

## A Study among Bank Stability, Bank Competition, and Economic Growth: A Causality Approach

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<b>Article History:</b>	<b>ABSTRACT</b>
<b>Received:</b> 13 <sup>th</sup> Feb, 2024	<b>Purpose:</b> This paper delves into the intricate causal connections between banking competition, banking stability, and economic growth.
<b>Revised:</b> 12 <sup>th</sup> June, 2024	<b>Methodology:</b> Utilizing unbalanced panel data spanning from 2000 to 2018, we meticulously analyze the causal relationships among these variables. Our primary objective is to determine the direction of causality within the selected variables.
<b>Accepted:</b> 27 <sup>th</sup> June, 2024	<b>Findings:</b> Our study's findings offer support for various hypotheses including demand-following, supply-leading, feedback, and neutrality, contingent upon different measures of banking competition (BC), banking stability (BS), and economic growth (EG). Theoretical underpinning: Building upon the theoretical model proposed by Jayakumar, which explores the causal relationships between BC, BS, and EG using diverse indicators, we empirically validate these indicators in our study. This study contributes to the existing literature by delineating defined relationships observed in both developing and developed countries.
	<b>Implications:</b> Our research encompasses a range of policy implications. Investors can utilize our findings to analyze the optimal management of their finances, while government agencies can leverage this study to formulate effective policies that foster EG by understanding the interplay between financial dynamics and economic prosperity.
	<b>Keywords:</b> Bank Competition, Bank Stability, Economic Growth, VAR Model.

### 1. Introduction

Economic growth plays a crucial role in advancing financial institutions and shaping business strategies. It can also bolster banking stability and competitiveness. The operations of the financial

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system can significantly impact EG, thus stimulating the economy. Various studies have explored the correlation between financial development and economic progress. EG plays an efficient role in the progress of the financial institution and the development of business strategies. Moreover, economic growth could enhance banking stability and help to compete in the banking sector. The academic writer observed in the literature review that developing countries are paying more attention to the financial sector to boost up their economies. Financial system operations can have a symbolic effect on economic growth as well as boosting the economy. Claessens and Laeven (2005) examined that during the competition, banks are providing a high-quality financial product.

The financial sector is influenced by competition in different ways. First of all, it affects the better working of financial. Secondly, it is helpful to boost up economic and industrial growth (Allen & Gale, 2004). Thirdly, it also has an impact on the financial system (Boyd et al., 2004). In many financial markets, competition is said to be a positive characteristic because it decreases the prices and enhances the quality of products and innovation. However, in many banking industries, competition is considered as the reason for banking instability.

EG plays a crucial role in advancing financial institutions and shaping business strategies. It can also bolster banking stability and competitiveness. The operations of the financial system can significantly impact EG, thus stimulating the economy. Various studies have explored the correlation between financial development and economic progress. Bank Competition in the financial markets is generally seen as beneficial as it lowers prices and encourages product innovation. However, in the banking sector, intense BC can lead to instability. This instability affects financial services and can impact banking BC and stability.

This study delves into the complex interplay between BC, and EG across developed and developing economies. There's been considerable debate regarding how these factors relate to each other. Most studies propose that financial development stimulates economic growth, and BC enhances stability, thereby fostering EG. Theoretical perspectives on BC, stability, and fragility in financial development and EG highlight differing viewpoints. Some argue that low BC reduces stability, while others suggest that it enhances it. BC is generally associated with greater stability, although low BC can result in higher interest rates and risk-taking behavior.

Policy makers and regulatory authorities are actively engaged in the debate on whether high BC is beneficial or detrimental to stability. This study examines the relationship among banking stability, BC, and EG across several countries using various indicators. The study employs Granger causality analysis to understand the causal relationships among banking BC, stability, and EG. The results suggest a strong interrelationship among these factors, supporting various hypotheses.

The subsequent sections of the study include a literature review, methodology, model testing, and analysis of findings, providing a comprehensive understanding of the relationship between banking BC, stability, and EG.

## **2. Literature Review**

This section provides detailed literature on the matter which is under study. The chapter is composed of two components; empirical and theoretical literature review. The theoretical form of literature explains the theories and concepts which are related to the existing relationship of BS, BC, and EG. On the other hand, an empirical literature review analyzes the previous research that is implemented by others on the relationships of BS, BC, and EG.

### **2.1 Banking Competition and Economic Growth**

Advancement of skills and technology in different sectors of the economy is EG (Krugman, 1998). The banking sector is an important part of the financial industry. Banking BC is the effort of banks' consumer banking services and the creation of those hurdles through which competitive advantage can be taken. For the advancement of EG, banking BC is believed to be an important determining factor as much research is done on it (Laowattanabhongse & Sukcharoensin, 2017).

The empirical literature mostly analyses the relationship of banking BC and EG. Banya and Biekpe (2017) evaluated the nexus between BC and EG by using the Boone indicators. They found that BC significantly affects EG. The interrelationship analyzed among the banking industry, insurance sector, and EG. In long run is revealed that banking industry and insurance sector significantly influence EG. But in the short-term, the inter-linkage among the variables differs among country to country (Pradhan et al., 2017). (Hamada et al., 2018) examined the relationship between imperfect BC and EG revealed that the high deposit interest rate increases EG. Moreover, an increase in BC increases EG Pradhan et al., (2014) discussed the link among banking sector development, stock market development, and EG revealed both unidirectional and bidirectional relationships among these variables. The study conducted by Fernández, González, and Suárez, (2013) showed that the impact of banking BC on EG during the financial instability is more.

**$H_{1A}^0$**  *Banking Competition does not cause Economic Growth.*

**$H_{1B}^0$**  *Economic Growth does not cause Banking Competition.*

## 2.2 The Stability in Banking and Economic Growth

The relationship of EG and BS has received consideration from several researchers (Ashraf, Arshad, & Yan, 2017; Ashraf, 2018; Bourgain, Pieretti, & Zanaj, 2012; Cubillas & González, 2014; Luo, Tanna, & De Vita, 2016). The link between BC and stability in banking sector has remained a debatable issue since the last decade. Louhichi, Louati, and Boujelbene, (2019) examined the stability BC trade-off in Islamic and conventional banking. They revealed that increased BC decreases the stability in conventional banking, but increased in the BC also increases the stability in Islamic banking. However, BC-fragility view was supported in conventional banking and BC-stability view supported in Islamic banking. Moudud-UI-Huq (2020) categorized the result into three perspective, First, when BC is high in the market, then large size banks work effectively than small banks, second, there existed no linear association between BC, performance, and risk, third, In a crisis, with less BC, small banks are more steady, but in a competitive market, banks are less stable.

BS minimizes the volatility, and this effect is high in a less competitive economy (Fernández, González, & Suárez, 2016). Beck and Levine (2002); empirically tested the relationship between financial development and EG. They suggested that better financial markets are essential for understanding the EG. Financial services and innovation are important parameters for EG. Both financial innovation and financial access positively impact the GDP and gross savings (Azimova & Mollaahmetoglu, 2017).

$H_{2A}^0$  *Bank stability does not cause Economic Growth.*

$H_{2B}^0$  *Economic Growth does not cause Banking Competition.*

## 2.3 Banking Competition and Banking Stability

The nexus between financial development and EG studied and found that financial development leads towards high EG (Swamy & Dharani, 2019). (Creel et al., 2015) assessed the financial stability and economic performance. In this regard, found that financial distress negatively impacts economic performance. Trade openness in lending activities provides multiple opportunities, which in turn leads to less banking risk. These results also aligned with (Alsamara, Mrabet, Jarallah, & Aluko & Ajayi, 2018). Abedifar, Molyneux, and Tarazi, (2018) find positive relationship between no adverse effects of non-interest income on bank instability. This effect is found in larger banks. (Abuzayed, Al-Fayoumi, and Molyneux, 2018; AlKhoury and Arouri, (2019) analyzed the relationship of diversification and stability of Islamic and conventional banks, focusing only on GCC countries. These studies found that diversification negatively influence the stability of both banking systems. More developed financial system increases the chances of private credits for firms with low interest rate and, hence, improves the firm investment and EG. These results showed that the industrial sectors which are more dependent on private credit grow in economies with developed financial system (Claessens & Laeven, 2003; Levine, 2005; Peia & Roszbach, 2015; Porta et al., 1998; Rajan & Zingales, 1998).

$H_{3A}^0$  *Banking Competition does not cause Banking Stability.*

$H_{3B}^0$  *Banking Stability does not cause Banking Competition.*

## 2.4 Competition-Fragility Hypothesis

In the empirical literature two types of hypothesis are discussed, i.e. competition-fragility as well as competition-stability hypothesis. Competition-fragility hypothesis refers that high competition between banks brings high fragility (Beck, 2008; Keeley, 1990). It is need of era to increase the fragility, more profit lend to high risk in competitive environment (Beck, 2008). In addition, BS can be affected in a more competitive environment which can reduce bank incentives, when the banks have no information on their borrower's information. On the other hand, by taking excessive risk banks can avail high profitable opportunities while BC is low (Albaity, Mallek, & Noman, 2019; Leroy & Lucotte, 2017). Besanko and Thakor, (2004); Furlong and Keeley, (1989); Keeley, (1990); Marquez,( 2002) support the competition fragility hypothesis.

As stated by the BC-stability hypothesis, banks with a competitive environment are more likely to remain stable during times of low competition. Instead of choosing risk on bank assets, borrowers can choose their investments based on their riskiness (Boyd & De Nicolo, 2005). Furthermore, the theory indicates a positive relationship between bank concentration and bank fragility. Furthermore, it indicates that policymakers are more focused on bank failures. It was found that Kabir and Worthington (2017) examined Islamic and conventional banking with respect to competition stability and competition fragility. In addition, the degree of competition impact on stability was higher in conventional banks than in Islamic banks. Their findings support the competition stability theory for Islamic and commercial banks. (Islam et al., 2020) Another study provides evidence supporting the competition-stability view and states that loans in highly competitive markets should not suffer sudden losses. (Rousseau & Wachtel, 2011) examined the relationship between FD and EG in the empirical literature on development.

In literature review, it is observed that financial development and EG is divided into four forms, first one is about supply leading hypothesis, this hypothesis is about unidirectional relationship of defined relationship and this is aligned with (Hsueh, Hu, & Tu, 2013). SLH is telling about financial development that it can play an important role to boost up EG with the help of financial assets and further with the help of capital formation. Malik and Raisham, (2018) revealed the unidirectional impact states that financial development can be impact on country EG. After this first perspective, the next perspective is about demand following hypothesis (DFH), which states that with the help of financial sector position, there is a chance to improve the EG with financial development. So, it is observed that, finaicanla development is performing key role to determine EG. So, there is a unidirectional relationship from EG to FD (Pradhan et al., 2017). After the dscussion of first two perspective, the next perspective is about Feed-back hypothesis (FBH), which is overall picture about FD and EG. This perspective is about bidirectional relationship between FD

and EG (Karlsson & Mansson, 2015; Pradhan et al., 2014). Fourth, is the Neutrality hypothesis (NH), which states that there is no causality between EG and FD? Accordingly, the variables are independent of each other (Pradhan et al., 2013; Sime, 2016). The current study tried to fill the gap by examining the short-run causality among banking competition, BS, and EG.

### 3. Methodology

#### 3.1 Population and Sampling

We used unbalanced panel for eight developed and developing countries including first one is Pakistan, second one is India, third one is Bangladesh, and for the and last one is Australia, Sri Lanka, Singapore, Hong Kong, and New-Zealand. Data was collected from World Bank (WDI) and Global Financial Development for the period starting from 2000 to 2018.

#### 3.2 Research Instruments

We used four indicators for banking competition, BS and EG. Lerner index, CR5 firm concentration, foreign ownership, and HHI statistics are used indicators for banking competition (Berger, Klapper, & Turk-Ariss, 2017; Hussain & Bashir, 2019; Jayakumar et al., 2018). BS used two ways of measurement. Firstly, six BS indicators are used, and a second-way BS index is used. The BS indicators are non-performing loans, private credit, bank capitalization, profit ratio, deposit interest rate, and Z-index. Some indicators are previously used by (Berger et al., 2015; Tabak, Fazio, & Cajueiro, 2012). Second, stability index is composed of weighted average of four stability measures, namely return on assets, bank capitalization, private credit, performing loan assets. EG measured through four indicators, which are per capita EG, trade openness (TO), inflation (INF), and government consumption (GC). The summary of sample distribution is in Table 1 in appendix.

### 4. Data Analysis

The descriptive statistics of selected sample is given in Table 4.1. The sample contains 93 banks with 1149 observations over the period 2000-2018. We have briefly discussed the descriptive statistics of the study variables.

**Table 4.1. Descriptive Statistics**

Variables	Obs.	Std. D.	Mean	Max.	Min	Skewness	Kurtosis
BC	1149	0.17	0.10	2.12	-0.03	6.11	48.35
CR5	1149	24.45	58.55	130	28.37	0.32	3.20
DIR	1149	3.45	3.80	11.72	0.02	0.34	1.82
EG	1149	2.70	4.66	14.52	-2.45	0.02	2.84
FOWN	1149	25.15	12.43	92	2	2.07	6.11

GOVT-CONS	1149	4.04	11.45	19.64	5.03	0.68	2.57
HHI-STAT	1149	8.86	13.53	43.74	3.74	0.69	3.77
INF	1149	4.54	5.61	22.56	-3.68	1.06	4.7
LI	1149	36.07	78.03	160.81	47.96	0.16	3.68
NPLR	1149	0.516	0.26	3.69	0.007	3.08	13.46
PC	1149	55.76	67.51	218.94	14.77	0.89	2.54
PR	1149	4.41	1.61	32.37	-2.71	3.57	16.82
STAB I	1149	6.39	14.26	34.49	5.34	0.22	3.79
TO	1149	223.61	38.27	296.02	-126.71	11.62	152.68
Z I	1149	614.05	57.68	156.15	-3.12	23.53	565.54

(The BC is the Bank Capitalization ratio of the total equity over total assets(%), CR% is five largest banks concentration, DIR is Deposit interest rate paid to deposit holders, EG is the growth rate of Gross Domestic Product in (%), FOWN is the total assets owned by foreign banks, GOVT CONS is the Government Spending to GDP (%), HHI STATS is the Revenue elasticity of Input prices, INF is the Consumer Price Index to GDP, LI is Lerner Index, NPLR is the Ratio off Non Performing organization loans to total loans, PC is the Private Credit, PR is the Profit Ratio, STAB I is the Stability Index, TO is Total volume of trade as a % of GDP, ZI is the Sum of equity and ROA to total asset divided by SD of ROA.

Bank Capitalization showz a mean of 0.104, and its value ranges from 2.120 to -0.033 in Table 4.1. The average value of bank capitalization indicates that the selected banks are less dependent on equity and rely on debt financing which lessen the stability. The high average value of CR5 signifies that selected banks of developed and developing countries are working in highly competitive business environment. The deposit interest rate mean value suggests that banks are attracting people to deposit money to get high interest rate. EG mean is 4.667, and it is between from -2.459 to 14.52. The average value of GDP signifies that the selected countries need more GDP to increase the competitive situation of financial sector. Additionally, High value of foreign ownership indicates that there is high competition situation in selected banking sector. High value of Government consumption indicates the low EG. On average, the inflation rate is not high in the selected developed and developing countries. High value of private credit indicates that economy is relying on debt financing which minimizes the stability. HHI STAT mean score is 13.53 and it is between from 3.749 to 43.7 which indicates the monopolistic competition. Lerner Index showed a mean of 78.02 and ranged from 47.967 to 160.8. High value of Lerner index signifies the high competition. In this regard, on average the non-performing loans are not very high which indicates high stability. The firm profit implies that banks are utilizing their profit to stay in financial sector. Stability Index is a mean score of 14.26 and ranged from 5.344 to 34.499 which indicate high stability. High value of trade openness indicates that countries maintain their trade to increase their exports which is essential for EG. Lastly, the result shows that the Z Index mean is 57.68, and it also ranged from 3.1218 to 156.15. High value indicates the high stability. Table 2 analyzed the description of statistics for the variables employed in the study. Furthermore, descriptive indicators

shows that there is high variation in the values. It is due to the selected sample belongs to diverse countries and each country has its own rules & regulations, economic situation and financial condition.

Table 4.2 shows the correlation matrix among the variables. If correlation values is higher than 0.8 then Multicollinearity problem exists. Table shows that there is not much high correlation among the variables; therefore, no Multicollinearity issue exists.

The study employs the following model to analyze the direction of causality among BC, BS, and EG.

$$EG_{it} = \eta_{1j} + \sum_{k=1}^a \alpha_{1ik} EG_{it-k} + \sum_{k=1}^b \beta_{1ik} BC_{it-k} + \sum_{k=1}^c \gamma_{1ik} BS_{it-k} + \epsilon_{1it}$$

$$BC_{it} = \eta_{2j} + \sum_{k=1}^a \alpha_{2ik} BC_{it-k} + \sum_{k=1}^b \beta_{2ik} EG_{it-k} + \sum_{k=1}^c \gamma_{2ik} BS_{it-k} + \epsilon_{2it}$$

$$BS_{it} = \eta_{3j} + \sum_{k=1}^a \alpha_{3ik} BS_{it-k} + \sum_{k=1}^b \beta_{3ik} BC_{it-k} + \sum_{k=1}^c \gamma_{3ik} EG_{it-k} + \epsilon_{3it}$$

Where

i indicate the country in the panel; t represents time in the panel;

$\eta_{1j}, \eta_{2j}, \eta_{3j}$  represents the Eta which is a fixed effect;

EG denotes the per capita EG measured through various indicators: EG, TO, INF, and GOVT CONS;

BC is banking competition measured through various indicators: LI, HHI STATS, CR5, and FOWN;

BS represents the Bank stability consisted of different indicators: BC, PC, STAB I, PR, DIR, ZI, NPLR.  $\epsilon_{it}$  represents the random error term.



**Table 4.2: Correlation Analysis**

Variables	BC	CR5	DIR	EG	FOWN	GOVT CONS	HHI STAT	INF	LI	NPLR	PC	PR	STAB I	TO	ZI
BC	1														
CR5	0.0706	1													
DIR	0.292	0.038	1												
EG	-0.079	0.315	-0.11	1											
FOWN	0.124	0.224	0.0448	-0.135	1										
GOVT CONS	0.46	0.124	-0.107	-0.52	-0.2112	1									
HHI_STAT	0.55	0.146	-0.096	0.2004	0.1236	0.1375	1								
INF	-0.08	-0.175	0.3993	0.1807	0.222	0.2782	0.2999	1							
LI	0.0972	0.314	0.0454	-0.246	-0.1967	0.167	0.0643	-0.0838	1						
NPLR	0.0746	0.151	-0.198	-0.333	0.1981	0.1928	-0.1155	-0.2936	0.1406	1					
PC	0.0906	0.285	-0.423	-0.393	0.1158	0.3414	-0.2419	-0.5189	0.1003	0.5194	1				
PR	0.0772	0.159	-0.234	-0.106	0.3469	-0.07	-0.434	0.2694	-0.086	0.4284	0.4673	1			
STAB I	0.023	0.43	-0.483	-0.038	-0.1207	0.2849	0.1304	-0.3082	0.2172	0.389	0.3396	0.1099	1		
TO	-0.12	0.193	-0.14	-0.112	0.2292	0.0714	0.1351	-0.1196	-0.1	0.51	0.1301	0.1062	0.1622	1	
ZI	-0.07	0.21	-0.07	-0.086	-0.337	0.1126	-0.464	-0.0491	0.0981	0.584	0.648	-0.2	-0.24	-0.514	1

(The BC is the Bank Capitalization ratio of the total equity over total assets(%), CR% is five largest banks concentration, DIR is Deposit interest rate paid to deposit holders, EG is the Gross Domestic Product Growth Rate (%),FOWN is the total assets owned by foreign banks,GOVT CONS is the Government Spending to GDP (%), HHI STATS is the Revenue elasticity of Input prices,INF is the Consumer Price Index to GDP, LI is Lerner Index,NPLR is the Ratio off Non-Performing loans to total firm loans, PC is the Private Credit, PR is the Profit Ratio,STAB I is the Stability Index,TO is Total volume of trade as a % of GDP, ZI is the Sum of ROA and firm equity to total asset divided by SD of ROA.

**Table 4.3: Panel Vector Autoregression Results**

Variables	Case1 BC	Case 2 CR5	Case3 DIR	Case4 EG	Case5 FO	Case6 GC	Case7 HHI STAT	Case8 INF	Case9 LI	Case 10 NPLR	Case11 PC	Case12 PR	Case 13 SI	Case 14 ZI	Case 15 TO
R-squared	0.294	0.624	0.923	0.597	0.770	0.929	0.622	0.614	0.581	0.749	0.724	0.838	0.550	0.029	0.188
Adj. R-Sq.	0.275	0.614	0.921	0.587	0.764	0.927	0.612	0.604	0.569	0.742	0.717	0.834	0.538	0.0030	0.167
Sum Sq. Resid.	24.1	256706	1038.5	3376	165767	1319.62	33348.65	9090.59	625711	76.476	979324	3572.6	21057	4.19E0	465496
S.E. Eq.	0.147	15.207	0.967	1.744	12.220	1.090	5.481	2.861	23.742	0.262	29.703	1.794	4.355	614.74	204.74
F-statistic	15.439	61.489	448.229	55.011	124.406	488.173	60.993	58.983	51.317	110.783	97.380	191.932	45.260	1.115	8.618
Log likelihood	579.4	4708.85	1565.32	-2238.04	-4459.347	-1701.98	-3544.51	2802.984	5217.144	-77.132	5472.713	2270.179	3282.22	8929.85	7675.65
Akaike AIC	-0.961	8.308	2.798	3.977	7.870	3.037	6.267	4.967	9.199	0.189	9.647	4.0336	5.807	15.707	13.508
Schwarz SC	0.824	8.445	2.935	4.114	8.007	3.174	6.404	5.104	9.336	0.326	9.784	4.170	5.944	15.843	13.645
Mean depend.	0.104	58.657	3.805	4.658	12.423	11.463	13.440	5.602	78.052	0.259	67.782	1.597	14.278	57.946	38.498
S.D Depend.	0.174	24.482	3.456	2.714	25.185	4.053	8.802	4.548	36.195	0.5176	55.857	4.403	6.408	615.655	224.375

(The BC is the Bank Capitalization ratio of the total equity over total assets(%), CR% is five largest banks concentration, DIR is Deposit interest rate paid to deposit holders, EG is the Gross Domestic Product Growth Rate (%), FOWN is the total assets owned by foreign banks, GOVT CONS is the Government Spending to GDP (%), HHI STATS is the Revenue elasticity of Input prices, INF is the Consumer Price Index to GDP, LI is Lerner Index, NPLR is the Ratio off Non Performing loans to total loans, PC is the Private Credit, PR is the Profit Ratio, STAB I is the Stability Index, TO is Total volume of trade as a % of GDP, ZI is the Sum of firm ROA and equity to total asset divided by SD of ROA. We start with the discussion of stationarity of our selected sample. We employ unit root test to check the causal relationship.

In this research, data is stationary at level; accordingly, vector autoregressive is applied. The unit root test showed that variables are stationary at level in table 5. So, the unit root test indicates that, Fisher ADF results found no unit root at a 5% significance level.

VAR model is applied because variables are stationary at level. In the panel VAR model, each variable is use as an endogenous variable (Said et al., 2024). R-squared, the F-statistic are basic criteria for VAR model. R-squared values represent the percentage change in the dependent variable explained by independent variables. Furthermore, R-squared values indicate whether the independent variables are more or less effective at explaining the dependent variable. High value of R-squared value is expressing the maximum explanatory power. The F-statistic measures the overall significance of the model. This estimation is calculated as the mean of a series of values. In this study F statistic is used to distinguish among all model since the different F statistic values of the models allowed for comparison. The highest significant value of F statistics showed that the overall model is fitted.

The value of R- squared shows that the change in percentage in the study dependent variable explained by independent variables in the table 6. In case 3 and case 6 the value of R-square is high which shows the high explanatory power. The value of F-statistic showed the overall significance of the results. In current study the F-statistic values of case 3 and case 6 are much higher. AIC and Schwartz values are used to indicate the goodness of fit. These criteria are important to analyze the best explanatory model among all. Low AIC and Schwartz values indicates the best model. Case 3 and case 6 have lowest AIC and Schwartz values

After analyzing the relationship through VAR model among banking competition, BS, and EG, a Granger causality test based on VAR is employed short-run direction of causality among the variables. Granger causality is also used to analyze the short-run causality among the variables(Aixalá & Fabro, 2009; Jayakumar et al., 2018). Table 4.3 shows the Granger causality between banking competition and EG based on equation 1. The results are abridged below.

#### 4.5 Hypotheses Testing

Banking competition and EG is checked for short-run causality. In this regard, found bidirectional and unidirectional between banking competition and EG in selected sample in Table 4.3.

The relationship is bidirectional in (INF $\Leftrightarrow$  CR5; INF $\Leftrightarrow$  FOWN; TO $\Leftrightarrow$  HHI STATS) and unidirectional in (EG  $\Leftarrow$  CR5; GOVT CONS  $\Rightarrow$  CR5; FOWN  $\Leftarrow$  EG; TO  $\Leftarrow$  CR5; HHI STATS $\Leftarrow$  CR5; LI  $\Leftarrow$  EG; TO  $\Leftarrow$  FOWN; LI  $\Leftarrow$  GOVT CONS; LI  $\Leftarrow$  INF) depending on the banking competition and EG indicators. Therefore, a non-uniform relationship is found among banking competition and EG.

The null hypothesis of the study is rejected in the favor of alternate hypothesis because p-value is less than 5%.Therefore, in this case, null hypotheses are rejected in the favors of alternate hypotheses, which is Banking competition causes EG, and EG causes banking competition. These findings are consistent with (Cetorelli & Gambera, 2001; Coccores, 2008; Jayakumar et al., 2018).

**Table 4.5.1: Banking Competition and EG**

Null Hypothesis:	Obs	F-Statistic	Prob.	Direction of Causality
EG does not Granger Cause CR5	1147	2.15522	0.1163	
CR5 does not Granger Cause EG		32.0454	3.00E-14*	EG $\Leftarrow$ CR5
GOVT_CONS does not Granger Cause CR5	1147	19.0753	7.00E-09*	GOVT CONS $\Rightarrow$ CR5
CR5 does not Granger Cause GOVT_CONS		1.53443	0.216	
INF does not Granger Cause CR5	1147	11.0972	2.00E-05*	

<b>CR5 does not Granger Cause INF</b>		5.66984	0.0035*	INF <=> CR5
<b>FOWN does not Granger Cause EG</b>	1147	14.4697	6.00E-07*	
<b>EG does not Granger Cause FOWN</b>		2.18846	0.1126	FOWN=> EG
<b>TO does not Granger Cause CR5</b>	1147	0.94647	0.3884	
<b>CR5 does not Granger Cause TO</b>		25.2623	2.00E-11*	TO<= CR5
<b>HHI_STAT does not Granger Cause EG</b>	1147	16.7546	7.00E-08*	HHI STAT=>EG
<b>EG does not Granger Cause HHI_STAT</b>		1.89106	0.1514	
<b>LI does not Granger Cause EG</b>	1147	0.54863	0.5779	
<b>EG does not Granger Cause LI</b>		3.80765	0.0225*	LI<= EG
<b>GOVT_CONS does not Granger Cause FOWN</b>	1147	2.59904	0.0748	
<b>FOWN does not Granger Cause GOVT_CONS</b>		1.94058	0.1441	GOVTCONS<#>FOWN
<b>INF does not Granger Cause FOWN</b>	1147	6.80370	0.0012*	
<b>FOWN does not Granger Cause INF</b>		15.8127	2.00E-07*	INF<=>FOWN
<b>TO does not Granger Cause FOWN</b>	1147	1.96232	0.141	
<b>FOWN does not Granger Cause TO</b>		2.98798	0.0508*	TO<= FOWN
<b>HHI_STAT does not Granger Cause GOVT_CONS</b>	1147	0.16477	0.8481	
<b>GOVT_CONS does not Granger Cause HHI_STAT</b>		1.93532	0.1449	HHI STAT<#> GOVT CONS
<b>LI does not Granger Cause GOVT_CONS</b>	1147	1.50136	0.2233	
<b>GOVT_CONS does not Granger Cause LI</b>		4.64216	0.0098*	LI<= GOVT CONS
<b>TO does not Granger Cause HHI_STAT</b>	1147	4.40400	0.0124*	
<b>HHI_STAT does not Granger Cause TO</b>		6.81591	0.0011*	TO<=>HHI STAT
<b>LI does not Granger Cause INF</b>	1147	6.25372	0.002*	
<b>INF does not Granger Cause LI</b>		1.53094	0.2168	LI => INF
<b>TO does not Granger Cause LI</b>	1147	0.10263	0.9025	
<b>LI does not Granger Cause TO</b>		1.31309	0.2694	TO<#> LI

Note: \* P value<0.05

#### 4.6 Causality between Banking Stability and EG

Similar to previous case, BS and EG is checked for short-run causality. Accordingly, the relationship between banking stability and EG is also non-uniform. The findings provide support for all demand following, supply leading, feedback, and neutrality hypothesis Table 4.4. The findings support the feedback hypothesis in (EG <=> DIR;

NPLR $\Leftrightarrow$  EG; PC  $\Leftrightarrow$  EG; TO  $\Leftrightarrow$  PC; TO  $\Leftrightarrow$  STAB I; PC  $\Leftrightarrow$  INF) and support the Supply leading and demand following hypotheses in (EG  $\Leftarrow$  BC; GOVT CONS  $\Leftarrow$  BC; INF $\Leftarrow$  DIR; NPLR $\Leftarrow$  INF; PR  $\Leftarrow$  INF; TO  $\Leftarrow$  NPLR; TO  $\Leftarrow$  PR; ZI  $\Leftarrow$  EG). Consequently, support the neutrality hypothesis in(TO $\nrightarrow$  BC; NPLR  $\nrightarrow$  GOVT CONS; ZI $\nrightarrow$  TO).These non-uniform results are due to the banking stability and EG indicators. The null hypothesis is rejected in the favor of alternate hypothesis because p-value is less than 5%. In this regard, null hypotheses of the study are rejected and alternate is accepted, which are BS causes EG, and economic. These results are consistent with(Creel et al., 2015; Dhal et al., 2011).

**Table 4.6.1: Banking Stability and Economic Growth**

Null Hypothesis:	Obs	F-Statistic	Prob.	Direction of Causality
EG does not Granger Cause BC	1147	2.34771	0.096	
BC does not Granger Cause EG		2.95930	0.0523*	EG $\Leftarrow$ BC
GOVT_CONS does not Cause Granger BC	1147	0.92988	0.3949	
BC does not Granger Cause GOVT_CONS		3.72178	0.0245*	GOVT CONS $\Leftarrow$ BC
INF does not Granger Cause BC	1147	2.99809	0.0503*	
BC does not Granger Cause INF		0.38728	0.679	INF $\Rightarrow$ BC
TO does not Granger Cause BC	1147	0.04590	0.9551	
BC does not Granger Cause TO		0.53406	0.5864	TO $\nrightarrow$ BC
EG does not Granger Cause DIR	1147	7.93041	0.0004*	
DIR does not Granger Cause EG		28.9415	5.00E-13*	EG $\Leftrightarrow$ DIR
GOVT_CONS does not Granger Cause DIR	1147	1.94422	0.1436	
DIR does not Granger Cause GOVT_CONS		10.8897	2.00E-05*	GOVT CONS $\Leftarrow$ DIR
INF does not Granger Cause DIR	1147	79.7690	4.00E-33*	
DIR does not Granger Cause INF		0.25368	0.776	INF $\Rightarrow$ DIR
TO does not Granger Cause DIR	1147	1.21881	0.296	TO $\Leftarrow$ DIR
DIR does not Granger Cause TO		11.1079	2.00E-05*	
NPLR does not Granger Cause EG	1147	14.7184	5.00E-07*	
EG does not Granger Cause NPLR		5.34039	0.0049*	NPLR $\Leftrightarrow$ EG
PC does not Granger Cause EG	1147	21.8068	5.00E-10*	

<b>EG does not Granger Cause PC</b>		5.76627	0.0032*	PC<=> EG
<b>PR does not Granger Cause EG</b>	1147	10.6462	3.00E-05*	
<b>EG does not Granger Cause PR</b>		5.80381	0.0031*	PR<=> EG
<b>STAB I does not Granger Cause EG</b>	1147	16.1011	1.00E-07*	
<b>EG does not Granger Cause STAB I</b>		0.38355	0.6815	STAB I=> EG
<b>ZI does not Granger Cause EG</b>	1141	2.25185	0.1057	
<b>EG does not Granger Cause ZI</b>		5.48917	0.0042*	ZI<= EG
<b>NPLR does not Granger Cause GOVT_CONS</b>	1147	0.30319	0.7385	
<b>GOVT_CONS does not Granger Cause NPLR</b>		0.85061	0.4274	NPLR<#> GOVT CONS
<b>PC does not Granger Cause GOVT_CONS</b>	1147	4.00512	0.0185*	
<b>GOVT_CONS does not Granger Cause PC</b>		3.96351	0.0193*	PC<=>GOVT CONS
<b>PR does not Granger Cause GOVT_CONS</b>	1147	0.16510	0.8478	
<b>GOVT_CONS does not Granger Cause PR</b>		0.46822	0.6262	PR<#> GOVT CONS
<b>STAB I does not Granger Cause GOVT_CONS</b>	1147	2.52771	0.0803	STAB I<= GOVT CONS
<b>GOVT_CONS does not Granger Cause STABI</b>		11.8564	8.00E-06*	
<b>ZI does not Granger Cause GOVT_CONS</b>	1141	0.48498	0.6158	
<b>GOVT_CONS does not Granger Cause ZI</b>		6.09794	0.0023*	ZI<= GOVT CONS
<b>NPLR does not Granger Cause INF</b>	1147	9.20841	0.0001*	
<b>INF does not Granger Cause NPLR</b>		2.17640	0.1139	NPLR=> INF
<b>PC does not Granger Cause INF</b>	1147	25.0501	2.00E-11*	
<b>INF does not Granger Cause PC</b>		21.3015	8.00E-10*	PC<=>INF
<b>PR does not Granger Cause INF</b>	1147	6.46622	0.0016*	PR=> INF
<b>INF does not Granger Cause PR</b>		1.72389	0.1788	

<b>STAB I does not Granger Cause INF</b>	1147	17.9160	2.00E-08*	
<b>INF does not Granger Cause STAB I</b>		14.2171	8.00E-07*	STAB I $\Leftrightarrow$ INF
<b>ZI does not Granger Cause INF</b>	1141	0.25371	0.776	
<b>INF does not Granger Cause ZI</b>		0.82363	0.4391	ZI $\nrightarrow$ INF
<b>TO does not Granger Cause NPLR</b>	1147	0.08959	0.9143	
<b>NPLR does not Granger Cause TO</b>		2.94080	0.0532*	TO $\Rightarrow$ NPLR
<b>TO does not Granger Cause PC</b>	1147	3.72670	0.0244*	
<b>PC does not Granger Cause TO</b>		9.73407	6.00E-05*	TO $\Leftrightarrow$ PC
<b>TO does not Granger Cause PR</b>	1147	0.00763	0.9924	
<b>PR does not Granger Cause TO</b>		3.91679	0.0202*	TO $\Leftarrow$ PR
<b>TO does not Granger Cause STAB I</b>	1147	6.46238	0.0016*	
<b>STAB I does not Granger Cause TO</b>		30.6642	1.00E-13*	TO $\Leftrightarrow$ STAB I
<b>ZI does not Granger Cause TO</b>	1141	0.01931	0.9809	
<b>TO does not Granger Cause ZI</b>		0.02988	0.9706	ZI $\nrightarrow$ TO

Note: \* P value<0.05

#### 4.7 Causality between Banking Competition and Banking Stability

In this case, BS and BCpetition is checked for short-run causality. In this regard, found bidirectional causality in (HHI STAT  $\Leftrightarrow$  DIR),(LI  $\Leftrightarrow$  DIR),(PC $\Leftrightarrow$ HHI STAT),(PC $\Leftrightarrow$ LI). These findings support the feedback hypothesis aligned with(Jayakumar et al., 2018; Liu & Wilson, 2013). Furthermore, found unidirectional causality in (FOWN $\Rightarrow$  DIR);(NPLR $\Leftarrow$  FOWN); (FOWN  $\Leftarrow$  BC);(DIR  $\Leftarrow$  CR5);(CR5 $\Rightarrow$  STAB I);(PR $\Rightarrow$  FOWN);(STAB I $\Leftarrow$  FOWN);(PC $\Leftarrow$  FOWN);(STAB I $\Rightarrow$  HHI STAT). These results support the demand following and supply leading hypothesis consistent with(Allen & Gale, 2004; Fiordelisi & Mare, 2014; Kasman & Kasman, 2015). Consequently, found no causal relationship in (NPLR $\nrightarrow$ CR5),(PR $\nrightarrow$  CR5),(ZI $\nrightarrow$ FOWN),(NPLR $\nrightarrow$  HHI STAT) and support the neutrality hypothesis, similar to(Jayakumar et al., 2018). The null hypothesis is rejected in the favor of alternate hypothesis because p-value is less than 5%. Accordingly, null hypotheses of the study are rejected in the favor of the study alternate hypotheses, which are banking competition causes BS and BS causes banking competition Table 4.5.

**Table 4.7.1: Banking Competition and Banking Stability**

<b>Null Hypothesis:</b>	<b>Obs</b>	<b>F-Statistic</b>	<b>Prob.</b>	<b>Direction of Causality</b>
<b>FOWN does not Granger Cause BC</b>	1147	0.59870	0.5497	
<b>BC does not Granger Cause FOWN</b>		3.80587	0.0225*	FOWN <= BC
<b>HHI_STAT does not Granger Cause BC</b>	1147	0.03222	0.9683	
<b>BC does not Granger Cause HHI_STAT</b>		0.98285	0.3746	HHI STAT<#> BC
<b>DIR does not Granger Cause CR5</b>	1147	0.42930	0.6511	
<b>CR5 does not Granger Cause DIR</b>		10.1801	4.00E-05*	DIR <= CR5
<b>PC does not Granger Cause CR5</b>	1147	1.45717	0.2333	
<b>CR5 does not Granger Cause PC</b>		1.37470	0.2533	PC<#> CR5
<b>PR does not Granger Cause CR5</b>	1147	1.01096	0.3642	
<b>CR5 does not Granger Cause PR</b>		0.93361	0.3934	PR<#> CR5
<b>STAB I does not Granger Cause CR5</b>	1147	14.4418	6.00E-07*	
<b>CR5 does not Granger Cause STAB I</b>		0.24529	0.7825	CR5=> STAB I
<b>NPLR does not Granger Cause CR5</b>	1147	0.83522	0.434	NPLR<#> CR5
<b>CR5 does not Granger Cause NPLR</b>		0.84515	0.4298	
<b>Z_INDEX does not Granger Cause CR5</b>	1141	0.11574	0.8907	
<b>CR5 does not Granger Cause Z_INDEX</b>		0.27359	0.7607	PR<#> CR5
<b>FOWN does not Granger Cause DIR</b>	1147	16.1501	1.00E-07*	
<b>DIR does not Granger Cause FOWN</b>		2.03531	0.1311	FOWN=> DIR
<b>HHI_STAT does not Granger Cause DIR</b>	1147	10.3344	4.00E-05*	
<b>DIR does not Granger Cause HHI_STAT</b>		9.05169	0.0001*	HHI STAT <=> DIR
<b>LI does not Granger Cause DIR</b>	1147	14.9223	4.00E-07*	
<b>DIR does not Granger Cause LI</b>		3.42214	0.033*	LI <=> DIR
<b>NPLR does not Granger Cause FOWN</b>	1147	1.45916	0.2329	NPLR<= FOWN



<b>FOWN does not Granger Cause NPLR</b>		5.03679	0.0066*	
<b>PC does not Granger Cause FOWN</b>	1147	0.03889	0.9619	
<b>FOWN does not Granger Cause PC</b>		5.06763	0.0064*	PC<= FOWN
<b>PR does not Granger Cause FOWN</b>	1147	7.36884	0.0007*	
<b>FOWN does not Granger Cause PR</b>		1.40939	0.2447	PR=> FOWN
<b>STAB I does not Granger Cause FOWN</b>	1147	0.24676	0.7814	
<b>FOWN does not Granger Cause STAB I</b>		4.99888	0.0069*	STAB I<= FOWN
<b>ZI does not Granger Cause FOWN</b>	1141	0.16787	0.8455	
<b>FOWN does not Granger Cause ZI</b>		0.53697	0.5847	ZI<#>FOWN
<b>NPLR does not Granger Cause HHI_STAT</b>	1147	1.91273	0.1481	
<b>HHI_STAT does not Granger Cause NPLR</b>		0.59791	0.5501	NPLR<#> HHI STAT
<b>PC does not Granger Cause HHI_STAT</b>	1147	9.87681	6.00E-05*	
<b>HHI_STAT does not Granger Cause PC</b>		7.75374	0.0005*	PC<=>HHI STAT
<b>PR does not Granger Cause HHI_STAT</b>	1147	1.51607	0.22	
<b>HHI_STAT does not Granger Cause PR</b>		0.30260	0.739	PR<#> HHI STAT
<b>STAB I does not Granger Cause HHI_STAT</b>	1147	30.4059	1.00E-13*	
<b>HHI_STAT does not Granger Cause STAB I</b>		0.39914	0.671	STAB I=> HHI STAT
<b>ZI does not Granger Cause HHI_STAT</b>	1141	0.27318	0.761	
<b>HHI_STAT does not Granger Cause ZI</b>		0.74088	0.4769	ZI<#> HHI STAT
<b>NPLR does not Granger Cause LI</b>	1147	2.92105	0.0543*	
<b>LI does not Granger Cause NPLR</b>		0.63612	0.5295	NPLR=> LI
<b>PC does not Granger Cause LI</b>	1147	3.63946	0.0266*	

<b>LI does not Granger Cause PC</b>		20.1960	2.00E-09*	PC<=>LI
<b>PR does not Granger Cause LI</b>	1147	2.40407	0.0908*	
<b>LI does not Granger Cause PR</b>		0.08969	0.9142	PR=> LI
<b>STAB I does not Granger Cause LI</b>	1147	133.041	1.00E-52*	
<b>LI does not Granger Cause STAB I</b>		1.47772	0.2286	STAB I=> LI
<b>ZI does not Granger Cause LI</b>	1141	1.74926	0.1744	
<b>LI does not Granger Cause ZI</b>		5.00077	0.0069*	ZI<= LI

Note: \* P value<0.05

## 5. Discussion

This paper aimed to investigate the causal relationship between banking competition, BS, and EG across a sample of both developing and developed economies. Utilizing annual data spanning from 2000 to 2018, the study examined variables such as banking competition, BS, and EG, incorporating seven indicators for BS, four indicators for banking competition, and four indicators for EG. Data was collected from 93 commercial banks operating in developing and developed regions, and analysis was conducted using E-Views.

The study-initiated discussions on the integration and co-integration of variables. A unit root test using a Fisher ADF was performed, indicating that the variables were stationary at the level. Consequently, causal relationships between BC, BS, and EG were identified. Further analysis using VAR tests confirmed the presence of causality among these variables. Granger causality results revealed both bidirectional and unidirectional causality among BC, BS, and EG in the short run.

## 6. Conclusion

It is evident that a robust banking system is pivotal for sustained EG, while any disruptions within this system can severely impact real per capita growth. Policymakers should exercise caution in interpreting financial indicators, recognizing that not all indicators may contribute positively to improvement. For investors in the banking sector, this study provides insights into optimizing their investments.

Future research could conduct comparative studies across different institutional contexts to explore variations in competition, stability and EG. Additionally, further investigation into various aspects of EG is warranted. Furthermore, future studies should explore the relationship between financial development, EG, and indicators of unemployment and poverty reduction, particularly in developing countries. This holistic approach can provide a deeper understanding of how these factors intersect and contribute to overall socioeconomic development. This study contributes to existing literature by examining the linkages and causal relationships between BC, BS, and EG. The findings underscore the importance of understanding banking sector indicators for the overall economy. They also suggest that informed financial management within banks is crucial to avoid over-indebtedness. Moreover, efficient policies aimed at developing the banking sector can significantly contribute to EG.

In addition to focusing on financial sector improvements, governments should prioritize macroeconomic factors such as enhancing trade openness, reducing inflation, and curtailing government consumption to foster economic prosperity. This study holds significance for governments, investors, policymakers, and financial institutions, emphasizing the need for an active financial environment to promote stability, competition, and growth within the banking sector.

### **Limitation of the Study**

It is essential to acknowledge the limitations of this study, including its reliance on limited measures of BS, BC, and EG. Future research should consider incorporating additional variables such as Distance to Default and Foreign Direct Investment. Moreover, employing advanced methodologies beyond Granger causality could yield more accurate results.

### **Implication of the study**

Our research holds important implications for policy. Firstly, companies involved in competition initiatives tend to outperform their competitors financially. This suggests that investing in competition can yield positive returns, indicating sound stability practices at the top level. Implementing competition is viewed as an investment for long-term gains, despite the initial cash outflow. Particularly in Asia, where firms are closely intertwined with political interests, the findings are promising for various stakeholders such as investors, corporate leaders, and local governments, as they align with EG practices.

However, CEO turnover negatively impacts CSR performance in the Chinese context, as CEOs play a pivotal role in maintaining corporate operations. This underscores the importance of retaining capable executives and considering their attributes when strategizing CSR efforts. Policies should be formulated to mitigate executive turnover and dual roles, with preference given to executives with certain traits, such as CFOs.

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## Appendix

**Table 1: Sample Distribution**

Country name	No. of local banks in each countr	Selected banks in each country	Percentage
Pakistan	20	18	19.3
India	57	19	20.4
Bangladesh	33	10	10.8
Sri Lanka	26	10	10.8
New-Zealand	20	11	11.8
Hong Kong	22	07	7.5
Singapore	12	06	6.5
Australia	18	12	12.9
Total	208	93	100

**Table 3.4: Measurement of Variables**

Abbreviation	Proxy	Description	References
<b>Banking Stability Indicators</b>			
BC	Bank capitalization	Total equity to total assets ratio	(Hussain & Bashir, 2019)
PC	Private credit	Financial resource issued to the private sector from deposit money banks	(Nana, 2014)
STAB I	banking stability composite index	Weighted average ROA,BC,PLA,PC	(Jayakumar et al., 2018)
PR	Profit ratio	Return on Asset	(Thompson, Brinkman, Dharmapala, Gonzalez-Lima, Thrall, 1997)
DIR	Deposit interest rate	The rate paid by the bank to deposit holders	(Meslier et al., 2017)
ZI	Bank-level index	Total of ROA & equity to total assets divided with SD of ROA	(Hussain & Bashir, 2019)
NPLR	nonperforming loans	nonperforming loans to the total amount of loans ratio	(Hussain & Bashir, 2019)
<b>Banking Competition Indicators</b>			
LI	Leaner index	An average bank-level measure output price over marginal cost	(Berger et al., 2017)
HHI STATS	H statistic	Revenue elasticity to input prices	(Jayakumar et al., 2018)
CR5	CR5 firm concentration	the concentration of assets owned by five largest banks	(Jayakumar et al., 2018)

FOWN	Foreign ownership	total assets owned the foreign banks	(Jayakumar et al., 2018)
Economic Growth Indicators			
EG	Per capita economic growth	% change in per capita GDP	(Rakshit & Bardhan, 2019)
TO	Trade openness	The total volume of trade as percentage change in GDP	(Rakshit & Bardhan, 2019)
INF	Inflation	The growth rate of the consumer price index	(Rakshit & Bardhan, 2019)
GOV CONP	Government consumption	Government expenditures to GDP	(Abu-Bader & Abu-Qarn, 2003)

**Table 4.1: Unit Root Test Results**

Variable	Statistic	Probability	Cross-sections	Observations
CR5	-29.0239	0.0000	93	1026
FOWN	-1.93650	0.0264	71	833
LI	-3.58756	0.0002	93	1026
HHI_STAT	-7.26733	0.0000	93	1029
BC	-43.4161	0.0000	90	988
DIR	-4.77156	0.0000	74	771
NPLR	-3.36063	0.0004	93	1030
PC	-7.11949	0.0000	93	1024
PR	-8.27333	0.0000	93	1032
STAB I	-22.4825	0.0000	93	1024
EG	-17.7756	0.0000	93	1026
GOVT_CONS	-3.65195	0.0001	93	1049
INF	-11.1170	0.0000	93	1056
TO	-176.360	0.0000	93	1036

(The BC is the Bank Capitalization ratio of the total equity over total assets(%), CR% is five largest banks concentration, DIR is Deposit interest rate paid to deposit holders, EG is the Gross Domestic Product Growth Rate (%),FOWN is the total assets owned by foreign banks,GOVT CONS is the Government Spending to GDP (%), HHI STATS is the Revenue elasticity of Input prices,INF is the Consumer Price Index to GDP, LI is Lerner Index,NPLR is the Ratio off Non Performing loans to total loans, PC is the Private Credit, PR is the Profit Ratio,STAB I is the Stability Index,TO is Total volume of trade as a % of GDP, ZI is the Sum of ROA and equity to total asset divided by SD of ROA.