

# Mobile money adoption and spending behaviour: the case of students in Ghana

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## Abstract

**Purpose** – The purpose of this paper is to investigate how the use of the mobile money technology among students affects their spending behaviour.

**Design/methodology/approach** – The study reports interesting findings by using a random sample of 506 students from the University of Ghana and applying ordinary least squares regression technique.

**Findings** – The findings suggest that active use of mobile money services has significant influence on students spending behaviour. On a monthly basis, students who use mobile money spend on the average 20 Ghana Cedis more than their colleagues who do not use mobile money. Students who use both mobile money and ATMs jointly spend nearly 13 Ghana Cedis more than their counterparts who use either of them.

**Social implications** – The implication of this finding is that mobile money technology which provides easy access to money can increase spending behaviour of students and reduce the tendency of savings. The authors therefore conclude that although technological growth should not be curtailed given the numerous benefits technology accrues to society, its use must be controlled, in particular, when it comes to using it as a medium of exchange so as to minimize the negative influences (such as indiscriminate spending).

**Originality/value** – This paper studies the post-adoption behavioural responses of mobile money users particularly among students in Africa which is rare in the literature.

**Keywords** Behaviour, Ghana, Students, Mobile money, Spending

**Paper type** Research paper

## 1. Introduction

Technology alters lifestyles and behaviours in one way or the other as it makes work simpler, lives more comfortable, and influences savings of those who want to purchase them as well as increases productivity, income and spending (Maurer, 2012). Though various technologies have been introduced over centuries, one technology that has revolutionized the world and has, in particular, penetrated the lifestyles of consumers is the mobile phone technology (Jack and Suri, 2011).

Undoubtedly, a number of reasons exist for this easy penetration of mobile phone. One remarkable reason remains that mobile phone technology followed other technologies that may have paved way for it. With the exception of radio, other technologies that have been introduced over time were relatively slow to diffuse through the population. Yet, the speed with which the technology of mobile phones was adopted, especially in the developing world, remains unprecedented (Jack and Suri, 2011).

Today, in most parts of Africa, mobile banking is available due to the existence of mobile phones, which is enabling financial inclusion of the vast majority of the people who are unbanked. Mobile money systems consist of electronic money accounts that can be accessed via mobile telephones. Per a 2012 GSMA survey report, 150 live mobile money services existed worldwide with 56 per cent of them in sub-Saharan Africa. There were about 30 million active users of mobile money services globally. GSMA (2012) again reported that 56.9 million people have opened mobile money accounts in Sub-Saharan Africa.

Although a basic mobile money system pays no interest on savings or providing loans, it is often likened to simple bank accounts because it allows deposits, transfers and withdrawals to be made (Demombynes and Thegeya, 2012). Globally, the proportion of mobile network service providers who offer the service varies from country to country.



Kenya, each of the mobile service providers currently has a mobile money service (Demombynes and Thegeya, 2012), but only four out of the six telecom companies offer the service in Ghana.

In developing countries like Ghana, the adoption rate of mobile phones is high and it is estimated that there are more owners of mobile telephones than there are of bank accounts (Porteous, 2007; Comminos *et al.*, 2008). As a result, the mobile money technology has been introduced and adopted in a number of countries, including Kenya, Sudan, South Africa, Ghana, and some Latin American and Middle East countries. Yet very little is known about how the mobile money technology influences the daily activities and lifestyles of its users.

Though Donner and Tellez (2008) found that most businesses do not accept credit cards for payment of goods and services, and that, the “cash-and-carry system” is largely upheld in developing countries, mobile money is readily accepted as means of payment for goods and services, including taxi fares, particularly, in Kenya (Jack and Suri, 2011). Hirschman (1979) found that ready acceptance of credit cards by retail shops influences spending of its users. Hayhoe *et al.* (1999) also found that credit card holding induces spending among students. To some degree, the mobile money technology may have the potential of altering consumer spending of its users. This is because it allows easy transferability of money and at any point in time, electronic (mobile) money is highly liquid (Mbiti and Weil, 2011). To the extent that mobile money transfer adds to recipient’s income and reduces sender’s income, it cannot be denied that it also can influence spending among its users.

There remains a huge gap in the literature on post-adoption behavioural responses of users of the technology. Knowledge about the influence that mobile money has on peoples’ spending remains very minimal. To add to the existing literature and knowledge, this study seeks to determine how the adoption and use of mobile money influences spending behaviour of students in Sub-Saharan Africa.

The rest of the paper is organized as follows: Section 2 focusses on the overview of mobile money industry in Ghana; Section 3 highlights related literatures; Section 4 explains the sampling procedure and the empirical model specifications. Section 5 discusses estimation procedure and findings. Section 6 presents the conclusion and policy implications of the study findings.

## **2. Overview of mobile money penetration in Ghana**

This section gives a general overview of mobile money penetration in Ghana and discusses how the mobile money industry has evolved in Ghana. Mobile money technology in Ghana has witnessed an astronomical growth and penetration in recent times.

Ghana currently has four mobile money service providers, with mobile phone penetration reaching in excess of 11.5 per cent in 2015, according to the National Communication Authority (NCA) 2015 report. The World Bank Findex data also mention Ghana as one of 13 markets with mobile financial services penetration above 10 per cent in 2014, while BMI Research, in its June 2015 report, indicates that 13 per cent of adult Ghanaians report having access to a mobile account, as compared to the Sub-Saharan Africa average of 11.5 per cent in 2014. The NCA report, again, estimates that the value of mobile money transactions when put into perspective is just GHc5.85 billion (US\$1.7 billion) shy of the total deposit liabilities of the 29 banks as at the end of 2014.

This surge in mobile money usage indicates the vital role technology is playing to advance the central bank’s cash-lite economy agenda, and also ensures that the push for more financial inclusion is brought into the hands of millions of Ghanaians.

There are six mobile telecom companies in operation in Ghana currently, but only four of them provide mobile money services to customers. These four are MTN, Tigo, Airtel and now, Vodafone which started operating Vodafone Cash a couple of months back. Together, the

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preceding three hold about 72 per cent shares of the total market for mobile telecom. Zain ZAP was introduced in just a year after MTN started providing mobile money services in 2009. Airtel which bought Zain off-the-shelf rebranded ZAP mobile money service as Airtel money. Till date, there is no dominant mobile money service provider despite MTN's large voice subscription market base. Mobile money remains relatively new in Ghana and mobile telecommunication companies have much to do if the service is to be assimilated well.

In Ghana, it has been relatively easy for subscribers to hold mobile money accounts. And for this reason, it has been successful relative to the e-zwich introduced by the Bank of Ghana for branchless banking. All a customer needs in order to own a mobile money account is a registered cell phone SIM card of the mobile network operator offering the service and then register for a mobile money account. The customer can then make cash deposits at any of the offices of the operator's mobile money agents or partner banks. These cash deposits create electronic money credit in the customer's account.

Mobile money account holders can make transfers of cash and airtime credit to the accounts of other mobile money users on the same network. It is also possible for them to make cash transfers to non-account holders or customers on other networks. In this case, all that is required to access funds is a token number and a PIN from the sender. Non-account holders can similarly transfer money to account holders by depositing it for free in the latter's accounts, whereas they can transfer money to other non-account holders at a fee. Account holders can also use their mobile money credit to pay bills and buy phone airtime. Withdrawals can be made at the offices of the network's mobile money agents or partner banks.

The simplicity associated with registering for and maintaining a mobile money account coupled with the variety of services one can enjoy under the mobile money service could make it an imperfect substitute to banking services in the view of non-banked savers and business persons.

### *2.1 MTN mobile money*

MTN has the largest market share in voice subscription in the Ghanaian mobile telecom market and was the first to launch mobile money in Ghana in the third quarter of 2009. It had about 5,389 mobile money merchants on the Ghanaian market. A large proportion of their customer transactions is done by their customer service centres and the partner banks. It had about 238,000 (based on a 90-day metric) mobile money subscribers representing about 2.1 per cent its subscriber base at the end of 2013. MTN's voice subscriber base coupled with its dominance in the market explain why one would expect MTN to be performing much better in mobile money as well. Yet, in about six years since the launch of mobile money, the company is yet to find the right approach to improve customer uptake of mobile money and to take dominion over the mobile money market.

### *2.2 Airtel money*

Airtel was the second mobile telecommunication company to launch mobile money in Ghana. It entered the Ghanaian market in 2010 and launched the Airtel mobile money that very year in the second quarter of 2010. Airtel had an agent base of 1,575 as at the end of 2013 in the market. About 10-15 per cent of these are active with low activity across the agent network. Liquidity of the Airtel money agent network is currently weak. Airtel is the fourth largest mobile telecom company in Ghana and presently has a voice subscriber base of about 3.8 million. It has an active Airtel money subscriber base of about 90,000 (based on a 90-day metric) which represents about 2.6 per cent penetration of its voice subscriber base. Airtel money has also been in operations for about five years and is also yet to make an impressive mark on the mobile money market.

### 2.3 Tigo Cash

Millicom Ghana launched its mobile money service in the second quarter of 2011. Tigo Cash, as it is generally known, is the third mobile money service to penetrate the Ghanaian market. Tigo Cash had an active agent base of 949 as at the end of 2013. The company, however, went through several phases to arrive at this number of agents. Tigo cash agents have a high activity level relative to those of MTN and Airtel. Tigo Cash agents are moderately liquid. Tigo has a voice subscriber base of about 4.2 million. It is the third largest mobile telecom company in Ghana after MTN and Vodafone. It has a market share of 13.85 per cent and an active subscriber base of 285,000 (based on a 60-day metric) representing 7.8 per cent penetration of its subscriber base. Similarly, Tigo Cash yet to stand out on the Ghanaian mobile money market.

## 3. Literature review

This study is theoretically based on the technology acceptance model (TAM) spearheaded by Davis (1989) and a modern consumption theory developed by Dornbusch *et al.* (1989). In what follows, the two broad theories are discussed. Empirical works that relate to the study are further discussed.

### 3.1 Technology adoption model/theory

The TAM posits that perceived usefulness and perceived ease of use are the main factors that influence one's decision to accept and use a given technology. It originates from the theory of reasoned action (TRA) developed by Fishbein and Ajzen (1975). Yet, it differs from it in two ways. First and foremost, the TAM does not include subjective norms in determining human behaviour in response to accepting and using an innovative technology. Second, the TAM uses two constructs to explain human behavioural responses to accepting and using a given innovative technology: perceived usefulness and perceived ease of use.

Perceived usefulness is the belief that a given technology can ameliorate once performance. The implication of this construct is that people have a more positive behavioural response towards accepting a technology that is believed to be useful in increasing their performance or productivity for any given task.

Again, perceived ease of use is the belief that using a given innovative technology would be free of effort. This construct also means that human behavioural response would be in favour of technologies which are easier to use or which one can use effortlessly.

TRA proposes that a human behavioural response is determined by the intention to behave in a said manner and this intention is, subsequently, dependent on one's attitude towards the behaviour and one's subjective norm. According to Fishbein and Ajzen (1975), intention best predicts human behaviour. Intention is explained as the cognitive symbolism of one's preparedness to behave in a said manner. Per the TRA, three factors determine one's intention: attitude towards the specific behaviour, subjective norms and perceived behavioural control.

Per the TRA, what actually determines the use of an innovation is the human intention to use it. Fishbein and Ajzen's (1975) theory was formidably useful in the context of consumer behaviour, yet, it had limitations for which the development of extended theories was necessary.

As part of its limitations, attitudes and norms which determine human behavioural response are not easily distinguishable; attitudes can sometimes be viewed as norms and vice versa. Additionally, it assumes that when someone forms an intention to act, he/she will be free to act without limitation. This, however, is not valid. Finally, in practice, one can be restrained by limited time, ability, environmental or organizational limits among others that can inhibit the freedom to act. Consequently, extended theories were needed to give better explanations to human behavioural responses to accepting and using an innovation.

Davis's (1989) TAM explained why innovations that relate to information technology are widely accepted and used by students. Such technologies are perceived as useful for

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deriving needed information quickly. Again, relatively, students have access to information that makes them use such innovations quite effortlessly.

Additionally, unlike the TRA, TAM acknowledges the potency of external forces to affect the intention to use and the actual usage of a technology.

Although perceived ease of use and perceived usefulness of an innovation influence its acceptance and use, they are also incentives for continuous usage of the technology. The introduction of a new technology may change the way humans do things. Continuous use of the technology, in effect, accustoms them to doing things in a particular way. Consequently, the introduction of the new technology does not only change their way of doing things, but it also changes their behavioural responses to certain actions and certain circumstances (Simonson and Maushak, 1996).

### 3.2 *The modern theory of consumption*

Following the constant struggle over what actually determines consumption and what does not, Dornbusch *et al.* (1989) developed a more modern theory that harmonizes the apparent disparities among the various consumption theories. The theory inculcates and does not fail to emphasize what the previous theories had given very little attention to: real wealth. According to Dornbusch *et al.* (1989), one's real wealth adds to their accumulated savings on which current consumption will largely depend. While they did not overlook the role of income in determining the spending of consumers, they focussed less on pinpointing how much income is spent or not. They again emphasize that past income has the tendency of influencing current consumption not through accumulated savings or wealth, but through a cultivated lifestyle.

### 3.3 *Empirical literature*

Empirically, there are a number of proofs that the mobile money technology has influenced the lives and behaviours of its users in one way or the other. Kimenyi and Ndung'u (2009) assessed the expansion of the Kenyan financial services and investigated the lessons that can be learned from mobile phone banking in Kenya. The work reveals that mobile money transfers facilitate payment for services of which labour is no exception. Per the study, prompt payment of weekly labour in remote parts of Kenya has led to a transformation of lives in Kenya, particularly in rural regions. This transformation is said to be in the right direction and suggests that the people of rural areas can now readily afford to pay for their needs on time and can increase their spending on goods and services.

Morawczynski (2009) also examined the adoption, usage and the outcomes of mobile money in Kenya. The study employed the socio-technical systems framework to present M-PESA as a complex system rather than an isolated application. The work makes it clear that M-PESA helped users to do what they were doing before the technology was introduced. These include money transfers back home and savings. It also reveals that financial practices began to change as M-PESA became integrated into daily life. Users now send money home more often. Users' saving frequency has also augmented. The work further reports that some users now have more time to work (save travel time to send money home). The study concludes that availability of mobile money agents in rural regions has also influenced the lives of mobile money users positively. To some degree, therefore, easy access to funds via mobile money increases spending among mobile money users.

Though the study was enlightening, Morawczynski (2009) could have made good use of regressions to explore the impacts of the technology rather than merely describing survey responses.

Aker and Wilson (2012) investigated whether and how mobile money can promote financial inclusion of the poor, particularly those living in rural areas of northern Ghana. The survey is in two stages: a data collection and a follow-up. It uses four different interventions (each one) designed to partially address some key barriers to mobile money

adoption. Per their findings, rural populations are much interested in adopting m-money. Two and a half months after the initial intervention, 26 per cent more households started to use mobile money with 86 per cent of users receiving money transfers via the medium. Moreover, 70 per cent of users save on their mobile phones (on the mobile money platform).

Moreover, there is also empirical evidence that the possession of a credit card (another technology that facilitates access to finance) is associated with measurably higher expenditure levels and a greater incidence of in-store purchasing among customers of a northeastern department store chain in the USA (Hirschman, 1979). In a study to examine how consumer purchasing behaviours vary with credit card systems, Hirschman (1979) uses data from a survey conducted in several branches of a departmental store chain. In collecting data for the work, every fifth customer exiting the shop is administered a structural questionnaire by a professional field service interviewer. The questionnaire deals with purchases made at the store, mode of payment used, attitudes concerning various credit instruments, store patronage, and a detailed set of demographic characteristics. A total of 4,049 customers are interviewed in the survey. As a result of the exploratory nature of the research, both bivariate and multivariate statistical analyses are used to test the hypotheses.

Compulsive purchasing and high spending is known to be relatively high among college and university students. Hayhoe *et al.* (1999) determined the differences in spending habits and credit card use of college students. Responses from 480 students of 6 state-sponsored universities in the USA are used to estimate coefficients using logistic and OLS regressions. The study reveals students with more than four credit cards are mostly compulsive buyers who have high spending attitudes. It also shows that such students make high demands for money to meet their high current expenditures and pay back high past credits. Compulsive purchasing is known to be relatively high among college and university students.

Results from the work of Darling *et al.* (2006) appear to follow closely the assumption of the life cycle hypothesis that, "the individual does not save at the very early stages of his life. He consumes every income he receives". Students take up part-time jobs to support the "apparently low" disposable incomes they receive from their parents and guardians. After earning more than they need, they still would not save the surplus but gamble and purchase products which have negative influences on the consumer's health. It is therefore interesting to find that Davies and Lea (1995) did not ignore Modigliani and Brumberg's (1954) life cycle theory in interpreting their findings. Obviously, Keynes' proposition that a greater proportion of any increase in income is saved may not be valid in the case of students.

#### 4. Model specification and data sampling procedure

The work hangs on the theoretical framework of consumption. Specifically, it adopts a recent model by Dornbusch *et al.* (1989). Dornbusch *et al.* (1989) argued that one's consumption does not only depend on his income, but also on his accumulated stock of wealth. Per the theory, it cannot be denied that it is from income that spending is done, but the individual's net worth cannot also be overlooked. One's net worth determines his actual economic status in society. Consequently, their model takes the following form:

$$C = \alpha WR + \beta \theta Y_t^d + \beta(1-\theta)Y_{t-1}^d$$

where  $C$  is the consumption,  $WR$  the real wealth,  $\alpha$ ,  $\beta$  and  $\theta$  are fractions,  $Y^d$  the current disposable income,  $Y_{t-1}^d$  the lagged disposable income.

The above single equation model exhibits the features of a modern consumption function and allows modification or inculcation of other indispensable variables that may exert some influences on the consumption behaviour of people.  $\theta$  and  $(1-\theta)$  are weights attached to present and past incomes, respectively.

The modern consumption function by Dornbusch *et al.* (1989) is adopted and modified to encapsulate variables that are crucial in measuring consumption behaviours of a group of consumers with peculiar characteristics. The past disposable income variable ( $Y_{t-1}^d$ ) is omitted in the modified model used in this study. One cannot deny that, one way or the other, the past income of the individual does affect his present consumption. Yet, when one's past income is not spent, it adds to his or her stock of wealth to influence his consumption in the successive periods. Moreover, income whether present or past can be generically referred to as income. This implies that if the past income adds to the stock of real wealth, then disposable income would have a weight of 1. Alternatively, merging the incomes and their respective weights,  $Y^d$  would have a weight of 1. Generally, students do not pay direct taxes on the remittances they receive from parents or guardians and other sources. There is therefore no distinction between their gross and net or disposable incomes. Hence, the consumption function is modified to depend on wealth and income of the consumer.

To determine the influence of access to mobile money service and active use of the service on the consumption (spending) of students, the model is rewritten to capture the accessibility and active use variables:

$$C = \alpha_0 + \alpha_1 WR + \beta_1 Y + \gamma_1 MM_{ACCESS} + \gamma_2 MM_{ACTIVEUSE} + \gamma_3 MM_{VSATMUSE} + \varepsilon_i$$

Other factors, such as age, gender, marital status, students' year at the university, among many may exert some influence on students' consumption behaviour. The empirical model used in the estimation is therefore stated as:

$$C = \alpha_0 + \beta_1 WR + \beta_2 Y + \gamma_1 MM_{ACCESS} + \gamma_2 MM_{ACTIVEUSE} + \gamma_3 MM_{VSATMUSE} + \lambda_1 AGE + \lambda_2 GNDR + \lambda_3 MrS + \lambda_4 LVL + \lambda_5 YES + \varepsilon_i$$

#### 4.1 Description and explanation economic variables in the model and their expected signs

- $C$  = overall consumption expenditure (or overall consumption behaviour).
- $\alpha_0$  = intercept (part of consumption that is not induced or influenced by any explanatory variable).
- $\beta_1$  = marginal effect of real wealth of students on their consumption behaviour.
- $WR$  = real wealth of students.

Dornbusch *et al.* (1989) maintained that one's consumption does not only depend on his income, but also on his accumulated stock of wealth. For students, these net worth are mostly in the form of "smart" electronic devices and vehicles. Among these devices (smart) phones, laptop PCs, tablet computers and cars were used to assess students' net worth. This is because these devices are widely used by students. Secondly, these devices may come with expenditures on internet data bundle in the absence of free Wi-Fi connections and on fuel and fluids (in the case of vehicles). Again some devices are necessary for studies, while others are "luxuries". Students who own and use phones, laptops, and tablet computers only are classified as less wealthy. This is because these are basic requirement for academic work and therefore do not reflect the true wealth of students. Students who owned and used cars are classified as wealthy. A positive relationship is expected between students' wealth and their expenditure:

- $\beta_1 WR$  = proportion of consumption expenditure (behaviour) induced by students' real wealth.
- $\beta_2$  = marginal effect of students' income on their consumption behaviour.
- $Y$  = students' income.

Theory has it that income is an indispensable determinant of consumption spending. Fortunately, empirical works of Easterlin (1974), Brady and Friedman (1947), Alpizar *et al.* (2005) and many others support this theory. It would thus be inappropriate to estimate consumption behaviour without taking incomes into account:

- $B_2Y$  = proportion of consumption expenditure (behaviour) attributable to students' income.

#### 4.2 Justification for resorting to OLS

Prominent among the objectives of the research is to determine the influence the mobile money technology has on students' spending behaviour. This necessitates that the relationship between mobile money and students' spending behaviour (among other factors) is well known. The OLS is instrumental in estimating a function which best fits a given data or best approximates the functional relationship between or among given sets of data. This yields unbiased estimators with minimum variance. Among unbiased estimators, the OLS has the minimum variance.

Also, the data to be used in the estimation have the properties which make it possible to apply the OLS in estimating the parameters. First, the dependent variable does not take two values (0 or 1) but rather a positive or negative value ( $\pm\infty$ ). Thus, the error term is normally distributed. For a normal distribution, it requires that the error term should take any value between positive and negative value up to infinity ( $\pm\infty$ ). In such a case, the error term is homoscedastic (i.e. its variance is not dependent on any of the independent variables) and there is no correlation between the error term and any of the explanatory variables (Jones, 2005). Next, the independent variables are non-stochastic (fixed) and there is a unilateral causal relationship between the independent and dependent variables (flowing in the direction of the latter). What is more, there is no exact linear relationship among the independent variables.

Unlike other estimators, the only assumptions that ought to be made when applying the OLS to a given set of data are that the equation must be linear in parameters and the first-order conditions should be solvable.

#### 4.3 Data collection and sampling procedure

The study makes use of data solely from primary source. This section spells out the detailed procedure by which data is collected for the study.

The student body of the University of Ghana makes up the study population. The current student population is about 40,000. Questionnaires are administered over a sample of 550 students on the University of Ghana's main campus (though calculated sample size is approximately 400).

The 550 questionnaires were administered equally among 10 halls with 55 questionnaires to each hall. Two of the halls are non-segregated and 8 are segregated. The ratio of male to female students is almost 1:1 in all the 8 halls. The stratified random sampling technique was used to stratify sample in every hall into homogeneous groups of males and females. Proportion of females and males in each hall is calculated and then a proportionate number of the 55 questionnaires are allocated to each hall and administered among each of the two groups by convenience sampling. For the remaining two which are "all male" and "all female" halls, there was no need for rationing. Only convenient sampling is employed among these respondents (Table I).

### 5. Estimation and analysis of results

Results from the study are presented and discussed in this chapter of the work. It commences with the descriptive statistics of students' mobile money usage. It then proceeds to the presentation and discussion of regression results. All the analyses and estimations are carried out using SPSS, Excel 2010 and STATA version 13 (Stata Corp, 2011).

Variable name	Description	Per cent (mean)	Expected sign
Real wealth (RW)	1 if student owns and uses a car, 0 if students has phones, tablets and laptop computers only	0.0069	+
Income (Y)	Continuous variable		+
Mobile money access	1 if student has access (i.e. students has an MM account and the distance from the closest MM agent is 5 minutes' walk from student's residence), 0 if otherwise	0.45	+
Mobile money active use	1 if student sends and/or receives money at least every 2 weeks, 0 if otherwise	0.34	+
Mobile money vs ATM use	1 if student uses both mobile money and ATM, 0 if otherwise	0.56	+
Age	Discrete variable	0.7	-
Gender	1 if male, 0 if otherwise	0.55	-/+
Marital status (Mrs)	1 if married, 0 of otherwise	0.05	+
Level of study (LVL)	Diploma/certificate, first, second, third, final and Graduate level	0.21	-
Income earning status (YES)	1 if student works or is engaged in an income earning activity, 0 if otherwise	0.66	+

**Table I.** Descriptive statistics of the variables in the spending model and their hypothesized signs

### 5.1 Descriptive statistics of sample's mobile money use

Responses for how students receive money from their parents revealed that 25.7 per cent regularly received their maintenance allowances from their parent through mobile money. In total, 28.1 per cent of them have it paid into their bank accounts and 33.8 per cent usually go home for their maintenance allowances. Moreover, 3 per cent of them usually receive their maintenance allowances from parents via international money transfers. Interestingly, some 6.3 per cent of respondents had their maintenance allowances sent to them from their parents through family and friends. Another 2.2 per cent claim they are given cheques to cash or get their maintenance allowances via means other than the above mentioned.

### 5.2 Presentation and discussion of regression results

The ordinary least square (OLS) model is used to assess the influence of mobile money use on the spending behaviour of students. Overall expenditure of students is the dependent variable. Regression results are displayed in Table II.

Overall expenditure	Coef.	SE	T	P > t	95% Conf. interval	
Gender (Male) Female	-1.42632	5.891972	-0.24	0.809	-13.0113	10.15863
Age	-8.97947	9.002678	-1.00	0.319	-26.6808	8.721835
Level	-1.13155	2.095416	-0.54	0.59	-5.25162	2.988511
Marital Status (Married) Unmarried	14.43613	13.1843	1.09	0.274	-11.4872	40.35944
MMvsATM use (Changed) Not Changed	13.03655**	5.655025	2.31	0.022	1.917488	24.15561
MMaccess (Access) (No access)	-0.41085	1.329014	-0.31	0.757	-3.024	2.20229
MMactiveuse (Active user) Inactive user	-20.1594*	11.21386	-1.8	0.073	-42.2084	1.889613
Real Wealth (Less wealthy) Wealthy	3.87513*	2.262125	1.71	0.088	-0.57272	8.322979
Income Earning Status (Work) Do not work	51.55454***	10.24306	5.03	0.000	31.41436	71.69472
Income	0.601621***	0.017451	34.48	0.000	0.567309	0.635934
_cons	-45.8523	44.27364	-1.04	0.301	-132.904	41.19968

**Notes:**  $R^2$  and Adjusted  $R^2$  are 0.8013 and 0.7960, respectively. \*, \*\*, \*\*\*Significant at 10, 5 and 1 per cent levels, respectively

**Source:** Authors' computation from primary data

**Table II.** Regression results

Per the findings of the study, at 10 per cent significance level, active use of the mobile money service by students influenced students' spending behaviour. Per the outcome of the study, students who often send and receive money via mobile money spend about 20.16 Ghana Cedis more than those who do not actively use the technology. Apparently, the mobile money technology facilitates students access to money thereby induces high spending among those that use it actively.

Roberts (1998) affirmed that the use of a technology that facilitates access to fund induces high spending among students. This finding by Roberts (1998) is confirmed by the findings of this study. In as much as the technology that facilitates access to funds is different in the two studies (credit cards in Roberts' study and mobile money in our study), it turned out that in both cases, active use induces higher spending among students.

Furthermore, the effect of mobile money usage on ATM usage was another significant factor which influences the spending behaviour of students at 5 per cent. Students whose mobile money usage has not affected their ATM usage spend about 13 Ghana Cedis more than their colleagues whose ATM usage has been affected by their mobile money usage. Obviously, such students now have two separate mediums through which they receive money. While those who prefer sending monies to these students via their bank accounts may continue to do so, others who prefer a simpler means of sending money to them can now do so via mobile money. Resultantly, they would have more money than before and can also spend more.

Moreover, real wealth of students keenly influenced their spending behaviour at 10 per cent significance level. The study revealed that on a monthly basis, wealthier students spend about 3.88 Ghana Cedis more than their colleague students who are relatively less wealthy. This can be explained by the fact that students with more assets can generate more income from them and would as such spend more than those with fewer assets. Students with cars, for example, rent out their cars for other uses and make money. They therefore have the means to afford relatively higher expenses.

Again, students' income earning status was significant at 1 per cent in influencing students' spending behaviour. Far from expectations, students who did not work or were not engaged in any income earning activity spent about 51.55 Ghana Cedis more than students who worked alongside schooling.

In follow-up telephone interviews with some of the respondents, some of those who work claimed they work to top up the very low upkeep allowances they receive from their parents. Others also claimed they worked to save monies for their needs after school (specifically, before they get their first jobs). Another group of interviewees also mentioned that they do not work to live luxurious lives today but to invest and save for their future. Undeniably, they save their earnings to mobilize some start-up funds for businesses they intend to start after school. Obviously such students do not value present spending over future and hence would save more and spend less of what they receive from working.

Last but not least, at a significance level of 1 per cent, students spending increases by about 0.6 Ghana Cedis for every 1 Ghana Cedis increase in his income (total receipts). Generally, higher income positively correlates with higher ability to pay. This therefore explains why students with relatively higher incomes spend relatively more. This is very consistent with literature (Boulding, 1945).

## 6. Concluding remarks

The study has sought to assess the influence of mobile money technology on students' spending behaviour in Ghana. Given that mobile money is one technology that has been widely assimilated shortly after its introduction to developing countries (Jack and Suri, 2010) and that students are a group who easily adopt computer and mobile phone related technologies, the influence of mobile money technology on students' spending behaviour was studied.

Data used in the study were of primary source and were collected by means of a questionnaire. A total of 550 questionnaires were administered among 10 residential halls on the University of Ghana's main campus. Yet, only 506 responses were useable in the study. The modern consumption model developed by Dornbusch *et al.* (1989) was adopted. An OLS consumption model was used to estimate the results derived from the study.

Results from the study reinforced some findings of studies reviewed in this paper and contradicted others. While Jack and Suri (2011) and Mbiti and Weil (2011) found that mobile money complements banking products, this study revealed that banking products, such as ATM, are jointly used with mobile money but the two do not necessarily complement each other (because an increase in the use of either of them does not result in an increased use of the other). Yet majority (56.5 per cent) of respondents reported that their usage of mobile money did not change the frequency at which they use ATMs.

Moreover, active use of the mobile money technology was significant at 10 per cent in influencing students' spending. Active mobile money users spend about 20 Ghana Cedis more than inactive mobile money users spend each month. This finding happened to affirm the findings of Roberts (1998) and they both imply that the active use of a technology that facilitates access to money indeed influences spending among its users.

Again there was evidence from the results that at 5 per cent significance level, the effect of mobile money usage on the frequency of ATM usage also influences students' spending. Students whose ATM usage had not been affected by their mobile money usage tend to spend 13 Ghana Cedis more than students whose ATM usage had been affected by their mobile money usage. The implication of this finding is that people who use two or more technologies that facilitate access to funds or money at any point in time are more likely to spend more than those who trade the usage of one of such technologies for the other.

Additionally, students' real wealth and income were remarkably important determinants of students' spending at 10 and 1 per cent significance levels, respectively. Wealthier students and those with higher income (receipts) had relatively higher expenditures than their colleagues. Yet the study showed that at 1 per cent significance level, students who do not work (engage in any income earning activity) alongside schooling are more extravagant relative to students who work. The former group spend about 52 Ghana Cedis more than the latter.

The study therefore concludes that given that technologies that increase access to finance influence spending, it is recommended that students will be cautious in how they use such technologies so as to maximize the positive influences (such as increases in productivity) and minimize the negative influences (such as indiscriminate spending) that using the technology can have on spending patterns.

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### Further reading

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**Appendix**Mobile money  
adoption and  
spending  
behaviour

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Variable	VIF	1/VIF
Age	1.97	0.508596
Level	1.90	0.526225
Overall_in~d	1.47	0.681061
Income_ear~s	1.31	0.760950
Gender	1.16	0.865116
Real_Wealth2	1.08	0.927172
Marital_st~s	1.07	0.932517
MM_vs_ATM_~e	1.05	0.953580
activeusexzy	1.04	0.960044
MMprxnacss	1.03	0.966934
Mean VIF	1.31	

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**41****Table AI.**  
Variance  
inflation factor

**Table AII.**  
Correlation matrix  
of coefficients of  
regression model

e(V)	Gender	Age	Level	Marita~s	MM_vs_~e	MMprxn~s	active~y	Real_W~2	Income~s	Overall~d	_cons
Gender	1.0000										
Age	0.0990	1.0000									
Level	0.1337	-0.6283	1.0000								
Marital_st~s	0.0321	0.0562	0.0377	1.0000							
MM_vs_ATM_~e	-0.0641	0.0360	0.0367	0.0147	1.0000						
MMprxmcs	0.0044	0.0530	-0.0782	-0.0114	-0.0770	1.0000					
activeusexzy	-0.0023	-0.0012	0.0026	0.0065	-0.1483	-0.1139	1.0000				
Real_Wealth2	0.1151	-0.0572	0.0318	0.0799	-0.0404	0.0348	0.0140	1.0000			
Income_ea~s	-0.0572	-0.0838	0.0196	0.0410	0.0128	0.0510	-0.0037	-0.1549	1.0000		
Overall_in~d	0.0871	-0.1631	-0.0136	0.1679	-0.0122	0.0122	-0.0343	-0.1396	0.4651	1.0000	
_cons	-0.2427	-0.1548	-0.0526	-0.6588	-0.1303	-0.0542	-0.4468	-0.0597	-0.4876	-0.3785	1.0000