

MODERN ECONOMY, ELECTRONIC FINANCIAL MARKETS AND ECONOMIC GROWTH IN SELECTED COUNTRIES

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—Abstract —

In recent years, information and communication technology (ICT) as a characteristic of modern economies, has developed greatly and gradually has affected various economic sectors over the world. Using ICT, more and faster access to accurate information necessary for activity in financial markets has been provided. Developed financial markets are essential for the emergence of the modern economy and also Internet has significant influence on financial services through high market potential. In this study, the effect of electronic financial markets on economic growth, in 29 countries, during the period 2003-2008 was estimated, using panel data and Generalized Methods of Moments (GMM). The results indicate positive and significant effects of ICT and financial sector development on economic growth in studied countries.

Key Words: *ICT, Electronic Financial Markets, Economic Growth.*

JEL Classification: L63, O16,O40.

1. INTRODUCTION

The rapid development of ICT in recent years has had a major impact on the global economy. One of the most important changes is the rapid spread of personal computers, internet, mobile phones and broadband networks. Gradually, the various economic sectors, including financial markets, will operate ICT infrastructure. Developed financial markets are crucial for the emergence of new economies and developed financial sector is important for economic growth (Mahmoodzadeh, 2007,14). Developed financial markets which have good relationships with financial institutions at international level in a country will improve and support competitiveness of that country. Having efficient financial markets, developed banking sector and Utilization of financial services with good quality, are important factors of competitiveness of the country. In this regard, Internet has greatly affected the financial sector services, especially marketing capabilities. Nowadays electronic financial markets play an important role in economic growth as a result of financial development of economies due to domain expansion, wide access to information, transparency of prices, lower processing costs for suppliers and also low cost of access to information for consumers. Users can perform their financial transactions anywhere and anytime using a computer or mobile phone with internet access. By increasing cell phone and Internet users, communication channels will be created which will improve more rapid access to financial resources. Financial services including internet banking, brokerage, payment and other transaction related to electronic Financial Services can be easily done via Internet. Therefore, development of financial markets with financial services and online banking and transactions through mobile phones and Internet as the backbone of any economy, is widespread and can lead to economic growth (Shamim, 2007,2).

In this paper, the development of electronic financial markets through expansion internet users and economic growth through the in selected countries during the period 2003-2008 using panel data and generalized method of moments is experimentally evaluated. In second section, theoretical concepts of development of electronic financial markets and economic growth are analyzed. The third section is devoted to the research literature. In the fourth section, definition of model parameters and model estimation are presented and finally results of experimental model estimation are analyzed and suggestions are offered.

2. LITERATURE REVIEW

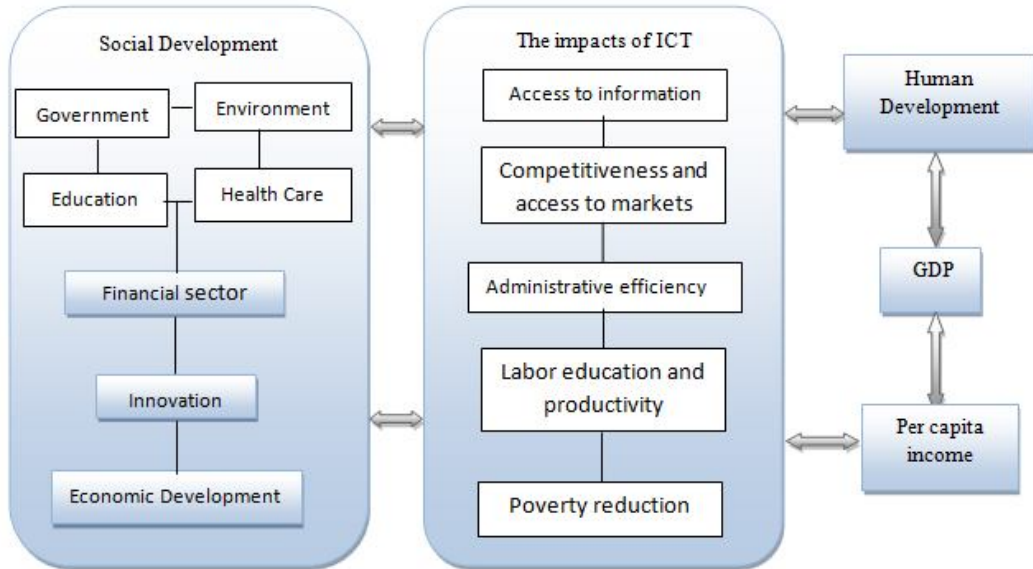
2.1. Theoretical concepts

Over the years the relationship between financial sector development and economic growth is considered by many economists. Most analysts like Mckinnon and Shaw (1973), King and Levine (1993), Levine and Zervos (1996), Neusser and Kugler (1996) believe that Financial Deepening can increase the speed of economic growth. Some economists also do not believe in this relationship, like Patrick (1966), Lucas (1988), Stern (1989) and Ireland (1994). In the new study by Levine, Loyaz & Beck, a positive relationship between financial development and economic growth is emphasized.

In the past two decades, ICT has been one of the major factors that play an important role in improving productivity and economic growth. With the increasing use of ICT, firms and institutions provide potentials for improving efficiency and productivity by facilitating the exchange of information and better access to existing markets and entering new markets. Dedrick & Kraemer (2003) offered interesting findings that are called the duality nature of ICT capital. They claimed that the ICT capital like other physical assets can result in better production technology and deepening of capital in use. According to the diagram (1), ICT plays an important role in social and economic development, so that by providing the infrastructure by electronic government, employing ICT in healthcare, schools and educational centers, social development will be achieved. Also by applying ICT, financial sector development at lower cost and faster access to information will be possible while and on the other hand created innovation will lead to labor productivity, improved competitiveness and administrative efficiency.

In this regard, the development of electronic financial markets and its role in economic growth has been considered by economists. According to Nsouli and Schaechter (2002) electronic banking, mode is easier to provide services to customers in comparison with non-electronic method. Banks and financial institutions can attract customers and increase their productivity and profits by more investment in the field of ICT. Claessens et al (2002) argue that electronic financial markets provide an opportunity for some developing countries to enhance in the financial systems and the ICT infrastructure including internet, plays an essential role in promotion of this market.

Chart 1: Summary of relationship between ICT and Development



Qureshi, 2005

They emphasized the relationship between improved electronic financial markets and rapid economic growth. Petersen and Rajan (2001) emphasized on increasing the use of ICT for financial institutions, particularly banks. Because in one hand further access to information for customers and on the other hand cost reduction for financial institutions through electronic financial markets will be provided. Also, studies done by Allen et al (2001), Kim (2003) Fuatai , Toland (2003) and Shamim (2007) focus on the positive relationship between the development of electronic financial markets and economic growth.

2.2. A review of experimental studies

King and Levine (1993) believed that financial services can affect economic growth through increased capital accumulation and technological innovations. To verify this, they had studied 80 countries during the years 1960 to 1989. They have used four indices of financial development which exactly shows the functioning of the financial system and three indices of average economic growth. Results indicated that there is statistically significant positive relationship between there financial development and four growth indices.

Allen et al (2001) in their study showed that access to financial resources for businesses in the developing world is a phenomenon challenging. Thus, there

should be channels that improve access to financial resources. In this regard, electronic financial communications reduce asymmetric information due to lower cost of communications, computing and quick information processing and this allows buyers and sellers to have greater access to information. According to the results of this study in late 1990, banks in North America, northern European countries and Japan, used Internet as service delivery channels to customers and using electronic financial communications have affected economic growth in these.

Klasns et al (2002) in their study showed that, improvements in communications and the growth of the Internet and wireless communication technology have changed the structure and nature of financial services dramatically. Electronic financial markets may be an opportunity for developing countries to improve their financial systems and to achieve faster sustainable growth.

Papaioannou (2004) studied the effects of ICT on economic growth in developed and developing countries during the period 1993 to 2001. He used foreign direct investment (FDI) as a variable to demonstrate the technological progress of a country and came to the conclusion that foreign direct investment has a significant positive effect on economic growth in studied countries and this effect is greater in developing countries. Also he gained a positive relationship between ICT and economic growth for all countries in the study but the relationship was not significant.

Shamim (2007) studied the relationship between index of financial development and ICT index with economic growth, using cross-sectional data for 61 countries from 1990 to 2002. In this study, the number of mobile users, Internet users, personal computer users and Internet hosts were used as index of ICT and electronic communication elements and the impact of ICT on economic growth in 61 countries was estimated by GMM. The results showed that, in countries where their relationships has increased, especially with the increased number of mobile phone users and Internet users , the financial deepening which is the backbone of any country for growth have happened, in other words, using ICT and financial deepening, has improved the economic growth.

Aghayee and Assari Arani (2008) have examined the relationship between ICT and economic growth in OPEC member countries, using panel data for the period 1998-2004. Test results show that ICT has a significant effect on the growth of these countries, also foreign direct investment as an indicator of technical and technological progress has had a positive effect on growth. While the coefficient of oil revenues, which indicates the abundance of natural resources in these

countries, was negative, and the results state that mentioned variable has no appropriate effect on economic growth in OPEC members.

2.3. Methodology

In this study, to evaluate the effect of electronic financial market development on economic growth in selected countries (Argentina, Burundi, Burkina Faso, Brazil, Switzerland, Chile, Algeria, Ecuador, Guatemala, Guinea, Kuwait, Iran, Japan, Kenya, Mexico, Malawi, Nicaragua, Pakistan, Peru, Philippines, Solomon Islands, El Salvador, Seychelles, Tunisia, Turkey, Uruguay, United States, Venezuela, South Africa), the model presented by Shamim (2007) has been referred to as:

$$LGY_{it} = \alpha_{it} + \beta_{1it}LFD + \beta_{2it}LINTU + \beta_{3it}LHC + \beta_{4it}LGCF + \beta_{5it}LGOVT + \beta_{6it}LTRD + \varepsilon_{it}$$

In which LGY represents the logarithm of GDP per capita in US dollar and is considered as a variable for economic growth.

LFD is the volume of M3 to GDP. One of the methods commonly used for measuring financial depth is the ratio of to GDP. Liquid Liabilities includes money and coins outside the banking system plus current accounts and other interest-bearing liabilities of banks and non-bank financial intermediaries. Accordingly, it is equivalent to ratio of M3 to GDP. In this study, this index is used as an indicator of financial sector development.

LINTU is the logarithm of the number of Internet users per 100 people.

LHC is the logarithm of enrollments in high school as the second education period which is the most effective period for educate young people and is used as an indicator of human capital in the model. Utilization of electronic financial services requires high skills and competencies. The educated and knowledge-based workforce is considered as a substitute for human capital.

LGCF is the logarithm of the ratio of gross fixed capital formation to GDP which is used as an indicator of physical capital. Most growth theories emphasize on the critical role of physical capital.

LGOVT is the logarithm of the ratio of government consumption expenditure to GDP which is an alternative indicator for government size. These variables often appear n Keynesian and neo-Keynesian models as explanatory variables in growth patterns.

LTRD is the logarithm of the ratio of trade to GDP as an indicator of the degree of openness of the economy in the models. Increasing developments in business and advances in information technology have led to the development of electronic financial markets. ε_{it} is the random error component in the model. Statistics data related to Variables have been extracted from the World Bank. (WDI, 2010)

First, for estimating the desired model in 29 selected countries during the 2003-2008, panel data method is used. To determine the presence (or absence) of separate intercept for each country F test were used. Since the calculated amount for F is larger than F table, different intercept (fixed effects or random effects models) should be considered in the model.

Then Hausman test was used. H_0 for the Hausman test based on random effects method was rejected so fixed effects model was confirmed for estimating. The results of estimating models by panel data with fixed effects method and the F statistic and the Hausman test are presented in Table 1.

Table 1: Results of studding the effect of electronic financial markets on economic growth in selected countries with panel data approach.

Variables	Coefficients	Standard deviation
C	*8.341	0.362
LFD	**0.135	0.055
LINTU	*0.229	0.013
LHC	*0.144	0.075
LGCF	*0.284	0.039
LGOVT	*-0.245	0.052
LTRD	*0.251	0.028
F test statistic	[0.000]	364.3
Hausman test statistic	[0.000]	68.2

Numbers in brackets the P-Value, * indicates significance at 99% level and ** indicates significance at 95%.

As it is clear from the pattern estimation results, all the coefficients have signs consistent with theoretical foundations. The impact of Indicators of financial development on economic growth in selected countries is positive and statistically significant at the 95% level. Physical capital has the greatest influence on economic growth in selected countries. The impact of human capital coefficient

and the degree of economic openness and economic and the number of Internet users on growth is positive and statistically significant at the 99 percent level. The coefficient for the size of the government was negative, as expected, and statistically significant at the 99 percent level.

The second estimator of Dynamic Panel Data Model uses Generalized Method of Moments (GMM). This estimation method solves the problem related to endogenous explanatory variables. In this method a lagged dependent variables is used as explanatory variables. Table 2 presents the results of studying the effect of financial electronic markets on economic growth in selected countries with GMM approach. The Wald and Sargan test statistic are presented in Table.

Table 2: The results of studying the effect of financial electronic markets on economic growth in selected countries with GMM approach.

Variables	Coefficients	Standard
LGY (-1)	*0.680	0.063
LFD	*0.281	0.010
LINTU	**0.035	0.018
LHC	**0.132	0.014
LGCF	*0.206	0.051
LGOVT	** -0.079	0.066
LTRD	0.033	0.037
Wald test	[0.000]	476.4
Sargan test	[0.4]	9

Numbers in brackets the P-Value, * indicates significance at 99% level and ** indicates significance at 95%.

The results of GMM are significant and match the results of fixed effects estimations. Wald test is used for checking the simultaneous significances of estimators. H_0 in this test, the zero amounts of all variables at significance 1% level, is rejected so the validity of the estimated coefficients and also the validity of the model is confirmed. Tools in this way are the lagged explanatory variables. H_0 in Sargan test is based on the lack of correlation between tools and error components. Sargan test results show that the tools have required validity thus the validity of the results for interpretation is confirmed.

3. CONCLUSION

The rapid expansion of ICT in the last two decades has a positive impact on economic growth potentially. Financial markets are one of the sections that ICT sector has been utilized due to faster and broader access to information that is

required in financial markets. In this paper, the effect of electronic financial markets on economic growth, in 29 countries, during the period 2003-2008 was estimated, using panel data and Generalized Methods of Moments (GMM). Estimation results indicate that index of financial development and internet usage have affected the economic growth positively and usage of internet and ICT infrastructures for developing this sector is necessary because of cost savings and increased transaction and resulted financial deepening. Also controlling variable of openness has positive effect and size of government has negative effect on economic growth of selected countries. While human capital and physical capital indexes have expectedly significant positive effect on economic growth.

According to this research following point can be considered in planning for economic growth:

1. To strengthen and increase the impact of ICT on economic growth and utilizing various economic sectors from this technology, providing more ICT infrastructure should be emphasized.
2. If the developed financial markets function properly, they can have a significant positive effect on economic growth and ICT infrastructure including the Internet; can make a profound impact on the financial services sector. Therefore, due to lower cost and more accessible markets and product distribution, a wide range of financial institutions can increase the speed of their financial flows by Internet access and effective payment solutions.
3. Countries can not use this technology and benefit from this opportunities without the necessary skills in using ICT capabilities, so people need to be taught how to use this technology.

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