

RELATIONSHIP BETWEEN MACROECONOMIC VARIABLES AND MOBILE MONEY TRANSFER

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Abstract

The mobile money industry in Kenya has in the last eight years contributed to financial innovations, moving from the traditional banking to better meet the growing complex needs of their customer and globalization challenges. Despite the recognized importance of financial innovation and an extensive descriptive literature, there have been surprisingly few empirical studies. The population of the study consisted of the entire population of registered mobile money services users in Kenya. Secondary data was collected from the World Bank database, Central Bank of Kenya, Kenya National Bureau of Statistics and communications authority of Kenya for the periods 2008-2014. 77.5% of the variations in mobile money transfers is explained by the variables. SV, UN, Pop, IN exhibited a positive relationship with mobile money while IR indicated a negative relationship with mobile money transfers. This study recommends that there should be capacity building to encourage appropriate saving by the citizenry; this can be taken up actively by the mobile service providers. Also the issue of unemployment need to be resolved by concerted efforts of both the public and private sectors. Adamant and stringent measures need to be taken to consideration while dealing with both interest rates and the inflation rates.

Keywords: Mobile money transfer, Population, Interest rate, Savings, Inflation, Unemployment

INTRODUCTION

Information and communication technology has evolved overtime, where its major contribution is making life easier. The world has experienced changes in this sector that has seen it gain the status of a digital globe. The trickle-down effect has been enjoyed throughout all sectors of operations within a nation. The economic sector not withstanding has greatly been revolutionised since its inception in a bid to generate efficiency and transparency.

The advent of Information and Communications Technology has led to the proliferation of electronic-based banking products as an alternative channel for routing banking services to customers (Narteh, 2012). This has positively influenced banking operations globally by transforming banking operations from paper-based operation to computer and internet oriented operations (Al-Jabri and Sohail, 2012). The innovations in the ICT banking sector has given birth to products that most of the potential users can resonate with.

LITERATURE REVIEW

Theoretical Literatures

The Harrod–Domar Model

The mobile banking industry is a growing sector within the financial market. This model will be of much importance in the understanding of the growth trends of the mobile banking. Together with the evaluated macroeconomic indicators, it will be possible to fit the growth patterns with the prevailing economic conditions and hence forecasting, management and stimulation may be achieved as desired.

The Quantity Theory of Money; Irving Fisher

This in essence, defines the scope and the validity of mobile money services and their effect in facilitating finance and the quantitative and qualitative aspects of the Kenyan economy today and the future prospects of the service, in relation to its contribution economically. It will be important to factor in the velocity since most of the time the money is circulating within the population as recent studies shows that the rate of interpersonal transfers has been increasing in more than the estimated proportions.

In this case mobile money transfer will be our output with the macroeconomic factors as the exogenous variables in the model. Of key interest will be to establish how the dynamism of the macroeconomic variables contributes to the determination of mobile money transfers. This is so as to be able to assist in purposes of economic estimations and forecasting.

The assumption that Fisher made that was to some extent useful in the above deduction was flexibility of wages and prices guaranteed output to beat full employment is constant in the

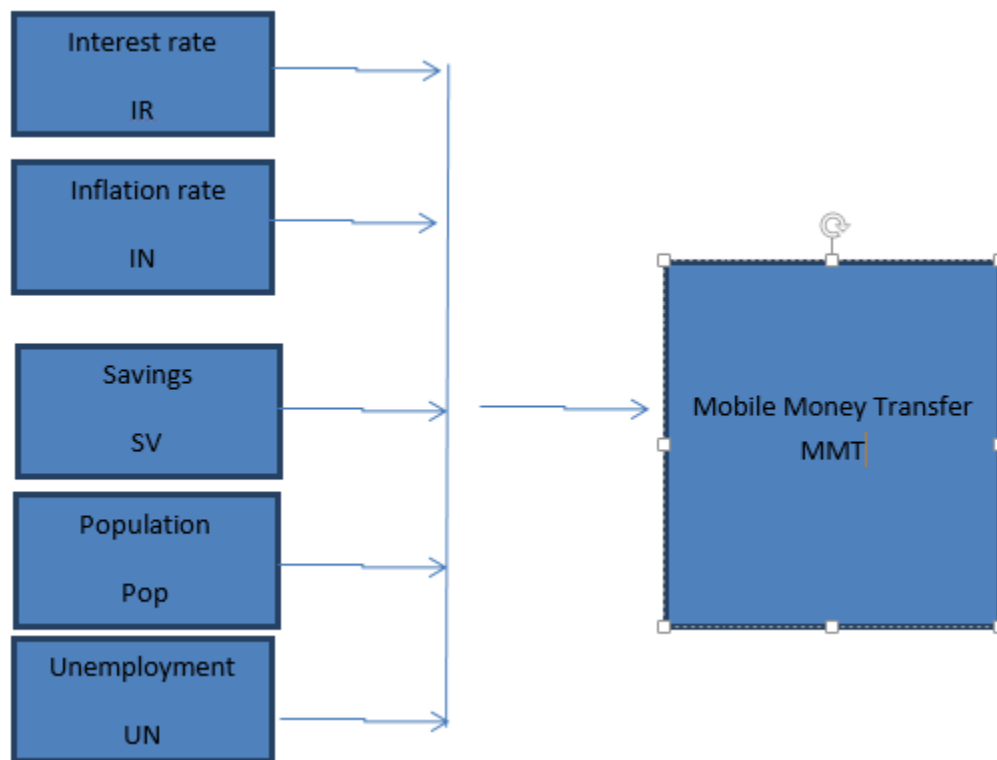
short run. At full employment all macroeconomic factors are assumed to be optimal and fully employed in the model.

The Tie bout Model

The assumptions made by the Tie bout model and that were be essential for this particular study are perfect mobility of individuals and consumers thus the ability to access the mobile money services, consumers have full information about the mobile money services and large number of individuals and communities

The endogenous variable is mobile money transfer (MMT). The exogenous variables are: savings (SV), population (Pop), unemployment (UN), interest rate (IR) and inflation rate (IN). These variables were used because of their authenticity in empirical literature on mobile money transfers and the fact that they are of key interest to all stake holders in the sector.

Figure 1. Conceptual Framework



Empirical Literature

Interest rate

In his study interest rates was found to negatively correlated with performance of personal finances.(Tomori, 1972). He found out that income, interest rate and real income were the major

determinants of demand for money in Nigeria. In subsequent write-ups on the same topic though estimating demand for money as mobile money transfers, found out that the variables had similar effect.

Inflation rate

Part of this favourable inflation performance can be related to global structural factors such as increased international competition and the emergence of new suppliers of manufacturing and traded goods. An attempt is made to account for these global factors when estimating the role played by inflation targeting in these developments. (Truman, 2003) and (Ball and Sheridan, 2003) find positive effects of inflation targeting on growth, but these effects remain statistically insignificant (Ball and Sheridan, 2003) or on the borderline (Truman, 2003).

Savings

(Arunga and Kahora 2007) concluded that sole proprietors and small businesses in Kenya benefited hugely from the mobile phone revolution as they are able to make savings and gain access to more customers and new services. Researchers have also noted the potential of M-Pesa to affect savings. (Morawczynski and Pickens, 2009) observe that users often keep a balance on their M-Pesa accounts, thereby using the system as a rudimentary bank account despite the fact that the system does not provide interest. In addition, (Vaughn, 2007) notes that some individuals stored money in M-Pesa due to safety considerations, especially when travelling across the country. Using ethnographic methods in three communities, (Plyler et al., 2010) argue that M-Pesa has enabled small businesses to expand and grow and has also increased the circulation of money in these communities.

Population

Aker and Mbiti, (2010) conducted a study to examine the evolution of mobile phone coverage and adoption in sub-Saharan Africa over the past decade. The findings revealed that, the first people to adopt the mobile phones were primarily male, educated, young, wealthy and urban populations. This was due to the relatively high costs of handsets and services. By the year 2009, mobile phone was owned by even the poor, the elderly and rural populations, in part facilitated by the introduction of low-priced handsets and lower denomination mobile top up cards. The study revealed that, on average, M-pesa users are wealthier, better educated, urban populations and are “already banked”. The findings also show that most of the M-pesa transfers are occurring within urban areas.

Jack and Suri, (2011) report results of a 2009 survey of Kenyan households that use M-PESA. They find that M-PESA reached nearly 40 percent of the Kenyan adult population after only two years of operation. While M-PESA was initially adopted mostly by wealthier households, adoption by less wealthy households was also increasing. Jack and Suri also find an increase in the use of M-PESA by the unbanked population.

Unemployment

In recent decades, banks have been impelled to liberalized domestic regulation, intensified international competition, and increasing consumer sophistication to leverage trends in information technology to develop new innovative products and services (Tufano, 2003; Abor, 2005; Frame and White, 2004; Abir and Chokri, 2010; Baba, 2012). According to these researchers unemployment was seen to have a causal effect with regards to accessibility of funds with relation to technology. A common ground is seen however as their studies tend to converge towards a positive relationship between unemployment and demand for money.

Research gap

Mobile money transfer is one developing mobile technique used in the commercial domain. It has combined information technology and commerce applications together. Since mobile money transfer was introduced, consumers have been able to use it to obtain special services 24 hours a day without having to visit the traditional bank branch for personal transactions.

A lot of studies have been done in trying to understand the mobile money services. Unlike with other financial innovations, most studies have mainly targeted the economies of interests at micro levels. With the growing usage of this financial tool there is need to have an understanding at macro level also. This is so as to be able to safe guard the economy or just to stimulate the economy depending on the outcomes. The much importance that mobile banking has been accorded by the researchers has paved way for broader studies in bid to understand this financial phenomenon. The emphasis of a more macro based investigations shows that there is a lot of research gap that needs to be filled.

RESEARCH METHODOLOGY

Research Design

The research design is causal study. This study uses time series data analysis and design. This research design is used because it readily establishes whether a relationship exists between two or more variables observed at the same time and also over a series of time.

Target population

The study will focus on time series data for six variables in Kenya. They are mobile money transfers MMT, interest rate IR, inflation rate IN, savings SV, population Pop and unemployment UN. The data will be for the period between 2008 and 2014. The choice of this period will be based on the data availability from various sources. The study will investigate the entire study area and as such, there will be no sampling undertaken.

Data collection

For the empirical analysis, monthly time series data from 2008 to 2014 will be used. The data will be obtained from various sources including Central Bank of Kenya, Economy watch, World Bank, African Development Indicators database. This period is chosen because of data consistency and availability. Data will be picked from the database in excel format and used for running the regression.

Model specification

Based on both the theoretical and empirical literature discussed earlier, we specify the savings function for this study as follows:

$$MMT = f (IR, IN, SV, Pop, UN)(1)$$

Where MMT is mobile money transfers (total transfers by service providers) it is given as a whole figure by the regulating authority CBK. IR is interest rate and is given by the CBK lending rate. IN is prevailing inflation rate and is given by the consumer price index (CPI). SV is savings within the economy and is estimated as a percentage of GDP. Pop is used as population estimator and is given as the ratio of dependents--people younger than 15 or older than 64--to the working-age population--those ages 15-64. UN is unemployment within the economy as is given as the proportion of individuals that are ready to be absorbed by the labour force but are still not engaged in any productive activities. It is important to note that these variables are by no means the only variables that influence mobile money transfers within the economy. The exclusion of some factors is unavoidable due to the degrees of freedom available, on account of the short time series availability.

The determination of a mobile money transfer function based on country level data on time series requires following strict estimation procedures. First is to carry out unit root test to test for stationarity of the macroeconomic variables. This was done using the Augmented Dickey Fuller (ADF) approach on both the dependent and independent variables. The test for unit root was performed and variables were found to be stationary at level. The next step was to perform a co-integration test which is basically a test of stationarity of the residuals. If all or

some explanatory variables are co-integrated, the next step was to estimate a multivariate saving function. If sets of variables were co-integrated, the short-run dynamics and long-run equilibrium could be described by an Error Correction Model. Estimation of the long-run relationship is by Ordinary Least Squares (OLS).

The long-run (equilibrium) specification is given by equation (2) specified below.

$$MMT = \beta_0 + \beta_1 IR + \beta_2 IN + \beta_3 SV + \beta_4 Pop + \beta_5 UN + \varepsilon$$

The β s' are parameters to be estimated. With the variables found to be jointly integrated, short-run dynamics of the long-run are estimated using the following empirical model.

$$\Delta MMT_t = \beta_0 + \sum_{t=0}^n \beta_1 \Delta IR_{t-n} + \sum_{t=0}^n \beta_2 \Delta IN_{t-n} + \sum_{t=0}^n \beta_3 \Delta SV_{t-n} + \sum_{t=0}^n \beta_4 \Delta Pop_{t-n} + \sum_{t=0}^n \beta_5 \Delta UN_{t-n} + \beta_5 ECT_{t-1} + \varepsilon_t \tag{3}$$

Where, ECT_{t-1} is the error correction term.

Data processing and analysis

E-views statistical package is used to analyse the data quantitatively. For data that was not originally in percentage form, it had to be transformed by generating its natural logarithm in order to interpret the elasticity of its slope coefficients as a percentage.

RESULTS AND DISCUSSIONS

Descriptive test

The Characteristics of the distribution of the variables are presented in Table 1 below.

Table 1: Descriptive statistics (n=84)

	SV	POP	IR	UN	IN	MMT_V
Mean	9.232143	9.400476	7.196438	82.08343	9.285714	2.67E+09
Median	8.500000	7.360000	7.042438	82.16768	9.286574	2.16E+09
Maximum	18.00000	19.72000	17.33842	82.71565	9.416550	2.23E+10
Minimum	5.750000	3.180000	3.675855	81.34565	9.183449	-8.73E+09
Std. Dev.	3.395112	5.271647	2.690318	0.500307	0.084744	5.93E+09
Skewness	1.666434	0.648456	1.427156	-0.228753	0.289954	0.636174
Kurtosis	4.771525	2.001811	5.953857	1.550400	1.548799	4.013216
Jarque-Bera	49.86209	9.374272	59.05327	8.087281	8.547969	9.148940
Probability	0.345000	0.09213	0.234456	0.475340	0.13926	0.10312
Sum	775.5000	789.6400	604.5008	6895.008	780.0000	2.21E+11
Sum Sq. Dev.	956.7232	2306.592	600.7385	20.77547	0.596074	2.89E+21

From the test, the distribution probabilities for SV is 0.34500, Pop is 0.09213, IR is 0.234456, UN is 0.475340, IN is 0.13926 and MMT_V is 0.10312 (for a normal distribution, probability

should be greater than 0.1). Therefore not all variables are normally distributed. The statistic for Kurtosis (K) shows that SV, IR and MMT_V are leptokurtic, since their distribution is peaked relative to the normal. On the other hand, POP, UN and IN are platykurtic, suggesting that their distributions are flat relative to the normal. Skewness (S) for SV is 1.666434, Pop is 0.648456, IR is 1.427156, UN is -0.228753, IN is 0.289954 and MMT_V is 0.636174 (for normal distribution, skewness: S=0). From the results UN is negatively skewed whereas SV, Pop, IR, IN and MMT_V were positively skewed. The Jarque-Bera test was used to determine whether macro-economic factors and mobile money transfers follow the normal probability distribution. It utilizes the skewness and kurtosis measures and uses the following formula;

$$JB= n [S^2/6 + (K-3)^2/24]$$

Where n= sample size, S= skewness coefficient, and K= Kurtosis coefficient. The JB normality test is a joint hypothesis that of skewness (S) and kurtosis (K) (for a normal distributed variable, S=0 and K=3). Therefore we conclude that all the variables in our study are not normally distributed since there is no variable whose distribution has S=0 and K=3.

The standard deviation is a measure of variability from the mean. From the test, we find that MMT_V has the greatest variability (5.93E+09) while IN has the smallest variability (0.084744) from the mean. The minimum, maximum, median and the mean, shows the smallest growth rate, the maximum growth rate, the middle growth rate and the average growth rate for each variable respectively.

Test for Stationarity

When estimating a model that includes time series variables, it is necessary to ensure that all time series variables in the model are stationary, which means that they are integrated of the same order. This is done by conducting a unit root test on each variable to find the order of integration. A stationary variable has a time invariant mean and covariance. Estimation based on non-stationary variables may lead to spurious results with high R² and t-statistics, but without any coherent economic meaning and inconsistent parameter estimator. This is called spurious regression.

An I(0) series is a time series that is stationary at level. An I(1) series contains one unit root and is a time series that is stationary at first difference. If the time series data is non-stationary and y_t is differenced d times before it became stationary, then it is said to be integrated of order d. We write $y_t \sim I(d)$. So if $y_t \sim I(0)$ then $\Delta dy_t \sim I(0)$. If the variables in the regression model are non-stationary, that is, not integrated of the same order, then, the analysis will call for the error correction model to be run. But if stationary, that is, integrated of the same

order, then, we go ahead with our analysis using the OLS. In this study, Augmented Dickey-Fuller (ADF) test was used to test for unit roots. The results are as shown in the table 2.

The decision criterion involves comparing the computed ADF statistic values with the Mackinnon critical values for the rejection of a hypothesis of unit root. If the computed ADF Statistic is smaller compared to the critical values, the null hypothesis of non-stationarity in time series variables is rejected and vice versa. In our case (Table 2), the computed ADF test-statistics are smaller than the critical values at 1%, 5%, 10% significant levels therefore we can reject H_0 . It means the time series doesn't have unit root problem and the series is stationary at 1%, 5% and 10% significant level. In our case (Table 2), the results shows that the independent variables are stationary at all critical values, while the dependent variable was however not stationary, prompting the use of first order differential which thereof was found to be stationary.

Table 2: ADF Unit-Root Test Results

Variable	t-Statistic	Test critical values			Remark	Order of Integration
		1% level	5% level	10% level		
SV	-10.00726	-3.514426	-2.898145	-2.586351	Stationary	I(0)*
Pop	-18.25756	-3.525618	-2.902953	-2.588902	Stationary	I(0)*
UN	-5.722232	-3.734834	-2.931404	-2.603944	Stationary	I(0)*
IR	-5.457301	-3.512290	-2.897223	-2.585861	Stationary	I(0)*
IN	-4.051422	-3.515536	-2.898623	-2.586605	Stationary	I(0)*
MMT_V	-16.23594	-3.512290	-2.897223	-2.585861	Stationary	I(0)**

Notes: *Significant at 10 percent ** Significant at 5 percent, *** Significant at 1 percent; H_0 : there is a unit root Source: E-views

Co-integration Test

If all variables are integrated of the same order, the second step is to estimate the model, also called a "co-integrating equation," and test whether the residual of the model is stationary, in which case the model defines a long run equilibrium relationship among the co-integrated variables. This was done by generating the residual series using E-views 7 Software and the residuals were subjected to an ADF Test. The computed values are compared with the critical values as shown in table 3. The results show that for the six variables used in the study there is the existence of co integration. It shows that there is a linear combination between the dependent variable Mobile Money Transfer Value (MMT_V) and the independent variables

Savings (SV), Proportion of population that are dependent (Pop), Unemployment (UN), Interest Rate (IR) and Inflation (IN).

Table 3. Unit Root Test for residual results

Variable	t-Statistic	Test critical values			Remark	Order of Integration
		1% level	5% level	10% level		
Residual	-6.390081	-3.596616	-2.933158	-2.604867	Stationary	I(0)***

Notes: ** Significant at 5 percent, *** Significant at 1 percent; H_0 : there is a unit root. Source: *E-views*

The results indicate that these residuals are stationary of degree zero at 1% significance (i.e. I(0)). The linear combination of the variables of the model is stationary and they are co-integrated which shows presence of long run relationship between the dependent and independent variables.

Correlation Analysis

The correlation analysis is a statistical technique employed to analyse the relationship between the variables used in the study. Column 2 shows the relationship between the dependent and independent variables. From the results SV, Pop, UN and IN are directly correlated to MMT (note the positive sign) while IR is inversely correlated to the same (note the negative sign). Columns 3, 4, 5, 6 and 7 show the relationship among the explanatory variables. The correlation matrix shows that all the variables are not highly correlated (for high correlation, the coefficients are above 0.8). As a result, the problem of multicollinearity brought about by high correlation between the variables is avoided. This outcome gave the researcher the green light to run the OLS model.

Table 4: Correlation Matrix

	MMT_V	SV	POP	IR	UN	IN
MMT_V	1.000000	0.026488	0.120335	-0.024296	0.058456	0.019426
SV	0.026488	1.000000	0.353952	0.115261	-0.433021	0.021528
POP	0.120335	0.353952	1.000000	0.073190	0.035540	0.000847
IR	-0.024296	0.115261	0.073190	1.000000	-0.128647	0.405727
UN	0.058456	-0.433021	0.035540	-0.128647	1.000000	-0.071558
IN	0.019426	0.021528	0.000847	0.405727	-0.071558	1.000000

Regression Analysis

The tests determines the impact of independent variables on the dependent variable by comparing the results of the model. In this study, the test was to determine the impact of savings (SV), population (Pop), unemployment (UN), inflation (IN) and interest rates (IR) on mobile money transfer (MMT).

Table 5: Regression Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.67E+10	3.35E+08	6.098766	0.0000
IN	2.23E+08	67447854	3.311831	0.0014
IR	-4.00E+08	7.52E+08	-0.531169	0.0968
POP	7.79E+09	8.08E+09	0.964421	0.0079
SV	49799366	1.99E+09	0.025047	0.0801
UN	2.39E+10	9.51E+10	0.251713	0.0819
R-squared	0.77479	Mean dependent var	2.69E+09	
Adjusted R-squared	0.72374	S.D. dependent var	5.97E+09	
S.E. of regression	6.249	Akaike info criterion	48.00406	
Sum squared resid	299.21	Schwarz criterion	48.15082	
Log likelihood	-193.167	Hannan-Quinn criter.	48.06298	
Durbin-Watson stat	2.771936			
F-statistic	18.3454			
Prob(F-statistic)	0.00000			

Source: E-views

Discussion of results

An examination of the econometric results shows that the overall fit is satisfactory with an R-squared (R^2) of 0.77479 or 77%. It implies that SV, Pop, UN, IR and IN explained about 77% systematic variations on Mobile money transfers (MMT) over the observed years in the Kenyan economy, while the remaining 23% variation is explained by other determinant variables outside the model. The value of Durbin Watson is 2.772 for the model. This falls within the determinate region and implies that there is no positive first order serial autocorrelation among the explanatory variables in the model.

The potency of SV in explaining MMT in the country is positive, this is due to the positive sign of the coefficient and is statistically significant at 10 percent significance level (p -value < 0.1). A one percent increase in SV will cause MMT to increase by 49799366 units,

ceteris paribus. These findings are in line with other researchers such as (Arunga and Kahora 2007), (Waverman et al., 2005), (Hughes and Lonie 2007) and (Cruz and Laukkanen, 2010).

Pop is an important determinant of MMT at 1% significant level (p -value < 0.01). This implies that a one unit increase in UN will lead to an increase in MMT by $7.79E+09$ units. It can be inferred that Pop has a positive impact on MMT, this is so since the coefficient of Pop is a positive number (Aker and Mbiti, 2010), (Jack and Suri, 2011) and (Camner and Sjöblom, 2009), found the same tendencies in their studies.

UN is also an important determinant of MMT at 10% significant level (p -value < 0.1). This implies that a one unit increase in UN will lead to an increase in MMT by $2.39E+10$ units. It can also be inferred that UN has a positive impact on MMT. The trend found with this variable is such as was found by the following researchers, (Tufano, 2003), (Abor, 2005) and (Frame and White, 2004).

IR was also found to be a significant factor in explaining MMT at 10% significant level (p -value < 0.1). Here it was found that there is a negative relationship between IR and MMT. This is the indication from the negative coefficient realised after regression. This shows that one unit increase in IR leads to $4.00E+08$ decrease in MMT. This is also in line with the findings of (Porteous, 2006), (Tomori, 1972) and (Adebiyi, 2004).

IN in the study was found to have a positive coefficient at 99% confidence level (p -value < 0.01). This implies that IN has a positive impact on the MMT. One unit increase in IN leads to a $2.23E+08$ increase in MMT. (Truman, 2003) and (Ball and Sheridan, 2003) did find that inflation had a positive relationship with growth.

SUMMARY

The purpose of this study was to determine the relationship between macroeconomic variables and mobile money transfer. This was done through linear regression. Before the estimation, the stationarity properties of the variables of interest were first tested with the help of the Augmented Dickey Fuller (ADF) test. This was to ensure that all the variables of interest are integrated of the same order. Unit root test for the residual value was employed to determine the long run relationship among the variables of interest. The study revealed that there is co-integration. From the analysis, it is evident that SV, Pop, UN, IR and IN were all found to be significant determinants of MMT.

In this regard, the main objective of the study was to examine the macroeconomic determinants of saving in Kenya for the period 2008 to 2014 by means of Ordinary Least

Square Model using monthly data for a period of 7 years. In order to achieve the main stated objective, the following research questions were tested:

1. To what extent do interest rates impact on mobile money transfers?
2. Is there relationship between inflation and mobile money transfers?
3. What is the relationship between savings and mobile money transfers?
4. What is the impact of population on mobile money transfers?
5. What is relationship between unemployment and mobile money transfers?

CONCLUSION

The problem of this study was to ascertain the relationship between macroeconomic variables and mobile money transfer and determine which ways these determinants influence economic policy formulation and implementation.

All the independent variables were found to be significant at different confidence levels. Savings, unemployment, inflation and population were found to bear a positive relationship with mobile money transfers. Interest rates on the other hand were found to possess a negative relationship with the dependent variable.

As savings increase, mobile money transfers also increases. This would possible mean that money is being deposited into the mobile account for saving purposes. On the other hand it would also mean that the more people tend to save the more the tendency to use up the savings through mobile money transfers.

Unemployment, inflation and population are variables that are highly dependent on the government policies and regulations. When they are favourable within the economy it means that the mobile money transfers will not be too high. The indication herein is that there is need to keep them in check so as to protect the interests of the country and its citizens interests.

Finally, interest rates were seen to depict a negative relationship with the mobile money transfers. This essentially means that as interest rates increase, mobile money transfers decreases. The service providers need to take this to consideration even as they continue with their operations to inform their startegies.

RECOMMENDATIONS

Government agencies need to take key note on the prevailing unemployment, population, and inflation rates since they have been found to be significant in their relation with mobile money transfers. This is because as they tend to increase the mobile money transfers also increases. There need to be stringent measures to improve on economic stability so as to minimise the inflation effect on the MMT. Growth and development policies need to be implemented to create

more employment. A proper social welfare policy needs to come to life that will improve on the quality of life of individuals thus reducing the dependency gap so that the individuals within the economy can attain financial independence. A proper channel of education on ethical and reasonable saving need to be implemented in the economy. This is so that the nation as a whole adopts proper saving methods. The indication from the study shows that the more savings available the more the transfers are made thus leaving a very small window for saving. This is a major cause of alarm to the consumers and caution needs to be addressed. The service providers should also take note of the prevailing interest rates since it was found to be key in reducing the values achievable through MMT. They also need to be seen actively involved in promotion of savings since this plays a major role in realising high values of MMT.

SUGGESTIONS FOR FURTHER STUDIES

This research could be extended by further research to investigate possible effects of all macroeconomic determinants, which was the main limitation in this study, due to lack of information and resources even as the mobile money transfer is still a young financial sector both nationally and internationally.

As more time series data become available coupled with structural changes in the economy, one should continue to consider whether there are fundamentally different determinants of mobile money transfers in Kenya and internationally, as this seems to imply and given their important policy implications. Future research should consider to model with more alternative possible macroeconomic determinants of mobile money transfer. This is so that we can generate a conclusive relationship between all macroeconomic determinants and mobile money transfer.

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