

## Time to Chirp; an Advice to Pakistan, China and India

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**Abstract:** The scientific research is the key for industrialization. The objectives of this paper are to investigate the relationship between stock market growth and economic development and the moderating effect of scientific research on this relationship. The panel study is done by taking three countries Pakistan, China and India and the sample data is taken for each country from 1992-2012. The STATA 11 is used for statistical analysis and Hausman Test signifies the significant of random-effects regression model. The results show that the relationship between stock market and economic growth is significant and the moderating effect of scientific research is also significant. The Breusch and Pagan Lagrangian Multiplier test for random-effects model also show significance of the random-effects model. The study is very beneficial for these countries to focus on scientific research in future.

**Keywords:** Scientific Research, Stock Market Growth, Economic Development, Hausman Test, Random-Effects Model, Lagrangian Multiplier Test

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## 1. Introduction

The objective of every country is to improve the economic growth; obviously the signs of increase in investments and installing more and more industries would impetus improvements in growth of the countries. Countries strive for political stability so that the stakeholders particularly investors feel comfortable for developing businesses. When the businesses move towards boom trend then ultimately the economic indicators get improved. Now industrialization has become the key for upgrading the living standards of any economy. Because technology has out flunk the traditional ways of doing business. The researches have played very important role in the field of industrialization. The developed countries have spent majority of their resources in researches therefore they are enjoying top ranking in the field of development in all over the world. In this study we have tried to find out the impact of scientific researches on stock market that is why we have selected Scientific and Technical Journal Articles as a proxy for measuring the true intensity of occurrence of scientific researches in any country. The scientific researchers will lead the cause of innovations

required for industrialization in a country.

We all know that Stock market is the place where buyers and sellers come together and trade, the interest of buyers and sellers reflects the growth of companies, in fact the volume of trading is the live breath for the companies. The stock market is the platform that collects and presents the worth of the company and tries to become the true representative of the companies' assets.

The relationship between stock market growth and economic development is the room in literature which has very little space for exploration, researchers have done lot of valuable researches but still every new research creates an enigma for the available scholarships and for the upcoming researchers. It is an ocean wise to discuss this topic which will reveal new significant additions to the literature.

Pakistan, China and India; these are the three countries which should chirp now. These countries are big economic powers. That is why these countries have become an attractive gap for research. The researchers should not ignore this part of world. This paper argues that Market

Capitalization of stock market in this region is very important for the economic growth and on the other hand the scientific research plays an important moderating role in this relationship.

## 2. Objective of Study

The Objectives of this study are;

1. To study the Impact of Market Capitalization of stock market and Economic growth.
2. To study the moderating affects of scientific and Technical Journal Articles while studying the impact of Market Capitalization of stock market and Economic growth.

## 3. Literature Review

### 3.1. Review of Time Series Studies

Kolapo (2012) has attempted to examine the impact of the Nigerian capital market on its economic growth from the period of 1990-2010. He considered Gross Domestic Product (GDP) as dependent variable and Market Capitalization and Total New Issues as the independent variables. He applied Johansen co-integration and Granger causality tests and have come up with results showing that the Nigerian capital market and economic growth are co-integrated. It is a good attempt of developing an opinion upon a time series data for 20 years with considering very strong proxies of stock market Stock. Similarly Paramati (2013) contribution of the study is in identifying the role of economic growth in stock market development is another addition to time series research literature similarly Mahmood (2013) attempts in Pakistan, his research paper demonstrates the association between economic growth and financial development in Pakistan for time period 1979 up to 2008. According to his findings, economic growth is positively related to real deposit rate in long run perspective but its impact is insignificant.

Another time series study of Bayar (2014) supports (Kolapo, 2012) by examining the relationship between stock market development and economic growth in Turkey during the period 1999-2013, Results indicate that there is a long run relationship between economic growth and stock market capitalization, total value of stocks traded, turnover ratio of stocks traded and also there is unidirectional causality from stock market capitalization, total value of stocks traded and turnover ratio of stocks traded to economic growth.

Financial crises have put lot of pressure on researchers and therefore opened a new world of experiments and researches. That is why Pan (2016) have come up that Global Financial Crises had a significant impact on both China's real sector and financial sector and they do not find any evidence of a relationship between stock market and real economy in the short run. In the same year Brown (2016) fill a little room of research gap in Nigeria which was not studied by (Kolapo, 2012) he introduced a new time series study by employing

more proxies of stock market and economic growth like; total value traded in the stock market, market capitalization, trade openness, inflation rate and economic growth in Nigeria.

### 3.2. Panel Studies Review

Now the panel study has been appreciated by many researchers for studying the relationship between stock market growth and economic development. Enisan (2009) have examined the long run and causal relationship between stock market development and economic growth for seven countries in sub-Saharan Africa. Using the autoregressive distributed lag (ARDL) bounds test, the study finds that the stock market development is co-integrated with economic growth in Egypt and South Africa. Similarly we find a very appreciable attempt on ASEAN countries based on panel study by Pradhan (2014), he has studied the relationship between banking sector development, stock market development, economic growth, and four other macroeconomic variables in ASEAN countries for the period 1961–2012. He recommended to nurture stock market development, which will facilitate the increased raising of capital for investment purposes to enhance economic growth.

Similarly Ayadi (2015) has examined the relationship between financial development and economic growth across the Mediterranean in 1985–2009. He has come up with a verdict that Stock market size and liquidity play a role in growth.

A valuable support is given by Naik (2015) who empirically has found that stock market development significantly contributes to economic growth. He studied a panel of 27 emerging economies using annual data over the period from 1995 to 2012. Samargandi (2015) has revisited the relationship in a panel of 52 middle-income countries over the 1980–2008 by showing that there is an inverted U-shaped relationship between finance and growth in the long run.

In South Asia region this study has not been left ignored that is why Ullah (2016) explored four South Asian economies, India, Bangladesh, Pakistan and Sri Lanka for the period 1990 to 2011. They claimed that their results suggest that stock market development leads to economic growth in the long run as well as in the short run.

Appreciable attempt on lower-middle income countries has got recognizable addition to literature Bilal (2016) has highlighted the importance of panel study by saying that Panel data models play an important role in consequence of stock market development on economic growth in lower-middle income regions. He studied the panel data of 20 lower-middle income countries gathered from the period of 1990 to 2012. He applied panel data techniques by fixed effects and random effects by applying Hausmann test. His findings suggest that there is positive and significant impact of stock market development on economic growth.

### 3.3. Meta Analysis Review

A very strong Meta analysis has opened a gap for doing

research for the upcoming researcher like Valickova (2015) analyzed 1334 estimates from 67 studies that examine the effect of financial development on economic growth. Taken together, the studies imply a positive and statistically significant effect, but the individual estimates vary widely. This is the research gap which still has influenced the upcoming researchers to keep their interest in this field.

### 4. Theoretical Framework and Research Methodology

There are many researchers who study the impact of stock market on economic growth and we are developing the theoretical framework based on the study of Kolapo (2012), Bayar (2014) and Brown (2016). We are also introducing a moderating variable which is Scientific and Technical Journal Articles in figure 1. We believe that whatever the research and developments are going on, it will affect the relationship between stock market and economic growth.

Figure 1

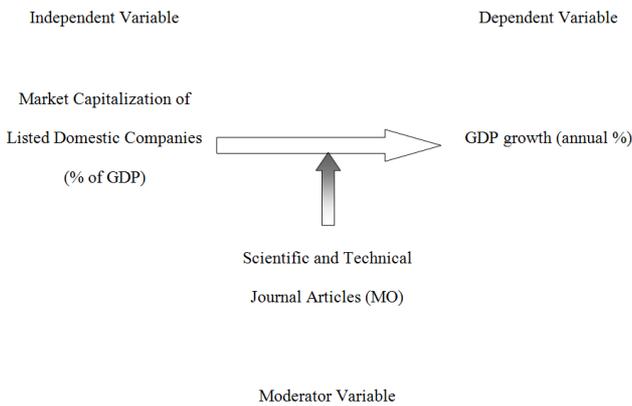


Figure 1. "Theoretical Framework of our study".

We have taken sample from 1992 to 2012 and we believe that this sample is sufficient to prove the scenario of the whole population. This 21 years data is taken as annual based data. We have considered three developing nations Pakistan, India and China. So the panel study {as studied by Ayadi (2015), Enisan (2009) and Naik (2015)} appeared to be strongly balanced in STATA 11 (statistical software). We studied (21 \* 3) 63 observations for the analysis. A panel data is a longitudinal or cross-sectional data in which economic entities are observed across time (Sayrs, 1989). We have applied fixed effects and random effects model in our study and by applying Hausman test we have come to know that random effects model is more appropriate for our study.

$$gdp_{it} = mcr_{it}\beta_1 + mo\{mcr * stja\}_{it}\beta_2 + \alpha + \epsilon_{it}$$

Where;

$gdp_{it}$  (Gross Domestic Product) is taken as dependent variable based on annual growth in % from world bank data bank for "i" countries at time "t".

$mcr_{it}$  (Stock Market Capitalization) is taken as independent variable based on % of gdp from world bank data bank for "i" countries at time "t".

$mo\{mcr * stja\}_{it}$  (Moderating Variable) is taken by multiplying  $mcr$  with  $stja$  (Scientific and Technical Journal Articles) taken from world bank data bank "i" countries at time "t".

$\beta_1$  and  $\beta_2$  are the parameters,  $\alpha$  is the constant term and  $\epsilon_{it}$  is the error term.

### 5. Findings and Analysis

Table 1 show descriptive including mean (the measure of central tendency (Von Hippel, 2005)) and the standard deviation (of the observations) the most stable measure of variability. It takes into account each and every score in a distribution (Fraenkel, 1993). The small value of standard deviation shows that the variability of observations from the mean is much closed; the descriptive of our study shows a very close deviation from mean. Table 2 and 3 show the results of our study in which we have come to the conclusion that by introducing moderating variable we study a positive significant result between  $mcr$  and  $gdp$ . We are accepting the random effects of our panel regressions by applying Hausman test. To determine between fixed effect and random effect the Hausman test is used. Hausman Test compares fixed effect with random effect in STATA. Running a Hausman specification test at five (5) percent level enables the researcher to choose between fixed and random models (AFRIYIE, 2013). The Hausman Test evaluates the Null hypothesis that the coefficient estimated by the random effect estimator is the same as the ones estimated by the constant fixed effect estimator. If the Hausman test is insignificant (Prob > Chi2 greater than.05), then the fixed effects model will be used (Torres-Reyna, 2007).

Table 1. "Descriptive of gdp mcr mo".

| gdp: gross domestic product   |     |         |           |       |        |
|---|-----|---------|-----------|-------|--------|
| mcr: market capitalization ratio  |     |         |           |       |        |
| mo: moderating variable (Scientific and Technical Journal Articles*market capitalization ratio) |     |         |           |       |        |
| Variables   | obs | Mean    | std. Dev. | Min   | Max    |
| gdp   | 63  | 7.018   | 3.33      | 1.014 | 14.27  |
| mcr   | 63  | 33.867  | 23.58     | 2.4   | 109.89 |
| mo  | 63  | 148.488 | 122.71    | 9.22  | 503.69 |

Source: results generated from STATA 11

Table 2. "Hausman test for selection of random effects model".

| Hausman test for selection of random effects model    |         |         |            |                     |
|---|---------|---------|------------|---------------------|
| Coefficients  |         |         |            |                     |
|   | (b)     | (B)     | (b-B)      | sqrt(diag(v_b_v_B)) |
|   | f       | R       | Difference | S. E                |
| mcr   | 0.1599  | -0.3248 | 0.484      | 0.022               |
| mo  | -0.0278 | 0.0701  | -0.098     | 0.0054              |
| b = consistent under H0 and Ha; obtained from xtreg   |         |         |            |                     |
| b = inconsistent under Ha and H0; obtained from xtreg |         |         |            |                     |
| Test: H0: difference in coefficients not systematic   |         |         |            |                     |
| Chi2(2) = (b-B)*[(v_b_v_B)^(-1)](b-B) = 311.74        |         |         |            |                     |
| Prob>chi2 = 0.0000                                    |         |         |            |                     |
| (v_b_v_B is not positive definite)                    |         |         |            |                     |

Source: results generated from STATA 11

**Table 3.** “Random Effects Model GLS regression”.

| xtreg gdp mcr mo, re                     |                  |   |                         |                      |                      |       |
|--|------------------|---|-------------------------|----------------------|----------------------|-------|
| Random Effects Model GLS regression      |                  |   |                         | Number of obs = 63   |                      |       |
| Group variable: d                        |                  |   |                         | Number of groups = 3 |                      |       |
| R-sq:                                    | Within = 0.0076  |   | obs per group: min = 21 |                      |                      |       |
|  | Between = 0.9960 |   | obs per group: avg = 21 |                      |                      |       |
|  | Overall = 0.2896 |   | obs per group: max = 21 |                      |                      |       |
| Random effects u <sub>i</sub> = Gaussian |                  |   |                         | Wald chi2(2) = 24.46 |                      |       |
| Corr (u <sub>i</sub> , X) = 0 (assumed)  |                  |   |                         | Prob > chi2 = 0.0000 |                      |       |
| gdp                                      | Coef.            | Std. Err.                                     | z                       | P> z                 | [95% Conf. Interval] |       |
| mcr                                      | -0.32            | 0.082   | -3.94                   | 0.0000               | -0.486               | -0.16 |
| mo                                       | 0.0701           | 0.015   | 4.43                    | 0.0000               | 0.039                | 0.101 |
| _cons                                    | 7.601            | 0.744   | 10.21                   | 0.0000               | 6.14                 | 9.06  |
| sigma_u                                  | 0                |   |                         |                      |                      |       |
| sigma_e                                  | 2.015            |   |                         |                      |                      |       |
| rho                                      | 0                | (fraction of variance due to u <sub>i</sub> ) |                         |                      |                      |       |

Source: results generated from STATA 11

The equation will be

$$gdp_{it} = -0.324864mcr_{it} + 0.0701674mo_{it} + 7.601764 + \epsilon_{it}$$

“mcr” is showing significant impact on “gdp” but its impact is negative, but when we introduce “stja” then the results become positive and significant which is (0.0701674). The constant term has also shown significance in our model. Table 3 shows that If Prob > Chi2 is < 0.05 then our model is ok. This is a test (F) to see whether all the coefficients in the model are different than zero (Torres-Reyna 2007). In table 4 we can clearly observe that here we succeed to accept the null hypothesis and conclude that random effects is appropriate (Torres-Reyna 2007).

**Table 4.** Breusch and Pagan Lagrangian multiplier test for random effects”.

| Breusch and Pagan Lagrangian multiplier test for random effects |                    |      |
|---|--------------------|------|
| gdp[d,t] = Xb + u[d] + e[d,t]                                   |                    |      |
| Estimated results:  |                    |      |
|   | Var sd = sqrt(Var) |      |
| gdp   | 11.15              | 3.33 |
| e   | 4.06               | 2.01 |
| u   | 0                  | 0    |
| Test: Var(u) = 0  |                    |      |
| chi2(1) = 23.09   |                    |      |
| Prob > chi2 = 0.0000  |                    |      |

Source: results generated from STATA 11

## 6. Conclusion

It’s time to chirp now, it can be concluded that this part of region has to pay lot of attention towards research and development, these countries should be focusing on scientific research because this can cause in increase in stock market development and economic growth as well. The policy makers must pay attention towards universities and encourage the researchers and professors to do more research. The government should locate a healthy budget for the research and development so that these countries may come to enjoy a healthy benefit of that.

## Limitations

A lot more needs to be done in this research, the upcoming researchers are encouraged to work on it because these countries have become the most important region in all over the world. The sample size may be the biggest restriction in our study. The upcoming researchers are encouraged to study these countries by applying more sample space. We also do not apply a unit root test which is a considerable limitation of this study.

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