

Causality between Financial Inclusion and Economic Development: Lesson from the Emerging Indonesia Economy

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Keywords: Financial Inclusion, Economic Development, Panel Granger Causality.

Abstract: Our study aims to determine the causality between financial inclusion and economic development in Indonesia. This research uses the panel data set for 33 provinces from Indonesia for a period of 2013 to 2017. To estimate panel Granger Causality test, this study implements Pedroni's cointegration test, and Panel Vector Auto Regression Model. This study finds that there is no significant causality relationship between the financial inclusion and economic development indicators. The results show that some indicators of economic developments such as income per capita and poverty have significant correlation to financial inclusion in Indonesia. Nevertheless, financial inclusion does not have an impact to economic development in Indonesia.

1 INTRODUCTION

Nowadays, Indonesia's economic growth increases steadily, and it is followed by a reduction in poverty and income inequality. This situation indicates that Indonesia's economic growth becomes more inclusive. The real GDP (Gross Domestic Product) of Indonesia has grown to 5.02 percent in 2016 and picked up to 5.07 percent in 2017. Subsequently, the poverty rate reduced from 10.70 percent in 2017 to 9.80 percent in the following year.

The financial sector plays an essential role in economic growth. Demirgüç-Kunt, Beck and Honohan (2008) point out a poorly matured financial development system may increase the persistence of inequality. In addition, Levine (1997) argues that there is a positive relationship between financial functions with economic growth in the long term. Ismail and Pratomo (2006) also note that financial intermediation has a positive relationship to the economic growth of Indonesia. The financial liberalization of Indonesia since the year 1983 gives a positive impact on the real sector improvement. Another research conducted by Cheng et al (2006) also finds that the development of the financial sector, particularly the banking sector, can increase economic growth. The banking sector contributes a positive impact on the real sectors.

The development of the financial sector, especially banking, increases access and the use of banking services by the public. Thus, the public can utilize banking products and services to encourage their productive investments. The difficulty in accessing banking products and services causes public only rely on the limited capital resources. As a result, the economy will grow slowly, and poverty and inequality may still persist. Although the efforts of financial services develop rapidly, the level of financial literacy of Indonesia is still quite low. Based on Demirgüç-Kunt et al., (2015) reveals that in the Global Financial Index (Findex) in 2014, there was still 36.1 percent of the adult population of Indonesia, who has accounts in the Bank, and this achievement below the average performance of East Asian countries at 69.0 percent.

The low level of financial literacy of Indonesia is caused by several factors such as the low level of income, the over prudential regulation of banks, the lack of finance and banking education, the high administration cost of banks and the limited number of bank's branches in rural areas. This leads to the low level of financial literacy and also low financial inclusion. Regarding the important role of financial inclusion to the economic growth of Indonesia, This research will analyze the nexus between financial inclusion and the economic growth, poverty rate, and inequality.

2 LITERATURE REVIEW

2.1 Financial Inclusion Development

Several studies have shown a positive impact of the financial inclusion on the economic growth and the poverty reduction in developing countries.

Sarma (2012) defines financial inclusion as a process that ensures the ease of access, availability, and usage of the formal financial systems for the whole economy members. Subsequently, Demirgüç-Kunt and Klapper (2012) points out that financial inclusion as providing board access to financial services without a price or nonprice barriers.

In order to figure out the level of financial inclusion Sarma and Pais (2011) developed the financial inclusion index which based on three dimensions, namely the banking penetration, the availability of banking services, and the use of banking services. Meanwhile, Demirgüç-Kunt, Beck and Honohan (2008) and Chandran (2011) mention the financial inclusion as follows out of range (outreach), benefits (usage), and quality (quality) of financial services.

2.2 Financial Inclusion and Inclusive Growth

Many empirical studies find that there is a positive relationship between financial system development and economic growth. The research conducted by Beck, Demirgüç-Kunt and Levine (2007) shows the impact of financial intermediation development on poverty rate and inequality. The growth of the financial sector gives a positive impact on (i) the decline in income inequality (gini coefficient), (ii) an increase in the income of poor people, and (iii) a decrease in the percentage of the population that lives under the poverty line. The same results are found by Demirgüç-Kunt, Beck and Honohan (2008). They revealed opening the access to the poor will reduce income disparity and poverty rate more quickly.

Furthermore, research that explains in the theoretical foundations of growth and financial inclusive is conducted by Chandran (2011). Their research reveals a descriptive analysis in enhancing financial inclusion, which is always associated with poverty alleviation which in turn create an inclusive growth. They mention that the financial inclusion will encourage economic growth by empowering individuals and families to cultivate economic opportunities.

Regarding to inclusive growth, Anand, Tulin and Kumar (2014) find that macroeconomic stability, human resources, and structural change are the primary basis for inclusive growth. In their study, Anand, Tulin and Kumar (2014) point out that the development of the financial and macroeconomic sectors had a significant influence on inclusive economic growth.

3 RESEARCH METHOD

This research focuses on the causality between the financial inclusion and economic development in Indonesia. The data used in this research are provided by Indonesia's Central Bureau of Statistics. The financial inclusion variable used in this study refers to the financial inclusion index created by Sarma (2012). Financial inclusion index covers three dimensions, namely the banking penetration dimension, the availability of banking services, and the use of banking services. The economic development indicators in this study consists of economic growth, income percapita, income inequality, poverty, and unemployment.

This study measures the levels of financial inclusion index in 33 provinces of Indonesia from 2013 to 2017. It covers three dimensions, i.e. the banking penetration dimension, the availability of banking services, and the use of banking services. The index of each dimension, d_i , is calculated using the following equation:

$$d_i = w_i \frac{A_i - m_i}{M_i - m_i}; i = 1, 2, 3$$

where:

w_i = weight for dimension i , $0 \leq w_i \leq 1$

A_i = current value of variabel i

m_i = lower limit of variable i

M_i = upper limit of variable i

The first dimension, banking penetration covers the users of banking services. In this study, the indicator used for the banking penetration dimension is the assets of commercial banks in each province in Indonesia divided by the number of adult populations of each province.

$$d_1 = \frac{\text{Commercial Bank Assets}}{\text{Adult population (age 15 or above)}}$$

The second dimension, the availability of banking services describes the outreach of commercial banking service. The number of branch offices of commercial banks in each province divided by the number of adult population points out as the variable.

$$d_2 = \frac{\text{Number of brach offices}}{\text{Adult population (age 15 or above)}}$$

The third dimension, the use of banking services describes the benefits of banking services that are perceived by the community. The indicators used in this research are the total of bank deposits and commercial bank loans in each province and divided by the province's GRDP (Gross Regional Domestic Product).

$$d_3 = \frac{\text{Total Deposits+Total Loans}}{\text{GRDP}}$$

The weights used for the whole dimension are equal (wi = 1). Referring to the method used by Sarma (2012), this study assumes that all dimensions have the same priority, so each dimension weight is wi = 1 for all i. The index of financial inclusion from province K can be calculated as follows:

$$IFI = \frac{1}{2} \left[\frac{\sqrt{d_1^2 + d_2^2 + d_3^2}}{\sqrt{3}} + \left\{ 1 - \frac{\sqrt{(1-d_1)^2 + (1-d_2)^2 + (1-d_3)^2}}{\sqrt{3}} \right\} \right]$$

The financial inclusion index (IFI) is between 0 and 1. The IFI equals to 1 indicates that the province has the best financial inclusion conditions among provinces. The financial inclusion rate is high when the value of the financial inclusion index is 0.6 or above. The level of financial inclusion is moderate if the value of the financial inclusion index is $0.3 \leq d \leq 0.6$. Finally, the financial inclusion rate is low if the index value below 0.3.

The first stage in our empirical study is represented by the analysis of stationarity. We used Levin, Lin & Chu (LLC) method to conduct unit root test. This to analyze whether the data used in this research is stationary or not. In addition, this study conducts cointegration test. This test used to examine the existence of a long-term relationship between the variables analyzed. The next stage of the test is the causality analysis between the variables with using a panel vector auto regression (PVAR) – Granger Causality model. The PVAR Granger Causality model employed to examine the causality relationship between financial inclusion and economic development which are formulated as follow:

$$\begin{aligned} \Delta IFI_{it} &= \alpha_0 + \sum_{j=1}^n \alpha_1 \Delta IFI_{i,t-j} + \sum_{j=1}^n \alpha_2 \Delta EC_{i,t-j} + \varphi e_{i,t-1} + \mu_{it} \\ \Delta EC_{it} &= \gamma_0 + \sum_{j=1}^n \gamma_1 \Delta EC_{i,t-j} + \sum_{j=1}^n \gamma_2 \Delta IFI_{i,t-j} + \psi e_{i,t-1} + \varepsilon_{it} \\ \Delta IFI_{it} &= \chi_0 + \sum_{j=1}^n \chi_1 \Delta IFI_{i,t-j} + \sum_{j=1}^n \chi_2 \Delta UN_{i,t-j} + \omega e_{i,t-1} + \mu_{it} \\ \Delta UN_{it} &= \delta_0 + \sum_{j=1}^n \delta_1 \Delta UN_{i,t-j} + \sum_{j=1}^n \delta_2 \Delta IFI_{i,t-j} + \tau e_{i,t-1} + \varepsilon_{it} \\ \Delta IFI_{it} &= \theta_0 + \sum_{j=1}^n \theta_1 \Delta IFI_{i,t-j} + \sum_{j=1}^n \theta_2 \Delta POV_{i,t-j} + \rho e_{i,t-1} + \mu_{it} \\ \Delta POV_{it} &= \lambda_0 + \sum_{j=1}^n \lambda_1 \Delta POV_{i,t-j} + \sum_{j=1}^n \lambda_2 \Delta IFI_{i,t-j} + \theta e_{i,t-1} + \varepsilon_{it} \\ \Delta IFI_{it} &= \eta_0 + \sum_{j=1}^n \eta_1 \Delta IFI_{i,t-j} + \sum_{j=1}^n \eta_2 \Delta GR_{i,t-j} + \kappa e_{i,t-1} + \mu_{it} \\ \Delta GR_{it} &= \sigma_0 + \sum_{j=1}^n \sigma_1 \Delta GR_{i,t-j} + \sum_{j=1}^n \sigma_2 \Delta IFI_{i,t-j} + \xi e_{i,t-1} + \varepsilon_{it} \end{aligned}$$

where:

- IFI = financial inclusion index
- EC = GRDP percapita (Rupiah)
- UN = Open Unemployment Rate (percent)
- POV = poverty rate (percent)
- GR = Gini Ratio (index)
- i = cross section provinces in Indonesia
- t = time series (2013 until 2017)

To examine the causality relationship between variables, this research uses PVAR-Granger causality method. It will be able to identify which of the earlier variables appear. That is, whether financial inclusion leads to economic development indicators or vice versa.

4 RESULT AND DISCUSSION

The calculation of the Financial Inclusion Index was performed following the method introduced by Sarma (2012) as indicated in equation (5). Basically, the financial inclusion level of provinces in Indonesia is low. Only Jakarta province is in a moderate category and fairly stable every year. The various levels of financial inclusion level among provinces in Indonesia shows inequality in access to inter-provincial banking services. The bigger GRDP, the higher financial inclusion in that province.

Table 1. Financial Inclusion Index of Provinces in Indonesia (2013-2017)

Provinces	2015	2016	2017
Aceh	0.137	0.237	0.264
Sumatera Utara	0.488	0.292	0.294
Sumatera Barat	0.135	0.234	0.233
Riau	0.055	0.200	0.203
Jambi	0.105	0.195	0.197
Sumatera Selatan	0.141	0.294	0.289
Bengkulu	0.161	0.242	0.251
Lampung	0.155	0.427	0.424
Kep. Bangka Belitung	0.126	0.189	0.231
Kep. Riau	0.112	0.132	0.133
Dki Jakarta	0.620	0.620	0.620
Jawa Barat	0.215	0.449	0.453
Jawa Tengah	0.171	0.390	0.387
Di Yogyakarta	0.302	0.355	0.370
Jawa Timur	0.169	0.364	0.362
Banten	0.265	0.518	0.514
Bali	0.291	0.336	0.333
Nusa Tenggara Barat	0.150	0.342	0.350
Nusa Tenggara Timur	0.176	0.326	0.381
Kalimantan Barat	0.207	0.308	0.306
Kalimantan Tengah	0.150	0.230	0.248
Kalimantan Selatan	0.198	0.268	0.277

Provinces	2015	2016	2017
Kalimantan Timur	0.080	0.094	0.076
Sulawesi Utara	0.180	0.214	0.211
Sulawesi Tengah	0.129	0.244	0.237
Sulawesi Selatan	0.161	0.267	0.259
Sulawesi Tenggara	0.100	0.195	0.195
Gorontalo	0.159	0.241	0.258
Sulawesi Barat	0.092	0.259	0.267
Maluku	0.191	0.252	0.254
Maluku Utara	0.124	0.191	0.197
Papua Barat	0.223	0.255	0.253
Papua	0.062	0.141	0.140

The low level of financial inclusion in Indonesia indicates that a huge number of people who cannot access banking. The community cannot access banks due to the geographical barriers as Indonesia is an archipelago country so that the cost of establishing a branch office is quite expensive. In addition, strict requirements, complex processes, and high formality become obstacles for people to access banking.

Furthermore, to analyze the financial inclusion relationship and economic development is conducted by the Granger Causality Panel test. These analysis procedures begin with unit root testing, cointegration test, and Granger Causality Panel test. A critical condition before the causality analysis is carried out, the research variable must be stationary or not have unit roots. This study conducts Panel Unit Root Test using Levin, Lin, and Chu Test (Levin, et.al., 2002). The results of processing data show that both variables are declared stationary.

Table 2. Panel Unit Root Test Results Using Levin, Lin & Chu Test

Method	Statistics	Prob	Total (Balanced) observation	Cross-section
Series: IFI				
Levin, Lin & Chu t	-9.759	0.000	128	32
Series : EC				
Levin, Lin & Chu t	-16.249	0.000	132	33
Series : UN				
Levin, Lin & Chu t	-8,853	0.000	132	33
Series : POV				
Levin, Lin & Chu t	-4,886	0.000	132	33
Series : GR				
Levin, Lin & Chu t	-10,539	0.000	132	33

The results of the unit root test indicate that the two variables are stationary variables. Therefore, the

analyses can be followed by a cointegration test. The cointegration test used in this study is the Pedroni Residual Cointegration test (Pedroni, 1999). The estimated result shows that there is a cointegration among variables.

Table 3. Cointegration Test Results Using Pedroni Residual Cointegration Test

	t-Statistic	Prob.	Weighted Statistic	Prob.
Cointegration: IFI and EC				
Panel v-Statistic	-47.47893	1.0000	-2.605182	0.9954
Panel rho-Statistic	0.114855	0.5457	0.037042	0.5148
Panel PP-Statistic	6.126532***	0.0000	-6.744810	0.0000
Panel ADF-Statistic	-5.784282***	0.0000	-6.268550	0.0000
Cointegration: IFI and UN				
Panel v-Statistic	-66.73856	1.0000	-0.278074	0.6095
Panel rho-Statistic	0.637672	0.7382	0.527411	0.7010
Panel PP-Statistic	5.110519***	0.0000	-4.216713	0.0000
Panel ADF-Statistic	-4.835073***	0.0000	-4.167942	0.0000
Cointegration: IFI and POV				
Panel v-Statistic	0.567534	0.2852	0.317260	0.3755
Panel rho-Statistic	1.289416	0.9014	1.664561	0.9520
Panel PP-Statistic	-3.527668**	0.0002	-1.864925	0.0311
Panel ADF-Statistic	-3.604684**	0.0002	-1.856084	0.0317
Cointegration: IFI and GR				
Panel v-Statistic	-54.01402	1.0000	-0.773321	0.7803
Panel rho-Statistic	0.161344	0.5641	0.120381	0.5479
Panel PP-Statistic	4.452373***	0.0000	-4.673994	0.0000
Panel ADF-Statistic	-4.431585***	0.0000	-4.635997	0.0000

Note: *** indicates the rejection of null hypothesis at 1% significant level; ** at 5% significant level and * at 10% significant level

The null hypothesis in the cointegration test is that there is no cointegration between financial inclusion and economic development indicators, i.e. income

percapita, unemployment, poverty and income inequality. Conversely, the alternative hypothesis is that the two variables are cointegrated. The acceptance of these hypothesis considers to the level of significant or p-value. When p-value > 0.05, then the null hypothesis is accepted, conversely, when p-value < 0.05, the alternative hypothesis is not rejected. The results of Pedroni's panel residual-based cointegration test shows that Panel PP-Statistic and Panel ADF-Statistic are significant. Thus, it reveals that the existence of long-run cointegrations between financial inclusion and economic development in Indonesia.

Table 4. Result of Lag Length Criteria Test

Lag	Log L	LR	FPE	AIC	SC	HQ
0	-99.88402	NA	0.000397	6.356607	6.583351	6.432900
1	234.1468	546.5958	2.97e-12	-12.37253	-11.01207*	-11.91478
2	267.0963	43.93272*	2.05e-12	-12.85432	-10.36014	-12.01511
3	296.6811	30.48133	2.13e-12	-13.13219	-9.504292	-11.91151
4	341.0803	32.29030	1.34e-12*	-14.30790*	-9.546281	-12.70576*

Notes:* denotes lag order optimum by the criterion. (each test at 5% level). LR: sequential modified LR test statistic. FPE: Final prediction error. AIC: Akaike information criterion. SC: Schwarz information criterion. HQ: Hannan-Quinn information criterion.

This research also attempts to determine the optimal lag-length to the detect the fit lag for Vector Autoregressive (VAR) model. There are several criterias that commonly used to determine the optimal lag length in the VAR model. The criteria consist of the Akaike information criterion (AIC), Hannan-Quinn (HQ), and Schwarz information criterion (SC). The results reveals some differences in optimal lag length. The AIC and HQ indicate the optimal lag length of 4, while LR indicates the optimal lag length of 2.

Table 5: Estimated VAR Granger Panel Causality/Block Exogeneity Wald Test

Dependent variable: IFI

Excluded	Chi-sq	df	Prob.
EC	0.874028	2	0.6460
GR**	7.120055	2	0.0284
POV*	5.073717	2	0.0791
UN	0.742667	2	0.6898

Dependent variable: EC

Excluded	Chi-sq	df	Prob.
IFI	2.656863	2	0.2649
GR	3.142527	2	0.2078
POV	0.080019	2	0.9608
UN	3.832015	2	0.1472

Dependent variable: GR

Excluded	Chi-sq	df	Prob.
IFI	4.431864	2	0.1091
EC	4.554433	2	0.1026
POV***	13.51105	2	0.0012
UN	2.073878	2	0.3545

Dependent variable: POV

Excluded	Chi-sq	df	Prob.
IFI	0.811811	2	0.6664
EC	3.101273	2	0.2121
GR	0.808440	2	0.6675
UN	0.589400	2	0.7448

Dependent variable: UN

Excluded	Chi-sq	df	Prob.
IFI	0.210226	2	0.9002
EC	1.415067	2	0.4929
GR*	5.706669	2	0.0577
POV	3.750756	2	0.1533

Note: *** indicates the rejection of null hypothesis at 1% significant level; ** at 5% significant level and * at 10% significant level

Based on the estimated result, it reveals that the income percapita causes the financial inclusion in Indonesia at 5% significant level. The poverty also causes the financial inclusion at 10% significant level. On the other hand, there are no causality relationship among the variables. This can be concluded that an increase in Indonesia's income percapita has a contribution to increase the financial inclusion. The people who earn more income tends to be connected to banks and involving in financial activities such as saving, lending and other bank services. Moreover, poverty has a weak contribution to the financial inclusion, since it has a significant relationship with income inequality. The government in Indonesia attempts to reduce the poverty by giving

more access to the poor people to be connected to banks. Since 2007, the government has launched the credit program called Kredit Usaha Rakyat (KUR). The objective of this program is to increase the poor people income through a credit scheme with a low interest rate (7,0% annually) policy. Until year 2018, the Government of Indonesia has delivered around Rp120 trillion for KUR. This policy contributes an impact in increasing the financial inclusion in Indonesia.

5 CONCLUSION AND POLICY IMPLICATION

This study aims to analyze the causality between financial inclusion and economic development in Indonesia. Using the panel data set for 33 provinces from Indonesia for a period of 2013 to 2017, this research applies Panel Vector Autoregressive (P-VAR) Granger Causality test to analyze the relationship among the variables. The main conclusion of this study are as follows: firstly, there is a cointegration among the variables which means there is a long-run and short-run relationship between financial inclusion and economic development. Secondly, the estimation results reveal that the income percapita and poverty has a unidirectional causality to financial inclusion. In other words, an increase in Indonesia's income percapita has an influence on increasing financial inclusion. Poverty also has a positive contribution to financial inclusion as the government has distributed a huge number of credit program to poor people so that they can have more access to financial institutions and increase their financial literacy. However, since Indonesia have approximately 25,0 million of poor people, the credit program policy still does not make a significant impact to financial inclusion.

Based on the estimation results above, increasing financial inclusion in Indonesia is needed to be able to encourage higher income percapita, elevating poverty and reducing income inequality. The Government of Indonesia should continue the credit programs and monitoring the effectiveness of the credit in order to increase income percapita of poor people.

ACKNOWLEDGMENTS

This research was supported by Polytechnic of Medan grant. We would like to express gratitude to Director

of Polytechnic of Medan and to all of our colleagues to support and give valuable guidance for this paper.

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