is a 10% increase compared to 2011. Financial inclusion is measured in terms of account ownership since accounts enable one to save money and undertake other financial transactions (Demirgüç-Kunt et al., 2018).

The development of Mobile Money platforms was necessitated by the need for suitable channels consumers can explore financial products and services conveniently (Shirono, 2021). Mobile Money has modernized access to financial products, particularly among the financially excluded in developing countries (Balinto et al., 2020). It has lessened the traditional challenges faced in the access and use of formal financial services provided by banks and microfinance institutions (Steinert et al., 2018). Users no longer must go through the hustle of traveling long distances to access a banking service, long queues in the banking halls, and delays in transactions (Zhang et al., 2018; Balinto et al., 2020).

Mobile Money's history and rapid spread dates to 2007 in Kenya when Safaricom PLC, a Kenyan telecommunication company, launched the flagship money transfer innovation "M-PESA" (Mbiti & Weil, 2015). The term "M-PESA" is an amalgam of the initial "M" for mobile and "PESA" a Kiswahili word meaning money (Hughes & Lonie, 2007). M-PESA has registered explosive growth as noted by Mbiti and Weil (2015). 8 months into M-PESA's introduction, it had already attracted over 1.1 million users in Kenya and money transfers within the same period had hit US $87 million. As of January 2022, M-PESA controls 99.8% of the Mobile Money services in Kenya (Awanis et al., 2022). This milestone by Safaricom's M-PESA and lucrative Mobile Money market attracted other players (Mutunga, 2012). Airtel Money, a subsidiary of Airtel Telecommunications, entered the Kenyan market in 2010 (Awanis et al., 2022). The company, however, is not as competitive as M-PESA is, controlling only 0.2% of the Mobile Money market as per the Communications Authority of Kenya (CAK,

2022) report. Telkom Kenya's T-Kash is another entrant into the mobile money market in early 2018. T-Kash only controls 0.006% of the mobile money market (CAK, 2022). The richly served Mobile Money market makes Kenya a perfect place for this study where the real influence of Mobile Money on savings behavior can be evaluated. Due to the homogeneity of service provision by Mobile Money markets (Pazarbasioglu et al., 2020), the next subsection will describe in detail the operations and the type of products and services offered by the main Mobile Money operator with the biggest market share.

1.2.2 Safaricom's M-PESA

M-PESA is the first-ever Mobile Money invention in the world launched in 2007 in Kenya (IDE-JETRO, 2022; Mbiti & Weil, 2015). Since its inception in 2007, Mbiti and Weil (2015) recognize that M-PESA adoption and utilization have been on an increasing trajectory which has contributed heavily to financial inclusion in Kenya. Kuzmina (2018) supports that M-PESA's inception in Kenya is a financial inclusion gap-bridging invention that solved most of the consumer's problems associated with formal financial institutions [3]such as long distance to the banks which took a lot of time and effort, expensive services in the banks and little to no incentive for using the banks. M-PESA is the brand leader in terms of Mobile Money services in Kenya with 34,270,393 subscribers in the financial year 2020/2021 according to CAK (2021) report. Comparatively, this massive subscription is attributed to the high number of Mobile Money agents (254,312) strategically positioned country wide (Naghavi, 2019).

1.2.3 Role of MPESA agent

Agents play a key enabling role by enabling users to access financial services via M-PESA irrespective of their locations (Van Hove & Dubus, 2019). Eijkman, Kendall, and Mas

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[3] Formal financial institutions are those financial institutions legally regulated by the government or by a statute enacted by the government (Wiyani et al., 2016).

(2009) note that M-PESA agents are well distributed such that in urban and peri-urban areas, MPESA agent touchpoints average 200 meters apart hence ease of accessibility compared to banks. Agents enable users to deposit and/or withdraw money in their M-PESA wallet (Mbiti and Weil, 2015). For deposits, a user walks into the M-PESA outlet with any amount of money of his/her choice up to maximum cash of 300,000 Kenyan Shillings (Ksh) which the agent can easily deposit in the individual's registered M-PESA account after security checks such as the registered user's name as it appears on the ID and the exact registered phone number in the name of the individual (Safaricom, 2022). The transaction is then recorded in the agent's logbook to keep track of daily transactions (Flaming, McKay & Pickens, 2011). Usually, the process takes less than 3 minutes before a confirmation message is sent to the user by Safaricom confirming the amount deposited among other details unless there is a network delay (Flaming, McKay & Pickens, 2011). Once the confirmation message has been received, it means an individual whose M-PESA wallet has been credited can use his/her for money at any time (Eijkman, Kendall, and Mas,2009).

Withdrawals follow the same process. A user has any amount of e-money in their M-PESA wallet of up to Ksh. 300,000 that s/he may want to convert to cash. While at the agent outlet, the user inquires if the agent has enough cash to cover their preferred amount of withdrawal (Safaricom, 2022). When possible, for the client to proceed, the agent would require the user's ID card as a security check (Flaming, McKay & Pickens, 2011). The user initiates the withdrawal service from his/her M-PESA menu by navigating to the toolkit, following the prompts, and keying in the required information, most importantly the agent number, amount to be withdrawn and Personal Identification Number (PIN) then confirms the withdrawal (Flaming, McKay & Pickens, 2011). In less than 3 minutes, a confirmation message is sent to both the user and the agent for the transaction (Eijkman, Kendall, and Mas,2009).

The agent after his/her security checks records the transaction details in his/her logbook and hands over the withdrawn cash to the user (Flaming, McKay & Pickens, 2011).

The MPESA agent, therefore, has a critical function in linking the users to the service provider and being the middleman to enable the success of transactions (Flaming, McKay & Pickens, 2011). The process would not be as seamless and efficient had there been no agent to mediate in this process. The business owners have also conferred the agents some level of decision-making roles which gives the agent a share in the business which then inculcates some level of ownership as they run the business (Johnen, Musshoff, and Parlasca, 2022). Apart from just creating an enabling environment for normal transactions, the Mobile Money agent also plays a critical role in information sharing with the clients through posters, especially on transaction tariffs and other products offered by the business (Di Castri, 2013).

1.2.4 Savings in Kenya: M-PESA and other modes

M-PESA has an integrated loans and savings platform that every user can access known as "Mshwari" (Safaricom, 2022). It allows users to deposit and save as low as Ksh1 from their M-PESA wallet and the amount saved in "Mshwari" is separated from the M-PESA balance (Safaricom, 2022). It also allows a user to open locked savings account for their preferred duration of time before accessing the savings (Safaricom, 2022). A user can withdraw their savings anytime back to the M-PESA wallet or send them back to "Mshwari" (Safaricom, 2022). Saving via "Mshwari" is beneficial to the user such that the money saved in "Mshwari" earns interest at the rate of 6.3% per annum, the money is safe and there is ease of access (Safaricom, 2022). "Mshwari" also allows users to access loans from Ksh.1000 to a maximum of Ksh. 1Million depending on the rate of his/her savings and the frequency of using other Safaricom goods and utilities such as voice, M-PESA, and bundles (Safaricom, 2022).

MPESA also offers account linkages, a user with other saving platforms such as formal banks, MFI, and SACCOs can send money into their linked accounts from MPESA or even withdraw money from these accounts into MPESA for savings or use depending on their needs (Bateman, Duvendack and Loubere, 2019). They can also access credit/loans depending on their qualification and account-MPESA linkages (Bharadwaj, Jack and Suri, 2019). These MPESA to other accounts transactions charge small transaction fees as governed by the financial laws in Kenya and are under tight security checks which then enables an MPESA user to have an array of secure, efficient, and cheaper financial access costs (Bharadwaj, Jack and Suri, 2019).

According to Sile and Bett (2015), savings in Kenya incorporates both informal and formal methods. Sile and Bett (2015) identify informal savings methods as financial activities that take place without government agency intervention or control. Such informal savings methods as identified by Sile and Bett (2015) include Rotating Savings and Credit Associations (ROSCAs), Accumulating Savings and Credit Associations (ASCAs), Savings and Credit Cooperative Organizations (SACCOs), and Merry-go-Rounds. Ky et al. (2018) also note that some individuals also save using traditional methods such as buying a "valuable" asset for example jewelry or livestock, while others due to the inaccessibility of formal savings touchpoints, still save "under the bed." Formal savings platforms attract government interventions and regulations for consumer protection through established agencies (Wiyani et al., 2016). Formal savings institutions in Kenya majorly encompass banks and Micro-Finance Institutions (Okeyo, 2022).

Of critical importance for this study is the influence of Mobile Money on saving behavior by the youth. Sweta (2022) defines savings as the remainder of or unspent portion of an individual's income after meeting all the consumption needs. A good savings culture is of

vital importance to any individual in the society (Ye et al., 2021). Wealth accumulation is often achieved through the mobilization of savings which when translated to investment, directly impacts economic growth (Karlan, Ratan & Zinman, 2014). Economies with high savings per capita, amass wealth more efficiently which stirs up rapid economic growth as compared to those that have less asset accumulation (Lipsey & Chrystal, 1995). Poverty eradication, high productivity, and general economic growth are noted by Cheruiyot et al. (2012) as the overall benefits of a good savings culture.

As noted by Steinert et al. (2018), savings in Kenya used to be in the form of "under the bed" banks, saving in the form of possession such as jewels or livestock which are easily liquified, Rotating Savings and Credit Associations (ROSCAs) and merry-go-rounds. The move away from these informal modes of savings influenced by the growth of Mobile Financial Services has positively boosted savings mobilizations, ensured the security of money, and induced more financial controls (Van Hove & Dubus, 2019). According to Financial Sector Deepening (FSD, 2019), 53.6% of Kenyans save using Mobile Money accounts, 25.4% save in formal bank accounts while SACCOs, MFIs, and Post Bank account for 9.4%, 0.7%, and 0.3% respectively in savings mobilization.

1.2.6 The youth and their Savings Behavior

The 2019 population census identifies that 75% of Kenyans are under the age of 35 years (KNBS, 2019). In the context of a developing economy, this highly youthful population is both an advantage and a disadvantage (Dabla-Norris et al., 2015). According to DESA (2015), A youthful population promises a potential labor provision in the future. It also ensures adequate labor replacement and continuous generation of government revenue in form of taxes availing constant availability of resources for financing most public goods (DESA, 2015). On the other hand, for developing countries without a well-developed capacity to engage the

youthful population in labor, the high population of the youth is just but another level of dependence to be shouldered by the government (United Nations, 2017).

According to German Cooperation (2022), saving is an important instrument that influences the development of the youth. Accumulation of assets especially through savings has proven to positively impact household livelihoods, more so, for those with low incomes (Karlan et al., 2017). Deshpande (2016) finds a linkage between youth development and savings noting that savings make the youth have positive attitudes, shape behavior, lead to asset accumulation, and induces a positive change in income. German Cooperation (2022) also cements this idea stating that the participation of the youth in social savings groups improves both the financial and livestock assets of the youths and their households. However, despite the high financial inclusion in Kenya, youth participation in savings is still low and largely dependent on some factors (Zou et al., 2015), for instance, Silinskas et al. (2021) find that the savings behavior of the youths varies depending on their social status[4]. Those with low social status tend to save more using platforms such as mobile money compared to those who are from rich backgrounds (Silinskas et al., 2021).

1.3 Problem Statement

Kenya's fiscal inclusivity as a function of both mobile money accounts and active formal bank account ownership has been on a steady rise from 2006(26%) through to 2021(83.7%) (Chitavi et al., 2021). FinAccess (2021) attributes this growth to technological advancement, especially in mobile money services. However, account ownership and access to financial services do not necessarily translate to the actual usage of financial products such as credit, savings, insurance, and airtime among others (Pazarbasioglu et al., 2020). Apollo

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[4] Social status refers to the rank that a person has in a society. This may include duties, lifestyle, and attendant rights based on honor (Lundberg, 2008)

(2020) estimates that only 23% of Kenyan youth between the age of 18-25 years are financially excluded. Apollo (2020) also finds that the youth are 33% unlikely to hold bank accounts compared to adults. These statistics show a positive trend towards account ownership in Kenya and better financial inclusion and are linked to the upsurge of MFS in Kenya, especially Mobile Money (Apollo, 2020).

Most studies focus on the impact of MFS on financial inclusion in Kenya, (e.g Hove & Dubus, 2019; Macus & Nan, 2020; Ngun'gu, 2018). Ouma et al., (2017) and Rugemintwari and Sauviat (2018) however take a similar approach to the current study by evaluating the impact of MFS on savings behavior. These studies [Ouma et al., (2017) and Rugemintwari and Sauviat, (2018)] focus on the savings behavior of the general population who have access to MFS platforms for savings. The current study, however, deviates from this approach by evaluating Mobile money's influence on the savings behavior of the youth who as noted by Demirgüç-Kunt et al. (2017), are among the financially excluded alongside the rural dwellers, physically challenged, women, and the elderly. This study will therefore explore and contribute to the literature on how Mobile Money influences the savings behavior of the youth in Kenya and propose policy options that can be implemented by both MFS operators and financial institutions in improving financial access hence better financial inclusion for the vibrant youth.

1.4 Research Objectives

The main objective of this study is to assess the influence of Mobile Money on the savings behavior of the youth in Kenya. The specific objectives that the study aims to achieve will be to investigate the barriers to savings by the Kenyan youth posed by financial institutions, to assess the impact of Mobile Money policies on the savings behavior of Kenyan Youths, and to analyze the correlates of using Mobile Money among the youth.

1.5 Research questions

The following are the research questions the study will answer;

1. Does the use of Mobile Money influence saving mobilization by youths in Kenya?

2. Does mobile money service influence savings behavior of the youth in different savings platforms?

1.6 Research Hypothesis

The study will answer the research questions by attempting to reject the null hypothesis and formulating the alternative hypothesis.

1. Ho: Access to Mobile Money Service does not improve the tendency of savings by the Youth in Kenya.

2. Ho: Access to Mobile Money Service does not increase savings mobilization on different savings platforms by the youth in Kenya.

1.7 General Study Outline

Chapter 2 explores and critiques existing literature that relates to the influence of Mobile Money and the savings behavior of the youth. Chapter 3 presents the Methodology highlighting the datasets, estimation methods, and models of analysis. Chapter 4 will include the presentation of the results. Chapter 5 will form the discussion to highlight the main findings and inferences made thereof. This will also summarize the study findings, and study contributions, make recommendations, and propose opportunities for further research based on existing gaps.

2.0 LITERATURE REVIEW

2.1 Introduction

The research assesses the influence of Mobile Money on the saving behavior of Kenyan youth. In this paper, I analyze how the increased access to Mobile Money has influenced the saving behavior of youth in Kenya. Therefore, in this section, I highlight the theoretical overview which anchors the research and review the pragmatic literature on the use of Mobile Money as a savings platform.

2.2 Theoretical Overview

Mobile Money has modernized and redefined the concept of money both as a medium of exchange and a store of value (Shirono et al., 2021). Mobile Money users can store the value of money in their preferred mobile money accounts which offers important controls such as safety and convenience as opposed to the informal savings mechanisms (Cook & MacKay, 2015). Cook and MacKay, (2015) posit that users can access and utilize the e-money stored in the mobile money account at any point of their choice if they can access an agent. This ease and convenience of access to money increase the trustworthiness and adaptability of mobile money both as a store of value and a medium of exchange (Rea and Nelms, 2017). Thus, the propensity of users to store and access money in their mobile money account and the acceptance of mobile money as a mode of payment justifies both the "store of value" and "medium of exchange" purposes of money which are critical to this study (Dahlberg, 2015). Mobile Money's popularity in Kenya has attracted various studies which have approached this topic anchoring their studies on the hypothesis of money (e.g Fung et al., 2014; Dahlberg, 2015; Arvidsson, 2014). This study takes the same approach, particularly based on Jevons (1876) "theory of money" and the "Agency theory" put forward by Jensen and Meckling (1976).

2.2.1 The Theory of Money

In his book "Money and the Mechanism of Exchange", Jevons (1876) identifies four foundational purposes of money: Money as a medium of exchange, a store of value, a common measure of value, and a standard of value. Of keen interest to this study are the "store of value" and "medium of exchange" components of the definition due to their applicability to mobile money (Dahlberg, 2015). Jevons (1876) notes that a common commodity serves as a medium of exchange in which both the buyers and sellers dim fit. In other words, a commodity used as a medium of exchange must be one that all the trade partners are willing to receive during a sale and can also be used for purchase (Kiyotaki & Wright, 1989). As a store of value, Jevons (1876) points out that a commodity of exchange must meet the threshold of satisfying the wants of both the buyer and the seller taken separately. Jevons (1876) explores and asserts that a desirable payment instrument must meet minimum characteristics such as universality, security, convenience, economy, certainty, and information.

Mobile money satisfies both the medium of exchange and store of value as a definition of money theorized by Jevons (1876). In contemporary economics, money that is stored in electronic form acts as a store of value (Adrian & Mancini-Griffoli, 2021). Mobile money offers an e-money platform and hence serves as a store of value (Shirono et al., 2021). E-money can also be used as a medium of exchange where a user can make purchases and payments if it is acceptable medium of transaction (Jack, Suri, and Townsend, 2010). In Kenya, the use of mobile money both as a store of value and as a medium of exchange is wide (McLeay, Radia & Thomas, 2014). As noted by Jevons (1876) on the desirable characteristics of a payment instrument, Dahlberg (2015) confirms that indeed mobile money meets such minimum characteristics as universality, security, convenience, economy, certainty, and information. According to Batista and Heitmann (2010), Mobile Money service is universal for instance through the integration it has with other digital platforms such as PayPal or Western Union or

banks both internationally and regionally. Mobile money is also secure because customer information is protected and secured by a PIN which can only be accessed by a specific user (Ali, Ally & Elikana, 2020). Mobile Money's convenience is unrivaled, it is economical and easy to transfer money between users without extra costs and time wastage (Suri, 2017). Moreover, mobile money acts as a link with other financial platforms such as formal accounts, MFIs, and SACCOs (Parlasca, Johnen & Qaim, 2022). Widespread mobile money agents make it easy to access services and information without much strain (McGath & Lonie, 2013).

2.2 The agency theory and Mobile Money

In their book "*Theory of the firm: Managerial Behavior, Agency Costs, and Ownership Structure*", Jensen and Meckling (1976) address a contractual engagement between two or more people in which one party acts as a "principal" who engages the services of the other "agent" to run a service on the principal's behalf. The principal delegates not just duties and service performance but also some decision-making initiatives so that the agent enjoys some level of responsibility and ownership of their work (Jensen & Meckling,1976). However, Jensen and Meckling (1976) note that there is a separation of power and evaluation by the principal on the conduct of the agent to ensure that the agent conducts himself/herself in accordance with the interest of the principal.

Mobile Money companies exhibit this "principal-agent" relationship (Johnen, Musshoff, & Parlasca, 2022). The principals are the Mobile Network Operators (MNOs) while agents are the 'contracted agents' who operate at the local levels and serve their customers in designated Mobile Money outlets (Johnen, Musshoff, and Parlasca, 2022). In Kenya for instance, Safaricom, Airtel, and Telkom being the main MNOs have contracted agents spread across the country, the most predominant are the M-PESA agents (NUTHU, 2015). Johnen, Musshoff, and Parlasca (2022) note that agents play a critical function in shaping the expansion

of the mobile money. The agents contribute to the growth of the business by being directly involved in customer sourcing, serving, and training which improves brand awareness initiative (Lal & Sachdev, 2015).

The success of mobile money services depends majorly on the level of involvement of the agents (Lal & Sachdev, 2015). According to Mas (2011), in Kenya, M-PESA enjoys most of the customer subscriptions owing to the role played by the MPESA agents. Mas (2011) points out that the success of Safaricom in commanding a big Mobile Money market share lies in Safaricom's commitment to a properly instituted agency structure that promotes trust and builds customer confidence, hence ensuring the continued growth of MPESA.

2.3 Mobile Money and Livelihoods in Kenya

Suri and Jack (2016) establish a connection between financial inclusion and mobile monetary systems. Suri and Jack (2016) note that a convenient and reliable financial service is a prerequisite for a stable financial inclusion initiative especially in developing economies. Suri (2015) identifies that most financial markets in developing countries have high transaction costs, which therefore is a hindrance to achieving financial inclusion initiatives in such economies. Manyika et al, (2016) note that emerging economies have the potential of growing their GDP by at least 6% if proper financial inclusion strategies are put in place. Kenya for example has this potential. The growth of Mobile Money platforms such as M-PESA has increased both financial inclusion and share of GDP. For instance, in 2019, the Central Bank of Kenya [CBK] (2019) reported that over US $26 billion which is about 48.76% of Kenya's GDP was transacted via M-PESA, which is proof of the importance of Mobile Money in realizing financial inclusion and bettering livelihoods of the taxpayers as supported by various empirical pieces of evidence.

Kim (2022) while assessing the impact of mobile money in Kenya, focused on the financial inclusion of women in Nairobi Kenya. Women in Kenya, just like in most developing countries have the challenges of property rights and ownership (Kim, 2022). Kim (2022) further notes that women still rely more on their male counterparts in making decisions regarding property rights, usage, or ownership. Kim (2022) finds that most women require the approval of their husbands and family members to use a property even if it is family property. Moreover, the study by Kim (2022) establishes that most women in Nairobi are majorly involved in the informal sector businesses which to some extent limits their chances of financial inclusion as most would struggle to get collateral for financial access. They are therefore more dependent on informal finance. Mobile money, however, is redefining financial access by women by offering safe savings platforms, payment services, and remittances which has made most informal businesses run by women thrive (Islam and Muzi, 2020). This finding by Kim (2022) provides evidence of how mobile money works in reshaping sources of livelihood, especially for a disadvantaged group like women, and evidence for increased financial inclusion through different channels.

Wieser et al. (2019) studied how mobile money influences poor rural households in Uganda through a randomized experiment using mobile money agents stationing. The study by Wieser et al. (2019), which sought to investigate how mobile money agent distribution would impact the local livelihoods found out that among the treated group mobile money remittances increased through person-to-person transfers and significantly reduced the transaction costs for all the remittances. Wieser et al. (2019), also found that the availability of mobile money agencies resulted in the doubling of nonagricultural businesses improving self-employment rates from 3.4 to 6.4% which as a result also impacted food insecurity reducing it from 62.9% to 47.2% in areas that were insufficiently served by banks. The evidence from this study by Wieser et al. (2019), even though conducted in Uganda, is applicable in Kenya's case given

the same geographical locations and almost similar economic models (Olsson, 2012). The findings are a likely pointer that mobile money impacts livelihoods positively even in areas that have less of both physical and financial infrastructure (Ouma et al., 2017).

Ouma et al. (2017) in their study of Mobile Financial Services (MFS) and financial inclusion, question whether MFS is a blessing for mobilizing savings. Conducted in selected Sub-Saharan African countries, the household cluster study by Ouma et al. (2017) found that the use of mobile phones to provide financial services is beneficial to savings mobilization at household levels and the impact is twofold; not only does the use of mobile phones for financial service provision impact the savings behavior at household levels but also is a key in the choice of amount to save. Savings directly improve the livelihoods of a household, especially in response to both predictable and unpredictable events in the future such as health emergencies (Jack and Suri, 2014). The findings in this study by Ouma et al. (2017) are likely attributed to the convenience, cost-effectiveness, and ease of access and use of mobile phones for financial transactions (Ouma et al., 2017). To improve livelihoods, especially among the poor and other vulnerable [5]groups, savings mechanisms should be tailored in a more efficient, convenient, cheap, secure, and reliable way which can be achieved through the integration of mobile phone technology into financial services (Donovan, 2012).

Trik and Faye (2013) describe MFS as a disruptive innovation in Africa through Mobile Money. In their findings they note that Mobile Money enables people to undertake financial transaction without having to physically visit the banking halls. Manyika et al. (2016) support that Mobile Money has financially included above 1.6 billion people, the majority of whom are women and the youth. Another reason why MFS is ensuring financial inclusion is the widespread distribution of Mobile Money touch points manned by agents (Suri, 2011).

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[5] Vulnerable groups refers to the low-income earners, less educated, females, youth and rural dwellers who face financial challenges (Van Hove & Dubus, 2019)

According to Jack and Suri (2011), in Kenya, mobile money agents are within reachable distance and are well distributed both in urban and rural settings which enable users in different geographical locations to access, transact and save money regardless of their socioeconomic statuses.

2.4 Mobile Money as a savings mobilization platform

Adan (2016) identifies that the unbanked group with little access to financial institutions, most often use informal savings mechanisms which are known to be insecure, unreliable, and inconvenient. Gugerty (2007) also notes that even though some of the informal saving mechanisms, for instance, savings in assets such as livestock or in ROSCAs could be appropriate for future events, these kinds of savings cannot be used for emergencies. Mobile Money, therefore, offers a more secure interface for personal savings (Donovan, 2012). Compared to savings in formal institutions, Mobile Money savings is also proving to be more efficient and convenient than saving in formal institutions (Aron, 2018). This is so due to the spread of Mobile Money agents both in rural and urban areas in Kenya compared to banks and MFIs which have their most outlets in urban areas (Jack and Suri, 2011). Mobile Money users need not travel long to access financial services but rather acquire such services from the nearest Mobile Money agent touch point (Steinert et al., 2018).

There are different findings on how the use of Mobile Money influences the savings behavior of an individual [e.g. (Batista & Vincente, 2017); (Kikulwe et al., 2014)]. Batista and Vicente (2017) used Randomized Controlled Trials to assess the influence of mobile money on agricultural investments for smallholder farmers in Mozambique. With a set of two groups, Batista, and Vicente (2017) offered remunerated mobile money accounts to one group of farmers and a non-remunerated mobile money account to the other group. Findings by Batista and Vicente (2017) suggest that farmers with remunerated mobile money accounts saved more

for future agricultural investment especially in inputs such as fertilizer compared to their counterparts who had non-renumerated mobile money accounts. Despite the control group not having any remuneration through the mobile money accounts, Batista, and Vicente (2017) found that the control group used the mobile money accounts for other mobile money transfers leveraging on the ease of use, cheap services, and the convenience of this technology (Aron, 2018). This finding by Batista and Vicente (2017) suggests the importance of a well-structured mobile money instrument which if well-tailored to suit the needs of the users, can be a powerful instrument to mobilize savings (Di Castri, 2013).

Also studying smallholder farmers in Kenya, Kikulwe et al. (2014) analyzed the impact of mobile money on the welfare of smallholder farmers in Kenya through the effect of remittances received from family and relatives via mobile money platforms. Kikulwe et al. (2014) observed the financial behavior of both the users of mobile money and non-users. Kikulwe et al. (2014) report that users of mobile money increased the propensity of the smallholder farmers who receive family support through mobile money remittances to keep the money for future acquisition of farm inputs. Kikulwe et al. (2014) attribute this observation to the fact that mobile money discourages the temptation of impulse buying and reduces other financial risks compared to cash which is very liquid. These studies [(Batista & Vincente, 2017); (Kikulwe et al., 2014)], therefore, emphasize the alternative hypothesis that the access and use of Mobile Money services shape an individual's savings behavior.

Mobile Money use has also proved to be effective, especially in poverty eradication and redefined gendered roles as studied by Suri and Jack (2016). Suri and Jack (2016) explored the impact of mobile money on gender and poverty in Kenya. Findings by Suri and Jack (2016) point to mobile money as a tool to eradicate poverty if well-structured and with appropriate controls. Suri and Jack (2016) note that mobile money access and usage led to long-term

increased consumption and reduced the number of households in extreme poverty over time. This was a result of observed changes in financial behavior as mobile money increased the chances of people saving via mobile money platforms and access to other savings and credit platforms (Suri & Jack, 2016). Women-headed households are found to be the biggest beneficiaries in this study where most women who were trapped in the provision of agricultural labor on their farms or on a contractual basis, moved out of these to start their own businesses after mobilizing savings (Suri & Jack, 2016). These findings by Suri and Jack (2016), therefore, confirm that mobile money is a boon for not only mobilizing savings but also an efficient platform for overtime allocation of consumption, distribution, and reallocation of labor which thence can reduce poverty (Ouma et al., 2017).

Ky et al. (2018) sought to find if mobile money affects savings behavior, especially in developing countries. This study by Ky et al. (2018) in Burkina Faso centered on the use of mobile money to save both for predictable and unpredictable events in the future. Findings by Ky et al. (2018) point strongly to the importance of mobile money in shaping savings behavior for emergencies specifically for health issues but could not establish a correlation between mobile money and savings for predictable events. Ky et al. (2018) notes that using Mobile Money increases the chances of savings for future emergencies, especially for low-income earners, rural dwellers, women, youth, the old, and the less educated. This study is therefore another evidence that Mobile Money access and usage can influence the savings behavior of an individual.

Gomber et al. (2018) finds that the integration of mobile phones, mobile networks, and the internet has simplified individuals' financial accessibility. In a related study by Loaba (2021) evaluating the impact of mobile banking on saving behavior, his findings suggest that the use of mobile phones as a financial access tool improves an individual's propensity to save

in formal bank accounts by 2.4% and in mobile accounts by 0.83%. Loaba (2021) also explores the impact of mobile money on the saving behavior of women who traditionally in developing economies most likely have informal saving mechanisms. Loaba (2021) notes that access to mobile money makes women shift from informal saving platforms to formal savings. Loaba (2021) also observes that education, employment, and access to any form of income lead to the adoption of mobile money either as a savings platform or as a medium to mobilize savings in other platforms. This study's findings point to the need to strengthen the integration of mobile phones and financial services in revamping financial inclusion, especially for disadvantaged groups (Kim et al., 2018).

Analysis of the reviewed literature portrays evidence that mobile money use has positive influence on the savings behaviors of individuals. My study will therefore contribute and extend the works done by different scholars on this topic by taking a more specific approach on establishing not just the relationship but also the causal effect of mobile money on saving behavior of the youth who are one of the disadvantaged groups in financial inclusions in a context of a developing country. The youths are of central focus given the early exposure to the digital era compared to the old (Salmela-Aro & Motti-Stefanidi, 2022), hence the real impact of mobile money can presumably be evaluated better in this group given the digital divide that exists especially in the context of a developing economy. Also, this study is the first to evaluate the relationship between mobile money and savings mobilization on different savings platforms and the causal effect of mobile money on savings behavior on different savings platforms.

2.4 Conclusion

It is apparent that most of the empirical studies on this topic find some level of relationship between Mobile Financial Services (henceforth referred to as Mobile Money) and

financial inclusion. Most importantly for this study, some studies also find that Mobile Money play important role in shaping the savings behavior of individuals. The next section will use data to analyze the nature of the influence of Mobile Money on savings behavior with a more central focus on the youth.

3.0 RESEARCH METHODOLOGY

3.1 Introduction

The study investigates the influence of mobile money on the savings behavior of the youth in Kenya. This chapter will give a deep dive into the data used for this purpose, a brief into the survey tool used during the data collection and a description of variables of interest for this study. This chapter will also provide an explanation into the estimation method, model suitability and specification.

3.2 Survey Information

The study relies on secondary household data collected by FinAccess by way of survey. The data was collected by enumerators contracted by FinAccess to administer questionnaires through one-on-one interviews with the targeted respondents in their households. The household head was targeted during the interviews with a spouse or any other adult household member above 16 years of age interviewed in the absence of the household head and after three consecutive visits. The four-rounds data is a repeated cross-section which commenced in 2006 with the objective of measuring the demand and access of financial services among adults in Kenya. The sample size varies for each wave: wave 1 (4310), wave 2 (6,596), wave 3 (6,449) and wave 4 (8,665) for a total of 26,020, representative enough at national, province and rural/urban levels. The study utilizes the four rounds of data conditioning for age of the youth between the age bracket of 16-35 years of age representing the youth in Kenya. The total sample size utilized by the study is therefore 14,443 respondents. The age 16 is considered an adult according to Kenya's employment act cap 226 of the Kenyan Laws. The sample demographics is presented in the frequency table 1. General knowledge of mobile money, agent positioning, other financial services, and savings formed part of the questions in the survey.

3.3 Demographic summary of the sample

Table 1.0: Demographic Characteristics of the sample size

Variable Name	Whole Sample	Mobile Money Users	Mobile Money Non-Users
Saving behavior			
Savings Product	69.27	63.7	36.3
Saving: Mobile Money	44.76	66.15	33.85
Saving Platforms:			
Savings-Bank	12.35	71.29	28.71
Savings-Sacco	8.53	64.22	31.93
Savings-MFI	2.63	61.02	36.44
Savings-ROSCA	30.84	66.65	33.35
Savings-ASCA	8.72	77.15	22.85
Savings-Group of friends	8.81	56.55	31.29
Savings-Family	6.81	46.62	31.4
Savings-Secret Place	38.9	49.63	42.38
Age (Mean Age)			
Age	25.78	26.83	24.47
Respondent Gender			
Male:	37.33	61.88	38.12
Female:	62.67	55.1	44.9
Married (Single=1)			
Single:	37.40	54.13	45.87
Divorced/Separated:	2.60	68.08	31.92
Widowed:	2.51	55.80	44.20
Married:	57.26	61.35	38.65
Cluster Type (Rural=1)			
Rural	57.12	46.40	53.60
Urban	42.88	72.02	27.98
Education (None=1)			
None:	17.13	46.69	35.29
Primary:	46.27	47.78	34.97
Secondary:	27.76	47.24	35.30
Tertiary:	8.84	48.63	33.75
Mobile Phone			
Mobile Phone Use	59.59	74.56	17.06
Monthly Income			
Monthly Income	10186	13014	4,329
#HH members			
Household Size	4	4	5
#Income Earners			
Income Earners	4	4	4
Employment			
Formal Employment	45.33	53.58	46.42
Informal Employment	32.90	68.41	31.59
Unemployed	21.78	48.83	51.17

The table 1.0 above gives a summary statistic of the sample size. It is important to note that 44.76% of the whole sample have mobilized active savings on the mobile money platform. 66.15% of those using mobile money as a savings platform also have mobile money accounts. 33.85% of those saving on mobile money platforms have no mobile money accounts but save on mobile money accounts of others most of whom are family members.

69.27% of the whole sample have mobilized savings in different savings platforms. 63.7% of those with savings product are also mobile money users. 36.3% of those holding savings in different platforms do not use mobile money. Mobile money is the most preferred savings platform as 44.76% of the whole sample save using mobile money. "Savings in a secret place" is second to mobile money saving at 38.9% of the whole sample while 30.84% save with ROSCAs. This signifies preference to informal savings platforms as opposed to formal savings platforms such as banks (12.35%), saccos (8.53%) and MFIs (2.63%).

42.88% of the respondents live in the urban settings compared to 57.12% residing in the rural. 62.67% of the respondents are females while 37.33% are males within 16-35 years age bracket. 57.26% of the respondents are married compared to 37.40% single respondents.

Most of the respondents have basic primary education as 46.27% completed Primary level of education compared to 27.76% of the secondary school graduates. 8.84% have tertiary education while 17.13% have no education. For further analysis, education of the respondents will be categorized as either "low education" constituting those with primary education and/or no education and "high education" comprising of respondents with secondary school and above.

The mean age of the whole sample of respondents is 25 years of age. Mobile money users average 26 years of age with the non-users of mobile money averaging 24 years. The Mobile money non-users are therefore relatively young compared to the mobile money users. On average, each household in the whole sample earns a monthly income of Ksh. 10186.

Mobile Money users earn relatively higher on average Ksh. 13014 compared to the non-users who earn on average of Ksh. 4329 per month.

In the whole sample, on average, each household has 4 income earners, the same trend is observed in the sub-sample of mobile money users. Mobile money non-users however have on average 6 income earners. The average number of dependents per household in the whole sample is 4, with the similar trend in the sub-sample of mobile money users. Number of dependents in the household in the mobile money non-users is on average 5 members.

59.59% of the respondents own a working mobile phone. 74.56% of those who own a working mobile phone are users of mobile money with only 17.06% of mobile phone owners not users of mobile money.

3.4 Variable Definitions

Table 2.0: Variable Definitions

Variable	Definition	Observations	Mean	SD	Min	Max
Gender (Male=0)	Describes respondent's gender: 0 (Male) 1 (Female)	14443	0.63	0.48	0	1
Education (None=1)	Describes respondent's education level: 1 (None) 2 (Primary) 3 (Secondary) 4 (Tertiary)	14443	2.28	0.85	1	4
Financial Literacy	Describes respondent's knowledge of various financial products: 1 (Low) 2 (Medium) 3 (High)	4,957	1.96	0.80	1	3
Married (Single=1)	Describes respondent's Marital status 1 (Single) 2 (Divorced) 3 (Widowed) 4 (Married)	13447	2.80	1.44	1	5
Employment	Describes respondent's Employment Status: 1 (Formal Employment) 2 (Informal Employment) 3 (Unemployed)	14163	1.76	0.78	1	3
Expenditure	Describes household monthly expenditure	11826	6204.64	18676.16	0	812500
Cluster Type (Rural=1)	Describes the cluster type: 1 (Rural) 2 (Urban)	14443	0.43	0.49	0	1
Monthly Income	Describes the household's total monthly income from all sources	8,526	10185.96	20575.52	0	687000
Age	Describes the respondent's age	14443	25.78	5.56	16	35
HH Shock	Describes whether a household experienced a shock within the past 12 months	14443	0.91	0.28	0	1
#HH members	Describes the number of people living under the same household	11050	4.01	2.33	1	22
#Income Earners	Describes the number of people earning income and living within the same household	9,196	3.58	46.45	0	999
Assets Owned	Describes whether a household owns assets or not	14443	0.94	0.25	0	1
Time to Agent	Describes the time take by an individual to reach nearest mobile money agent	8,248	1.77	1.00	1	9
Mobile Phone	Describes whether the respondent has access to a working mobile phone	14443	0.60	0.49	0	1
MM Saving	Describes whether the respondent saves using mobile money	8,844	0.45	0.50	0	1
Loan	Describes whether the respondent uses a loan's product or not	14443	0.32	0.47	0	1
Insurance	Describes whether the respondent uses an insurance product or not	14443	0.14	0.34	0	1
Mobile Money	Describes whether the respondent is a Mobile Money User or Not	11919	0.58	0.49	0	1

Table 2: Descriptive statistics of all the variables to be used in the estimation model

Table 2.0 above presents the definitions of all the possible variables used in the test specification model. The model capitalizes on the robust standard errors to minimize the variability of the residuals (variances in the predicted model) of the independent variables in predicting the main outcomes. This robustness of standard errors takes care of homoskedasticity assumption.

Savings product is the main outcome variable (Y). It is a binary variable where "0" denotes individual not having a savings product while "1" denotes an individual with a savings product. The saving product platforms vary depending on the chosen platform. A summary of saving platforms is included in table 1. Mobile Money Use is the main predictor variable (X). It is also a binary variable which is equivalent to "1" if an individual is a mobile money user and "0" otherwise.

Initially respondent marital status is a 4-scale categorical variable with values such that 1 "Single" 2 "Divorced" 3 "Widowed" 4 "Married/Living with partner". For a more flexible analysis, the marital status of the respondents has been constructed to a dummy variable with "0" denoting single (single, divorced, and widowed) and "1" denoting married category. The household shock is constructed as a dummy variable with "0" denoting "no major shock experienced by the household in the last 2 years" while "1" denotes "household experienced a major shock within the last two years."

3.5 Model Specification

The study utilizes the logit model to establish the effect of mobile money on having a savings product and the effect of mobile money on the use of different savings platforms. The model integrates time specific and region-specific fixed effects to correct for the household changes over time and the adjustments that have taken place in districts where agents are located. This will correct any confounding factors that might lead to bias.

The model specification is as follows:

PROB {Saving Product (Y_{ijt}) = 1} = Φ ($β_0$ + $β_1MM_{ijt}$ + $β_2C'T_{ijt}$ + $δ_{ij}$ + $λ_{it}$ + $ε_{ijt}$) ...…… (1)

Where:

- Y_{ijt} is the main dependent variable "Having a savings product" which is a proxy for saving behavior. The variable is binary where y=1 signifies an individual having a savings product and y=0 signifies no savings product. Equation 1 will also be used to test the effect of mobile money on individual savings platform.

- Φ is the cumulative density function, a non-linear function which transforms the effects of all the coefficients to be between 0 and 1 because P(Y=1) is a probability.

- MM is main predictor variable of interest (Mobile Money use). It is also a dummy variable with values 0 and 1. 0 if individual does not have mobile money account and 1 if individual has mobile money account.

- $C'T_{iit}$ represents the summation of all other control variables as presented in table 2 above.

- $δ_{ij}$ represents the district fixed effect.

- $λ_{it}$ represents time fixed effects.

- $ε_{ijt}$ represents the error term.

- $β_1$ is the coefficient of interest; the effect of Mobile Money (MM) on the saving product (Y). It is expected that if the users and non-users of mobile money differ in terms of their savings behavior, $β_1$ will be positive and significant.

The predicted probabilities will be estimated as follows:

$$\bar{y}_{ijt} = β_0 + β_1MM_{ijt} + ΩX_{ijt} + λ_{it} + δ_{ij} + ε_{ijt}$$

It is worth noting that the effect of mobile money on savings could be different depending on individual characteristics. For example, the effect could be different in terms of gender, cluster type (whether one lives in the rural or urban setting), marital status, level of education and even financial literacy. The study therefore takes care of this different effect of mobile

money on different individual characteristic by including an interaction term in the specification equation 1 to isolate the effect of mobile money on different individual characteristics.

$$\text{PROB } \{\text{Saving Product } (Y_{ijt}) = 1\} = \Phi (\beta_0 + \beta_1 MM_{ijt} + \beta_2 D_{ijt} + \beta_3 MM_{ijt} * D_{ijt} + \beta_4 C'T_{ijt} * D_{ijt} + \delta_{ij} + \lambda_{it} + \varepsilon_{ijt}) \text{ ... (2)}$$

Where, D_{ijt} is a dummy variable that denotes individual characteristics such as rural vs urban, male vs female, low education vs highly educated, marital status and financial literacy. The coefficient of interests is therefore β_1 and the sum of $\beta_1 + \beta_3$.

This model assumes that mobile money effect is exogenous and is not correlated with the error term. However, since access and use of formal financial services for savings is relatively limited and dependent on other factors, there is possibility that some people use mobile money as a savings platform due to the ease of accessibility and convenience (Adan, 2016; Gugerty, 2007). This therefore leads to potential endogeneity concerns. To address the problem of endogeneity, the study capitalizes on the use of Instrumental Variable to correct for the possibility of the effect of mobile money on the savings behavior not being exogenous.

3.6 Identification Strategy

The use of mobile money is largely dependent on mobile money agents who are the linkage between users of mobile money and the Mobile Network Operators (Johnen, Musshoff, & Parlasca, 2022). They perform important role in the cash-in and cash-out services to mobile money users: To deposit money in the phone, an individual needs an agent to convert the cash to e-money, likewise, to withdraw money from the phone to cash, an agent is equally needed (Ky et al., 2018). Without the agent therefore, mobile money fails (Rea and Nelms, 2017). Agent's network in Kenya has been on an increasing trajectory currently over 300,000 distributed countrywide (Ochieng et al., 2022). Agents' distribution especially at the onset of mobile money in Kenya, followed an urban to rural expansion framework capitalizing on the

availability of enabling infrastructure in the urban centers (Ky et al., 2018). Administratively, agent networks spread from the capital Nairobi where the business is established, to other urban and peri-urban centers before touching base in rural settings (Ochieng et al., 2022). As of 2019, agent density network averaged 228 agents per 100,000 adults: 7 times the number of available ATMs and 20 times the number of bank touch points (Ochieng et al., 2022). This therefore signifies the ease of access and better proximity to a mobile money agent as opposed to other financial service providers (Ky et al., 2018). Theoretically, the less time spent to the nearest mobile money agent or the smaller the distance covered to the agent, the higher the likelihood of adoption and use of mobile money (Ochieng et al., 2022).

The proximity of the mobile money agent therefore presents a better identification strategy for an IV modelling to establish the causal relationship between mobile money and savings behavior and for robustness check by minimizing the effect of endogeneity in the first model (Jack and Suri, 2014). Given that the use of mobile money is the only potential endogenous variable, the study identifies "*time to the nearest agent*" as a measure of proximity of a user to an agent, hence a valid instrument. The less time it takes to an agent, the higher the likelihood of adoption and use of mobile money (Jack & Suri, 2014). Therefore, the instrument satisfies the relevance assumption of the IV as recommended by Angrist and Pischke (2014).

Some studies [Jack and Suri, (2014); Ky et al. (2018)] have used "*distance to the nearest agent*" as a valid instrument to measure the proximity of an individual to an agent. The use of "*time to the nearest agent*" serves as a proxy for "*distance to the nearest agent*" as used by Jack and Suri (2014) and Ky et al. (2018) because of their direct proportionality. "*Time to the nearest agent*" is a 10-scale categorical variable with the lowest scale being "*less than 10 minutes*" and the highest being "*more than 7 hours.*" The underlying assumption is that proximity to an agent would only affect the use of mobile money and has no relationship with

savings behavior by individuals especially in other platforms. For this reason, time spent to the nearest agent does not affect the decision by individual to save in various savings platforms.

4.0 RESULTS

4.1 Mobile Money and Savings in general

Table 3 gives a breakdown of the logit model estimations for each of the outcome variable. The standard errors are in parenthesis. Column 1 gives the estimations of "savings product" in general, columns 2-8 gives estimations for savings in different platforms as the main outcome variables. As observed in column 1, the coefficient of mobile money is positive and statistically significant at 1%. This implies that mobile money use significantly improves the savings behavior of the youth thus provides a ground for rejection of the null hypothesis. The finding therefore is in support of literature as illustrated in section 2 of this report that mobile money improves the savings behavior of its users.

The same trend is observed in Table 4 column 1 of the 2SLS IV model. The estimation of the mobile money use is more robust and statistically significant in this model compared to the logit model. Users of mobile money are 0.559 times more likely to have a savings product compared to the non-users as depicted by the positive and significant coefficient of Mobile Money in column 1. The IV estimate is higher than the logit estimation which indicates that logit model underestimated the effect of mobile money on savings behavior and a potential proof of existence of endogeneity biasing the estimates.

P-values for both Wald-Chi of the 2SLS IV model and the P-value for the F-statistic of the logit model are 0 for all the predicted variable "Savings Product" and "savings on different platforms" which signifies that the model is of best fit at all the significant levels. The R-square values 0.209 and 0.127 for the logit and IV respectively imply that mobile money use can explain 20.9% and 12.7% variance in savings behavior of the youth.

4.2 Mobile money use and savings on different platforms

Column 2-8 of both Table 3 and Table 4 evaluates the effect of mobile money use on different savings platforms. Column 2-4 presents the estimates of savings in formal[6] saving platforms such as banks, saccos and microfinance institutions while column 5-8 presents estimate of savings in informal platforms.

4.2.1 Logit model

For the logit model, as observed, mobile money has no significant effect on the use of different formal savings platforms. In specific, the use of mobile money decreases the likelihood of using a Sacco as savings platforms as shown in column 4 for the youth even though it is not statistically significant. In column 1 and 3 however, mobile money use increases the likelihood of using a bank and a Micro-Finance Institution for mobilizing savings among the youth even though the effect of which is not statistically different from zero.

The effect of mobile money on informal savings platforms is large and significant as observed in column 5-7. Mobile money use significantly increases the likelihood of using a ROSCAs, ASCAs and Savings in a secret place among the youth. Despite mobile money increasing the likelihood of savings with a family member in column 8, it is not statistically significant. In general, therefore, the null hypothesis for the impact of mobile money use on different savings platforms is not rejected across all the savings platforms.

On the controls used in the model, for savings in general (column 1), age positively and significantly influences savings mobilization. An increase in age increases the likelihood of

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[6] Banks, Saccos and MFIs are considered formal Saving platforms because they are regulated by government acts as opposed to the informal savings platforms such as ROSCAS, ASCAs which are not regulated by statutes but group laws (Wiyani and Prihantono, 2016).

having a savings product. The effect is large and significant in informal savings platforms especially ROSCAs and ASCAs as shown in columns 5-6.

Gender is positively and significantly correlated with savings in general. Females are more likely to have a savings product compared to males as observed in column 1. On the contrary, on individual savings platforms, females are less likely to use banks for their savings as depicted in column 2 but more likely to use Saccos and MFIs even though the effect is not statistically significant. The effect of gender is large and statistically significant on informal savings platforms. Females tend to use more of ROSCAs and ASCAs as preferred savings mobilization platforms as shown in columns 5 and 6 as opposed to saving in a secret place or with family as shown in columns 7 and 8 respectively. Marital status is positive and highly significant especially for informal savings platforms ROSCAs and ASCAs as shown in column 5 and 6. Married youth tend to use more informal savings platforms as opposed to the formal platforms.

Increase in the number of income earners in a household significantly improves savings behavior in general as observed in column 1. The number of income earners is also significant for mobilizing savings on Microfinance platform as the only formal platform, but also significant and large for mobilizing savings on informal platforms especially ASCAs. Increase in monthly income has a positive and significant influence on the savings behavior of the youth as depicted in column 1. As income increases, this increases the likelihood of a youth holding a savings product. The youths are more likely to save using ROSCAs when their income increases as depicted in column 5. Having other financial products such as loans and insurance significantly and largely contribute on the savings behavior of an individual. Such financial products improve the savings behavior in general but also improves savings mobilization especially on informal savings platforms as shown in columns 5-6.

	Formal Savings Platform				Informal Savings Platforms			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Savings Product	Bank	Mfi	Sacco	Rosca	Asca	Secret	Family
Mobile Money	0.520***	-0.072	0.567	-0.067	0.663***	1.305***	0.172**	0.271
	(0.0919)	(0.1222)	(0.2070)	(0.1180)	(0.1023)	(0.1704)	(0.0808)	(0.1592)
Cluster Type (Rural=0)	0.026	-0.487*	-0.836	-0.280	-0.111	-0.548***	-0.001	0.099
	(0.0994)	(0.1488)	(0.2346)	(0.1281)	(0.0951)	(0.1344)	(0.0800)	(0.1578)
Age	0.210**	-0.020	-0.136	0.215	0.738***	0.971***	-0.035	-0.213
	(0.0081)	(0.0110)	(0.0189)	(0.0098)	(0.0077)	(0.0107)	(0.0066)	(0.0138)
Gender (Male=0)	0.255***	-0.244	0.529	0.080	1.073***	1.253***	-0.078	-0.307
	(0.0863)	(0.1216)	(0.1965)	(0.1058)	(0.0861)	(0.1254)	(0.0685)	(0.1348)
Respondent Marital Status	0.125	-0.237	0.098	-0.015	0.550***	0.658***	0.107	0.427
	(0.0910)	(0.1181)	(0.2136)	(0.1103)	(0.0826)	(0.1229)	(0.0736)	(0.1480)
Education	0.098	-0.224	0.115	-0.283*	0.060	0.220	-0.064	-0.002
	(0.0789)	(0.1119)	(0.1786)	(0.0980)	(0.0744)	(0.1057)	(0.0632)	(0.1246)
Employment	-0.122	0.138	0.417	0.193	-0.293***	0.106	0.084	0.246
	(0.0567)	(0.0693)	(0.1303)	(0.0717)	(0.0551)	(0.0811)	(0.0468)	(0.0907)
#HH members	-0.091	-0.094	-1.273**	-0.124	-0.170*	-0.076	-0.042	0.451*
	(0.0181)	(0.0241)	(0.0464)	(0.0232)	(0.0192)	(0.0274)	(0.0154)	(0.0285)
#Income Earners	0.614***	0.138	0.857*	-0.071	0.166*	0.687***	0.031	-0.168
	(0.0620)	(0.0711)	(0.1341)	(0.0709)	(0.0560)	(0.0778)	(0.0473)	(0.0888)
HH Shock	0.020	0.062	-0.686	0.016	0.077	-0.131	0.035	0.116
	(0.0905)	(0.1319)	(0.2038)	(0.1179)	(0.0906)	(0.1290)	(0.0744)	(0.1511)
Monthly Income	0.354	-0.222	-0.550	-0.087	0.195*	0.179	-0.070	-0.396
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Financial Literacy	0.641***	-0.006	-0.011	0.121	0.101	0.238	0.080	0.204
	(0.0579)	(0.0857)	(0.1346)	(0.0706)	(0.0543)	(0.0768)	(0.0461)	(0.0904)
Loan	1.041***	0.100	0.096	0.033	0.593***	1.801***	-0.041	-0.275
	(0.1004)	(0.1096)	(0.1974)	(0.1089)	(0.0804)	(0.1068)	(0.0699)	(0.1397)
Insurance	0.785***	0.208	-0.746	0.334**	0.362***	0.319**	-0.016	0.423
	(0.1396)	(0.1601)	(0.2852)	(0.1326)	(0.0976)	(0.1300)	(0.0883)	(0.1709)
Pseudo R^2	0.242	0.038	0.058	0.047	0.191	0.232	0.023	0.049
Wald Chi-Square	909.7	.	100.4	140.5	868.0	686.9	142.9	106.1
Observations	4814	4539	3449	4832	4758	4242	4950	4455
Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES

Standardized beta coefficients; Standard errors in parentheses
* p < 0.1, ** p < 0.05, *** p < 0.01

4.2.2 2SLS IV Model

The effect of mobile money on formal savings platforms is not significant. However, Mobile money use reduces the use of formal savings platforms such as banks and Saccos but increases the use of MFIs as shown in columns 2, 3 and 4 of Table 4. The impact of mobile money is positive and significant in the informal savings platforms especially saving with

ASCAs and with family. Despite the effect being insignificant for the other informal savings platforms, the effect remains positive for all the informal savings platforms.

On other controls, cluster type is a significant determinant of savings mobilization on ASCA platform. However, savings with ASCAs decrease as one moves to the urban compared to rural as depicted by the negative and significant coefficient of cluster type in column 6. Increase in age significantly increases savings mobilization on ROSCAs but decreases the use of family to mobilize savings as shown in columns 5 and 8 respectively. The effect of gender is significant for mobilizing savings among the mobile money users in general as shown in column 1. Effect of gender is also significant majorly on informal platforms such as ROSCAs and ASCAs as shown in column 5 and 6 respectively.

Marital status is only significant for mobilizing savings on both ROSCA and ASCA platforms, the effect of which remains insignificant in determining savings mobilization in general. Increase in the level of education reduces the use of Saccos among the youth in savings mobilization as seen in column 4 but remains insignificant determinant of savings mobilization in general and in other platforms. Mobile money users who are informally employed or unemployed save more using ASCAs and family compared to other savings platforms as depicted by significant coefficient in columns 6 and 8 respectively. Increase in household membership significantly reduces the use of MFIs but significantly increase savings with family members as shown in column 3 and 8 respectively.

The increase in the number of income earners in a household significantly and positively improves the culture of savings among the youth in general. The higher the number of income earners in a household, the higher the chances of using a MFI, ROSCA and ASCA for savings mobilization as shown in columns 1,3,5, and 6. Among the youth, increase in income positively and significantly improves the use ROSCAs for savings but significantly

decreases the dependence on family as a savings platform. Knowledge of financial institutions among the use significantly reduces the use of family for savings but has insignificant effect on the choice of other savings platforms. Financial products such as loans and insurance also significantly improve the savings behavior of the youth in general. The effect is also positive and significant in savings mobilization on ROSCAs, ASCAs and with family members.

Table 4: IV Model Results for Savings Behaviour and Mobile Money

	Formal Savings Platforms				Informal Savings Platforms			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Savings Product	Bank	Mfi	Sacco	Rosca	Asca	Secret	Family
Mobile Money	0.559***	-0.205	0.045	-0.011	0.207	0.303**	0.029	0.418**
	(0.1864)	(0.1196)	(0.0820)	(0.1293)	(0.1534)	(0.0992)	(0.1883)	(0.0986)
Cluster Type (Rural=0)	-0.036	-0.023	-0.036	-0.025	-0.025	-0.070***	0.002	-0.033
	(0.0216)	(0.0146)	(0.0092)	(0.0158)	(0.0202)	(0.0148)	(0.0231)	(0.0121)
Age	-0.057	0.033	-0.013	0.023	0.095***	0.030	-0.006	-0.092**
	(0.0033)	(0.0020)	(0.0014)	(0.0023)	(0.0027)	(0.0018)	(0.0033)	(0.0017)
Gender (Male=0)	0.046***	-0.023	0.020	0.007	0.173***	0.099***	-0.019	-0.013
	(0.0141)	(0.0097)	(0.0053)	(0.0101)	(0.0133)	(0.0097)	(0.0157)	(0.0087)
Respondent Marital Status	0.013	-0.013	0.003	-0.002	0.083***	0.047***	0.027	0.015
	(0.0151)	(0.0096)	(0.0060)	(0.0108)	(0.0150)	(0.0111)	(0.0168)	(0.0090)
Education	0.015	-0.019	0.004	-0.027*	0.009	0.012	-0.017	0.001
	(0.0128)	(0.0083)	(0.0051)	(0.0091)	(0.0123)	(0.0091)	(0.0141)	(0.0077)
Employment	0.012	-0.006	0.015	0.018	-0.029	0.037**	0.017	0.048**
	(0.0141)	(0.0086)	(0.0058)	(0.0094)	(0.0117)	(0.0079)	(0.0142)	(0.0076)
#HH members	0.011	-0.021	-0.042**	-0.013	-0.006	0.018	-0.010	0.055***
	(0.0039)	(0.0024)	(0.0015)	(0.0026)	(0.0032)	(0.0022)	(0.0041)	(0.0022)
#Income Earners	0.095***	0.014	0.031*	-0.005	0.024*	0.057***	0.002	-0.014
	(0.0098)	(0.0061)	(0.0041)	(0.0067)	(0.0090)	(0.0068)	(0.0106)	(0.0055)
HH Shock	-0.002	0.004	-0.024	-0.002	0.013	-0.010	0.009	0.006
	(0.0150)	(0.0099)	(0.0063)	(0.0109)	(0.0146)	(0.0104)	(0.0166)	(0.0091)
Monthly Income	-0.004	-0.009	-0.009	-0.009	0.030*	0.018	-0.015	-0.031**
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Financial Literacy	0.012	0.040	-0.006	0.007	-0.004	-0.024	0.022	-0.069*
	(0.0228)	(0.0146)	(0.0098)	(0.0157)	(0.0194)	(0.0129)	(0.0233)	(0.0125)
Loan	0.101***	0.022	-0.000	0.002	0.106***	0.185***	-0.043**	-0.043**
	(0.0176)	(0.0118)	(0.0079)	(0.0132)	(0.0176)	(0.0128)	(0.0101)	(0.0101)
Insurance	0.051***	0.029	-0.026	0.035*	0.068***	0.027	-0.004	-0.002
	(0.0197)	(0.0147)	(0.0093)	(0.0161)	(0.0219)	(0.0163)	(0.0243)	(0.0130)
R^2	0.127	0.007	0.035	0.037	0.209	0.147	0.031	
Wald Chi-Square	2668.6	397.5	157.9	606.1	1960.6	757.2	1562.9	225.2
Observations	4891	4891	4891	4891	4891	4891	4891	4891
Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES

Standardized beta coefficients; Standard errors in parentheses
* p < 0.1, ** p < 0.05, *** p < 0.01

4.2.3 Effect of mobile money on Savings behaviour for individual characteristics

The impact of mobile money on youth's saving behaviour and choice of savings platforms could differ depending on individual characteristics such as cluster type, gender, marital status, household shocks, and education. This section therefore analyses how mobile money effect on savings behaviour differs as per sampled individual characteristics.

4.2.3.1 Cluster Type

Relative to the rural cluster setting, the urban mobile money users are less likely to have a savings product as depicted by the negative coefficient of the interaction term between mobile money use and cluster type in column 1 of table 5 below. Mobile money users who dwell in the urban areas are 0.152 less likely to hold savings product. The same trend is visible across different savings products. Urban youths are less likely to use different savings platforms if they are mobile money users. This trend is likely because Mobile money offers ease of access to the stored money whether in the mobile phone account or in other savings platforms. The youths are therefore more likely to transfer their money from different forms of savings into their mobile money accounts for ease of access of their money. Zou et al. (2015) also identify that lack of financial resources make it difficult for the youth to mobilize savings. Most youth in the urban are not employed in stable jobs hence do not have stable incomes sources enough to mobilize savings in different platforms.

Table 5: Savings Behaviour and Mobile Money * Cluster Type

	Formal Savings Platform				Informal Savings Platforms			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Savings Product	Bank	Mfi	Sacco	Rosca	Asca	Secret	Family
Mobile Money	0.575***	0.002	0.645	-0.220	0.707***	1.205***	0.096	0.474
	(0.1141)	(0.1613)	(0.2598)	(0.1427)	(0.1245)	(0.1935)	(0.0983)	(0.1920)
Cluster Type	0.124	-0.317	-0.649	-0.650*	-0.004	-0.907*	-0.168	0.539
(Rural=0)	(0.1458)	(0.2235)	(0.3882)	(0.2161)	(0.1810)	(0.3625)	(0.1375)	(0.2611)
MM X Cluster	-0.152	-0.232	-0.251	0.490	-0.131	0.400	0.223	-0.590
Type	(0.1691)	(0.2464)	(0.4110)	(0.2322)	(0.1947)	(0.3734)	(0.1511)	(0.2899)
Controls	YES	YES	YES	YES	YES	YES	YES	YES
Pseudo R^2	0.242	0.038	0.058	0.048	0.191	0.232	0.024	0.049
Wald Chi-Square	909.3	108.1	100.6	142.9	869.4	683.9	144.5	109.3
Observations	4814	4539	3449	4832	4758	4242	4950	4455
FE	YES	YES	YES	YES	YES	YES	YES	YES

Standardized beta coefficients; Standard errors in parentheses
$^* p < 0.1$, $^{**} p < 0.05$, $^{***} p < 0.01$

4.2.3.2 Gender

Gender significantly affects the savings behaviour of the youth. Relative to the males, the females are more likely to hold savings products in general as shown in column 1 of table 6 below. Females are however less likely to hold savings in formal savings platforms compared to males. This is depicted by the negative coefficients of gender as shown in columns 2 and 4. Female youth are more inclined to informal savings platforms especially ASCAs and ROSCAs as shown in column 5 and 6. However, relative to the males, chances of having a savings product diminishes 0.178 times if one is a female mobile money user as shown by the negative coefficient of the interaction term between mobile money and gender. Female mobile money users are significantly more likely to save with family compared to the males as shown by the positive and significant coefficient of the interaction term in column 8.

Table 6: Savings Behaviour and Mobile Money * Gender

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
		Informal Savings Platforms			**Formal Savings Platforms**			
	Savings Product	Bank	Mfi	Sacco	Rosca	Asca	Secret	Family
Mobile Money	0.629***	0.019	1.617*	-0.388	0.784***	2.074***	0.168	-0.433
	(0.1517)	(0.2146)	(0.4428)	(0.1934)	(0.2264)	(0.5573)	(0.1322)	(0.2421)
Gender	0.369**	-0.136	1.701	-0.289	1.211***	2.162***	-0.082	-1.173**
(Male=0)	(0.1424)	(0.2156)	(0.4496)	(0.1955)	(0.2262)	(0.5570)	(0.1321)	(0.2568)
MM X Gender	-0.178	-0.152	-1.554	0.516	-0.165	-1.002	0.006	1.192**
	(0.1710)	(0.2477)	(0.4883)	(0.2254)	(0.2419)	(0.5697)	(0.1502)	(0.2890)
Controls	YES	YES	YES	YES	YES	YES	YES	YES
Pseudo R^2	0.242	0.038	0.060	0.048	0.191	0.232	0.023	0.050
Wald Chi-Square	911.0	107.5	101.6	142.4	862.3	669.9	142.9	109.6
Observations	4814	4539	3449	4832	4758	4242	4950	4455
FE	YES	YES	YES	YES	YES	YES	YES	YES

Standardized beta coefficients; Standard errors in parentheses
*$p < 0.1$, ** $p < 0.05$, *** $p < 0.01$*

4.2.3.3 Education

The effect of education on youth savings is insignificant in general. Education only significantly affects the choice of a Sacco as a savings platform among the youth. The youth who are less educated are less likely to have a savings product as depicted by the negative coefficient in column 1 of table 7. Mobile money users who are well educated are more likely to have savings product and the trend is also visible across different platforms as shown by the coefficients of the interaction term between Mobile money and education. The educated mobile money users are 0.206 times more likely to have a savings product.

Table 7: Savings Behaviour and Mobile Money * Education

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
		Informal Savings Platforms			**Formal Savings Platform**			
	Savings Product	Bank	Mfi	Sacco	Rosca	Asca	Secret	Family
Mobile Money	0.444***	0.058	0.445	-0.165	0.629***	1.037***	0.233***	0.193
	(0.1106)	(0.1621)	(0.2540)	(0.1408)	(0.1251)	(0.2080)	(0.0969)	(0.1928)
Education	-0.047	0.055	-0.161	-0.511*	-0.021	-0.505	0.069	-0.181
	(0.1305)	(0.2013)	(0.3656)	(0.1924)	(0.1669)	(0.3117)	(0.1239)	(0.2535)
MM X Education	0.206	-0.361	0.342	0.285	0.091	0.758*	-0.166	0.218
	(0.1631)	(0.2411)	(0.4159)	(0.2248)	(0.1858)	(0.3303)	(0.1443)	(0.2926)
Controls	YES	YES	YES	YES	YES	YES	YES	YES
Pseudo R^2	0.242	0.038	0.059	0.048	0.191	0.233	0.024	0.049
Wald Chi-Square	910.8	107.1	102.3	141.3	872.2	702.2	143.9	106.4
Observations	4814	4539	3449	4832	4758	4242	4950	4455
FE	YES	YES	YES	YES	YES	YES	YES	YES

Standardized beta coefficients; Standard errors in parentheses
*$p < 0.1$, ** $p < 0.05$, *** $p < 0.01$*

4.2.3.4 Marital Status

Marital Status positively but insignificantly affects savings behaviour of the youth in general as shown in column 1 of table 8. Married youth are more likely to have savings product compared to the single ones. Married youth are less likely to use formal savings platforms such as banks, MFIs and Saccos. However married youth are more likely to use informal savings platforms as depicted by significant and positive coefficients in column 5,6 and 7. Married mobile money users are 0.118 times less likely to have a savings product as depicted by the negative coefficient of the interaction term. Married mobile money users are more likely to use MFI as a savings platform as shown in column 3 of the interaction term. However, marriage reduces the use of informal savings platforms. Married mobile money users are significantly less likely to use ASCAs and savings in secret place as savings platforms as depicted in column 6 and 7 below.

Table 8: Savings Behaviour and Mobile Money * Marital Status

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
		Informal Savings Platforms			**Formal Savings Platforms**			
	Savings Product	Bank	Mfi	Sacco	Rosca	Asca	Secret	Family
Mobile Money	0.575***	-0.297	-0.518	-0.147	0.854***	2.210***	0.303***	-0.069
	(0.1267)	(0.1816)	(0.2977)	(0.1657)	(0.1691)	(0.3880)	(0.1122)	(0.2158)
Respondent	0.205	-0.614*	-1.632*	-0.136	0.814***	1.896***	0.312**	-0.123
Marital Status	(0.1414)	(0.2185)	(0.3832)	(0.1942)	(0.1831)	(0.4152)	(0.1330)	(0.2588)
MM X	-0.118	0.502	2.297**	0.161	-0.316	-1.355**	-0.267*	0.707
Married	(0.1636)	(0.2415)	(0.4182)	(0.2160)	(0.1961)	(0.4258)	(0.1446)	(0.2806)
Controls	YES	YES	YES	YES	YES	YES	YES	YES
Pseudo R^2	0.242	0.038	0.063	0.048	0.192	0.234	0.024	0.049
Wald Chi-Square	911.3	107.1	125.6	141.3	855.6	665.1	145.7	107.8
Observations	4814	4539	3449	4832	4758	4242	4950	4455
FE	YES	YES	YES	YES	YES	YES	YES	YES

Standardized beta coefficients; Standard errors in parentheses
$^* p < 0.1$, $^{**} p < 0.05$, $^{***} p < 0.01$

4.2.3.4 Shocks

Youths who have had a shock in the last two years are more likely to have a savings product in general even though the effect is not significant as shown in column 1 of table 9. Youths who are mobile money users and who have had a shock in the last two years are 0.026

times less likely to have a savings product relative to those who have not had a shock within the same period. There is a mixed trend of the effect of household shocks on mobile money users and the choice of savings platforms as depicted in columns 2-8 of table 8.

Table 9: Savings Behaviour and Mobile Money * Shock

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
		Formal Savings Platforms			**Informal Savings Platforms**			
	Savings Product	Bank	Mfi	Sacco	Rosca	Asca	Secret	Family
Mobile Money	0.538***	0.103	1.005	-0.267	0.778***	1.730***	0.004	0.004
	(0.1645)	(0.2583)	(0.3924)	(0.2263)	(0.2040)	(0.3901)	(0.1484)	(0.3026)
HH Shock	0.034	0.218	-0.260	-0.161	0.191	0.325	-0.118	-0.128
	(0.1471)	(0.2419)	(0.3944)	(0.2132)	(0.2005)	(0.4037)	(0.1413)	(0.2846)
MM X Shock	-0.026	-0.250	-0.662	0.286	-0.162	-0.591	0.244	0.388
	(0.1826)	(0.2819)	(0.4484)	(0.2491)	(0.2221)	(0.4211)	(0.1633)	(0.3308)
Controls	YES	YES	YES	YES	YES	YES	YES	YES
Pseudo R^2	0.242	0.038	0.059	0.048	0.191	0.232	0.024	0.049
Wald Chi-Square	909.9	107.1	104.2	140.4	869.4	682.9	144.7	106.9
Observations	4814	4539	3449	4832	4758	4242	4950	4455
FE	YES	YES	YES	YES	YES	YES	YES	YES

Standardized beta coefficients; Standard errors in parentheses
* p < 0.1, ** p < 0.05, *** p < 0.01

5.0 DISCUSSION

5.1 Mobile Money Use and Savings in general

The two estimation models have both demonstrated the positive and significant effect of mobile money on the savings behavior of the youth. The findings in this study are therefore in line with most of the existing empirical studies that have produced evidence that mobile money significantly affects the savings behavior of individuals (Kikulwe, Fischer and Qaim, 2014; Batista and Vicente, 2017; Loaba, 2021). Mobile money users are 56% likely to have a savings product compared to the non-users. The observed trend in the effect of mobile money on the savings behavior of the youth could be attributed to the fact that mobile money offers a cheaper channel of accessing money on different platforms and acts as an alternative savings platform which further improves the access of the saved money when required (Shirono, 2021). Cook and McKay, (2015) attribute this observation also to low interest rates charged on mobile money savings platforms such as "*Mshwari*" compared to formal financial institutions such as banks which then contributes to the preference of mobile money as an alternative savings platform.

Zhang et al. (2018) and Balinto et al. (2020) in their studies also note that mobile money use has modernized the access to financial products particularly among the financially disadvantaged by lessening the traditional challenges faced in access and use of formal financial services. Zhang et al. (2018) and Balinto et al. (2020) observe that users no longer must travel to access banking services or queue for long in banking halls or delay in waiting to undertake a transaction. These findings by both Zhang et al. (2018) and Balinto et al. (2020) are therefore directly attributable to the significant effect of mobile money on savings behavior of the youth as this study finds. In connection to this finding, Zou et al. (2015) note that even though individual characteristics are important in determining savings behavior, institutional characteristics are key determinant in savings behavior of the youth; they can hinder or promote

savings behavior of the youth. Ranging from institutional access by the youth to enabling fiscal policies such as interest rates on both savings and loans all are key to the use of an institution to mobilize savings (Zou et al., 2015). In Kenya, the inadequate access points of banks and other formal financial institutions discourage the youths from using such institutions for savings (Babu, 2017). Mobile money is therefore the most preferred savings platform due to ease of access of mobile money touch points and favorable fiscal policies such as less transaction fees and charges (Aron, 2018).

5.2 Mobile Money and other savings platforms

Mobile money has varying impact on the use of different savings platforms as observed in the results section above. The effect is positive and large in informal savings platforms compared to the formal savings platforms. The youth are inclined to save in ROSCAs, ASCAs, in secret place and with family as opposed to saving with banks, MFIs and Saccos. Zou et al. (2015) in their research on "Facilitators and Obstacles in Youth Saving: *Perspectives from Ghana and Kenya*" note that the youth attribute their low usage of banks and other formal savings platforms to mobilize savings to insufficient access of touch points. Mobile money and community-based organizations such as ROSCAs and ASCAs are therefore the most accessible means of mobilizing savings hence the positive and significant effect of such organizations on savings behavior of the youth (Aron, 2018).

5.3 Policy Implications and Recommendations

From the results presented in Chapter 4, it is notable that mobile money improves the savings behavior of the youth, users of mobile money are 56% more likely to save compared to non-users. Mobile money is also observed to increase the usage of informal savings platforms such as ASCAs, ROSCAs, saving with family or in secret place, as opposed to the

use of formal savings platforms such as banks, MFIs and Saccos. These findings are of useful policy implications to the government, network operators, and financial institutions.

Mobile Network Operators (MNOs) who seem to be the biggest beneficiaries as far as the use of mobile money is concerned, need to keep improving access of Mobile Money services to users especially in the remote rural areas which will in turn improve financial inclusion initiatives. Despite the overwhelming advantages of mobile money, there are challenges that need to be addressed to improve this ground-breaking invention. First, mobile network coverage needs to be improved. This can be achieved by ensuring network penetration into the remote locations to ease access of mobile money services. Rural settings have decried the instability of network coverage or complete lack of. Installation of network masts in strategic locations is key to the access of mobile networks thus the usability and expansion of mobile money. Secondly, the concentration of mobile money agents which is largely in the urban center also deny the rural areas of equal financial service access through mobile money. MNOs therefore need to decentralize and expand mobile money agents touch points to ensure better coverage and improved service provision in both rural and urban clusters. Thirdly, friendlier financial policies that govern the use of Mobile money should be imposed. Policy formulators need to take into consideration the benefits that the public derive from mobile money and the ease with which mobile money has increased the financial access and improved savings behavior of the youth. Tax and interest rates on transactions which limit the use of mobile money by the youth should be reviewed to affordable charges that would lead to expansion of the use of mobile money and encourage thriving of youth businesses.

The youths are observed to prefer savings on informal platforms such as ASCAs and ROSCAs to formal financial institutions such as banks, MFIs and Saccos. The informal institutions which are largely community-based organizations and/or groups are preferred by the youth for mobilizing savings because of the ease of access of services as they are controlled

by the enrolled group members who agree to meet on regular basis. Secondly, there is ease of access to their saved finances. In ROSCAs for instance, the group members collect money and give the whole "pot" to one member who has not received the round before, this improves trust among members who continue to contribute and watch their savings accumulate. ASCAs on the other hand, members contribute and then loan out the total amount to the interested group member(s) (Malkamäki, Johnson, & Nino-Zarazua, 2009). The proceeds are returned with interest which also build on the group's savings. These setups are not controlled by any government statute but most often by the rules and regulations set up by the group members. This level of flexibility thence enables the members to save and loan without any legal restrictions or interference of the government. Often, there are no charges to team members in their savings and/or loaning. On the other hand, formal institutions which are regulated by the government set stringiest financial rules which control both savings and access of saved finances. Interest charges which are sometimes higher than can be afforded by the youth, act as a barrier to the usage of such institutions to mobilize savings. Access to loans is also regulated and sometimes requiring protection against risks. Policies such as collateral limit the access of funds by the youth who are unable to avail any collateral. Insufficient touch points of banks, MFIs and Saccos also contribute greatly to the less usage by the youth. It is therefore vital and prudent that formal financial institutions have favorable financial policies which encourage the youth to save with them rather than encouraging the youth to other available informal platforms.

Due to the youth's preference to informal savings platforms, the government needs to have regulatory measures to ensure that institutions such as ROSCAs and ASCAs have well defined spheres of operation to ensure that the group members do not run the risk of financial losses especially in cases of dishonesty by scrupulous members who may get a round/borrow

money and fail to return. To discourage such instances, the government should also focus attention in enacting friendlier financial policies that eases financial access.

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