International Journal of Multidisciplinary Research and Development
Online ISSN: 2349-4182, Print ISSN: 2349-5979, Impact Factor: RJIF 5.72
www.allsubjectjournal.com
Volume 3; Issue 9; September 2016; Page No. 246-249

The Impact of Information and Communication Technology on the Assets of Mutual Funds in G-7 Countries

[1] Naser Sanoubar, [2] Parisa Khodayari

[1] Associate Professor of Business Administration, Faculty of Economics, Management and Business, University of Tabriz, Iran
[2] Master of Arts in Business Management, Faculty of Economics, Management and Business, University of Tabriz, Iran

Abstract
In recent decades, the financial markets have experienced tremendous changes. The dominant effect of certain financial intermediaries, notably banks has reduced gradually with the advent of new intermediaries and new financial instruments and there has created a special place for intermediaries such as mutual funds and exchange trade funds. Rather than simply being depositors and relying on low bank profit, however, many bank customers have been willing to invest in such funds despite its higher risk to earn more profit. On the other hand, the development of information and communication technology has increased investors tendency to invest in funds due to reduced uncertainty which is raised by asymmetric information. Considering the growing impact of investment funds on financial and economic development of countries, however, this study aimed to investigate the impact of information and communication technology on the assets of mutual funds in G-7 countries in 1999-2014. For this purpose, the panel data method was used for examining the hypothesis of relationship between Information and communication technology and development of mutual funds market. The findings showed that the information and communication technology impacted positively on the assets of mutual funds in G-7 countries.
Classification JEL: G11, G23, O16, O33, O57.

Keywords: Information and Communication Technology, Mutual Funds, G-7 Countries, Panel Data

1. Introduction
In most emerging and developing economies, the growth of information and communication technology has been remarkable and it has played an undeniable role in accelerating economic growth (information and communication technology statistics, International Telecommunication Union, 2015). The dynamic growth of financial systems is one of the main advantages of rapid ICT growth in emerging and developing economies; it increases the foreign investments, encourages new investments, and encourages the entry of strategic investors to firms with wider investments (Lechman and Marszk, 2015) [14]. The information channel is one of the major channels through which the ICT impacts on financial markets. The information is one of the basic and important components of financial markets and impacts on their efficiency. Through facilitating the storage, transfer, and dissemination of information and data, ICT has revolutionized the performance and efficiency of financial markets (Stigler, 1961; Morck *et al*., 2000) [21, 17]. Reducing the asymmetry of information, facilitating the free flow of information, and increasing the power and speed of information analysis, the ICT provides opportunities to participate in financial markets and develop them. If there will be unequal and asymmetric data transmission, however, it will have several undesirable consequences such as loss of market efficiency, increased transaction costs, lower liquidity, and reduced profit of transactions in capital markets (Binswanger, 1999; Singh, 1997) [20]. Most empirical studies including Lechman and Marszk (2015) [14], Sassi and Goaied (2013) [18], Falahaty and Jusoh (2013) [6], Shamim (2007) [19], and Bahrami (2007) [2] have concluded that the ICT has a positive impact on financial development. Therefore, this study assumes that ICT has a positive impact on development of mutual funds. The study sample includes G-7 countries in 1999-2014.

The G7 is an unofficial group which consists of seven industrialized countries including Japan, America, Germany, France, UK, Italy, and Canada. It was established in 1975 with the aim of creating consensus on how to deal with economic crisis. These countries are the same in terms of asset value of mutual funds and ICT indices such as number of users, Internet speed, and etc. (Report of investment companies institute and International Telecommunication Union, 2015).

The mutual funds are financial intermediaries which aggregate financial resources of individuals and companies to invest in portfolio of diversified assets. The open capital investment companies (which constitute the majority of mutual funds) sell new shares to investors and if needed, redeem the issued shares according to fair market value. The open capital investment companies enable the minor investors to invest in diversified portfolios of financial securities which have high liquidity capabilities. Therefore, the mutual funds can be considered as both the financial institutions and investment securities. According to many investors, the mutual funds decrease the trading costs and fees and are considered in scale of activities (Saunders & Corinth, p. 387). The investment funds collect the funds of large and small savings in order to allow savers to participate in a large portfolio with their little capital. It should be noted that the objective of investment is making a profit or at least protect the financial assets (GhaziFard *et al*., 2012) [7].

Using simple panel data analysis method, Bahrami investigated the impact of ICT on development of stock exchange. The population consisted of countries with low per

capita income including Argentina, South Africa, Brazil, Peru, Thailand, China, Sri Lanka, Philippines, Malaysia, India, and Iran. The findings showed that all ICT development indices including fixed and mobile phone penetration rate, number of Internet users, and number of personal computers impacted significantly on stock exchange development indices including activity ratio, liquidity ratio, and the number of listed companies in stock.

Andrianaivo and Kpodar examined the relationship between ICT and economic growth in Africa over the period 1988-2007. The findings show that there was positive correlation between financial growth and information and communication technology indices including number of fixed and mobile subscriptions.

However, this study aims to investigate the impact of information and communication technology on the assets of mutual funds in G-7 countries. For this purpose, the expenditure of ICT (% of GDP), number of Internet users, fixed broadband subscriptions, fixed telephone subscriptions, and mobile phone subscriptions are considered as ICT selected indices. The impact of each of these indices on mutual funds' assets in G7 countries over the period 1999-2014 is examined. Therefore, this study tries to answer the following question:

How the information and communication technology impacts on asset growth of mutual funds in G7 countries?

2. Methodology

According to Lechman and Marszk study (2015) [14], the following panel data model was used to investigate the relationship between Information and communication technology and mutual funds' assets:

$$LnAUM_{it} = \alpha + \beta_0 LnICT_{it} + \beta_1 LnMC_{it} + U_i + V_{it}$$

Where, $LnAUM_{it}$ represents the logarithm of mutual funds' assets value in country i and year t; $LnICT_{it}$ represents the logarithm of information and communication technology in country i and year t for which the indices including number of Internet users, fixed broadband subscriptions, mobile phone subscriptions, fixed telephone subscriptions, and ICT expenditure (% of GDP) are used; $LnMC_{it}$ Represents the logarithm of stock market value in country i and year t. The α , U_i , and V_{it} represent intercept, group-specific fixed effects, and equation error, respectively. According to studies of Lechman and Marszk (2015) [14], there are other indices such as stock market value (% of GDP), characteristics of funds manager (intelligence, education, professional training, gender, experience, timing ability, stock selection, and risk taking), investors' financial information, culture of countries, and etc. which may impact on mutual funds' assets. Except the stock market value, however, other indices are qualitative and their data cannot be collected in sample countries; therefore, there are not mentioned in the model.

In this study, the mutual funds is dependent variable and the independent variables include ICT expenditure, number of Internet users, fixed broadband subscriptions, mobile phone subscriptions, fixed telephone subscriptions, and stock market value (% of GDP).

3. Findings

Testing the statics of variables

The statics tests are important tests which estimate the regression with reliable coefficient. The statics test are used to prevent fictitious regression (Baltagi, 2005; Maddala, 1999) [3, 15]. The results of statics tests on research variables in G7 countries are presented in Table 1.

Table 1: Results of unit root tests

Variables	ADF	PP Fisher	LLC
LOG(AUM)	0.9980	0.9990	0.9980
LOG(SCM)	0.7344	0.5570	0.1699
LOG(IU)	1.000	1.000	1.000
LOG(MOB)	0.9879	1.000	0.9850
LOG(FBS)	0.8375	0.9803	0.6070
LOG(PHONE)	0.0000	0.0000	0.0000
LOG(EXPEN)	0.9998	0.9999	0.8222

The existence of unit root is the null hypothesis of statics tests. According to above table, this assumption is rejected only for variable PHONE. The rejection of null hypothesis is the deciding criterion in all three tests. According to table 2, other variables are static based on the statistics of these tests. Therefore, the static PHONE in level (cointegration in level I (0)) and variables AUM, CM, EXPEN, MOB, IU, and FBS are accumulated at first order.

Table 2: Results of unit root tests (one time differencing)

Variables	ADF	PP Fisher	LLC
DLOG(AUM)	0.0000	0.0000	0.0000
DLOG(CM)	0.0000	0.0000	0.0000
DLOG(IU)	0.0000	0.0000	0.0000
DLOG(MOB)	0.0000	0.0000	0.0000
DLOG(FBS)	0.0000	0.0000	0.0000
DLOG(EXPEN)	0.0000	0.0000	0.0000

Cao cointegration test

Most economic time series variables tend to move in same direction; this is due to a common trend which is seen in most of them. Generally, the economic variables which their statistics features such as mean and variance are a function of time are called non-stationary variables. The estimation of regression model using non-stationary variables is called false regression, because the reference to results of such a model will lead to misleading results. The differencing and using the difference of variables in the model is one way to avoid false regression. However, such a model does not provide any data on long-term relationships among variables. In this situation, the co-integration methods may be used to estimate the model based on variable levels (Cao, 1999). The results of statics test of variables shows that the non-stationary variables have become stationary with one differencing; so, the co-integration of variables needs to be examined. According to output of EVIEWS8 software:

Table 3: Cao's co-integration test results

ADF	t-statistics	P-Value
G7 Group	-2.547945	0.0054

According to above table, the cointegration or long run relationship between non-stationary variables is accepted. According to Cao test results, therefore, it can be said that although some variables are stationary at level (1) I, they are cointegarted at level zero; the mentioned regressions are not false.

Group effect significance test

Before the model estimation, the necessary tests should be conducted to examine the homogeneity of countries to determine whether the method of panel data may be used to estimate the model? For this purpose, the group effect significance test is conducted with null hypothesis (Studied countries are homogeneous) and alternative hypothesis (Studied countries are not homogeneous). Using STATA 12 and EXCEL 2013 Software, the F-test statistics was used in this test. The panel data method is used in the case of rejection of null hypothesis; otherwise, the model may be estimated by integrated ordinary least squares method (Katos and *et al*, 2000) [12].

Table 4: Results of F Limer test

F Limer statistics	Value	P-Value	Result
Group G-7	274.34	0.0000	Panel data

Choosing constant and random effects

After confirmation of using panel data, Hausman Test (1980) is used to choose from random and fixed effects (Gujarati, 2003). The results are given in Table 5.

Table 5: Hausman test results

Hausman test statistics (x^2)	Value	P-Value	Result
Group G-7	89.23	0.0000	Constant effects

Heterogeneity of variance test

The fixed variance of errors is one of the assumptions of regression equation and is known as assumption of homogeneity of variances. If the variance of errors will not be constant, it will be said that there is heterogeneity of variance (Abbasinejad, 2005) [1]. The likelihood ratio test is one of the tests to determine the heterogeneity of variance. The results of likelihood ratio test (LR) is presented in Table 6.

Table 6: Results of likelihood ratio test

LR statistics	Value	P-Value	Result
Group G-7	151.13	0.0000	Heterogeneity of variance

Autocorrelation test

Another assumption of linear regression model is zero covariance between error components over time (or cross-sectional for data types). In other words, according to this assumption, the errors are not related to each other. If the errors are not uncorrelated, they are autocorrelated. Therefore, this assumption needs to be tested. The Wooldridge test is one of the tests to examine the independence of errors (Wooldridge, 2010). The Wooldridge test results are provided in Table 7.

Table 7: Wooldridge test results

Wooldridge test statistics (F)	Value	P-Value	Result
Group G-7	38.133	0.0008	There is autocorrelation

4. Results of estimating the model with FGLS method

In general, it can be said that by inverse weighting of variance to variables, the GLS method underweights the observations with more dispersion and overweight the observations with less dispersion (Mohammadzadeh, 2013). Since the research model has heterogeneity of variance and autocorrelation, therefore, the feasible generalized least squares method (FGLS) is used to solve this problem. The results of model estimation are provided in table below.

Table 8: FGLS method

Variables	Coefficients	Statistics t	Probability
LOG(SCM)	1.1492	5.07	0.000
LOG(IU)	- 1.6767	-3 .03	0.003
LOG(MOB)	.3499	0.90	0.372
LOG(FBS)	0.5101	3.60	0.001
LOG(PHONE)	0.8660	1.33	0.187
LOG(EXPEN)	2.3193	2.17	0.033
R^2	.4612		

According to above table, the probability value of IU, FBS, SCM, and EXPEN is less than 0.05. Therefore, it can be concluded that these variables will impact significantly on growth of assets in mutual funds in long-term. In the long-term, however, the ratio of asset value in mutual funds to stock market value is equal to 1.1492; this indicates that 1 percent increase in value of stock market increases 1.1492 percent the assets of mutual funds. According to these results, the positive impact of stock market value on mutual funds' assets growth in long-term is confirmed. Also, in long-term, the ratio of mutual funds' assets value equal to ICT expenditure is equal to 2.3193; this indicates that 1 percent increase in ICT expenditure increases 2.3193 percent the assets of mutual funds. According to these results, the positive impact of ICT expenditure on mutual funds' assets growth in long-term is confirmed. The mobile and fixed telephone subscriptions have positive and non-significant impact on mutual funds' assets.

5. Discussion and conclusion

Using feasible generalized least squares method, this study investigated the impact of ICT on growth of mutual funds' assets in G7 countries during 1999-2014. It was found that the number of mobile phone, fixed telephone, fixed broadband, and ICT expenditure have a positive impact on growth of mutual funds' assets in G7 countries. However, the number of mobile and fixed phone subscribers had no significant impact

on growth of mutual funds' assets; the main reasons included space and time limitations, tariffs related to any of these indices, and the possibility of disruption in information and communication. The ICT expenditure had a significant and positive impact on growth of mutual funds' assets; this means that the developed countries have provided large reserves of physical infrastructure, human capital, and appropriate government policies which are used now for investment in information and communication technology. This also shows that this field has many applications in these countries; therefore, these countries must spend more on ICT to develop their financial markets. However, the number of internet users had a negative and significant impact on mutual funds' asset growth. According to studies conducted by Lechman and Marszk (2015) [14], it seems that the users in developed countries move toward new tools proposed in stock market such as exchange trade funds which has more advantages than mutual funds.

6. References

1. Abasinejad H. Advanced Econometrics. Tehran: Tehran University publication. 2005.
2. Bahrami A. The impact of ICT on development of Stock Exchange (Case study: Iran). Master thesis, University of Isfahan, retrieve number. 2007, 3178.
3. Baltagi BH. Econometric Analysis of Panel Data 3rd Edition England JW & Sons. 2005.
4. Ceccobelli M, Gitto S, Mancuso P. ICT capital and labor productivity growth: A non-parametric analysis of 14 OECD countries. Telecommunications Policy. 2012; 36(4):282-292.
5. Creane S, Mobarak AM, Goyal R, Sab R. Financial sector development in the Middle East and North Africa. 2004.
6. Falahaty M, Jusoh MB. Financial Development and Information Communication Technology Another look at the Evidence from Middle East and North African Countries. In 3rd International Conference on Business, Economics, Management and Behavioral Sciences (ICBEMBS'2013). 2013, 29-30.
7. Ghazifard A, Jamshidi H, Khoshkrudi M. Prioritizing the factors affecting the performance of investment funds by using QFD and AHP consolidated model in a fuzzy environment. Journal of Business Administration Research, fourth year, 2012; 8:1-29.
8. Gujarati DN. Basic Econometrics. 4th. New York: McGraw-Hill. 2003.
9. Investment Company Institute, Investment Company Fact Book: Review of Trends and Activity in the Investment Company Industry. 2015.
10. ITU. ITU World Telecommunication / ICT indicators 2015 (on-line version). 2015.
11. Kao C, Chiang MH. On the estimation and inference of a cointegrated regression in panel data. Available at SSRN 1807931. 1999.
12. Katos A, Lawler KA, Seddighi H. Econometrics: A practical approach. 2000.
13. Kpodar K, Andrianaivo M. ICT, financial inclusion, and growth evidence from African countries International Monetary Fund. 2011, 11-73.
14. Lechman E, Marszk A. ICT technologies and financial innovations: the case of Exchange Traded Funds in Brazil, Japan, Mexico, South Korea and the United States. Technological Forecasting and Social Change, 2015; 99:355-376.
15. Maddala GS, Wu S. A comparative study of unit root tests with panel data and a new simple test. Oxford Bulletin of Economics and statistics. 1999; 61(S1):631-652.
16. Mohammadzadeh P, Mamie Poor S, Feshari M. Stata software applications in econometrics Tehran: Nur-e- Elm Publication, Faculty of Economic Sciences. 2013, 1.
17. Morck R, Yeung B, Yu W. The information content of stock markets: why do emerging markets have synchronous stock price movements? Journal of financial economics, 2000; 58(1):215-260.
18. Sassi S, Goaied M. Financial development, ICT diffusion and economic growth: Lessons from MENA region. Telecommunications Policy, 2013; 37(4):252-261.
19. Shamim F. The ICT environment, financial sector and economic growth: a cross-country analysis. Journal of economic studies, 2007; 34(4):352-370.
20. Singh A. Financial liberalisation, stockmarkets and economic development *. The Economic Journal. 1997; 107(442):771-782.
21. Stigler GJ. The economics of information. The journal of political economy, 1961, 213-225.
22. Wooldridge JM. Econometric analysis of cross section and panel data. MIT press. 2010.
23. World Bank, World Development Indicators 2015.