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Long-run Equilibrium Relationship Between Financial Intermediation and Economic Growth: Empirical Evidence from Philippines

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Abstract

The financial sector is one of the most important building blocks of the economy. When this sector efficiently implemented a well-crafted program on banking and financial system to translate financial activities to income-generating activity, economic growth will be realized. Hence, this study analyzed the effect of financial intermediation on economic growth and the existence of cointegrating relationship using time-series data from 1986 to 2015. The influence of financial intermediation in terms of bank credit to bank deposit ratio, private credit, and stock market capitalization and time trend to economic growth was estimated using ordinary least squares (OLS) multiple regression. The results showed that all the financial intermediation indicators and time trend exert significant effect on Gross Domestic Product (GDP) per capita. The positive sign of the time trend indicates that there is an upward trend in GDP per capita averaging approximately 0.06 percent annually. Furthermore, the cointegration test using the Johansen procedure revealed that there is a presence of long-term equilibrium relationship between financial intermediation and time trend and economic growth, and rules out spurious regression results. This study established the idea that financial intermediation in the Philippines has a significant and vital role in stimulating growth in the economy.

Keywords: Banking System, Economic Growth, Financial Intermediation, Private Credit, Stock Market

JEL Classification Code: D63, G53, I31, J6

1. Introduction

Attempts to improve living standards have been the primary objective of any government in various countries. These countries set long-term and short-term goals, which are beneficial for its citizens and will heighten the standard of living of every household. In the Philippines, the government provides programs that will enable these goals to be achieved. For instance, the Ambisyon 2040 was launched by National Economic Development Authority (NEDA) in 2015 to

achieve an economic growth that is relevant, inclusive, and sustainable wherein the per capita income must also increase at least three-fold. This program has a common long-term goal and ambition for Filipinos and for the country in the succeeding twenty-five years, which is to enhance the quality of life of most Filipinos (NEDA, 2016).

Fundamentally, economic growth can be defined as an increase of income per person. Economic growth has three pillars: (1) human capital, which fuels growth and boosts higher labor productivity, (2) physical infrastructure, which is a prerequisite for inward investment and productive activities, and (3) good governance, which have necessary elements such as having efficient and transparent public sector institutions, stable financial system, and independent judicial system. A comprehensive and stable financial system offers financial programs that will help individuals to have beneficial financial habits as well as financial inclusivity across the country. This will also enable the effective distribution of productive capital from individuals, households, and corporations to different stakeholders. Furthermore, access to appropriate financial resources will greatly boost day-to-day financial management.

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An effective, accessible, and wide-ranging financial intermediation and financial system will boost productivity and welfare provided there are avenues for healthy and secure savings practices through promoting a whole range of effective financial services for all. Specifically, the country's first national identification system will provide easier access to public services and other financial services. According to NEDA, fourteen percent of Filipinos are denied government and other financial services because of the lack of acceptable identity papers. This problem hinders Filipinos especially in rural areas to access financial services and programs.

Corresponding to the primary goal of stimulating economic growth and sustainability through an effective financial system, this study aims to examine the effect of financial intermediation on economic growth of the Philippines. Specifically, this research will answer the following questions: (1) What has been the trend of economic growth when influenced by financial intermediation and time trend? (2) Is there a significant relationship between economic growth and its determinants such as bank credit to bank deposits, private credit, stock market capitalization, and time trend? (3) Is economic growth significantly affected by financial intermediation and time trend when taken collectively? (4) Is there a long-run equilibrium relationship between financial intermediation and economic growth?

2. Literature Review

2.1. The Role of Financial Sector in the Economy

The financial system plays a major and crucial role in promoting economic growth and development. Economies with well-developed and efficient financial system, intermediaries, and markets enjoy higher growth rates (Hwang et al., 2010). Thus, financial system development can be defined as progress in size and scope, efficiency, and financial market stability along with better access to financial markets that can have numerous benefits for the economy (Guru & Yadav, 2018). In some countries in Sub-Saharan Africa, financial development through private investment boost economic growth with some factors such as transparency and education (Seetanah & Rojid, 2011). With access to financial education, financial development could translate higher income (Monsura, 2020). In addition to private investment, Puatwoe and Piabuo (2017) pointed out that bank deposits and government expenditure have positive impact on economic growth of Cameroon, both in short-run and long-run periods. Hence, financial sector is regarded as one of the cornerstones of productive activity as it helps channel investment into output that drives economic growth.

This is also the case of some developing countries where financial sector development has positive and significant effect on GDP per capita or economic growth with investment

as the channel (Ahmad & Malik, 2009). Accordingly, the deepening financial deterioration in Southeast Asian nations except the Philippines was mainly cause by very poor response of the market along with the continuous decline in institutional performance of the financial system (Sheera & Bishnoi, 2013). This situation can be addressed through efficient financial system where better financial services will be provided which enables the economy to grow faster (Waheed, 2009; Yusifzada & Mammadova, 2015). Aside from investments, financial development in terms of flow of credit to private sector has positive impact on economic growth in low-income countries in Africa (Bist, 2018). This is evident when a country has favorable environment for private sector to expand with necessary finance.

Some famous economists like Schumpeter (1912), Hicks (1969), and McKinnon (1973) consider the indispensable position of the financial system. A high level of financial system stability ensures economic development (Yusifzada & Mammadova, 2015). The acceptable functions of financial growth are efficiently channeling money, mobilizing savings, the question of knowledge asymmetry, promoting trade, hedging, pooling and diversification of risk, encouraging the exchange of products and services, and controlling managers through the exercise of corporate control (Dutta & Roy, 2011). Consequently, economists typically emphasized the two key growth functions of the financial sector including domestic savings mobilization and efficient capital allocation (Okuda, 1990). These two functions should be effectively performed by the financial sectors to influence the economy's ability to achieve sustainable growth. For most developing countries, where direct financing is still improving and poorly developed, particularly in rural areas, indirect financing through intermediary institutions is the key means of moving capital from savings to investment.

2.2. The Effect of Financial Intermediation and Financial Inclusion on Economic Growth

Inclusive growth is better achieved when financial services are accessible by different social classes of the economy specifically the underprivileged and poor individuals (Zwedu, 2014). Economic growth is a result of efficient and stable financial institutions and financial intermediation where the needs of the people across the region were addressed. Particularly, Capelle-Blancard et al. (2008) used the financial intermediation ratios such as credit intermediation and market intermediation ratio to explain intermediate financing in Japan. These indicators were found to be significant contributors of economic development and growth. In addition, Bong and Premaratne (2019) investigated the effect of financial integration on economic growth in Southeast Asia. The initial financial development, financial crisis, income, initial schooling, inflation, trade openness, and corruption were used as financial integration

and revealed to have significant positive effect on economic growth. This financial integration along with financial inclusion has significant effect on poverty, financial stability, and income inequality as well (Ratnawati, 2020). The population living in poverty and income inequality was significantly reduced when financial inclusion in low-income countries to different levels in Asia's emerging market economies was improved (Loukoianova et al., 2018).

Access to savings and transfer services and provision of credit and insurance at a reasonable cost reaches poor people to be involved in formal banking system (Zwedu, 2014). Through enhancing bank-based intermediation as financial inclusion, inclusive growth and sustainable economic development will be achieved when poverty reduction was realized through financial services accessibility of the poor (Swamy, 2010). Therefore, poverty reduction and inequality, as part of inclusive growth, can be accomplished when financial inclusion helped the people to invest, to have reasonable consumption, and to manage financial risks. This allows people to experience formal financial services to make their financial transactions efficiently and safely, which helps poor people to get out of poverty (Demirguc-Kunt, 2017).

3. Methodology

This study used secondary time-series data over thirty years, from 1986 to 2015. The World Bank (2018) provided the data on *World Development Indicators* and *Global Financial Development* particularly bank credit to bank deposits ratio, private credit, stock market capitalization, and gross domestic product per capita. The determinants deemed relevant to this study are bank credit to bank deposits ratio (BCBD), private credit (PC), stock market capitalization (SMC), which are denoted as financial intermediation indicators, and time trend (t). On the other hand, gross domestic product per capita in real terms with 2010 as base year denoted as dependent variable. Thus, to analyze how economic growth is influenced by economic financial intermediation and time trend, a multiple linear regression analysis was performed using equation (1) as empirical model.

$$\ln\text{GDPcap} = \beta_0 + \beta_1\text{BCBD} + \beta_2\ln\text{PC} + \beta_3\ln\text{SMC} + \beta_4t + \mu_i \quad (1)$$

A double-log model represented by equation (1) was utilized to examine the elasticity coefficients or how the percentage change in financial intermediation will affect the percentage change in economic growth. To validate the assumptions of OLS in time-series regression, various statistical diagnostic tests such as stationarity test, normality test, heteroskedasticity test, and structural stability test were employed. Furthermore, the Johansen cointegration test was utilized to determine the long-run equilibrium relationship of economic growth and financial intermediation and time trend.

4. Results and Discussion

4.1. Unit Root Test on Univariate Series

A regression analysis could produce spurious regression results when time-series variables were employed because this type of data normally exhibits stochastic and deterministic trends, which characterized non-stationary data-generating processes. Thus, it is crucial to test the degree of integration, $I(d)$, where d is the number of differencing or unit roots required to make such variables stationary. If the mean, variance, and autocovariance at different lags remain the same at different points of a time series, then the variables are stationary. The formal test of unit root used in this paper is the Augmented Dickey-Fuller (ADF). The results of the test on each variable are summarized in Table 1.

The test, at levels, revealed that all the variables except bank credit to bank deposit ratio are non-stationary and contain unit root at levels since their ADFs were less negative than the Mackinnon critical values at 5% and 10% levels of significance. This observation is typical of macroeconomic time-series and correction can be made by obtaining first and second differences to make the series stationary.

At first differencing, gross domestic product per capita and stock market capitalization are stationary since the

Table 1: Unit Test Results

Variables	ADF Test Statistics		Mac Kinnon Critical Values		
	Level	First Difference	1%	5%	10%
lnGDPcap	-0.102231	-4.368635	-3.689194	-2.971853	-2.625121
lnBCBD	-0.364590	-2.980010	-3.689194	-2.971853	-2.625121
lnPC	-1.029888	-2.999374	-3.689194	-2.971853	-2.625121
lnSMC	-1.736673	-6.255775	-3.689194	-2.971853	-2.625121

computed ADF test statistics of -4.37 and -6.26 , respectively, are more negative than the McKinnon critical value of -3.69 at 1% level of significance. On the other hand, private credit is stationary at 5% level of significance since the ADF test statistics of -3.00 is more negative or greater in absolute value than the McKinnon critical value of -3.69 . In this case, second differencing is not necessary. It can be concluded that bank credit to bank deposit ratio is stationary at level while the rest of series become stationary only at first difference. Therefore, these variables are ready to use for regression analysis.

4.2. Correlation Results Analysis

To examine the degree of linear relationships between economic growth as represented by GDP per capital and the financial intermediation indicators such as bank credit to bank deposit ratio, private credit, and stock market capitalization and time trend, as well as cross-correlations among them, pairwise correlations using the Pearson coefficient of correlation formula, were calculated. The results were summarized in Table 2.

Table 2 showed that bank credit to bank deposits ratio, private credit, stock market capitalization, and time trend are significantly correlated with GDP per capita at 5% significance level. Since the computed r of stock market capitalization and time trend are 0.81 and 0.95, respectively, these variables have very high correlations with economic growth. The coefficient correlation of -0.47 and of 0.49 for bank credit to bank deposit ratio and private credit, respectively, indicated that these explanatory variables also have weak correlations with economic growth. The negative sign of bank credit to bank deposit ratio means that this variable is negatively correlated with economic growth.

Table 2: Correlation Matrix

Probability	LNGDPCAP	LNBCBD	LNPRIV	LNSMC	TIME
LNGDPCAP	1				
LNBCBD	-0.46965^{**}	1			
	0.0088	–			
LNPC	0.485666^{**}	0.326142	1		
	0.0065	0.0786	–		
LNSMC	0.813773^{**}	-0.06817	0.494677	1	
	0	0.7204	0.0055	–	
TIME	0.954353^{**}	-0.55968	0.526952	0.645	1
	0	0.0013	0.0028	0.0001	–

** Correlation is significant at 0.05 level.

4.3. Interpretation of Regression Results

To examine how each predictor explained economic growth, GDP per capita was regressed against financial intermediation indicators. The regression results were presented in Table 3.

The results showed that all explanatory variables have significant effect on economic growth at 1% level of significance. Specifically, 1% increase in bank credit to bank deposit ratio will result in GDP per capita increase of 0.55%. This means that from the years of observation the financial sector is efficient in channeling funds from those who have excess to financial resources to the individuals or firms which lack of resources to engage in productive activity (Uremadu et al., 2017).

Accordingly, private credit provided by other financial institutions showed a negative significant effect on GDP per capita. The negative coefficient portrays that a 1% increase

Table 3: Regression Results

Variables	Economic Growth
Bank Credit to Bank Deposit Ratio	0.54520453322***
Private Credit	-0.382562553101^{***}
Stock Market Capitalization	0.154043362811***
Time Trend	0.0560526115045***
$R^2 = 0.989233$	Critical Values
Adjusted $R^2 = 0.987511$	$F(4, 25)_{(0.05)} = 2.76$
F -Statistic = 574.2428	t -ratio _{(0.05)} = 2.056}
D.W. = 1.932339	D.W. _{(0.05)} = dl(1.143) du (1.739)}

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

in private credit will lead to a decline in GDP per capita of about 0.38%. This result is in accordance with the findings of Kagochi (2013) where banking development indicators, which include private credit has uncertain impact on economic growth. Financial deepening through credit to the private sector is not among the highest priorities of Southeast Asian Nations for stimulating growth (Cline, 2015). Formulation and implementation of policies that lessen the non-performing assets and improve the credit guarantees, which is favorable to private sector could address this issue (Bist, 2018).

Moreover, an increase in stock market capitalization creates a significant positive effect on the change of GDP per capita. For instance, a positive change in the rate of stock market capitalization, say by 1% point, other things equal, leads to an average increase of 0.15% GDP per capita. This means that stock market is an important driver of economic growth (Samsi et al., 2019). Campbell et al. (2010) confirmed that stock market promotes economic development, but differs according to level of development. Development in financial sector expands market capitalization where equity and bonds have crucial role in finance. The high presence of bond and equity finance in the Philippines and other emerging economies implies that the country is not exclusively reliable on traditional banking. Instead of bank loans, the country considers bonds and equity finance, which may result in higher market capitalization leading to economic expansion (Cline, 2015). Thus, this financial development through simultaneous development of bank and stock market activities stimulates economic growth (Waheed, 2009; Guru & Yadav, 2018).

Lastly, time trend exerts a significant effect on economic growth. The positive sign of the coefficient showed that there is an upward trend of GDP per capita in the Philippines averaging approximately 0.06% annually, other things equal. This means that the performance of the Philippine economy is good through time when influenced by financial intermediation.

Moreover, the computed *R*-squared of 0.9892 reveals that 98.92% of the variation in economic growth is explained by financial intermediation and time trend in the model. This indicates that bank credit to bank deposits ratio, private credit, stock market capitalization, and time trend are good predictors of economic growth. Furthermore, the computed *F*-statistic of 574.2428 with the degrees of freedom 4 and 25 is greater than the critical value at 5% level of significance. Thus, bank credit to bank deposits ratio, private credit, stock market capitalization and time trend have significant effect on economic growth when taken collectively.

Also, to verify if the regression results suffer from the problem of autocorrelation, Durbin-Watson statistics was used. Based on the computed value of Durbin-Watson statistic, there is no evidence of positive or negative

autocorrelation at 5% level of significance since $du(1.739) < d(1.9323) < 4-du(2.261)$ at $k' = 4$, and $n = 30$, where k' is the number of parameters and n is the number of observations. This validates the efficiency of the estimated parameters. In addition, the regression residuals are found to be normally distributed as supported by a Jarque-Bera statistic of 1.20 with a *p*-value of 0.54, which exceeds the 0.05 level of significance. This is also in accordance with the central limit theorem where the residuals are approximately normally distributed with large number of observations ($n \geq 30$).

4.4. Other Diagnostic Tests

To ensure that the assumptions under OLS method were not violated, the following diagnostic tests were employed. The results were summarized in Table 4.

The regression residuals were tested for the presence of heteroskedasticity or unequal variances using the popular Breusch-Pagan Test. This is important to ensure that the assumption of constant variance is not violated. Otherwise, if the residuals are heteroskedastic, then parameter estimates would be biased and inconsistent. Since the computed *F*-statistic is not significant at 5% level of significance, heteroskedasticity is ruled out in the model.

Consequently, the importance of structural stability in a regression model cannot be overstated. Policy formulation and forecasting largely depend upon the stability of regression parameters. Thus, the Chow Breakpoint Test was applied to test if there is stability in the relationship between economic growth and financial intermediation indicators such as bank credit to bank deposit ratio, private credit, and stock market capitalization and time trend. The results showed that the computed *F*-statistic is not significant at 5% level of significance, which means that there is no structural change in the relationship of economic growth and its determinants.

Another important diagnostic test is a determination if the model exhibits specification errors that could be attributed to omission of relevant explanatory variables, inclusion of irrelevant explanatory variables, and use of incorrect functional form. To test for the presence of these errors in the model, Ramsey's Regression Specification

Table 4: Other Statistical Tests Results

Statistical Test	Computed <i>F</i> -Statistic	Probability
Breusch-Pagan Test	0.478186	0.7514
Chow Breakpoint Test: 1997	0.131288	0.9834
Ramsey RESET Test	1.530384	0.228

Notes: Null hypothesis is rejected at 5 and 10 percent level of significance.

Table 5: Co-integration Results

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	5 Percent Critical Value	Prob.**
None*	0.660211	79.39986	63.8761	0.0015
At most 1*	0.519312	49.17581	42.91525	0.0105
At most 2*	0.432044	28.66478	25.87211	0.0219
At most 3*	0.367472	12.82485	12.51798	0.0444

Notes: *, (**) denotes rejection of the hypothesis at 5% (1%) significance level.
L.R. test indicates 4 cointegrating equation(s) at 5% significance level.

Error Test (RESET) was employed. According to Gujarati and Porter (2006), it can be concluded that the model was mis-specified when the computed F -statistic is statistically significant at the chosen level of significance. The result directs that no specification error was committed since the computed F -statistic of 1.53 is not significant at 5% level of significance. This means that presence of specification error in the model can be ruled out.

4.5. Cointegration Test Results

Finally, to rule out the presence of possible spurious regression results and establish if there is genuine long-term equilibrium relationship among the variables used in the model, the Johansen Cointegration test was utilized. This test examines not only if the results are accurate, but also the possible number of cointegrating vectors or relationships in the model. The results were presented in Table 5.

Table 5 shows that there are four cointegrating vectors in the model based on the trace statistic greater than the critical values at 5% level, but not at 1% level. Hence, the regression results are not spurious. This indicates that the long-run equilibrium relationship of economic growth and financial intermediation indicators such as bank credit to bank deposit ratio, private credit, and stock market capitalization and time trend is consistent.

5. Conclusion

The financial intermediation in terms of bank credit to bank deposit ratio, private credit, and stock market capitalization, exerted significant effects on economic growth as defined by an increase in real GDP per capita. The positive impact of bank credit to bank deposit ratio, stock market capitalization, and time trend on economic growth is consistent with the earlier studies that access to efficient financial services would lead to higher productivity and income. Meanwhile, the negative effect of changes in the private credit on economic growth maybe because credits are not channeled to beneficial uses for the private sector, but are redirected to other activities that do not

contribute to economic growth. This result can be addressed by implementing credit guarantee programs, which are beneficial for private sector.

Furthermore, the empirical model used in the study has no statistical evidence of autocorrelation, collinear variables, specification error, and structural instability. More importantly, the model shows that the variables are cointegrated indicating presence of long-term equilibrium relationship between financial intermediation and economic growth and rules out presence of spurious regression results. This study established that financial intermediation plays an important role in Philippine economic growth, both in the short-run and long-run periods.

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