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Procedia Economics and Finance 39 (2016) 156 – 164

Procedia
Economics and Finance

www.elsevier.com/locate/procedia

3rd GLOBAL CONFERENCE on BUSINESS, ECONOMICS, MANAGEMENT and TOURISM,
26-28 November 2015, Rome, Italy

Macroeconomic facts for Telecom Industry in MINT Countries

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Abstract

This paper proposes an overview of macroeconomic correlation between telecom investments and the GDP of MINT countries. MINT countries are Mexico, Indonesia, Nigeria and Turkey and the term has populated by Goldman Sachs, who has also created a relatively more referred term BRICS. The paper holds a specialized literature for each of MINT countries and then proposes a statistical model for correlation analysis, which is built on three well-known correlation coefficient calculation, Kendall's Tau, Spearman's Rho and Pearson's Product Moment Correlation. The results show a high correlation between the telecom investment and the GDP for each of the countries, but the correlation coefficient differs from country to country. For example the highest correlation monitored is in Nigeria with about 70% and the lowest correlation is in Indonesia with about 44%.

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Peer-review under responsibility of the Organizing Committee of BEMTUR- 2015

Keywords: Telecom Investments, MINT Countries, Macroeconomical Correlation

1. Introduction

In this paper, we propose a methodology to reveal the significant correlation between macroeconomic facts and the investments on telecom sector for Mexico, Indonesia, Nigeria and Turkey (MINT countries). Although each of the countries has their own characteristic market structure and requires a specialized management approach, it is possible to model a cross boundary analysis neutralized via the macroeconomic facts (Chircu & Mahajan, 2009). For example in their study, (Koski & Kretschmer, 2005) propose a three-dimensional model based on the entry time, service price and diffusion of the mobile telephony sector. There are also other studies with multiple-countries and

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single-equation approach (Doganoglu & Grzybowski, 2007). The telecom operators in a country are a part of information and communication technology (ICT) sector and we propose a statistical model for the correlation between the telecom industry and the gross domestic product (GDP) of the country. Also, the correlation function can be utilized for any formulation, far away from the market/industry differences or prediction purposes.

Companies use strategic investments for expanding their strategic position and being flexible to dynamic environments (Smit & Trigeorgis, 2004). Strategic investments help companies to gain competitive advantage by cost reduction and product differentiation, which contribute the created value of the companies (Porter, 1980). Strategic investments can be made by mergers or acquisitions according to market growth potential and market share of the company or product (Davidson, 1985). While deciding about strategic investments, companies try to analyze uncertainty about the environment and reflect the effects of macroeconomic parameters to the companies. For instance, oil price volatility can be an important effect on investment decisions of the firms and decrease the investment level to a certain point (Henriques & Sadorsky, 2011). However, after a certain level of uncertainty, some firms can generate higher income in their investments during the financial crisis. China, Brazil and India are the examples for being resilient to global financial crisis after 2008. These countries sustained to develop their inward and outward foreign direct investments (FDI) (Nayyar, 2011).

The rest of the paper will introduce the details of each MINT countries in the first chapter. In the second chapter the methodology and the background of the methodology will be introduced and also the application of methodology on real data for all four countries of MINT will be demonstrated. Finally the conclusion and interpretation of the outcomes will be presented.

1.1. Mexico

Since 1985, the role of telecommunications sector in Mexico's GDP has increased. But this ratio has stayed less than OECD average. The telecommunications sector in Mexico has been accepted as inefficient and functionless. This problem is related with lack of competition and transparency. These reasons lead to high prices, low market penetration, and insufficient infrastructure. Mexico has some of the highest consumer prices among members of OECD (OECD, 2012). Hausman and Ros (2012) demonstrate that the OECD study on Mexican telecommunications sector was incorrect when it concluded a lack of competition caused a loss of over US \$129 billion between 2005 and 2009. They argue that there have been significant gains in consumer surplus, not the loss.

The consensus of several studies on Mexican telecommunications is that the performance of sector in Mexico, while improving, falls short of the standards that are accepted very important for the performance of industry. According to this view, the causes of this deficiency are insufficient competition and weak regulation (Noll, 2013).

Mexico is very successful to attract FDI inflows. During the first half of the 1980s, Mexico has received 10% of all FDI to developing countries. The trade and investment liberalization process started in 1985, by the establishment of North American Free Trade Agreement (NAFTA) between Mexico, USA and Canada. The agreement has a major impact for the market liberalization of Mexico since NAFTA requires trade and FDI liberalization. After the liberalization process, Mexico is still an attractive country to raise FDI (Love & Lage-Hidalgo, 2000).

After 1990, the government has reformed telecommunications industry by allowing private ownership and promoting competition. The government has determined some goals like telephone penetration, service modernization, and cost reductions (Gonzalez, Gupta, & Deshpande, 1998).

Telefonos de Mexico (Telmex) was privatized on May 1991 with a value of 2,170 million USD (Bortolotti, D'Souza, Fantini, & Megginson, 2002). Privatization has been really important to improve the performance of companies. Bortolotti, D'Souza, Fantini, and Megginson (2002) examine the financial and operational performance of 31 national telecommunication companies. They find both of the performances for companies improve significantly after privatization.

One of the first milestones of Mexican telecom industry was in 1996, when an independent regulator was established. One of the mobile operators still dominates over 75% of the market. The telecom reform law passed by Congress in the summer of 2014, is the most significant step to construct the legal framework. Today America Movil, Axtel, Cablemas, Carso Global Telecom, Lusacell, Satmex and Telmex are operating in Mexican

telecommunications sector. Telmex is the dominant fixed line operator. It owns 90% of the telephone lines in Mexico City and 80% of the lines in all Mexico.

Bengoa and Sanchez-Robles (2003) explore the interplay among freedom in economy, FDI and economic growth for 18 Latin American countries between 1970 and 1999. They conclude that FDI is positively correlated with economic growth of host country. Love and Lage-Hidalgo (2000) argue that domestic demand and relative factor costs are the determinants of FDI, suggesting for both ‘cheap labor’ and ‘market size’ hypotheses.

1.2. Indonesia

Indonesian telecom sector has been growing fast by great competition among companies. The industry has both local and foreign strategic investors like Singapore Telecommunications, Axiata of Malaysia, Hong Kong's Hutchison and Saudi Telecom. According to Asia-Pacific Telecoms Risk/Reward Index for the third quarter of 2015, Indonesia is the 11th country in the region and keeps its rank. Major players in Indonesian telecommunications industry are Telkom, Indosat, Bakrie Telecom, Telkomsel, PT Smartfren Telecom, PT Hutchison CP Telecommunications and PT Broadband Multimedia (Kabelvision) and the biggest player Telkom's shares are divided by 53.9% for government and 46.1% for public (BMI, 2015). Indonesia has made the telecommunication reforms in two phases, starting from 1989 by the participation of public-private partnership arrangements in the fixed-line sector. However, 1999 regulation has removed public-private partnership arrangements and promoted a more competitive market environment for the companies. The 1999 reform in telecommunication industry was a necessity after 1997 financial crisis and IMF recommendations about liberation of telecommunication industry (Lee & Findlay, 2005).

It has been important to establish telecommunication infrastructures to develop global economy, since information transformation will affect trade and economic growth positively (Madden & Savage, 2000). For the developing economies like Indonesia, investments in mobile and land line phone markets have promoted economic growth and decreased poverty by establishing the telecommunication infrastructure (Sridhar & Sridhar, 2007). However, governmental regulation for the FDI in 2007 can thwart the economic development of Indonesia, since telecommunications sector has grown mainly by FDI inflows in previous years (Magiera, 2011). Since, in Asian countries governmental control is still high in investment governance, FDI inflows can not increase dramatically like in Latin American countries (Doh & Teegen, 2003). These studies are significant evidences for the relationship between strategic investments in an industry and macroeconomic events. Also, among APEC countries, Indonesia does not have high rates for market access and National Treatment Index. This situation affects the relationship between telecommunication infrastructure and total output negatively. Results have shown that Indonesia needs more market liberalization in telecommunications industry to reach higher FDI inflows (Lim & Chen, 2012). On the contrary to these examples, the study about the relationship between growth and telecommunication investment in ASEAN5 countries has shown no co-integration for Indonesia, Thailand and Philippines cases (Ahmed & Krishnasamy, 2012).

In Indonesian telecommunication sector Telkom has benefited from first mover advantage and being incumbent with having high market share and operational financial outcome. Telkom has the highest governmental shares in the market and the main telecommunication infrastructure, which brings an advantage on the mobile market (BMI, 2015; Jakopin & Klein, 2012). However, the role of FDI on economic growth of a country can not be ignored. Developing countries like Indonesia can grow by FDI and investing on ICT in the following years. Encouraging FDI in telecommunications industry may help Indonesia to bring new technology to their country and to get benefit for economic growth (Lin, 2008). Even so, business environment in Indonesia has been accepted as the key milestone for investing in the country. Instable macroeconomic situations, uncertain regulations, high taxes and law enforcement's deficiencies are the main causes for undesirable business environment of Indonesia. These situations also affect the entrepreneurs of the country to make strategic investments in local businesses (Moccerro, 2008). Another obstacle for investing in telecommunication industry of Indonesia is licensing regime of the government. A more technologically neutral licensing regime can promote investors in telecommunications industry and prevent incompatibilities of investment procedures for future entrepreneurs (Latipulhayat, 2014).

1.3. Nigeria

Nigeria is known to attract the highest number of FDI in Africa and ranks second in terms of gathering highest number of FDI projects in Sub-Saharan region. Since 2007, 50% of FDI observed in Nigeria has been realized in the energy sector, and 50% has been occurred in the services sector. At this point, FDI in Nigerian telecommunication sector should be emphasized, since it has recently attracted 23.9% of total FDI in the country. Besides, the value of infrastructure projects in Nigeria is approximately US \$100 billion and the country has a population of 171.3 million. Nigeria's current GDP is US \$ 262.61 billion and mobile penetration is 58.58%. Average GDP growth is 6.62% and income per capita is US \$ 2,652 (Ernst&Young, 2014).

However, there has been a debate on the relationship between (FDI) and performance of telecommunication sector in Nigeria. Some scholars claim there is a negative relationship between the two or the link is unclear (Akinlo, 2004; Amonkhenan, 1987) while some other scholars claim contrarily (Athukorala, 2003; Ogbaji, 2013). According to a recent study, FDI has a positive influence on the growth and productivity of Nigerian telecommunications sector (Opaluwa David, 2013; Ayashagba, 2002).

This result is parallel to former studies, which determined that FDI is effective to foster economic growth, technological improvement, efficiency and productivity (Ewe-Ghee, 2001; Ayanwale, 2007; Caves, 1996; Borensztein, 1998; Carkovic, 2002; De Gregorio, 2003; Sjöholm, 1999; Todaro, 1994; Onu, 2012; Nwankwo, Ademola, & Kehinde, 2013; Feldestein, 2002; Ekpo, 1997). Furthermore, FDI triggers economic improvement by the help of increasing exports (Otepola, 2002). FDI is also argued to generate higher economic returns in terms of human capital and employment, especially on non-energy sectors, such as telecommunications (Moses, 2011; Balasubramanyan, Mohammed, Salisu, & Sapsford, 1996). In this aspect, studies also point to a relationship between FDI and human capital, which is a component of intellectual capital (Lucas, 1988).

However, another study stressed, there is a weak correlation between FDI and economic growth in Nigeria (Ayadi, 2009). Similarly, it is also stated that FDI has a negative impact on Nigerian economic development (Oyinlola, 1995). Supporting this study, it was also defended that, human capital in terms of intellectual capital, economic stability and liberalized markets are a must to take advantage from long-term FDI inflows, and otherwise FDI is not fruitful and really meaningful (Bengoa & Sanchez-Robles, 2003). Parallel to this research, another study underlined the fact that, although FDI practices in Nigeria improved, many weak areas still exist. The mentioned weak areas in Nigeria were reported as corporate atmosphere, corporate law, bankruptcy and labor law (Jerome & Ogunkola, 2004).

Additionally, one research presented that, FDI in Nigeria was supposed to increase income per capita and decrease unemployment, but these problems are still not solved despite climbing rates of FDI inflows (Fasaya, 2012). According to another research, the main idea behind FDI should be eliminating differences between poor and rich countries. But FDI did not help for economic growth and development of Nigerian economy, since foreign investing firms transferred profits to their countries and contract fees in addition to interest payments, prevented to reach this goal (Danja, 2012). Likewise, a study examining the impact of FDI on Nigerian economy presented that, FDI is negatively correlated with gross domestic investment (Adelegan, 2000). Moreover, there also exist studies which emphasize, the long term impact of FDI is positive for less advanced economies, but negative for more advanced economics such as Japan (Bende-Nabende & Ford, 1998). On the contrary, one other study did assert that, the impact of FDI on economic growth with productivity and efficiency is limited, especially for developing countries (Aitken, Hansen, & Harrison, 1997).

Still, the telecommunication sector in Nigeria is known to attract the foreign investors seriously (Central Bank of Nigeria, 2004). The reason is that, Nigerian telecommunication sector is one of the fastest growing sectors in the world and the member subscription rates are climbing. Moreover, there is a fierce competition among operator firms in Nigeria such as MTN, Airtel, Glo and Etisalat (Imoudu, 2012; United Nations, 2009). Nigeria has also taken important steps in the recent years to attract FDI, such as putting Nigerian Investment Promotion Commission (NIPC) to work. Also, privatizations and commercialisations are encouraged (Lall, 2002), which increase FDI in non-energy sectors like telecommunications. Definitely, the deregulation of telecommunications sector via issuing licences for GSM operators should also be noted (Moses, 2011). In addition, the Nigerian government is appreciated to introduce Structural Adjustment Program (SAP) for attracting FDI to the country (Ayanwale, 2007).

1.4. Turkey

Studies about the relationship between information technology and economic growth in Turkey are limited. Telecommunication investments are crucially important for information technology, which is also an essential indicator for the knowledge economy. Some researchers are attracted with this topic.

Yaprakli and Saglam (2010) perform an analysis of causality between economic growth and information technology and reach bidirectional causality results.

Pazarlioglu and Gurler, (2007) find that information technology has a positive impact on economic growth in Turkey. The relationship between economic growth and telecommunications infrastructure investments has been investigated. The impact of telecommunications infrastructure investment to economic growth for 30 European Union core members and candidate countries in the long term was analyzed by using the dynamic fixed effects method. According to the results, telecommunications infrastructure investment has significant and positive impact on real GDP per capita. Effects of infrastructure investments on the progression of economic growth has been examined for each country such Denmark, Estonia, Holland, Ireland, Sweden, Latvia, Lithuania, Malta, Poland, Slovakia, Bulgaria and Croatia, which have an efficient dummy variable. Only Ireland and Poland among the countries have an economical growth which is greater than Turkey.

Bozkurt and Dursun, (2006), Ak and Gulmez (2006), Karagol and Kirankabes (2006) fail to find a statistically significant relationship between economic growth and information technology in terms of their studies.

Yamak and Kocak (2007) consider potential effects of information technology investment expenditures on the economic growth for the period of 1993-2005 covering 50 countries. The data set is handled in four different groups of countries; in the first group all 50 countries, in the second group 23 developing countries, in third group 27 developed countries and on the final group the G-8 countries. Grouped data set is analyzed by 3 different methods, which are random effects, standard least squares and fixed effects methods. According to research results, the effect of investments in information technology to economic growth is positive only in industrialized countries. However in the group of developing countries, including Turkey; due to social, cultural and institutional inadequacies, the relationship between the two variables is not positive or significant.

Kurt (2007) analyzes Turk Telekom investments for a 30-year period between 1970 and 1999 and runs econometric analysis in order to reveal the relationship between investment and growth of national economy. Research is conducted using annual time series data, which is covering 1970-1999 period. As a result of research, telecommunications investments indicates a relation between GDP per capita and economic growth, have been recognized as positive and significant.

Zeren and Yurtkur (2012) in their research indicate that along with rapid developments in telecommunications technology, importance of telecommunication sector on economic development has exponentially increasing. Investment in telecommunications infrastructure has specified positive and significant impact on economic development. Telecommunications investments facilitate the transfer of production technology and reduce transaction costs, which lead production increase. In this manner, it is also contributing to economic growth positively.

2. Methodology and Results

In this research, we try to uncover the correlation between GDP and Telecom investments in the countries. The data for the study have been collected from the World Bank, which is mostly supplied from the governmental agencies in the countries.

In order to objectively monitor the correlation between two macro economic facts, the GDP and the telecom investments, we propose the correlation coefficients in three alternative ways (Hauke & Kossowski, 2011):

- Kendall's Tau
- Spearman's Rho
- Pearson Product-Moment Correlation Coefficient

Besides the classical correlation coefficients we also present a novel approach by averaging the three correlation values and compare the correlation rate of countries by the average. The data gathered from World-Bank can be represented as in Figure 1 and 2.

Please note that the data gathered are between 1994 and 2013 and World-Bank do not hold the telecom investments for first three years for Nigeria only.

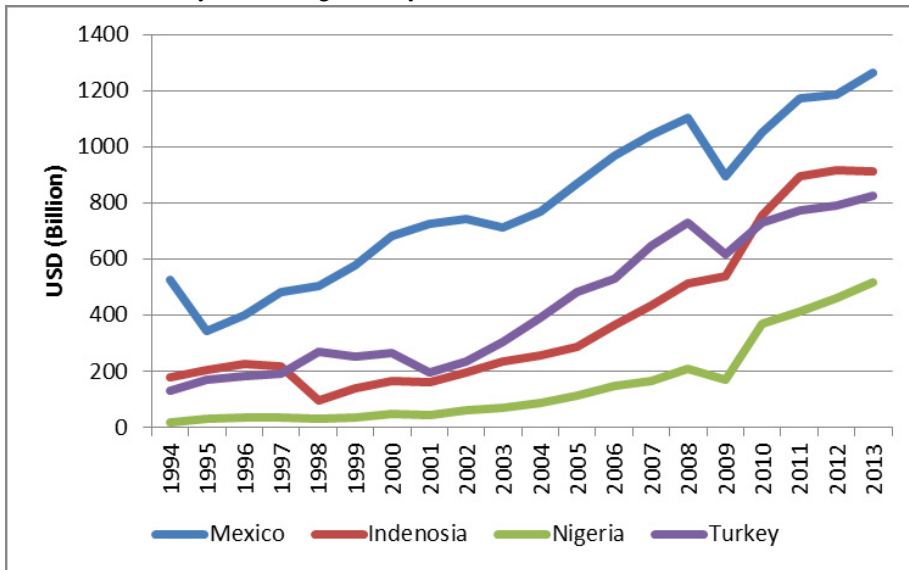


Figure 1 GDP values of MINT countries between 1994 - 2014

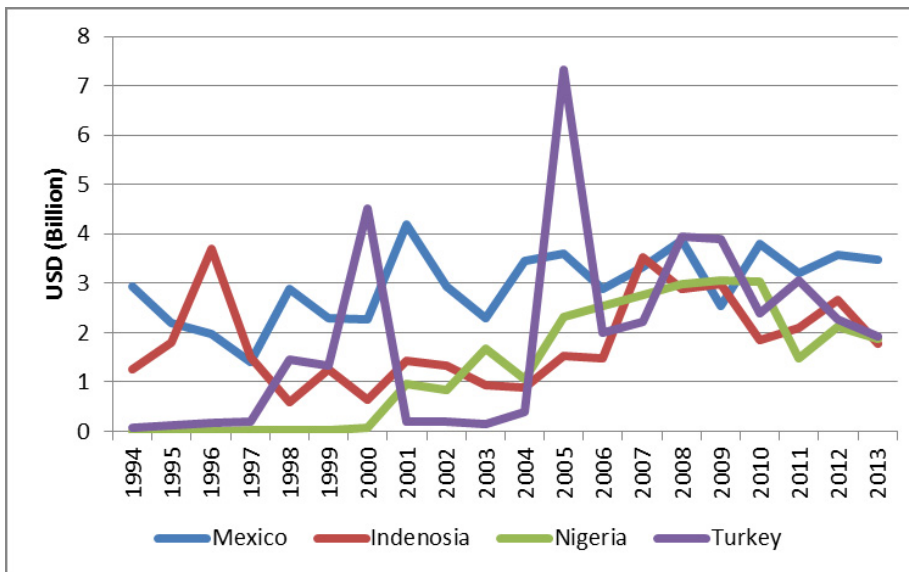


Figure 2 Telecom investments between 1994 and 2014 for MINT countries

Table 1, indicates a high correlation between the telecom industry and the GDP of each country. The values are given in order to present a comparable table with the literature. Most of the correlation values above 0.5 are accepted as an estimation possibility from one data set to another. The last row of Table 1 indicates the average estimate values for each country. The average values are gathered as majority voting approach to ensemble the techniques in order to achieve a final value for comparison. From the comparison values in Table 1, it is possible to

conclude the highest correlation is between Indonesian telecom investments and GDP and the lowest correlation is between Turkish telecom investments and GDP.

Table 1 Correlation Coefficients for 3 methods and four countries

Correlation Method	Details	Mexico	Indonesia	Nigeria	Turkey
Spearman's Rank	p. value	0.0007322115	0.001660346	3.527838e-06	0.0006305901
Correlation rho	estimate	0.7052632	0.6691729	0.8403624	0.7112782
Pearson's Product	p. value	0.001191391	0.05473895	0.005800608	0.01983275
Moment Correlation	estimate	0.6713438	0.4358398	0.5935352	0.5160995
Kendall's Rank	p. value	0.001099522	0.003782665	2.747884e-05	0.0004805755
Correlation Tau	estimate	0.5157895	0.4631579	0.6843718	0.5473684.
Average Correlations		0.630798833	0.44949885	0.7060898	0.591582033

3. Conclusion

This paper underlines the correlation between the GDP and telecom investments for the MINT countries for years between 1993 and 2014. The values are gathered from World Bank and the correlation model is built on an ensemble of three well known correlation technique, which are Kendall's Tau, Spearman's rank correlation rho and Pearson' product moment correlation. The paper also conducts a literature review for telecom investments in MINT countries and we believe the paper will have an important role for further studies in the field.

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