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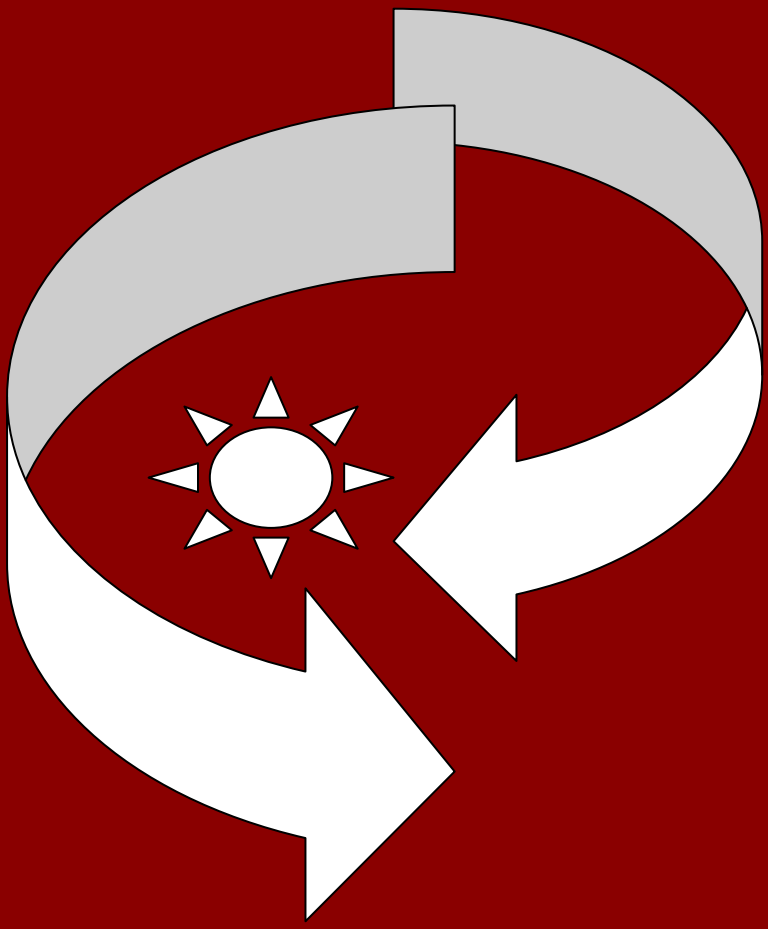

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Factors affecting on bank's profitability: the case of 19 Euro-Area countries

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Abstract

The paper has addressed as the main objective the assessment of productivity performance in euro-area nations, observing a combination of factors both in terms of the internal environment and external factors, or known as macroeconomic factors. The analysis includes 19 euro-area countries with 323 observations, including the period 2003-2019. The dynamic approach, the fixed-effect model, and the Arellano / Bond estimator were applied using the panel data to evaluate the study's factors. The analysis shows that the factors under the competence of their internal supervision impact the degree of profitability on the one hand. Macroeconomic factors also show an impact on the degree of profitability for euro-area countries. Five of the seven factors applied in the analysis turned out to significantly impact, while two turned out to be non-significant. For further studies, it would be beneficial to apply other dynamic models by using other specific factors, which will be considered a useful input to the financial industry and financial policy-making.

Keywords: *Fixed-effect, GMM, Panel data, Profitability*

JEL Classification: G21, G23, G33.

INTRODUCTION

The area of banking economics, namely the banking system in the current environment of globalization, continues to be a very attractive and challenging area for many studies, researchers, and policymakers. The year 2021 would be a year where many researchers are researching the impact of the global pandemic known as COVID-19 on the economy, respectively, on the financial system's productivity and policies towards maintaining financial stability. To conduct such research, many researchers have used various features to conduct their analyses and examine the effects on the banking system's profitability.

Another specificity presented by the researchers is that in their analysis, they have made the application of specific factors of the financial industry and macroeconomic factors by analyzing individual countries and panel countries. Current researchers often used they have applied specific financial industry factors and macroeconomic factors by analyzing individual countries. In contrast, this study examines panel data for 19 countries that are part of the euro area. The non-inclusion of the rest of the euro-area

countries lies in the fact that data for these countries were not available in the World Bank database. The data used are in the World Bank format, and they are also aggregated for each country separately. Economic activities in each euro area country are considered to impact the profitability of the banking sector directly. Before the outbreak of the Covid-19 pandemic within the individual euro area countries, there was financial instability, despite the austerity measures and directives of the European Central Bank - ECB, which has set strict financial measures supervision after the last global financial crisis.

The motivation to conduct this investigation is to understand which factors impact profitability, considering those issues in bank management and the impact of the problems that are not within the bank's supervisory competence. The dynamic approach was applied, modeling the fixed-effect regression model and the well-known Arellano-Bond Estimator method to observe these factors' correlation. This research structure consists of sections starting from the literature review, methodology, and data, econometric analysis, conclusions as a final part.

LITERATURE REVIEW

Capital adequacy (CAR), likewise recognized as capital to risk-weighted assets, as a proportion, measures a financial strength of a bank by using its capital and assets. From the regulatory point of view, CAR is considered a tool to defend depositors and stimulate financial systems' stability and effectiveness worldwide (Pasiouras & Kosmidou., 2007). Moreover, Sharif (2015), on his revision by considering the latest seven (7) years data with the time series of the period from 2008 to 2014 through establishing OLS regression models for 13 private commercials in banks of Bangladesh, come to the outcome that that CAR is considerably associated with profitability. Moreover, as Oyetayo et al. (2019) stated, there is a significant association between CAR and banks' productivity in Nigeria. Furthermore, the same author concluded that CAR proves to be a strong factor in profit planning and capital structure decisions.

Whereas when it comes to liquidity and its impact on profitability, Lukorito et al. (2014) used a multiple regression model to analyze bank productivity variation between commercial banks by changing liquidity. They assumed that liquidity is significantly associated with a bank’s productivity. Nevertheless, when liquid assets are held entirely, they yield low or zero interest. The revision noted that banks' liquidity was one of the major determinants of Kenyan bank’s profitability. Liquidity has a very significant effect on profitability, and however, when liquid assets are held in banks, they generate little or no interest.

Furthermore, there is an opportunity cost when holding low return assets, which eventually outweighs the benefit of any increase in the bank’s liquidity resiliency as perceived by funding markets, Durguti, (2020). Banks should maintain adequate liquidity levels through short-term marketable securities to realize profits for the banks (Lukorito et al., 2014). Also, Garcia-Herrero et al. (2009) examined the contributing factor that distresses the efficiency of 87 banks in China for 1997-2004. Their outcomes exposed that CAR, total deposits –to-total assets, interest rates (IR) as well as inflation take a confident impact on banks' efficiency

When it comes to Non-Performing Loans (NPL) affect the bank’s profitability, there are various studies made by different authors that have concluded that there is a relationship between NPL and banks’ profitability. According to an investigation performed by Eyup et al. (2017), by using a panel regression method, including 1809 observation for 55 Banks in Turkey for a period from 2005 to 2016, they concluded

there is a noteworthy, adverse relationship among non-performing loans and bank profitability which Return measures on Equity and Return on Asset.

Regarding GDP growth and its effect on banks' profitability, Tan (2012) showing that higher GDP growth leads to lower bank profitability in China. They also found that the Chinese banking industry's profitability is significantly affected by non-performing loans, and Chinese banks with higher levels of capital have lower profitability. Khrawish (2011) revised Jordanian commercial banks for the period from 2000 to 2010 and concluded that inflation has a negative impact on profitability. According to Jeevitha et al. (2019), the inflation rate does not affect the bank's profitability because other major factors like GDP, interest rates, investments, and internal bank variables may affect banks' profitability. On the same revision, there is no important association between inflation and banks' profitability for the period from 2014 to 2018.

The (HHI) is a monetary measure that evaluates a business's size compared to the level of competition concerning businesses in a similar branch. A small awareness of this indicator reveals that the corporate operates within the closest competition situation (Linares-Mustarós, Coenders, & Vives-Mestres, 2018).

METHODS

To investigate the impact of determinants on the banking industry's profitability as a dependent variable, we used other independent variables such as capital adequacy, liquid assets, funds source, asset quality, Herfindahl Hirschman Index, GDP growth, and inflation rate. The study includes data for 19 euro area countries annually, including the period 2003-2019 with 323 observations. The data used in this study are provided from the World Bank database. The methodology used in this study is the dynamic approach through fixed-effect regression and the Arellano-Bond GMM estimator.

We are based on studies conducted by Athanasoglou et al. (2008) and Ablertazzi & Gambacorta (2009) for selected indicators divided into two subgroups. In Table 1, we will present the study's factors and the expected results.

Table 1. Variables and expected sign

Variable		Denominations	Acronyms	Sign
Dependent variable	Profitability	Return on assets	ROA	
Explanatory variables	Bank-specific factors	Capital Adequacy	CAR	+
		Liquid Assets	LA	+
		Funds source	FS	+
		Assets Quality	NPL's	+/-
		Herfindahl Hirschman Index	HHI	+/-
Explanatory variables	Macroeconomics factors	GDP growth rate	GDP_g	+
		Inflation rate	Inf_r	+/-

Based on the explanation of the factors included in this examination and the defined methodology on the applied econometric investigation, in the following we will present the equations of the fixed-effect and the GMM estimator:

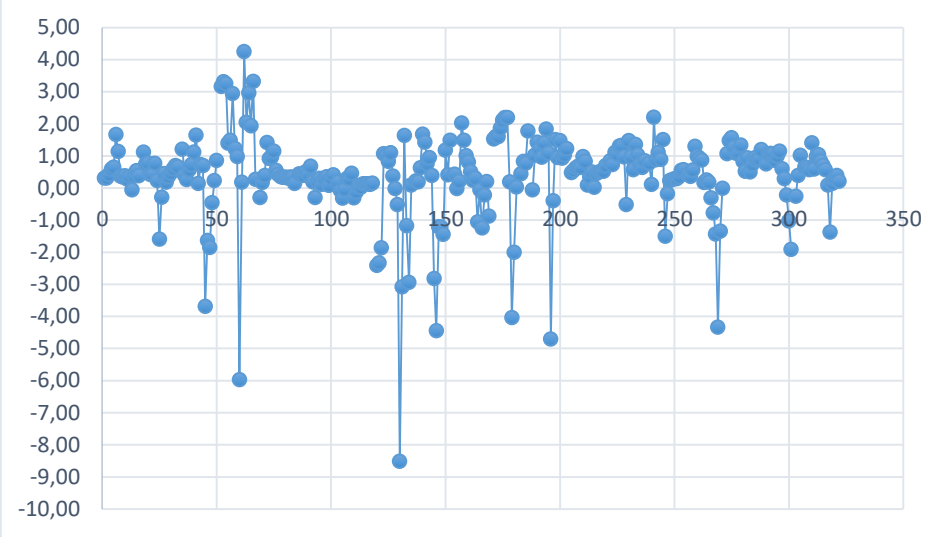
$$\mathrm{ROA_{it}} = \alpha + \beta_1(\mathrm{CA}_{it}) + \beta_2(\mathrm{LA}_{it}) + \beta_3(\mathrm{FS}_{it}) + \beta_4(\mathrm{AQ}_{it}) + \beta_5(\mathrm{HHI}_{it}) + \beta_6(\mathrm{GDP\_G}_{it}) + \beta_7(\mathrm{IR}_{it}) + \varepsilon_{\mathrm{it}}$$

The formula according to the dynamic-GMM approach, applying the factors outlined within the 1st difference is:

$$\Delta ROA_{it} = \alpha + \mu(ROA)_{t-1} + \alpha + \beta_1(CA_{it}) + \beta_2(LA_{it}) + \beta_3(FS_{it}) + \beta_4(AQ_{it}) + \beta_5(HHI_{it}) + \beta_6(GDP_{it}) + \beta_7(IR_{it}) + \varepsilon_{it}$$

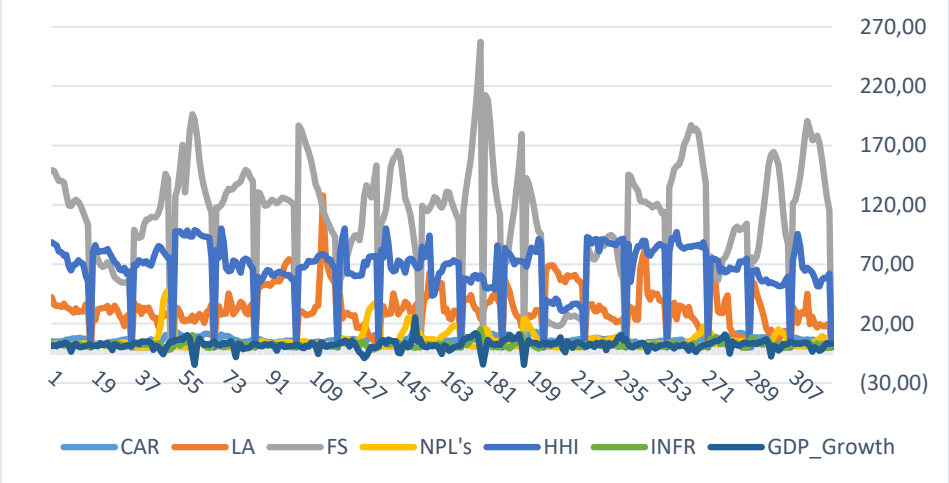
RESULTS AND DISCUSSION

Descriptive statistics, correlation analysis, and some of the important tests on heteroscedasticity and multicollinearity will be presented before applying the dynamic and GMM methods. Based on the information shown in Figure 1, the factors selected for econometric investigation. Figure 2 will give the variations of features by separating them into two groups, explicitly assessing the bank's proficiency and the features influencing the bank's productivity.



Source: World Banka Dataset & Author's calculation

Figure 1. Return on assets variation



Source: World Banka Dataset & Author's calculation

Figure 2. Other variables - explanatory factors

Table 2 presents the detailed core statistics for all selected parameters on assessing the degree of profitability.

Table 2. Summary statistics

Variables	Obs	Mean	Std.Dev.	Min	Max
ROA	323	.37	1.24	-8.52	4.24
CA	323	6.66	2.72	2.70	14.35
LA	323	32.43	17.46	5.27	127.97
FS	323	109.49	49.45	17.97	257.32
AQ	323	5.91	7.89	.01	48.68
HHI	323	67.47	21.85	30.61	100.00
GDP_G	323	2.15	2.05	-14.81	25.12
IR	323	2.19	3.88	-4.48	15.40

The return on assets shows the mean constant among periods was with a coefficient of .37 and a standard deviation of 1.24. The minimum value has reached -8.52, this value achieved by Greece in 2011, while the maximum has reached 4.24 value achieved by Estonia in 2011. Capital to assets have variations with a standard deviation of 2.72. The minimum value is 2.70, reached in 2001 in Belgium's banking system, while the maximum value is 14.35 was reached in Ireland's banking system in 2017. The liquid assets measurement indicator reached a minimum value in 2016, in Greece, with a value of 2.70, while the maximum value of 127.97 was reached in Germany's banking system in 2011. The parameter that has to do with the financing fund sources is noticed that there are oscillations within the euro-area countries with a standard deviation of 49.45. This indicator's minimum value is 17.97 achieved by Luxembourg in 2006, and the maximum was 257.32 in the Latvian banking system in 2008.

Asset quality is the main indicator that can destabilize the financial system within a country. Regulatory authorities have committed great importance to maintain financial stability. This indicator reached the minimum value in Luxembourg's banking system in 2006 at only 0.10, while the maximum reached 48.68 in 2014 in Latvia's banking system.

Regarding the degree of market concentration or market share, the HHI indicator reached a minimum value of 30.61 in the Luxembourg banking system in 2006. Finland reached a maximum value of 100 in 2003. The next variable that is considered an external factor on the measurement of banks' profitability is GDP_growth. The minimum value is -14.81, while the maximum is 25.12 achieved by Lithuania in 2009 respectively by Ireland in 2015. And at the bottom is inflation, where the minimum value achieved is - 4.48 reached in 2009 in Ireland and the maximum is 15.40 achieved in 2008 by Latvia.

Table 3 indicates the correlations among the variables applied to return on assets, which is the main indicator for measuring profitability. It is noticed that the return on assets has a significant association with a coefficient of 0.545 or 54.5 percent. In comparison, a strong negative association has the return on assets with the quality of assets or non-performing loans with a constant of -0.355 or 35.5 percent. However, other variables show a moderate positive relationship with the return on assets.

Table 3. Correlation statistics

Variables	ROA	CA	LA	FS	AQ	HHI	GDP_G	IR
ROA	1.000							
CA	0.167	1.000						
LA	0.136	-0.229	1.000					
FS	0.031	-0.071	0.047	1.000				
AQ	-0.355	0.248	-0.283	-0.024	1.000			
HHI	0.090	0.004	0.183	0.538	-0.025	1.000		
GDP_G	0.188	-0.041	0.045	0.139	-0.311	0.044	1.000	
IR	0.545	0.235	0.068	-0.122	-0.205	-0.026	0.153	1.000

Based on the outputs generated in this study, it would initially be necessary to analyze and discuss some applied tests that determine the applied models' importance and adequacy. The F-test has a coefficient of 7.28, with a probability of 0.000. It tells us that all the constants applied in the model have a value less than 10. Based on this, we can state that the parameters are suitable for a stable examination. Additional arguments that add value to the model's stability are R-squared is in the value of 0.541, which means that the explanatory variables impact or describe the dependent variable at the level of 54.1 percent.

At the same time, R-adjusted tells us that there is an association among properties at the level of 37.7 percent. For evaluating the second approach through GMM estimation, we have applied the AR (1) test, where wald chi2 is 173.34 with a probability of 0.000, which indicates the adequacy of the applied approach. Finally, concerning the applied tests is also the Kao-test for data co-integration. This test's outputs show that the applied data have no co-integration since the test's value is 10.772 with probability P = 0.000.

Table 4. Estimation results

Variable	Fixed Effects regression model		GMM- Arellano-Bond Estimation	
	ROA		ROA 1st lag	
	Coefficient	P>[t]	Coefficient	P>[t]
Constant	-.8426317	0.011	-.9372655	0.005
CA	.0806817	0.012	.0719395	0.031
LA	.0055973	0.062	.0059416	0.032
FS	.0039163	0.042	.0039260	0.048
AQ	-.0355943	0.000	-.025014	0.022
HHI	-.0013239	0.764	-.0004817	0.915
IF	.0146096	0.633	-.0025676	0.936
GDP_G	.1531046	0.000	.1462573	0.000
Observation	323	323	323	323
R-squared	0.5414	--	--	--
Adj. R-squared	0.3775	--	--	--
F-test	F (7,297)	Prob >F P=0.000	--	--
Wald Chi 2	--	--	Wald chi^2=173.34	P > chi^2 = 0.000
Kao test for co-integration	--	--	DF t-10.7724	P=0.000
Model	FE Regression Model		Arellano-Bond GMM	

Table 4, which presents the econometric analysis outcomes, shows that capital adequacy has a noteworthy positive effect on euro area banks' productivity. Model 1 with a significance level of 99.9 percent and the evaluation of the dynamic method known as Arrellano-Bond has the same level of significance of 99.9 percent. These outputs give us complete confidence to ascertain that banks with adequate capital or meet the criteria set by regulatory authorities affect banks' most productive performance.

These marks are in full accordance with the studies conducted by (Christaria & Kurnia., 2016) and the study conducted by Durguti (2020) involving 685 eurozone banks covering the period 2012 2019. The outcomes of these revisions show that capital adequacy has a noteworthy positive effect on banks' effectiveness. The parameter on liquidity measurement in both models has a noteworthy effect on the effectiveness of banks. In the fixed-effect regression model, there is a positive effect with a significance level of 95.0 percent. At the same time, according to the dynamic approach, GMM has a significant positive effect with a significance level of 99.9 percent. Also, the results of the second parameter are in full agreement with the revision conducted by Durguti et al. (2020), which analyzed the banks that operate in Kosovo, including the period 2006-

2019, and the results of this study show that liquidity has a positive impact on bank performance.

The other parameter that is considered vital is the Funds Source, which has a noteworthy positive effect at the significance level of 95.0 percent in both models. The quality of assets, respectively, non-performing loans, are at the center of many authors' discussion. Our analysis has resulted in the expected outcomes where there is a noteworthy negative effect on bank profitability in both assessments with an importance level of 99.9 percent. This study's outcomes are confirmed by the studies of (Linares-Mustarós, Coenders, & Vives-Mestres, 2018). This revision's outcomes argue that the deterioration of asset quality, respectively non-performing loans, forces banks to allocate reserves to cover losses, leading to a decrease in banks' profits. The last parameter that has a noteworthy positive effect on banks' performance is GDP_growth with an importance level of 99.9 percent in both estimates. This study's results are consistent with the outcomes (Christaria & Kurnia., 2016) where they argue that any increase in GDP affects the increase in banks' profitability. In contrast, two parameters that have shown non-significant outcomes are the Herfindahl index and inflation.

CONCLUSIONS AND RECOMMENDATIONS

Conclusion

The study presently includes investigating the main profitability factors for the 19 Eurozone countries, applying the two valuation methods through the dynamic approach to see their effect on euro area banks' profitability. After performing the empirical analysis, we can underline that the generated results are consistent with the expected results. Therefore, CAR, liquidity, fund of source, asset quality, non-performing loans, and economic growth impact the bank's profitability.

Meanwhile, the other two factors Herfindahl-Hirschman Index (HHI) and inflation, have turned out to be insignificant in the bank's profitability. The study results are consistent with previous studies and make the accurate identification of factors that impact bank productivity.

Recommendations

Banks need to continue to hold liquid assets to comply with regulatory requirements and respond to customer (depository) requirements, especially in crisis times, even though this does not enable banks to make a high degree of profit. Moreover, the banks' decision-making structures, such as the board of directors, CEOs, and other management structures, focus on internal factors that directly impact banks' profitability. When it comes to risk management practices, it is necessary to increase the credit risk management committee's awareness of non-performing loans, as they directly affect profitability. Using advanced techniques on assessing and preventing financial shocks that may occur in future periods, such as pandemic (COVID-19) situations, is recommended.

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Identifying factors influencing the low-income community in urban slum settlements in South Sumatera, Indonesia

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Abstract

The study is identifying factors influencing the low-income community in urban slum settlements in South Sumatra. The data utilized is primary data is taken through surveys and in-depth interviews. The samples were taken from 115 respondents purposively in the three cities of Palembang, Prabumulih, and Pagar Alam that are receiving benefits from the KOTAKU Program. The methods utilized are descriptive qualitative and quantitative approaches by applying multiple regression models. This study's findings indicate that jointly the variables of education level, age, family members, income expectations, and work types significantly affect the low-income communities' income level. Likewise, partially the education level variables, the family members, income expectations, and types of work positively and significantly affect income level. In contrast, the age variable has a negative and significant effect on the low-income community's income level in urban slums of South Sumatra.

***Keywords**:* Low-income community, Prosperity, Urban slum, Welfare, Indonesia

JEL Classification: P14, P25, R14, R20.

INTRODUCTION

The development of economic activities in urban areas is undeniably directly proportional to the community's welfare level. Besides, the urban economy's stretching is the main attraction as one reason for the individual to urbanization (Hussain & Imitiyaz, 2019; Leon, 2008). This condition raises the problems such as limited city capacity, crime, cleanliness/rubbish, health, and slums in the urban areas.

Slums in the city become a problem that requires serious attention from the government. The settlements can be viewed from land, housing, community, basic facilities, and infrastructure, which are intertwined in a socio-economic and cultural system both in a slum environment ecosystem itself or a city ecosystem. Slums must be viewed in their entirety and intellectually in a broader dimension. According to Sastra, Suparno, & Marlina (2006), several dimensions of slums that must always receive serious attention are land issues in urban areas, basic infrastructure and facilities issues, socio-economic problems, socio-cultural issues, urban spatial issues, accessibility issues (Yuliana et al., 2017).

The challenge for developing cities lies in the proper and inclusive management of slum settlements if the area is to progress in a sustainable manner (Tannerfelt & Ljung, 2006). It is also related to social, physical, social change, economy, politics, and urban environment. The cities function as multi-dimensional and multi-dimensional

machine rooms for human development (Nocca, 2017). The well-developed cities have always been attractive for residents looking for opportunities (Abubakar et al., 2019; Agnihotri, 1994; Glaeser, 2011).

The main purpose of moving or living in the city is to improve welfare and a better life. However, urban slums have always been a relatively easy source of living, accessible, and often permanent residence for the poor or the less fortunate. The urban area is paving the way to prosperity; the other side of the city is also causing inequality, economic and environmental challenges (Abubakar et al., 2019; Arimah, 2017; Nocca, 2017). Prosperity in urban areas is increasingly worrying. When it comes to slum settlements, poor governance and weak institutions can be linked. Herein lies the potential for engaging in this idea: for slums, cities have certain potentials for improvement and overall well-being; for the city, the way to achieve this goal is through prosperity (Abubakar et al., 2019).

The concept of prosperity has recently been studied as a significant measure of the life of a country, city, or population (Abubakar et al., 2019). Recent progress in understanding prosperity has been threefold: first, it recognizes that from a welfare perspective, prosperity is not only linked to economic growth - an aspect highlighted by the long-standing economic monopoly on the general concept of prosperity (Abubakar et al., 2019; De Snyder et al., 2011). Instead, it also concerns social and environmental criteria that address the growing gap between rural and urban areas. On the other side, prosperity is a relative concept rather than an absolute one (Abubakar et al., 2019; Yuliana et al., 2017).

Slum settlements in urban areas are always associated with the lack of availability of access to facilities and infrastructure, economic and social access, and the behavior of people whose majority of the population has low income (Ferrer et al., 2018; Parvin et al., 2016). To ensure sustainable slum upgrading needs to be supported by sustainable livelihoods, the government has a city without slum (KOTAKU) program. The program focuses on increasing the low-income community's capacity (MBR) in converting assets into income through synergies between increasing the pentagonal assets of low-income communities and developing the local economy.

This program is one of the government's strategic efforts to accelerate the handling of urban slums. This program utilized a collaborative platform between the central government, provincial governments, local governments, communities, and stakeholders by positioning the community and local government as the main actors. Funding for this program comes from the central government, provincial governments, local governments, non-government organizations, stakeholders, and government development partners such as the World Bank, the Asian Infrastructure Investment Bank, and the Islamic Development Bank. The funding source from government development partners (loans) is around 45% of the total financing needs.

The related studies have conducted by Siregar (2013) indicated that the level of community willingness to receive the benefits of the Urban Land Consolidation program was quite high at 64%. The significant variables influential to receive the program urban land consolidation are age, gender, work, area of origin, number of families, land area, number of building floors, length of stay, age of the building, number of rooms, the guarantee of getting property right certificate (SHMRSS) and a guarantee of compensation for relocation costs. Furthermore, Sastanti & Fibriani (2019) found that the priority factors for riverbank slum areas are urban land factors, spatial factors, and building ownership status factors. Priority factors that influence dense urban slums are urban land factors, spatial factors, and economic factors (Mahamud et al., 2016). Simultaneously, the priority factors that influence slum areas along the

railroad tracks are the building's ownership status, economic factors, and spatial factors (Krisandriyana et al., 2019).

Krisandriyana et al. (2019) found that slum areas in Surakarta city consist of three typologies, namely slum areas along the riverbanks, densely populated urban slum areas, and slum areas along the railroad tracks. This area is relatively neglected due to the decline in its physical, socio-economic, and socio-cultural qualities. These settlements are inhabited by a poor society that is densely populated and has minimal infrastructure. Many factors can affect slum areas, and these factors include urbanization, infrastructure, economy, urban land, spatial planning, urban attractiveness, socio-cultural, building ownership status, and length of stay (Chirisa, 2010; Esch et al., 2014).

On the other hand, the study conducted by Handito & Imron (2015) showed that meeting the poor's food needs depends on daily income. Therefore the poor have a way to be able to survive with low and uncertain income. Meanwhile, Dyah et al. (2010) that the development guidance (arrangement directions) involves the improvements of settlement infrastructures such as procurement of open green space facilities, the quality, and quantity of clean water supply, improvement of drainage facilities, and garbage disposal systems. Intensity settings of buildings in residential areas in the form of restrictions on KDB (Basic Building Coefficient) 70% and KLB (Building Floor Coefficient) 140% and controlling trade area intensity. The arrangement of social and economic improvement to minimize the Tunjungan square settlement problems and optimize the Tunjungan square area's potential.

Additionally, the results of the study by Heston & Yusuf (2013) explain that the success of social assistance in the rearrangement of urban slums depends on increasing the capacity of government governance and community. Valuable study on developing countries that deserve consideration has been carried out by Samuel et al. (2017). His study found that the relationship between the poor and friends, family, and communities in slum settlements was the main factor for this cluster's difficulty to move on of poverty because most of these clusters valued their social connectedness intrinsically. Therefore, social connectedness is an important factor that needs to be considered in overcoming multi-dimensional poverty effectively in certain clusters.

This study refers to the sustainable livelihood model (SL model). This approach explains three insights about poverty that underlie this approach (Krantz, 2001). The first is the awareness that although economic growth may be important for poverty reduction, there is no direct relationship between the two because it all depends on the poor's ability to take advantage of economic opportunities. Second, there is an awareness that the poor understand poverty is a problem of low income and includes other dimensions such as low education, poor health, lack of social security, and others. Third, the poor themselves are often best informed of their situation and needs and must design policies and projects to improve their lot. There is no integrated approach to implementing the SL model. this approach can be used as an analytical framework for program assessment, such as implementing the KOTAKU program. However, three basic features are common to most approaches (Krantz, 2001). First, the focus is on the livelihoods of the poor. The second is that this approach can reject standard procedures from conventional approaches that take certain sectors such as agriculture. Third, the SL approach emphasizes programs that involve all parties, such as the government, community organizations, and government development partners, to identify and implement a policy program.

In this regard, this study focuses on the level of welfare of low-income people in urban slum areas. As explained in the previous introduction, this research is still interesting because it focuses on slum settlements that target the KOTAKU program in

the province of South Sumatra, such as Palembang, Prabumulih, and Pagar Alam city. Therefore this study aims to identify factors that affect the low-income community in urban slum settlements. These factors are reviewed from socio-economic variables such as education level, age, type of work, family member, and income expectations. In the next section, we describe the research method, results and discussion, and finally, this study's conclusions.

METHODS

This study's concentration on the low-income community in urban slums as targets of the KOTAKU program in South Sumatera Province. The study location is three cities receiving the KOTAKU Program namely Palembang, Prabumulih, and Pagar Alam. The samples were taken as much as 10 percent of households at ten urban villages. This urban village was taken based on considering that most households in urban villages are targets of the KOTAKU program.

The sample was taken as many as 115 respondents purposively, with an estimated precision of 90% of the surveyed samples. Data collection methods are surveys and in-depth interviews with respondents. The respondents have the criteria of the low-income community below the poverty line of the Province of South Sumatra as of September 2018, i.e., earning IDR.441,049 per capita/month or earning IDR.2,035,988 per household per month. Data consist of qualitative and quantitative; the variable definitions and data measurements used in this study are presented in Table 1.

Table 1. Definitions of variables

Variable and Descriptions			Unit	Definition
INC	:	Low-income community (MBR)	IDR	The community income below the poverty line of the Province of South Sumatra is September 2018, namely MBR earning IDR.441,049 per capita/month or earning IDR. 2,035,988/household per month
EDU	:	Education level	year	The education level is the last level of education achieved by respondents
AGE	:	Age rate	year	The age of the respondent
FAM	:	Family members	number	The number of family members nurtures by the household head of the family consisting of wife, children, and others
TO	:	Type of work	dummy	The type of work is household assistant and day laborer
RE	:	Income expectations	IDR	Income expectations are a number of future income expectations of the respondent measured by the difference between the age of the respondent and the income received

To analyze the factors affecting low-income communities in urban slum settlements, cross-tabulation and quantitative approaches utilized regression models with the ordinary least square method (OLS). The welfare function, which is proxied by income household, is a function of the following variables in equation 1:

$$\mathrm{INC} = \mathrm{f}\,(\mathrm{EDU}, \mathrm{AGE}, \mathrm{TO}, \mathrm{FAM}, \mathrm{RE}) \quad (1)$$

Furthermore, the model specifications are as follows.

$$\mathrm{INC_i} = \alpha_0 + \alpha_1 \mathrm{EDU_i} + \alpha_2 \mathrm{AGE_i} + \alpha_3 \mathrm{TO_i} + \alpha_4 \mathrm{FAM_i} + \alpha_5 \mathrm{RE_i} + \varepsilon_i \quad (2)$$

Where: INC is the low-income community (IDR); EDU is education level (year); AGE is age rate (year); FAM is family members (person); RE is revenue expectations (IDR); TO is the type of work (dummy); α_0 is constant-coefficient; $\alpha_{1,2,3,4,5}$ is coefficients of

the parameters; and ε_i is the error term.

The forthcoming stage to evaluate and analyze the model estimation result based on three criteria. These are (1) diagnostic test of econometrics seen from OLS method violation tests including autocorrelation, heteroscedasticity, and multicollinearity tests; (2) statistical criteria seen from the coefficient value f-test and t-test; and (3) economic criteria seen from the consistency of sign on each coefficient of the independent variables whether accordance with the existing economic theory and previous studies.

RESULTS AND DISCUSSION

Socio-economic conditions of low-income communities in urban slums

According to the Central Statistics Agency (BPS), slums are areas of a residence inhabited by communities in slum settlements that occupy temporary buildings, no access to safe water to drink, lack of proper sanitation facilities, and inadequate environmental conditions. Furthermore, the World Bank (1999) explains that slums are an overlooked part of urban development. It is indicated by the socio-demographic conditions in slums, such as high population density, environmental conditions that are not livable and satisfy the requirements, and the lack of educational facilities, health, and socio-cultural infrastructure. The main factor for the growth of slums is the incessant rural-urban drifts. The following explained the income level based on socio-economic characteristics of household head in urban slums in South Sumatra, using the cross-tabulation as follows:

Table 2. Income level based on education level respondents in urban slums (percent)

Education level	Income level (in rupiah)		
	< 1 million	1 – 2 million	> 2 million
Incomplete primary school	48.33	3.03	0.00
Primary school	30.67	12.12	0.00
Junior high school	12.13	15.15	0.00
Senior high school	8.87	60.6	48.00
Bachelor degree	0.00	9.09	52.00

In Table 2, it can be seen that respondents with an education level that incomplete primary school are 48.33 percent on average earning less than IDR.1,000,000 per month. On the other hand, respondents with a high school education are 60.6 percent, with an average income of between IDR.1,000,000-2,000,000 per month. It showed that the importance of education in the family. Education is believed to be very influential on one's skills, behavior, and attitudes and influences one's income level.

Table 3. Income level based on the age of respondents in urban slums (percent)

Age rate (year)	Income level (in rupiah)		
	< 1 million	1 - 2 million	> 2 million
less than 30 year	60.00	40.00	0.00
between 30 – 60 year	42.57	56.43	0.99
more than 60 year	75.00	25.00	0.00

A person's productivity at work is influenced by age. Generally, someone of productive age will earn more income than someone of non-productive age. This age structure will affect the economic activities carried out by that person. Respondents in the range of 30 to 60 years, as much as 56.43 percent, have income between IDR.1,000,000-2,000,000 per month. This condition showed a direct relationship between the productive age and the respondents' income level (Table 3).

Table 4. Income levels based on family members in urban slums (percent)

Family members (persons)	Income level (in rupiah)		
	< 1 million	1 – 2 million	> 2 million
less than 3 persons	40.00	55.00	5.00
between 3 - 5 persons	38.36	54.79	0.00
more than 5 persons	45.45	54.54	0.00

In Table 4, as much as 54.79 percent of respondents earn between IDR. 1,000,000-2,000,000 and have family members between 3 to 5 persons. In theory, the number of family members will motivate someone to work hard to meet the needs of their family life

Table 5. Income levels based on the type of work in urban slums (percent)

Type of work	Income level (in rupiah)		
	< 1 million	1 – 2 million	> 2 million
Household assistant	72.00	28.00	0.00
Daily laborer	78.72	21.28	0.00

Based on Table 5, the average respondent earns less than IDR.1,000,000, with the type of work being processed household assistant and daily laborers. The rest will earn between IDR.1,000,000-2,000,000. This condition showed that most respondents work in the informal sector.

Determinants of income levels of low-income communities in urban slums

The diagnostic test using serial correlation (LM test) Breusch-Godfrey criteria shows that the probability of chi-squares value of 0.491 greater than the significant level of 0.05. It means the model does not experience autocorrelation problems Autocorrelation test. Furthermore, using the Heteroskedasticity test: ARCH, obtained chi-squares probability value of 0.732 greater than the significant level of 0.05, then Ho is accepted, which means the model does not experience the problem of heteroskedasticity. All variables have a value of variance inflation factor (VIF) < 10, concluded free of multicollinearity.

Table 6. The result of model estimation

Dependent variable = INC					
Variable		Coefficient	t-test	Sig.	VIF
C	Constant	15.978*** (3.174)	3.174	0.000	-
EDU	Education level	0.060*** (0.024)	2.465	0.015	1.248
AGE	Age rate	-7.826*** (-0.913)	-8.563	0.000	1.112
TO	Type of work	4.335*** (1.528)	2.836	0.000	1.166
FAM	Family members	4.041*** (0.412)	9.787	0.000	1.226
RE	Revenue expectations	1.231*** (0.112)	10.982	0.005	1.175
R^2 = 0.8515; $F_{statistic}$ = 125.066; $Prob_{(F\text{-}statistic)}$ = 0.000; $DW_{statsitic}$ = 1.803					
LM-test = 3.808 [0.491]; ARCH-test = 0.535 [0.732]					

*Note: the level of significant at ***1%, **5%, *1%*

To determine the effect of education level, age, family members, income expectations, and type of work on income level in urban slums in South Sumatra

Province. The estimation model results show that the f-test value is 125.066, and the probability value of 0.000 is smaller than the significance level of 0.05. So, it can be stated that independent variables, i.e., the education level, age, family members, type of work, and income expectation, significantly influence the level of the income level of low-income community families in urban slums areas. It also can be seen from the coefficient of determination (R^2) of 0.8515. It means that variations in the low-income community's income level in urban slums explain by the variation of the independent variables are 85.15 percent, the remaining 14.85 percent is determined by the variation of other variables outside the model used in this study.

The effect of education on income level

The estimation results obtained the coefficient value of the education level variable of 0.060, and the probability value of 0.015 is smaller than the significant level of 0.05. Thus, the educational variable significantly influences low-income community families' income in urban slum areas in South Sumatra Province. It means that the hypothesis that there is an effect of education on individuals' income level in the slum areas of South Sumatra Province is accepted. The education level was one measure of a person's quality; the higher a person's education, the more rational thinking. The estimation results show the value of the respondent education level coefficient was 0.060, and the effect was positive on family income. It means that if there is an increase in one level of education for each individual, the income received will increase by 0.060 or 6 percent. This seen that respondents with an education level did not complete primary school as many as 48.33 percent with an average income of less than IDR.1,000,000 per month.

On the other hand, respondents with a high school education are 60.6 percent, with an average income of between IDR.1,000,000-2,000,000 per month. Education is believed to be very influential in one's skills, behavior, and attitudes and influences one's income level. It means that the higher a person's level of education, the more it is possible to obtain a higher income. The study results support this finding by Putri & Setiawina (2013) and found evidence that education level has a significant effect on income levels.

The effect of age on income level

The estimation results obtained statistically show that the coefficient value of -7.826 and a probability value of 0.000 smaller than the significance level of 0.05. Thus, the age variable has a negative sign and a significant effect on income level in urban slum areas. It means that the hypothesis stating that there was an influence of age on low-income community families' income in the urban slums of South Sumatra is accepted. A person's productivity at work is greatly influenced by age. A general individual who was at a productive age will earn more income than an individual is of non-productive age. From the regression model's estimation results, the coefficient of the age variable value of -7.826 means that if during the productive age, the income level will rise. But if the age was no longer productive, there was a decrease in the level of income. Therefore the direction of the coefficient value of the age variable is negative. It was supported by Julianto & Utari (2017); the study found that age has a positive sign and significant effect on income level.

The effect of type of work on income level

From the estimation results obtained statistically, the work type's coefficient value is 4.335, and the probability value of 0.005 smaller than the 0.05 significance level. Thus, the variable type of work is significant and positively influences the income level in urban slum areas. The type of work performed will determine the income received by

respondents. Also, the type of work a person will see by the skills possessed. From the data processing results, the work type coefficient is 4.335, and the effect is significant. It means that respondents have different types of work as a determinant of the level of income received.

The effect of family members on income level

The estimation results obtained the coefficient value of the family members variable of 4.041 and a probability value of 0.000 smaller than the significance level of 0.05. Thus, the family members variable has a positive sign and significant effect on the income level in urban slum areas. The hypothesis states that family members' influence on income level in urban slums is accepted. Family members were the obligation of the head of the family to meet the family's living needs. The greater the family members, the family head should be more motivated to earn a living earning his family income. From the estimation results, it can be seen that the coefficient value of the family members variable is 4.041, meaning that if there is an addition of 1 person of the family member, then the income level will rise by 4.04 percent. The coefficient value reflects the relationship condition between family members and the income level received. This finding was in line and supported the study conducted by Murti et al. (2017).

The effect of income expectations on income level

The calculation results obtained the coefficient value of the income expectations statistically variable is 1.231 and a probability value of 0.000 smaller than the 0.05 significance level. Thus, the income expectation variable significantly influenced low-income community families' income in urban slum areas. It means that the hypothesis stating that there was an influence of income expectations on the income level in the urban slums is accepted. Theoretically, consumption of the live cycle hypothesis states that future income expectations will determine the amount of consumption expenditure. It was certainly related to a person's age. The income expectation variable is significant but has a negative effect on respondents' level of income, with a coefficient value of 1.231. It means that the higher income expectations, the higher the level of income received by respondents.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

More than half (52.17 percent) of low-income people in urban slum areas in South Sumatra have a high school education, and the rest (44.33 percent) have a junior high school education and below. As many as 87.83 percent were between the ages of 30 to 60 years, the remaining 8.7 percent and 3.48 percent, respectively, aged less than 30 years and more than 60 years. This condition shows that relatively many were in the range of productive age or working age.

Then as much as 63.48 percent of respondents have family members between 3 to 5 persons. The rest are less than 3 and above 5 individuals, respectively 17.39 percent and 19.13 percent. As many as 40.87 percent work as casual daily laborers, work in the home industry, the type of work carried out, as much as 24.35 percent, and open processed food stalls as much as 21.74 percent. Because of limited ability thus, the type of work performed is relatively limited, mostly working in the informal sector.

The variables of education level, age, family members, income expectations, and work type significantly affect the low-income community's income level in urban slums. Likewise, partially education variables, family members, income expectations, and work types positively affect the low-income community's income level. In contrast, the age variable negatively affects income level in urban slums.

Recommendations

We offer the need for great urban spatial planning by the local government so that urban slum settlements can be controlled. The KOTAKU program is one of the right strategies. Still, it needs support from many parties, especially the program's main actors are local governments and communities in urban slum settlements. This program adopts a sustainable livelihood approach by applying a collaborative approach between the central government, local governments, stakeholders, non-governmental organizations, and local government development partners such as the World Bank, the Asian Infrastructure Investment Bank, and the Islamic Development Bank.

Additionally, the program's main activities, starting from providing livable houses affordable for low-income communities in urban slum areas, enhance the public facilities in structuring activities in urban slum areas such as building the facilities and infrastructure needed by the community. This program activity also aims to form regional business units that aim to improve the quality of social structuring slums. Increase community capacity is done with citizens' commitment, active involvement in decision-making, planning, implementation, maintenance, monitoring, and improving social contribution quality in structuring slum priority. On the other hand, urbanization control needs to be improved by strengthening economic institutions supporting rural development. Furthermore, future research requires expanding the research scope, for example, in cities in South Sumatra. Besides that, it can develop a model by adding other socio-economic variables.

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Productivity of Islamic Banking in Indonesia

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Abstract

One measurement tool to increase banking performance, especially Islamic banking, is from the productivity side. Productivity measurement is done to determine how far a bank can run its operational activities by minimalizing input and maximalizing output results. This study aims to analyze the productivity level of Islamic Banking in Indonesia. The research sample was 11 Islamic banks from 2010 to 2019. Data obtained through financial statements and then divided into input and output variables. The productivity measurement technique by using Malmquist Index. The research shows that Islamic banking productivity with a cost approach indicates that Islamic banking has achieved a productive stage. It is seen from the average TFPCH (Total Factor Productivity Change) score that is quite high. It indicates that the decrease in Indonesia's Islamic banking growth generally occurs due to technology change.

Keywords: *Islamic Banking, Malmquist Index Productivity, Productivity*

JEL Classification: C67, G21

INTRODUCTION

Officially Islamic Bank emerged in 1992 with PT. Bank Muamalat Indonesia (BMI), which The Council of Indonesian Ulama (Majelis Ulama Indonesia, MUI). Law No 7, the Year 1992 concerning Banking, states that Islamic Bank is a bank with a profit-sharing system, without any detailed explanation about Syariah law or business type. Completion of the law is carried out through Law No. 10 of 1998 concerning Amendments to Law No. 7 of 1992 concerning Banking. The law explicitly explains the dual banking system, namely the conventional banking system and the Islamic banking system.

Since the emergence of Islamic banking, many improvements are achieved from the institutional side, regulation and monitoring systems have continuously improved. Besides that, more support in the form of Islamic finance literature continuously grows in society. The rapid development of the Islamic banking industry in the last couple of years indicates that society has been aware of Islamic banking. However, in the middle of the rapid development and people awareness, it doesn't close the possibility that there are still some people who aren't aware of the system and benefit of Islamic banking.

In October 2019, Islamic Bank development can be seen from Islamic banking's

total savings that reach 31,89 million. The Third Party Fund (*Dana Pihak Ketiga*/DPK) reaches RP 402,36 trillion, and total funding is 345,28 trillion. However, such an amount of DPK funds then raises a question of whether the bank has productively carried out its operational activities.

The Islamic banking industry's development becomes one of the main indicators in developing the Islamic financial economy. Because of this condition, research must be done in terms of how Islamic banking manages its input as minimal as possible to produce maximal output. On that basis, it needs to research how productive Islamic banking is in managing input and output.

Based on that condition, a problem appears, which becomes the basis of why this research is done; that is how the productivity level. The objective expected is to study efforts that an Islamic bank must do to increase productivity. This research becomes important because research about Islamic bank productivity is still rare; therefore, this research must be done immediately to have good performance and compete with a conventional bank.

A literature study states that even though many studies about banking efficiency level, research about productivity is still rare, as Rani, Widiastuti, & Rusydiana (2018) research productivity level using Malmquist Index is rare in Indonesia banking literature study. Moreover, research about productivity will be done using the Malmquist Index Productivity (MPI) method, a part of the Data Envelopment Analysis (DEA) method to see each business unit's productivity level in each business unit.

This research aims to measure Islamic banks' productivity levels in Indonesia using the MPI test during the 2010-2019 period. In brief, the research question is how is Islamic banks' performance in Indonesia during the research period?

Novelty contribution in this research is seen in several things. First, this research includes a new period, especially when Islamic banks grew rapidly in Indonesia. Second, this research is different from the previous study related to input and output usage; third, there isn’t much research about productivity using Malmquist Productivity Index in Islamic banking in Indonesia.

Hopefully, this research can add knowledge about the Islamic banking industry for researchers themselves and other parties, in this case, society. Hopefully, this result can give a conceptual contribution to the development of knowledge and research in the financial field, especially Islamic banking. It can give the government an idea contribution for Financial Service Authority (OJK) and Bank Indonesia. Besides that, this research uses the intermediation approach because the intermediation approach is a more appropriate approach to evaluating banking performance because its main function is to collect and dispense funds from society, seen in the used variables.

Islamic banking potential in Indonesia can be said growing; until 2019, there are 14 Islamic banks with 20 Islamic Business Units. In 2019 Islamic Finance Country Index (IFCI) also stated that the Indonesian Islamic banking rank was in no 1, passed Malaysia. Upon that escalation, therefore Islamic bank in Indonesia is expected to manage input and output more productive.

MPI is a method that uses DEA to evaluate productivity changes between two points by calculating ratio score of increase and decrease between two periods Coelli, Rao, O’Donnell, & Battese (2005). MPI is used to compare input and output in production concepts. This index was first introduced in 1953 by the MPI method with DEA basis was first introduced by Cavest al. in 1982, which was empirically developed by Fare in 1992 and 1994. Overall, there are three different alternatives in evaluating

productivity changes: the Fisher Index in 1922, the Tornqvist Index in 1936, and the Malmquist Index (1953). The Malmquist index is a non-parametric index. The Fischer and Tornqvist index are parametric indices; both indexes have variations in behavior assumption and whether they recognize random mistakes in data or noise (Kamarudin, Hue, Sufian, & Anwar, 2017).

Malmquist Index involves Technical Efficiency Change variables (EFFCH), Technology Change (TECHCH), Pure Technical Efficiency Change (PECH), Efficiency Scale Change (SECH), and Productivity Factor Total Change (TFPCH) (Raphael, 2013). The result from the Total Productivity Factor (TFPCH) Malmquist Index is measured by multiplying Technical Efficiency Change (EFFCH) with Technology Change (TECHCH).

Färe et al. (1994), Sellers-rubio & Mas-ruiz (2007), Malmquist Index can be formulated as follows:

$$M_{t,t+1}(y^{t+1}, x^{t+1}, y^t, x^t) = \left(\frac{D^t(y^{t+1}, x^{t+1})}{D^t(y^t, x^t)} \frac{D^{t+1}(y^{t+1}, x^{t+1})}{D^{t+1}(y^t, x^t)} \right)^{1/2}$$

I is indicated as output orientation, M is productivity from the previous production period (x^{t+1}, y^{t+1}) using t+1 period technology, in correlation with the previous production period (x^1, y^1) using t period technology, D is an input distance function.

$$M_{t,t+1}(y^{t+1}, x^{t+1}, y^t, x^t) = \underbrace{\frac{D^t(y^{t+1}, x^{t+1})}{D^t(y^t, x^t)}}_{\text{CU}} \underbrace{\left(\frac{D^t(y^{t+1}, x^{t+1})}{D^{t+1}(y^{t+1}, x^{t+1})} \frac{D^t(y^t, x^t)}{D^{t+1}(y^t, x^t)} \right)^{1/2}}_{\text{TC}}$$

Or M = E.P, M is Malmquist index from the measurement of P technical process which is measured as frontier period t+1 and period t with E efficient change at the same time.

There are several reasons why this Malmquist index is better than other methods in measuring productivity. According to Griffel-Tatje, E., and Lovell (1996) and Suzuki & Sastrosuwito (2011), the Malmquist Index has three main advantages compared to Fisher and Tornqvist Index. First, it doesn't require profit maximization and cost minimization. Second, it doesn't need information about input and output prices. Third, if the researcher has panel data, it analyzes productivity into two components: technical efficiency change or catching up and technical change or change in the best practice. However, besides advantages, the Malmquist index also has a disadvantage: thee needs to count distance function, but the DEA technique can overcome this problem.

Some research related to productivity, as Kumbhakar and Lovell (2000) stated, stated that technical efficiency is one of economy efficiency components as a whole, in which corporation is expected to be technically efficient. If efficiency is done to increase profit, the corporation must have maximal output with specific inputs with a specific price level. Avenzora et al. (2008) stated that productivity could be measured partially, which observes the relation between output and several aggregate inputs. If the number of inputs increases, then more output will be produced.

Sufian (2007) researched productivity index difference, technology change, efficiency change, and efficiency scale. Research result shows that middle-sized Islamic banks in Malaysia have higher productivity because of more advanced technology. Moreover, Sufian (2009) did banking research in Malaysia from 2001-2004. Research result indicates that Islamic bank experienced an 8.4% productivity increase in 2020 and got the highest score in 2003 as big as 11.2%, but experienced a decline in 2004 with 4.6% value. Besides, research result also indicates that foreign banks show higher

productivity than domestic banks in the early years of research. The opposite results in domestic banks' productivity relatively higher than those of foreign banks in the last years of research.

Inversely proportional to Raphael's (2013) finding, which examined the banking productivity level in Tanzania, this result indicates that efficiency change from a big scale domestic bank is bigger than that of another scale group. Meanwhile, small-scale banks' productivity value tends to be higher than big scale banks or big scale foreign banks. Research result by Octrina et al. (2019) indicates that a big bank is not necessarily more productive than a small bank.

Neupane (2013) did banking research in Nepal, and research result indicates that bank productivity increase because of technical factor and not because of efficiency influence. This result is different from what was done by Kalluci (2018) that indicates banking productivity value in Albania is affected by efficiency level, driven by efficiency scale and pure efficiency, not because of technological change. Meanwhile, productivity growth is averagely higher in middle-scale banks compare to other scales. According to Basri et al. (2018), one of the most influential factors for the Malmquist Productivity Index is technology change as the most influential factor towards growth. Along with technology advancement then this factor also has a major role in increasing banking performance from the productivity side.

Suzuki & Sastrosuwito (2011) researched 70 banks in Indonesia during 1994-2008 found that general bank productivity change in Indonesia was affected by technological change and not because of technical efficiency change. This finding implies the importance of technology development in creating productive banking. Meanwhile, Hadad, Hall, Kenjegaliev, Santoso, & Simper (2011), in their research, indicates that the average banking productivity in Indonesia is stable in which the most influential factor is technology advancement. According to Octrina et al. (2020), Indonesian banking tends to be more productive during the 2005-2016 period, with output used is the total of bank loan, securities investment, and other income, but from the efficiency change side Technical Efficiency Change Scale Efficiency Change aren't optimum yet.

Research about Islamic bank productivity using the Malmquist index hasn't been done yet, especially in Indonesia, compared to conventional bank research. But several types of research related to Islamic bank productivity have been done, amongst is Abbas did research uses DEA method and Malmquist index in Islamic banking in Pakistan during 2005-2009 indicates that bank productivity is higher in 2005 until 2006 and 2008-2009. Research related to Islamic banking productivity also done by Yildirim (2015) on Islamic banking in Turkey and Malaysia, research result shows that bank productivity isn't affected by technical Efficiency Change (EFFCH). This result indicates that bank managerial efficiency hasn't been able to do banking activity properly. Meanwhile, technology change is considered better even though the TFPCH hasn't reached the optimum score.

Kamarudin, Hue, Sufian, Anwar, & Aina (2017) researched 2006-2014 to examine the productivity of 29 Islamic banks in Southeast Asia. Research indicates that the increase of EFFCH technical efficiency becomes the most influential factor in the productivity level of domestic or foreign banks. Other research by Basri, Muhamat, & Jaafar (2018) on Domestic and Foreign Islamic Banks (IBs) in Malaysia discovers the most inefficient bank based on DEA test has increased in technical efficiency, technology change, and the total productivity factor based on MPI test. Usman,

Andriyani, & Pambuko (2019) did non parametric MPI test during 2012-2017 on nine Islamic banks in Indonesia. Research result indicates that the increase in productivity is more affected by technology aspect, not efficiency, the social fund increases 8.2% and more productive than a financial fund that decreases by 5.4%.

Besides, many research results indicate that the increase or decrease of productivity impacts technology advancement, Therefore further research is needed about how the condition of Islamic banking efficiency. This research result is expected to give stakeholders, especially the board of Islamic bank superintendent, to supervise and guide to increase productivity.

METHODS

This research uses secondary data in panel data or longitudinal data, a group of individual data consisting of Islamic general bank data in Indonesia. Data is obtained from Bank Financial report, which is reported to bank Indonesia, Financial Service Authority, and several data obtained from bank websites.

The research was done during 2010-2019. The population in this research is all Islamic Bank in Indonesia with a total of 14 banks. But in sample determination was done by purposive sampling method with criteria active bank during the research period, 11 banks. Data analysis that is used is descriptive analysis to describe studied variable, which is productivity, with analysis tool using computer program Deap 2.1.

This research is quantitative research using input and output variables to test productivity levels. Input and output that are used are general and administrative cost, fixed asset, total saving as input variables. Output variables are total loan, securities investment, and other income (Table 1).

Table 1. Productivity input variable and output variable

Input Variable	General and Administrative Cost Fixed Asset Total Saving
Output Variable	Total Loan Securities Investment Other income

RESULTS AND DISCUSSION

To analyze the productivity growth level of General Bank in Indonesia, uses Malmquist Total Factor Productivity Index (MTFPI) approach. Total productivity, usually called Total Factor Productivity (TFP), measures output with several inputs together. The relation is stated in the ratio from the output index towards the aggregate input index. If ratio increase means more output can be produced using the amount of particular input, or an amount of particular input can be produced by using less input. Two things count in the Malmquist index measurement, which is the catch-up effect and frontier shift effect. The catch-up effect measures the level of efficiency change relatively from period 1 to period 2. Meanwhile, the frontier shift effect measures the level of technological change, which is a combination of input and output from period 1 to period 2. The frontier shift effect is often called as innovation effect.

MPI is a bilateral index used to compare production technology of two economic substances and the basis of the production function concept that measures maximum production function with determined input limitation. MPI has several advantageous

characteristics. First, this index is a non-parametric method; therefore, it doesn't need specification of production function form. Second, MPI doesn't need to assume production unit economy behavior, such as cost minimization or profit maximization. So it is really useful if producers are different or unknown. Third, this index measurement doesn't need a price of input and output data which is often unavailable. Fourth, MTFPI can be composed of two components which are EFFCH and TECHCH. According to Avenzora (2008), this is very useful because the analysis can be done more specifically based on components. Positive EFFCH (positive efficiency change) is evidence that efficiency change near the frontier, while positive TECHCH (positive technological change) is known that technological change as innovation. EFFCH can then be composed of two components: PECH and SECH (Fare et al., 1994).

To limit the research scope, the data bank taken is from 2010 until 2019. This research uses output and input variables and uses general and administrative cost, fixed asset, and total saving as an input variable. Output variables use the total loan, securities investment, and other income.

Table 2 below explains input and output data in MPI during 2010-2019. This research refers to bank function as an intermediation institution, so this research put total saving as input variables.

Tabel 2. Productivity input and output variables (in a million rupiahs)

	General and Admin	Fixed Assets	Total Deposit	Total Finance	Securities and Investment	Other Income
Mean	264,956	418,275	1,927,811	6,454,018	1,999,999	174,106
Std.Dev	360,771	751,698	3,360,047	10,563,686	3,565,831	306,921
Maximum	1,507,041	3,357,284	16,637,027	42,865,000	21,088,128	1,866,238
Minimum	3,339	1,794	1	4,802	492	969

During the research sample period in 2011 until 2019, as many as 84 banks show an average score of 264,956 million. It indicates that the bank as a whole during research spent cost that much from all bank assets. The average fixed asset is 418,275 million, and high GA value reflects a high disparity inter bank operation. The amount of fixed assets between the highest and the lowest score is still very different; therefore, the bank needs to increase assets to work optimally. As an intermediation institution, there are still banks that have quite a low amount of savings. It indicates that the manager hasn't managed the banking function optimally, even though, as a whole, the average saving is 3,360 billion.

Output variable, a total loan given to related parties, shows an average score of 6,454,018 million. It indicates that the total loan given by the bank from the total assets owned is 6,454,018 million. Funding distribution that is higher than saving indicates that Islamic bank gives more comfort for society in terms of funding distribution. The average investment also has a high value, of 1.999 billion, with the lowest investment of 492 million. Meanwhile, banking also needs to increase the amount of another income, which is about 174 billion.

Table 3 indicates productivity change in each research sample bank in average has achieved productive level, this is shown from the average of achievement that has change score of Total Productivity Factor (TFPCH) is quite optimal which is shown from the average of 1.024, this result is in accordance with the score of Technical Efficiency Change (EFFCH) which is valued 1.016 and scale efficiency 1.010 which means Islamic bank in Indonesia is assessed has managed its activity efficiently which

is shown by the capability of managing input and output. There was a productivity decline in several banks during research, such as bank samples 1,3,6 caused by Technological Change (TECHCH). It means the decline in productivity was due to the technology factor and not because of the efficiency factor; therefore, issue related to technological advancement on each bank becomes important. On the contrary, the decrease in samples 8 dan 9 happened because the corporation could not efficiently manage bank input and output. It is shown from the low score of EFFCH in both samples compared to the technological factor (TECHCH).

Table 3. Malmquist Index summary of firm means

Firm	EFFCH	TECHCH	PECH	SECH	TFPCH
1	0.960	0.971	1.000	0.960	0.932
2	1.202	0.921	1.000	1.202	1.108
3	1.000	0.941	1.000	1.000	0.941
4	1.012	1.503	1.008	1.004	1.522
5	1.129	0.943	1.096	1.030	1.055
6	0.987	0.849	0.988	0.999	0.838
7	1.092	1.078	1.090	1.002	1.177
8	0.916	1.020	0.930	0.985	0.935
9	0.393	0.903	0.968	0.970	0.848
10	0.975	1.052	1.000	0.975	1.026
11	1.000	1.034	1.000	1.000	1.034
Mean	1.016	1.007	1.006	1.010	1.024

Information: EFFCH (Technical Efficiency Change); TECHCH (Technological Change); PECH (Pure Technical Efficiency Change); SECH (Scale Efficiency Change); TFPCH (Total Factor Productivity Change)

Meanwhile, on scale efficiency (SECH) and pure technical efficiency (PECH) result indicates that scale efficiency exceeds pure technical efficiency. Suppose inefficiency change most are due to pure efficiency (PECH), not scale efficiency (SECH). In that case, it shows that the bigger unit (trust) size it will give more disadvantage for productivity performance. In other words, a high score on SECH indicates that management is competent in using input resources effectively.

The test result shows that banking productivity level is more affected by performance efficiency and not technology. Rodoni et al. (2017) conclude that Indonesia's contributor to banking productivity is not the technological aspect but managerial performance.

Table 4 shows bank productivity change in Islamic Bank in Indonesia during the research period in average has achieved productive level, this is shown from the average score of Total Productivity Factor (TFPCH) assessed quite optimum which is seen from the average of 1.024, this result is in accordance with Technical Efficiency Change (EFFCH) valued 1.016 which means Islamic banking in Indonesia has managed its activity efficiently that is indicated by the capability of managing input and output. Efficiency fluctuation on the General Islamic bank in Indonesia during the research period could be due to an economic crisis. During the research, there is also a decrease in productivity in several years, such as 2011/2012, 2012/2013, 2013/2014, and 2016/2017, because of Technological Change (TECHCH) during those years. Therefore, technological advancement that can support Islamic bank activity is needed, such as easier Anjungan Tunai Mandiri (ATM) access, mobile banking, internet banking, and financial technology improvement

Table 4. Malmquist Index summary of annual means

Year	EFFCH	TECHCH	PECH	SECH	TFPCH
2010/2011	0.988	1.177	1.082	0.913	1.163
2011/2012	0.929	0.876	1.039	0.894	0.814
2012/2013	0.981	0.917	0.946	1.037	0.899
2013/2014	1.002	0.888	1.018	0.984	0.889
2014/2015	1.131	1.008	1.041	1.087	1.140
2015/2016	0.917	1.297	0.987	0.930	1.189
2016/2017	1.234	0.518	0.931	1.325	0.639
2017/2018	1.127	1.457	1.083	1.041	1.643
2018/2019	0.888	1.291	0.944	0.940	1.147
Mean	1.016	1.007	1.006	1.010	1.024

Information: EFFCH (Technical Efficiency Change); TECHCH (Technological Change); PECH (Pure Technical Efficiency Change); SECH (Scale Efficiency Change); TFPCH (Total Factor Productivity Change)

The PECH and SECH indices are a decomposition of the EFFCH index; the results show that SECH and not PECH mainly cause growth in the EFFCH value. The composition of SECH of 1,010 shows that Islamic banks can manage and utilize the available inputs to produce maximum output. The PECH value of 1,006 explains that Islamic banks' operational costs can be controlled due to increased managerial efficiency. The high EFFCH result shows that society's interest in Islamic banking increases because of the higher level of society literacy about Islamic banking, especially the awareness of riba's impact.

The result from the Malmquist index analysis is very interesting. The improvement of Islamic bank productivity is more affected by technical efficiency changes (EFFCH) and scale efficiency (SECH), a decomposition of EFFCH. Besides, the decrease in several years or several corporations happens because of the decrease in technological change; therefore, banking service improvement, especially technology utilization, is needed. This finding is following the research by Rusydiana, Laila, & Sudana (2019); Rusydiana, (2018); Kamarudin, Hue, Sufian, Anwar, & Aina (2017); Rodoni, Salim, Amalia, & Rakhmadi, (2017); Bahrini (2015); Sufian. & Habibullah (2014). However, these findings are not in line with Otaviya & Rani's (2020) research, which shows that technological changes influence Islamic banks' productivity.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

Islamic bank productivity level test results in Indonesia using Malmquist Productivity Index shows that productivity growth index on average is fulfilled, especially in the last years of research shows that an efficiency factor supports productivity change. The other result in certain years states that the change in productivity decrease also affected by technological decrease, so Islamic bank is expected to increase the usage of technology dynamically, safe, and reliable. Therefore production activity can move positively. The increased amount of network also needs to be done to reach broader society. Besides that, product diversification, especially in funding, must be done.

Recommendations

This research has implications for industry players to carry out bank operations more productively by managing inputs as best as possible and increasing the resulting

output. For OJK, the results of this research are expected to serve as a guide for future banking policy direction so that banks can continue to improve, especially in the use of technology to maintain the level of productivity of Islamic Banks in Indonesia.

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The application of gravity equation while accessing the environment of Pakistan-ASEAN technological trade flows

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Abstract

International trade, an important economic activity, has affected the human environment in varying degrees since its beginning. This research will carry out calculations and analyses on Pakistan-ASEAN bilateral and technological trade flows at a disaggregated level over 1995-2018. The current study found that medium-tech, high-tech, and low-tech trade flows, enhance economic growth in Pakistan and ASEAN, negatively impacting geographical distance by all technological trade flows. Similarly, the proportional element endowment confirms the Hecksher-Ohlin hypothesis. Yet, the perspective argues that countries with high production levels can exchange faster than their countries with lower output levels. Due to the variety in consumers' taste, increased similarity yields increased technological trade volumes, highest values received by medium-tech trade flow, and total bilateral trade flow. Depreciation in exchange rates showing a positive sign for total bilateral trade, low-tech trade, and high-tech trade, whereas unenthusiastic in the case of medium-tech trade flow between Pakistan-ASEAN nations. Free trade agreement and WTO membership will also foster trade activities in conscientious and economic association in ecumenical. Pakistan trade patterns are different from ASEAN trade patterns, which increased the opportunity to enhance business activities.

***Keywords*:** *ASEAN, Bilateral trade, Gravity model, Pakistan, Panel data*

JEL Classification: F14, F15, F18

INTRODUCTION

Liberalization of the economy has steadily encouraged trade development in recent decades. In the Asian area, the role of trade liberalization is a matter of great concern and priority. In South Asia, economic integration has been a slow process in contrast to other Asian countries. Moreover, there is a growing tendency in globalization (new realities arising from the worldwide perspective), leading Pakistan to reassert its place in East Asia and Oceania. This transition has also been significantly mirrored in Pakistan's policy in recent years, emphasizing improving diplomatic and sophisticated interactions, growing trade, magnetizing investment, and enhancing

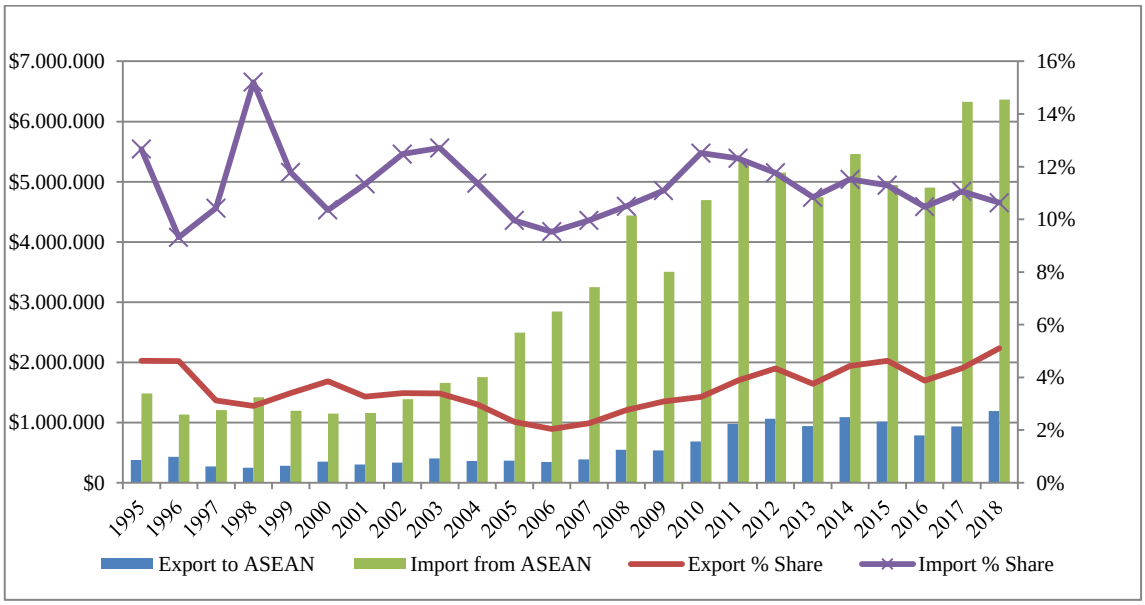
collaboration in several areas underneath the broad structure of vision East Asia (Irshad et al., 2016).

These days, trade is more than a "trade." It is clear that trade has been the dominant instrument of strategic policymaking in recent decades because of globalization. Irshad & Xin (2015) think Pakistan's position is its greatest strength, but it has yet to use it fully. Interaction between cultures and nations encouraged cross-cultural exchange and compelled the transformation of knowledge, skill, and skills. For now, Pakistan is talking with the ASEAN members about developing relations with them to increase cultural activities.

The living standards of 800 million Pakistanis are rising due to the economic revolution. The economic levels and the purchasing power of the people are similar compared to others developed economies. So, Pakistan has great potential in ASEAN countries to increase its trade and cultural ties, and for ASEAN nations, Pakistan is a great hub for long-term investment plans in nearly all sectors.

Pakistan has long term trade associations with ASEAN countries for the last three decades; thereupon, Pakistan had signed Free Trade Agreements (FTA) with independent ASEAN members. Pakistan-Malaysia FTA was signed and in operation in 2008, followed by Pakistan-Indonesia FTA signed and in force in 2013, whereas proposed and negotiations launched with individual members such as the Philippines in 2004, Singapore in 2005, with Thailand and Viet Nam in 2015. Pakistan also has endeavored to involved Pakistan-ASEAN FTA, which has been launched negotiations since 2009. Pakistan envisages expanding cooperation in various sectors along with institutional connection with ASEAN members independently and communally.

Figure 1 demonstrates that Pakistan’s trade enrolment with its percentage share with ASEAN. The total export to ASEAN countries accounts for US$ 0.3 billion in 1995, which is increased to US$ 1.3 billion in 2018. Similarly, total imports from ASEAN collectively accounted for US$ 1.5 billion in 1995, which is augmented to US$ 6.4 billion in 2018.



Source: Author’s compilation based on UN Comtrade database 2020.

Figure 1. The Pakistan-ASEAN trade capabilities in US$ 1000

Pakistan’s leading export partner is Indonesia, with a 25 percent share of total ASEAN, followed by Vietnam's 24 percent share accounted for US$ 298 million and

US$ 282 million respectively in the year 2018. In the case of Import leading partner of Pakistan in ASEAN members, Indonesia stands first with 39 percent share in total import from ASEAN, followed by Thailand with a share of 23 percent, which is accounted for US$ 2493 million and US$ 1430 million in the 2018 year (Table 1).

Table 1. Two decades comparative trade analysis of Pakistan-ASEAN (US$1000)

Country	Exports				Imports			
	1995	Share (%)	2018	Share (%)	1995	Share (%)	2018	Share (%)
Brunei	2920	0.8	797	0.1	180	0.0	37	0.0
Cameroon	1499	0.4	14879	1.2	16	0.0	2658	0.0
Indonesia	108388	28.8	298422	25.0	119111	8.0	2492713	39.2
Lao PDR	207	0.1	1210	0.1	56	0.0	1914	0.0
Malaysia	47037	12.5	156197	13.1	988247	66.7	1156772	18.2
Myanmar	2802	0.7	19036	1.6	30794	2.1	1937	0.0
Philippines	30838	8.2	110560	9.3	4045	0.3	64307	1.0
Singapore	89025	23.7	95394	8.0	225004	15.2	864483	13.6
Thailand	61690	16.4	213619	17.9	110310	7.4	1430022	22.5
Vietnam	31582	8.4	282034	23.7	4755	0.3	349754	5.5
ASEAN	375988	100	1192147	100	1482519	100	6364597	100

Source: Author's compilation based on UN Comtrade database 2020.

This study's major purpose is to get a clear eye on Pakistan-ASEAN trade and its impact on economies of both regions and income levels; infrastructure and development of Pakistan, and check if the FTA signed by both Pakistan and ASEAN will it accelerate trade between them. An analysis will employ an econometric model known as the gravity model and use a panel framework between 1995 and 2018. The variables are based on the literature of gravity model, in which variables including economic, political, and geographical influences.

This analysis aims to examine Pakistan's trade role with ASEAN and figure out the potential for trade cooperation with the neighboring nation. This research uses the Poisson Pseudo Maximum Likelihood (PPML) method in mathematical model estimation by Silva & Tenreyro (2006, 2011). This theory works best in the existence of heteroskedasticity along with zeroes trade observation. Based on current research findings, new conclusions for Pakistan's policymakers and industry and the coalition of ASEAN can be derived.

LITERATURE REVIEW

As globalization begins to transcend national borders, economies field gradually comes into contact with one another. Tinbergen (1962) had analyzed the interaction between GDP along with trade flows using a gravity model. The interest in Pakistan's economic influence on ASEAN is not widely explored, which is the research's key objective to study Pakistan's ASEAN members' bilateral exchange. Later Poyhonen (1963) established that trade between countries hinges on their distance and income.

Work included studies containing our views and ASEAN FTA study with other countries. For e.g., Kien (2009) carried out ASEAN free trade research by analyzing the export flows determinants of ASEAN countries using panel data estimates using a period 1988-2002 gravity model based on a two-way error component. The impact of ASEAN Free Trade Agreements (FTAs) with other countries and at the sectoral level has been studied (Kreinin & Plummer 1992; Plummer 1997; Clarete et al. 2003).

Besides, Naya & Plummer (2006) have also explored the prospect of referring the ASEAN regional grouping to a 'normal economic bloc.'

Further contributions discuss many topics, for example, the evaluation of how Asia's (including ASEAN) most productive way to build Batra's (2006) economic inclusion and whether regional trade blocs are precursors to multilateral trade liberalization Baharumshah et al. (2007).

Thorbecke's (2015) analysis estimated that Chinese exports to the United States are an outlier in a gravity model. The evaluation results show that since 2005 such exports are more than expected per year. Rasoulinezhad (2016) explores the degree, by gravity model, to influence Iran's foreign trade with Russia in 1994–2013 and the numerous sanctions (financial and non-financing) and oil prices. The negative ties with the trade between Iran and Russia between financial, non-financial, and petroleum price shocks were concluded.

In 2001-16, Irshad & Xin (2017) used different evaluation methods to analyze South Korean foreign trade. Their findings have shown that South Korea's trading patterns of imports and exports rely on GDP, trade ingenuousness, regional trade, along with exchange agreements, thus having an adverse impact on transport costs and the landlocked geographical countries. Irshad et al. (2018) also analyzed China's trade with the OPEC nations in the 1990-2016 periods. The findings confirmed the positive influence of Chinese bilateral trade with OPEC countries on GDP, GDP per capita, China's free trade and OPEC WTO nations, and the adverse effects on trade costs and support for the Linder hypothesis. Irshad and Anwar (2019) have endeavored to explore and become aware of dormant markets with Pakistan's bilateral exchange over the past 25 years with 198 trading cohorts (1992-2016). Empirical findings show that the size of the economy, mutual exchange rates, differential wages, common faith, frontier, and trade agreements optimistically impact bilateral trade volume.

In contrast, bilateral and landlocked countries show hostile relations between Pakistan and the rest of the world. Iqbal & Nosheen's (2020) study applies widespread gravity models to evaluate Pakistan's bilateral commodity trade flows employing both the panel and cross-section data estimations. Their research shows that trade costs are considerable and negatively correlated with commodity trade flows between Pakistan and its trading partners. In contrast, other empirical results by Hoang et al. (2020) measures trading links between Taiwan and ASEAN countries by using a PPML (pseudo-maximum similarity) gravity model for the periods 200-2017. They find that ASEAN's economic size and per capita income have considerably more significant impacts on gross trade and development than those of Taiwan.

METHODS

The gravity model has been known as the “workhorse” for evaluating foreign trade. Other "flagship" trade theories are critical for deciding the dynamics of import and export performances. It is the gravity that will decide the real trade flows, Irshad et al. (2018).

Model creation

Many researchers have been extremely active in improving the literature of the original gravity model and applying it through observational studies. One of the most productive variants was an arrangement suggested by Anderson & Wincoop (2003). The standard gravity equation was claimed as being distorted because the implications of multilateral resistance terms were not accounted for. The equation is seen as follows.

$$Ln\, BT_{ij} = \alpha_0 + \alpha_1 Ln(Y_i * Y_j) + \alpha_2 Ln(TC_{ij}) + \alpha_3 Ln(R_{ij}) + \alpha_4 Ln(\varphi_{ij}) + \varepsilon_{ij} \ldots\ldots(1)$$

Where BT_{ij} is the bilateral technological trade flows among Pakistan and ASEAN countries, $(Y_i * Y_j)$ represents the gross domestic product of Pakistan and partner country, (TC_{ij}) the geographical distance between Pakistan and partner country took as a proxy for trade cost; (R_{ij}) is trading multilateral resistances, (φ_{ij}) is dummy variable, and (ε_{ij}) is a random error term.

$$BT_{ij} = HTT_{ij} + MTT_{ij} + LTT_{ij} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

Whereas HTT_{ij} high technological trade, MTT_{ij} medium technological trade and LTT_{ij} low technological trade. The research will be undertaken to assess the scale of overall bilateral and disaggregated trade flows such as high-tech, medium-tech, and low-tech between Pakistan and Southeast Asian countries by employing an augmented gravity model equation. The equations should be as follows:

$$\boldsymbol{BT_{ijt}} / HTT_{ijt} / MTT_{ijt} / LTT_{ijt} = exp\{\beta_0 + \beta_1 Ln(Y_{it} * Y_{jt}) + \beta_2 Ln(TC_{ijt}) + \beta_3 Ln(REF_{ijt}) + \beta_4 Ln(Simi_{ijt}) + \beta_5 Ln(Exrate_{ijt}) + \beta_6 Ln(To_{it} * To_{jt}) + \beta_7 (FTA_{jt}) + \beta_8 (WTO_{jt}) + \mu_j + \pi_t + \varepsilon_{ijt}\} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (3)$$

Where BT_{ijt} stands for bilateral technological trade flows, HTT_{ijt} high-tech trade, MTT_{ijt} medium-tech trade and LTT_{ijt} low-tech trade among Pakistan, and ASEAN countries, respectively. $(Y_{it} * Y_{jt})$ represents the gross domestic product of Pakistan and ASEAN countries.

The distance calculation in this analysis used by Head and Mayer (2002) uses key agglomerations and populations' data of cities, towns, and places that provide geographical coordinates and population statistics for all countries. (TC_{ijt})[1] Weighted distance as a substitute for trade expenditure between country i and j, a sign is hypothetical to be negative. (REF_{ijt}) a proxy for factor endowment and $(Simi_{ijt})$ represents the similarity index between trading partners. (REF_{ijt}) acquires a minimum of zero if both partners demonstrate equal GDP or production.

The assortment of SIM is specified by, $0 \leq (Simi_{ijt}) \leq 0.5$; where 0.5 means 'equal' and zero implies 'absolute divergence' in country size[2]. Presently two variables can be defined in this manner:

$$(REF_{ijt}) = [\ln(PCGDP_{it}) - \ln(PCGDP_{jt})] \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (4)$$

$$(Simi_{ijt}) = 1 - \left(\frac{\ln(gdp_i)}{\ln(gdp_i + gdp_j)}\right)^2 - \left(\frac{\ln(gdp_j)}{\ln(gdp_i + gdp_j)}\right)^2 \ldots\ldots\ldots\ldots\ldots\ldots\ldots (5)$$

[1] The general formula developed by Head & Mayer (2002) and used for calculating distances between country *i* and *j* are $(TC_{ij}) = \left(\sum_{k\in i}\left(\frac{pop_k}{pop_i}\right)\sum_{l\in j}\left(\frac{pop_l}{pop_j}\right)d_{kl}^{\theta}\right)^{\frac{1}{\theta}}$,Where pop_kdesignates the population of agglomeration *k* belonging to country *i*. The parameter Ө measures the sensitivity of trade flows to bilateral distance d_{kl}.

[2] Breuss & Egger (1999), Egger (2000, 2002), and Serlenga & Shin (2007) define SIM in the following way: $(Simi_{ijt}) = \ln[1 - (\frac{gdp_i}{gdp_i + gdp_j})^2 - (\frac{gdp_j}{gdp_i + gdp_j})^2]$, In this definition, the index does not range between zero and 0.5 because the value under the bracket is a fraction, and the natural log of a fraction is something negative so we followed Kabir & Salim (2010).

According to Egger (2000), relative factor endowment (REF) is defined as the absolute value of the factor endowment of goods divided by the factor endowment of labor. However, it is generalized by using the absolute value of the dissimilarity between per-capita GDP and the normal logarithm (Egger, 2002).

Baltagi et al. (2003) and Serlenga & Shin (2007) both follow Egger's (2002) description of the REF, suggesting that the greater the dissimilarity in each country's per capita income, the subordinate the share of bilateral trade. A greater per capita income consequences in greater performance of goods and services and a lower trade deficit (Bergstrand, 1990). Capital-intensively enterprises prefer to manufacture more differentiated goods, and intra-industry specialization is more common in countries with higher average capital-labor ratios. Thus a bigger share of intra-industry trade is expected from capitalists. Bergstrand (1990) has shown that the gravity equations can describe the effect on the level of trade in intra-industry between two countries of the disparities in national and per capita income and capital-labor ratios.

The currency exchange rate plays a major role in a country's trade efficiency. As a consequence of the demand, when the supply is high, the price goes up, and hence the currency appreciates in value. When the country exports more than imports, the exchange rate will probably be higher when the exchange rate is fair when prices are released. When capital loses its worth, it can be said to depreciate. To observe this phenomenon, the study includes ($Exrate_{ijt}$) which represents bilateral exchange rates.

Trade liberalization is the elimination or diminution of restrictions or other obstructions on the gratis exchange of goods between nations. Trade to GDP ratios proxy for openness is employed in this study represents($To_{it} * To_{jt}$). The current study has included two dummy variables to grasp the impact of the trade agreement and membership to a world trade organization (WTO) whereas, (FTA_{jt}) takes a value of 1 if both countries have the trade agreement in a given year otherwise zero, and similarly (WTO_{jt}) would take a value of 1 if the partner country joined WTO in a given year. With the purpose of discovering the role of the membership of WTO on the trade of Pakistan with ASEAN nations, this variable is included in the above equation.

The equation (2) of time and region-specific consequences has also been calculated to help monitor various other macroeconomic variables, such as the world economic boom or recessions and the country effects of Silva and Tenreyro (2011) as to how the endogenous issues should be overcome. There is a good explanation of why countries-specific fixed effects (μ_j, π_t) should be acceptable if trade flows (geographical, political, or chronological determinants) are involved in export or import impacts or 'environmental determinants. These considerations are deterministically related to the diligent distinctiveness of a country and cannot be considered arbitrary.

Successive researchers reflected on several possible shortcomings of the gravity model specification, including potential endogeneity dilemma (Trefler, 1993; Lee & Swagel, 1997), zero exchange dilemma (Hallak, 2006; Helpman et al., 2008), and the issue of heteroscedasticity. Explanation of the endogenous problem was suggested by the inclusion of differences in types of fixed effects during the estimation of the gravity model (Baier & Bergstrand, 2007; Magee, 2003). Silva & Tenreyro (2006) predicted the gravity model estimator of Poisson-Pseudo Maximum Likelihood (PPML), which is incredible for the heteroskedastic degree of trading performance. Subsequently, Silva & Tenreyro (2011) found that there is also continuity in the existence of zero commercial observation in the PPML estimator.

Data sources

The dataset is an unprejudiced panel containing yearly bilateral trade flows, which are disaggregated by dissimilar technological trade flows. For instance, low-tech, medium-tech, and high-tech trade flows between Pakistan and ten ASEAN nations. Data is collected for the time ranging from 1995-2018, and total observations are (24×10=240). The variables used in our gravity equation (Table 2) comprising the predicted signs and data sources are explained.

Table 2. Description of variables

Variables	Unit	Type	Expected Sign	Data Source
BT_{ijt}	US$ 1000	Time-Variant	-	*UN Comtrade Database/ Pakistan Bureau of Statistics*
HTT_{ij}	US$ 1000	Time-Variant	-	*UN Comtrade Database/ Pakistan Bureau of Statistics*
MTT_{ij}	US$ 1000	Time-Variant	-	*UN Comtrade Database/ Pakistan Bureau of Statistics*
LTT_{ij}	US$ 1000	Time-Variant	-	*UN Comtrade Database/ Pakistan Bureau of Statistics*
$(Y_{it} * Y_{jt})$	US$ 1000	Time-Variant	Positive	WDI, World Bank
(REF_{ijt})	US$ 1000	Time-Variant	Ambiguous	WDI, World Bank
$(Simi_{ijt})$	Ratio	Time-Variant	Positive	WDI, World Bank
(TC_{ijt})	Weighted	Time-Invariant	Negative	CEPII database
$(Exrate_{ijt})$	Rupee	Time-Variant	Positive	WDI, World Bank
$TO_{it}.TO_{jt}$	%	Time-Variant	Positive	WDI, World Bank
FTA_{ijt}	(0/1)	Time-Invariant	Positive	Asia Regional Integration Center https://aric.adb.org/fta-country
WTO_{ijt}	(0/1)	Time-Invariant	Positive	World Trade Organization

Source: Authors' Compilation

RESULTS AND DISCUSSIONS

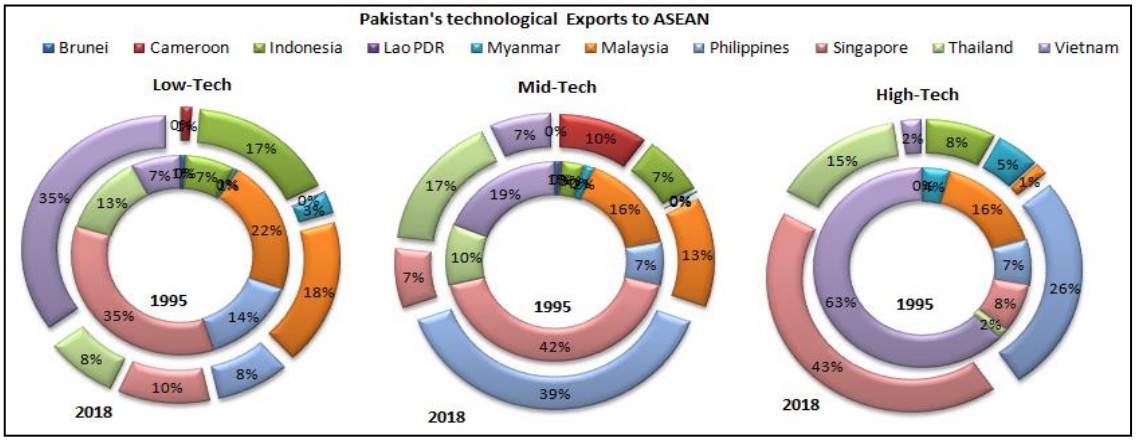
Pakistan-ASEAN technological trade analysis

The changing global climate and East Asia's rising centrality are moving Pakistan into East Asia. As a result of the transition, an emphasis has been put on the trade and investment and collaboration in many sectors.

Pakistan will improve its foreign trade with ASEAN by changing its foreign trade policy and promoting private-sector investments in the region. In signing free trade deals with South Asia regional bloc ASEAN to facilitate regional trade, Pakistan is in the process of signing free trade. In dealing with this issue, the first Southeast Asian economic ministers meeting took place in Bangkok in 2009. While there is a tremendous opportunity for Pakistan to trade with ASEAN members, there are also long-term growth and development prospects due to joint ventures. The ASEAN nations are emerging markets that wish to join regional partners for economic growth.

Figure 2 has shown a huge shift in technological trade between Pakistan and ASEAN nations. Pakistan mainly exports low-tech goods to ASEAN countries that counted USD 174 million in 1995, grown by USD 221 million in 2018. Similarly, medium-tech goods took second place in Pakistan's total exports to ASEAN, which

accounted for USD 69 million in 2018 compared to USD 17 million in 1995. Pakistan is not specialized in high-tech goods, which can be seen.

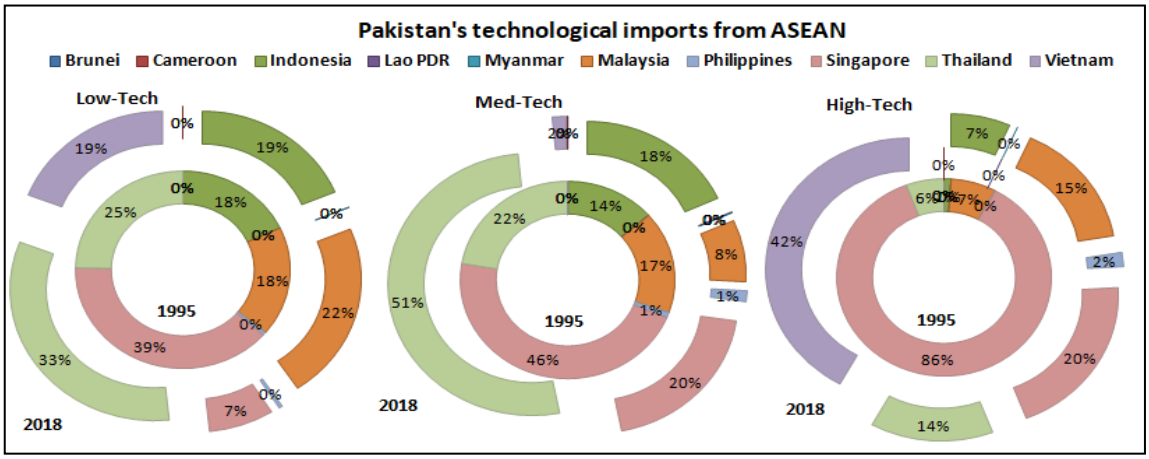


Source: Author's compilation based on WITS database.

Figure 2. Comparative analysis of Pakistan's technological exports to ASEAN

In each country's economy, exports play a critical role. Pakistan is supposed to uphold a robust balance between international trade and foreign reserves while ensuring economic growth in the region. The level of export growth in Pakistan should be persistent and intense. Exports affect the entire industrial world. To participate internationally, the industry is obliged to have standard superiority products, competitive prices, decent worth, and packaging in compliance with international labeling and packing laws, export functions as a driving force for a fast-expanding economy, and articulate a significant competitor on the global market.

Pakistan's largest imports from ASEAN countries are Medium-tech goods, USD 153 million in 1995, whereas a dramatic boost in later years accounted for USD 1945 million in 2018. In contrast, Thailand shares 51 percent of total imports from ASEAN, followed by Singapore 20 percent, and Indonesia 18 percent see (Figure 3).



Source: Author's compilation based on WITS database.

Figure 3. Comparative analysis of Pakistan's imports from ASEAN countries.

ASEAN investors sponsor investors from ASEAN countries to invest in Pakistan's agriculture, livestock, roads, electricity, cars, and many other sectors. The scope for bilateral or multilateral trade between Pakistan and ASEAN nations to grow is enormous (Musleh et al., 2009). Bilateral trade can further improve the competitiveness, living standards, and long-term development of economies by encouraging a more well-

organized distribution of capital and initiating the engine of development in Pakistan and ASEAN nations.

Gravity estimations

The cross-sectional dependency of panel data has been widely regarded over the years and is an emerging area of study in panel time-series analysis. There is a possible risk for the emergence of the world, traditional shocks like the oil crisis in the 1970s and the global financial crisis from 2008 onwards. This condition may result from spillover effects between countries or regions (Eberhardt & Teal, 2011; Moscone & Tosetti, 2009). The hypothesis test can be used to assess whether survey data are cross-sectionally dependent or independent. Without these conclusions (Breusch & Pagan, 1980; Pesaran, 2004), gravity model effects will not be correct. According to the time and cross-sections equation of gravitation, Pesaran (2004), the correlation coefficient $\hat{C}_{ij}$ the following study calculates pairs:

$$CD = \sqrt{\frac{2}{N(N-1)}} \sum_{i=1}^{N} \sum_{j=i+1}^{N} \sqrt{T_{ij}\hat{C}_{ij}} \quad \text{.......} (6)$$

We have calculated the CD test only for time-variant variables in our gravity equation because of CD test unable to define in the case of time-invariant variables, as Irshad et al. (2018) mentioned. There are zero values in our dependent variable, and we have dropped dummies because it is not definable in the CD test; however, we calculate it with the whole sample. Based on the result of Pesran's (2004) CD test, shown in Table 3, the null hypothesis (no CD in residuals) can be strongly rejected at the 5 percent level. It implies that all the panel time series have strong evidence for cross-sectional dependence.

Table 3. Results of Pesran's (2004) CD test.

Variables	Pesaran's CD test			
	Bilateral Trade	High-Tech	Med-Tech	Low-Tech
BT_{ijt}	11***	-	-	-
HTT_{ij}	-	7.2***	-	-
MTT_{ij}	-	-	10.6***	-
LTT_{ij}	-	-	-	5.07***
$(Y_{it} * Y_{jt})$	32.57***	32.57***	32.57***	32.57***
(REF_{ijt})	3.68***	3.68***	3.68***	3.68***
$(Simi_{ijt})$	8.36***	8.36***	8.36***	8.36***
$(Exrate_{ijt})$	11.71***	11.71***	11.71***	11.71***
$TO_{it}.TO_{jt}$	8.93***	8.93***	8.93***	8.93***

**** represents zero percent probabilities value.*
Source: Authors' compilation from STATA 14.0.

After confirming the cross-sectional dependency in our variables, the regression outcomes for gravity equation (3) are presented in Table 4. All the technological trade flow models are demonstrating anticipated signs and greatly significant fallout.

To answer the endogenous problem, equation (3) is calculated to be time-fixed effects; other macroeconomic aspects can be conveniently managed, such as a worldwide economic boom or slump suggested by Yang & Martinez (2014). Higher GDP of an economy that imports prices would have a favorable and statistically meaningful impact on trade because it indicates the ability to have a higher demand for economies that consume commodities. In exchange, a higher GDP of the exporter shows greater output capacity, thereby leading to elevated exports. Study outcome originates; this is factual for Pakistan's technological trade flows to ASEAN countries

in all the estimated models that have noticed highest in case of medium-tech trade flow increase by 1 percent will increase 2 percent in GDP of Pakistan and trading partners.

In the case of a geographical distance as a transportation cost proxy, its coefficient's negative sign reflects the geographical distance negatively affecting all models on Pakistan's technological trade flows into ASEAN countries. Estimation shows that the highest trade cost occurred while med-tech trade flows between Pakistan and ASEAN nations by 1 percent increase in distance will decrease 20 percent med-tech trade flows between Pakistan and ASEAN.

Table 4. Gravity results of all technological trade models PPML estimation technique.

Explanatory Variables	Bilateral Trade	High-Tech	Med-Tech	Low-Tech
Coefficient	-8.36	-18.6	2.2	-5.33
	(3.3)**	(3.02)***	(3.23)	(2.02)***
$(\boldsymbol{Y_{it} * Y_{jt}})$	0.44	0.4	0.66	0.32
	(0.5)***	(0.6)***	(0.05)**	(0.03)***
$(\boldsymbol{TC_{ijt}})$	-0.7	-1.24	-3.0	-1.13
	(0.24)***	(0.27)***	(0.28)***	(0.15)***
$(\boldsymbol{REF_{ijt}})$	0.3	0.53	0.37	0.1
	(0.14)**	(0.15)***	(0.1)***	(0.03)**
$(\boldsymbol{Simi_{ijt}})$	7.02	2.6	7.82	4.9
	(1.1)***	(0.9)***	(1.1)***	(0.45)***
$(\boldsymbol{Exrate_{ijt}})$	0.05	0.18	-0.05	0.12
	(0.03)*	(0.04)**	(0.02)**	(0.01)***
$(\boldsymbol{TO_{it}.TO_{jt}})$	0.31	1.65	0.2	0.71
	(0.1)**	(0.15)***	(0.1)**	(0.05)***
$(\boldsymbol{FTA_{ijt}})$	0.54	0.16	-0.12	0.2
	(0.18)**	(0.18)	(0.1)**	(0.1)**
$(\boldsymbol{WTO_{ijt}})$	0.8	2.73	0.6	0.7
	(0.2)***	(0.5)***	(0.3)***	(0.1)***
Fixed Effects	YES	YES	YES	YES
Observations	240	240	240	240
Log-likelihood	-12988.9	-1131.03	-2183.2	-1043.4
R-squared	0.77	0.7	0.86	0.90

Source: Author's calculation based on gravity equation (3), estimated by STATA 14.
*Note: ***0.01, **0.05, *0.1 level of significance.*

According to (REF_{ijt}) results in all technological trade flow models. However, the Hecksher-Ohlin hypothesis is backed by research from existing model studies on technological trade flows, which are very different from that view and challenge countries with varying development levels with more trade than countries with the same level.

Pakistan's trade patterns are different from ASEAN countries' trade patterns, which increased the opportunity to enhance trade between Pakistan and ASEAN partners. The highest value calculated by the high-tech model, which is 1.7 percent, implies that high-tech trade flows increase as the difference between the per capita GDP of Pakistan and the ASEAN partner increases. The more significant similarity in relation to GDP means that the scale of the country's product variety in the differentiated product's market would increase Breuss & Egger, (1999).

The diversity in consumers' tastes allows for an improvement in the yield of comparisons between Pakistan and the ASEAN partner in terms of technological trade flows. The study estimated positive and highly significant values for $(Simi_{ijt})$, which is highest in case of mid-tech trade flow between Pakistan and ASEAN partners and

second highest in case of total bilateral trade flow. Coefficients of the exchange rate in all models are statistically significant. They have a positive sign in total bilateral trade, low tech trade, and high tech trade, whereas showing negative signs in medium-tech trade flows between Pakistan and ASEAN nations.

Economic growth in Pakistan depends heavily on its export market, but Pakistan's exchange rate, which allows costly imports to decrease exports, has long struggled to regulate. In the search for long-term interests and a trend for the liberalization of foreign markets, the exchange rate must be freely controlled according to market values. Trade openness coefficients appear highly significant in all technological trade flows, which is a highly appreciated sign for Pakistan and ASEAN nations to improve trade relations by signing trade and investment agreements and reducing tariffs in both sides to create business opportunities.

The trade agreement variable also demonstrates positive signs in all technological trade flows models. ASEAN-Pakistan FTA will benefit both parties, and it will enhance bilateral trade, which will improve the economic growth of Pakistan. The dummy variable WTO has a positive sign in all models, and the positive sign shows the participation of Pakistan and ASEAN countries into WTO will augment trade growth. One indistinct outcome for the WTO's member dummies is that Pakistan must take fiercely appropriate measures to enhance access to international-regional trade cooperation structures to facilitate trade activity in particular and economic cooperation in general.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

Pakistan wants to be a powerful presence in all ten members of the Association of Southeast Asian Nations. The CPEC network would generate a number of possibilities for trade and commercial connections with countries under it. ASEAN economic ties have grown in the last 20 years. It will display a strong concentration on low-tech and med-tech goods from Pakistan exports to ASEAN. Pakistan imports from the South-East Asian countries high concentration on med-tech and high-tech products, particularly processed foods, electronics, and machinery. It has highlighted the growth in strength of trade ties between Pakistan and ASEAN countries and the creation of their respective production and distribution networks.

According to the gravity model, a country's degree of economic growth substantially influences the cross-regional exchange flow. Technological trade flows models support the Hecksher-Ohlin theory. However, it stands in stark dissimilarity to this opinion and clutches that countries with dissimilar output levels will trade more than countries with similar levels. Due to the variety in consumers' taste, increased similarity yields increased technological trade volumes between Pakistan and ASEAN partners.

The study estimated positive and highly significant values for the similarity index. Downward exchange rate depreciation may exacerbate trade balance and further exacerbated by high import dependence in Pakistan. Policies of import substitution might be helpful to lower import dependence. Efforts can be made to maintain quality management of export products so that they will be able to restore credibility in foreign markets.

Pakistan and ASEAN also have excellent competitive advantages in exchange since they are both extremely trade-oriented countries. The benchmarks indicate that an ASEAN Pakistan trade agreement would be favorable to both countries. The Pakistan-ASEAN trade agreement will maximize the quantum of intra-regional business opportunities. On the other side, the membership in WTO would carry along positive

effects on the Pakistan-ASEAN bilateral trade. Pakistan mainly exports low-technology and medium-technology commodities to ASEAN nations which are food and textile goods, while its imports mainly include medium-technology and high-technology commodities, minerals, vehicles, and electrical equipment.

Recommendations

The study will provide valuable knowledge for fostering economic development and product specialization. Pakistan would sign an ASEAN-wide free trade agreement to facilitate bilateral trade with the country. Pakistan is losing capacity and productivity in the production line. The effect of this is to export the country's raw material requirements indirectly. Pakistan will need to diversify its export base to take advantage of the wide Asian demand. The study also suggests conducting more studies to identify the influence of microeconomic and macroeconomic factors on Pakistan's competitiveness in the ASEAN area. Pakistan should stabilize macroeconomic policies and ease of doing business to attract the market of ASEAN countries for trade cooperation in diverse areas. Future studies may concentrate on industry-relevant, e.g., quality improvement.

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APPENDIX

Table 5. Pakistan's technological bilateral trade with ASEAN nations in 2018. (US$ 1000)

Country	Imports			Exports		
	Low-tech	Med-tech	High-tech	Low-tech	Med-tech	High-tech
Brunei	-	8	-	210	6	-
Cameroon	0.021	20	1	2438	6959	-
Indonesia	60155	353743	20123	36753	4888	113
Lao PDR	0.2	1889	4	232	43	-
Myanmar	14	1	1	5603	119	71
Malaysia	70285	148510	47046	39327	9189	21
Philippines	1315	26195	5247	18142	26973	383
Singapore	23562	382332	60480	22843	5015	618
Thailand	104496	1001612	41656	17907	11305	213
Vietnam	61472	30651	126326	77528	4752	33
ASEAN	321300	1944961	300882	220983	69252	1451

Source: Author's compilation based on WITS database

How the role of ATM technology encourage financial efficiency on Madura villagers?

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Abstract

Nowadays, the necessity and utilization of Automatic Teller Machine (ATM) technologies increase in rural areas. Financial technology became a crucial thing and created efficiency in their activities. Some previous research uncovers technology that could create efficiency in the economy, including financial technology. This paper, interest in investigating and detect how ATM technology establishes financial efficiency on villagers. This research was conducted in rural communities on the island of Madura, Indonesia. This study uses SFA (Stochastic Frontier Analysis) model to estimate technical efficiency. This research found out that ATMs in rural communities on Madura Island produce highly financial efficiency. It proved that the villagers in Madura need ATM technology for carrying out their economic activities.

Keywords: *Automatic Teller Machine, Financial efficiency, Stochastic Frontier Analysis, Villagers*

JEL Classification: G21, G50, O33

INTRODUCTION

The development of financial technology in Indonesia in the latest decade grows very high. The rapid development of financial technology, one of them is automatic teller machine (ATM) technology. Central Bank of Indonesia was recorded the average number of ATM cardholders during 2019 at 9.3 billion users (according to the report of transaction tool use card).

The development using ATM technology has increased awareness from the Indonesian society to use ATM technology growing fast. The necessity for ATM as supporting economic activities is needed, mainly for the people that stay in the rural area. The rapid technology development, both direct and indirect, also affects the village community's mindset and habits. Formerly, they perform financial transactions by coming directly to the bank, but now they are given easy to perform financial transactions and the bank through atm. The ATM technologies were given to the villagers for ease and smoothness in economic activities.

Wulan (2017) figures out ATM holders, which positively and significantly impact the economy. Liaou et al. (2019) prove that there is the involvement of the internet against financial efficiency. Li et al. (2018) reveal an important role of technological innovations in the industrial sector. If it is associated with this discovery, this can be

concluded technological innovations in the financial sector will also create efficiency. Asongu et al. (2019) uncover the important role of information technology and communication to create financial efficiency. Besides building financial efficiency, financial technology also changes people's mindset, particularly of a village community (Prawirasasra, 2018). Internet used properly also helps to create financial efficiency (Botti et al., 2014). Another research found out financial efficiency also came from good governance and professional treatment of a financial institution (Yobe et al., 2020; Botti, 2014). Even Sufian (2004) revealed that good managerial and governance in financial institutions should produce efficiency.

The research's main focus is to identify and detect the role of ATM technology in financial efficiency for villagers in Madura. Whether with ATM technology give a significant impact on the smooth and convenient activities which Madura villagers do. Whether by financial technology, Madura villagers on their financial activities become more efficient. To prove that question then will be used the Stochastic Frontier Analysis (SFA) method.

LITERATURE REVIEW

Financial efficiency and technology

In these decades, technology became a crucial thing in over the world. Nearly all activities in this world using technology, especially to create efficiency and effectiveness. Technology gives simplicity and smoothness to human activities, primarily financial activities.

Nowadays, the role of technology in finance is very important. Using technology in financial activity would make it more efficient and effective. Saksonova (2017) verified that financial technology does not give satisfaction, comfort, fastness, and security in Latvia Country. That is because Latvia is developing countries and it does not ready through financial technology.

Wulan (2017) found out that financial technology developed in Indonesia, such as credit cards, ATM cards, and computer mainframe banks, has increased significantly. This result has a positive impact on the Indonesian economy. It provides a significant positive impact on the Indonesian economy. Another finding of this study is that Indonesian financial technology still needs technology maturity, resources, users, and regulations.

Different outcomes find that financial technology development negatively impacts the banking industry (Purnomo & Khalda, 2019). In addition to being a barrier to banking, financial technology should also be an opportunity for banks. Financial technology also has social impacts, such as changing the mindset of conventional financial institutions (Prawirasasra, 2018). Another result reveals the need for optimization by intervention regulation to maximize financial technology.

Previous research proved that technology could produce efficiency. The technology injects into the financial sector will build financial efficiency. Liaou et al. (2019) discovered there an impact of the internet on financial efficiency. The internet has a role in promoting regional financial resources and making advanced technology. Li et al. (2018) show innovation in technology which can produce efficiency in the industrial sector, mainly manufacturing.

Similarly, the role of technology in the financial system is very important to build financial efficiency. Information technology and communication positively impacted increasing information and financial transactions in 53 countries in Africa's Continent (Asongu et al., 2019). Their result also discovers that information technology and communication produce financial efficiency, particularly efficiency on financial intermediaries. Using the DEA-Malmquist model, Li and Wu (2016) prove large

fluctuations to financial encourage efficiency.

Financial efficiency is one of the determinants of economic stimulus. Healthy finances were demonstrated by the level of efficiency achieved. Efficiency is also used as a benchmark for the health of financial institutions. Besides technology having an important role in financial efficiency, good governance and professional management have also driven financial efficiency. The oldest financial institution like cooperative becomes more efficient than new cooperative (Yobe et al., 2020). A cooperative or financial institution with long experience tends to have good and professional management. Good governance becomes one of the key successes to create financial efficiency. Botti et al. (2014) suggest that good governance and proper usage of the internet create efficiency in financial reporting. Nourzad (2014) uncovers the development of financial intermediaries and equity markets to increase efficiency. Sufian's (2004) investigation shows a positive and significant relation to financial institutions' non-bank that is more efficient in a managerial manner.

Financial efficiency and rural area

In the modern era, the important role of finance becomes one of the main factors driving the economy at the rural level. The financial role also improves the welfare of villagers—nearly all of their activity depending on the financial sector. Generally, rural areas' people in developed countries are already aware of the financial technologies as a form of financial inclusion.

Nevertheless, in developing countries, financial technologies still lack the facilities and infrastructures that support financial inclusion, so difficult to create. The financial technologies in China, a high level of economic growth, is quite helpful for rural communities, primarily for farming credit (Turvey and Xiong, 2016). Their findings recording more than 2 % farm credit were distributed to the village. Financial products have a more efficient and effective tendency when is given to women (Arnold & Gammage, 2019). Financial products such as the economic empowerment and rescue of the financial institution have effective and efficient when managed by women, particularly in the village (Robert, 2015). Women have a tendency professional in planning and financial management than men, although the income earned is smaller (Tharp et al., 2019). Arestis (2006), using DEA analysis, represents financial deepening and financial development, which positively affects production efficiency.

Stochastic Frontier Analysis (SFA)

Efficiency becomes important in the financial industry. Some previous research finds out efficiency on financial wich comes from technology usage. To detect, identify, and analyze exit or not efficiency on financial uses, the Stochastic Frontier Analysis (SFA) approach measures efficiency value.

SFA is one of the method and analysis instruments to measure the level of efficiency. SFA method built based on regression model theory that Battese & Coelli found in 1992. SFA is linear programming used to measure the performance of an organization's efficiency by using the DMU (*Decision Making Unit*) (Eni et al., 2020). A Decision Making Unit (DMU) is an entity that uses inputs to produce outputs (Hassan, 2018). Another definition of SFA is a statistical analysis technique used to estimate the cost of production function in an economy by considering the inefficiency of companies. This definition and strengthened by Coelli (2005) explain that two types of functions can measure the efficiency with the SFA method, namely the production function and the cost function. The SFA model could be written the equation 1:

$$Q_i = \beta_0 + \beta_1 X_i + v_i - u_i \quad (1)$$

Description:

Q_i : dependent variable (output)

β_0 : constanta
β_1 : coefficient of the independent variable
X_i : independent variable (input)
v_i : normally residual or random factors that cannot be controlled
u_i : technical inefficiency or random factors that can be controlled

METHODS

We are using primary data which can collect directly from Madura villagers. The Sampling technique uses the random sample cluster method, which is randomly generated by area, without any special classification such as social strata, age, education, etc.

The number of samples was 200 respondents, consisting of 50 respondents of each regency in Madura Island (Sumenep, Pamekasan, Sampang, and Bangkalan). Data sources are directly obtained through interviews and refilling of the questionnaires.

The questionnaire question includes two parts: 1) The respondent's identity form of the name, gender, age, and occupation; 2) Instrument efficiency of ATM uses the form of ATM usage period, the use of ATM menu of pin chance, transfer, withdrawal, payment, inquiry. Two other questions are regarding security and the ease of respondents accessing ATM.

This study uses a parametric approach with Stochastic Frontier Analysis (SFA) to detect and analyze the financial efficiency. Estimation of Stochastic Frontier Analysis (SFA) models as in the following equations 3:

$$P_1 = \beta_1 q_1 + \beta_2 q_2 + \beta_3 q_3 + \beta_4 q_4 + \beta_5 q_5 + \beta_6 q_6 + \beta_7 q_7 + \ldots\ldots + \beta_n q_n + E_n \quad \ldots\ldots\ldots\ldots \quad (3)$$

Description:
P_1 = Log Time Period of use ATM
$q1$ = Log Pin Change
$q2$ = Log Transfer
$q3$ = Log Withdrawal
$q4$ = Log Payment
$q5$ = Log Inquiry
$q6$ = Log Security
$q7$ = Log Access
E_n = error term

Meanwhile, E_n is the *error term* of the function (Zuhroh, 2015). According to Rahaman (2016) E_n is described by Collin's theory which is *error terms* in the SFA model consists of two components as in the following equation 4:

$$E_n = V_t - U_t \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (4)$$

Description :
V_t = Random factors that cannot be controlled.
U_t = Random factors that can be controlled.

From the equation above, we get an error technical as an efficiency indicator. To measure the level of efficiency, this can be calculated using the value of U_t. U_t , which indicates the efficiency value of the production output. U_t is a level of technical efficiency that has a value between 0 and 1. To simplify the process of analysis, technical efficiency is categorized into three namely:

1. Low efficiency, with a technical efficiency less than 0.5;
2. Medium efficiency, with a limit of technical efficiency of 0.5 to 0.8
3. High efficiency, with a limit of technical efficiency of more than 0.8

RESULTS AND DISCUSSION

Profile of respondents

Various age from respondent's between 25 until 70 years old. The profile exposing respondents' gender consists of 104 (52,00%) males and 96 (48,00%) females. The majority of ATM user is male. It proved that the male role in the family still dominant in finance facilitation rather than female. Madura society is still patriarchal, where males provide and determine a treasury within households.

Based on employment status, 79.50% of respondents worked, and 20.50% were not working (were housewives). Specifically, homemakers became a job and devotion for a woman in the village. In Madura, especially thick with religious teachings, they still believe to be selfless housewives is an obligation that later creates prosperity for their family.

Of the total respondents who are working status, almost half (49.00%) are entrepreneurs. The rest are those who work as government employees, private employees, farmers, and others. It showed that the profession of the majority of villagers in Madura is an entrepreneur. This discovery opens up new information that there is a shift in profession from farmers to entrepreneurs in the village. The development of financial technology also has a significant impact on the change of occupations in the village. Refers to this finding concludes that the average Madura society is an entrepreneur as a majority profession.

Stochastic Frontier Analysis

The equation above is estimated and tested using the Stochastic Frontier Analysis approach. The first result provides a descriptive statistic that is shown in Table 1. Meanwhile, the result estimation of the SFA model uncovers in Table 1. The Stochastic Frontier equation can be rewritten as follows:

$$P_1 = 0.060\ q_1 + 0.145\ q_2 + 0.182\ q_3 + 0.025\ q_4 + 0.062\ q_5 + 0.665\ q_6 + 0.148\ q_7 - 2.824 - 2.562 \ldots\ldots\ldots (5)$$

Based on the results of the SFA regression, all of the explanatory variables significant to the dependent variable. It is further strengthened by the probability value of Wald Chi-Square 0.000 less than the level of significant 5%. According to the revealed level table of transfer has a significant impact on the period of using ATM level. It is also evidenced by the probability value of z-statistic 0.078 less than 10% significant level. Each increase of 1% on transfer level will rise 0.145% of using ATM period. As well as the level of security has a significant effect on the period of use ATM level. The impact of the level of security is amplified by the probability value of z-statistic 0.000 less than 5% significant level. Rising of 1% on security level will rise 0.665% of Period of use ATM.

Table 1. The estimation of Stochastic Frontier Analysis (SFA)

Independent Variables	Coefficient	z-statistic	P > Z
Log Pin change (Q1)	0.060	0.98	0.329
Log Transfer (Q2)	0.145	1.76	0.078**
Log withdrawal (Q3)	0.182	2.26	0.024*
Log payment (Q4)	0.025	0.38	0.703
Log Inquiry (Q5)	0.062	0.76	0.449
Log Security (Q6)	0.665	7.27	0.000*
Log Access (Q7)	0.148	1.56	0.119
lnsig2v	-2.824	12.62	0.000*
lnsig2u	-2.562	8.90	0.000*
Wald chi^2 (7)	1369.74		
Prob > chi^2	0.000*		

***significant at the 5% level, ****significant at the 10% level*

The level of withdrawal has an influence significantly on the period of use ATM. It is enhanced by the probability value of z-statistic 0.024 less than 5% significant level. One percent increase on withdrawal level will increase 0.182% of the period of use ATM level. This discovery reveals that transfers, withdrawals, and security are commonplace by users of ATM technology. Referring to the results of estimating can be concluded that the role of ATM technology as a tool of ease in conducting financial transactions has been proven

Efficiency analysis

The measurement of efficiency score is determined by several classifications (Andhyka, 2017). According to Junaedi (2016) about technical simultaneous efficiency analysis uses the stochastic frontier production function model. The efficiency index value of the analysis results can be categorized as efficient in using production inputs if the value is almost and close to 1. The categories used in research are highly efficient when they have a value of more than 0.90 if its value is between 0.70 to 0.89, which means quite efficient, while the value is smaller than 0.70, which means inefficient.

Table 2 finds out that the average value of the technical efficiency was 0.813. It shows that most users have quite efficient ATM technology that has been used and provided. Furthermore, most (78.00 percent) of ATM users have a technical efficiency value that is highly efficient (value = 0.999) and quite efficient (value = 0.750). Only 22.00 percent of them experienced inefficiency (values 0.499 and 0.249).

Table 3. The average and distribution of technical efficiency value

No	Value of technical efficiency	Description	% respondents
1	0.999	highly efficient	51.50
2	0.750	quite efficient	26.50
3	0.499	inefficient	17.50
4	0.249	inefficient	4.50
Total			100.00
Average technical efficiency value = 0.813			

From this evidence can conclude mostly Madura villagers get high efficiency from ATMs usage. ATM technology gives them ease and effectiveness to activity that is related to economic and financial. This result also reinforces that ATM technology significantly affects financial efficiency in rural areas (based on average technical efficiency number 0.813). These findings are supported by previous research, which reveals which the role of banking can create financial efficiency (Steward et al., 2017). The results in this study are in line with research Mishkin and Strahan (1999), which states that the development of financial technology reduces transaction costs and asymmetric information's, improves efficiency in the financial system, and changes the structure of the financial system

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

On average efficiency value of ATM usage, Madura villagers are quite efficient. More than half of ATM users get ease and efficiency from the use of ATM. It provides evidence that ATM technology benefits Madura villagers' financial activities, partially supporting their economy.

This study founds out almost all ATM menus which they often use in conducting financial transactions. The discovery shows that Madura, as an area with low economic growth and minimal social welfare, also requires financial technology to support financial effectiveness and efficiency.

Recommendations

Policymakers should build more ATM facilities, support financial modernization, and facilitate and facilitate rural and remote communities' activities. Theoretically, this research still requires further studies in various places to strengthen the evidence that rural communities need ATM technology. Other research also needs to be carried out to analyze the relationship between the characteristics of rural communities and the need for ATM services.

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Farmers' technology adoption decision and use intensity in the agricultural sector: Case of Masha Woreda (Double Hurdle Model)

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Abstract

This research aimed to critically analyze the determinants of technology adoption and the use intensity by small farm households in the study area (Masha District). Six kebeles were randomly selected from the district, and 251 sample households were proportionally and randomly identified from the selected kebeles. The data collected from the sample households have been analyzed using both descriptive as well as inferential analysis. For inferential analysis, the Double Hurdle Model was adopted to estimate the technology adoption decision as well as use intensity of small farm households in the study area. The findings show that technology adoption decisions were associated with household-specific characteristics such as sex, education, extension, and family size, increasing the likelihood of technology adoption. In contrast, the age of the household head has a negative contribution to it. On the other hand, institutional factors such as access to extension service and access to credit facilities have a significant impact where the latter has contributed negatively to the farmers' decision regarding technology adoption.

Keywords: *Agricultural, Double-Hurdle, Masha Woreda, Technology adoption*

JEL Classification: Q12, Q16

INTRODUCTION

The African Union report recognized that there had been little improvement in agricultural production and factor productivity in Africa (New Partnership for Africa's Development, 2014). Though Agricultural growth in Africa is generally achieved by land-intensive production and by mobilizing a larger agricultural labor force, the two production factors (labor and land) remain stagnant in terms of productivity. On average, cereal yields are 50 percent less than those obtained in Asia per a given plot. In the last three decades, Africa's population has doubled, which implies the continent now has more mouths to feed and less per-capita land to cultivate. However, agricultural output has been unable to keep growing side by side. It resulted in food self-insufficiency, which puts the continent into a net importer of cereals from the rest of the world.

The dimension of African's agricultural growth has been recognized to be different from Asia and South America. Through intensification, agricultural growth was registered in Asia. Simultaneously, growth in South America was driven largely by improvements in labor productivity resulting from mechanization. Opposed to these, area expansion was responsible for increasing production in the agricultural sector and

the predominant intensification of cropping systems in sub-Saharan countries (New Partnership for Africa's Development, 2014; Brink & Eva, 2009). As SSA is generally endowed with abundant land and most of this arable land is still unexploited, area expansion in the decades to come may not seem problematic. But since in rural SSA, there is an uneven distribution of land. A considerable share of its rural population resides in smallholder farming areas densely populated and face land shortages (OECD/FAO, 2016; Jayne & Tschirley, 2014).

In countries with constrained land size, area-driven growth may come at the expense of fallows. The rapid growth of rural populations and associated land would result in continuous cropping in many African countries, with fallows largely disappearing in densely populated areas. The repeatedly cultivated plot of land would remain productive only when appropriate technologies such as fertilizers, improved seed verities, soil amendment practices, and other related investments are promoted and coupled with continued teaching and awareness creation to maintain and improve soil quality (Stoorvogel & Smaling, 1990; Drechsel et al., 2001; Tittonell & Giller, 2012). To re-state the above arguments, if Africa needs to attain food self-sufficiency and sustainable development, it needs to improve its technology adoption practice. Thus, those backward cultivation practices should progressively be transformed into relatively modern methods, while any attempt to boost production and productivity should be environmentally friendly.

The agriculture sector in the Ethiopian economy is the largest contributor to Gross Domestic Production (GDP), the lion's share contributor in employs generation (about 80% of the population), and the main income-generating sector for the majority of the rural population as well as a prominent contributor in foreign currency generation. Cereals, pulses, and oilseeds are the major crops grown in Ethiopia accounted for about 42% of the total agricultural GDP.

METHODS

The study area

Masha Woreda is one of the three woredas in the Sheka Zone of the South Nation Nationalities and Peoples Region (SNNPR. Masha Woreda shares borders on the South by the Andracha Woreda on the West and North by Oromia regional state and on the East by Keffa zone (CSA, 2007).

Concerning demographic characteristics, Masha Woreda has a total population of 40810, of whom 20,116 are men and 20,694 women. About 6787or 16.63% of its population is urban dwellers. Religion wise majority of the inhabitants (56.5%) were Protestant followers, followed by Ethiopian Orthodox Christian (32.82%), while the remaining 7.15% practiced traditional belief and 1.56% were Muslim (Census 2007 Tables). It receives a mean annual rainfall of about 2000m, and its mean monthly temperature ranges between 18 – 21oC. The woreda's total area is 217,527.15 hectares (CSA, 2007; Benyam & Fayera, 2018).

Data types, sources, and methods of data collection

This study used the data both from primary and secondary sources. Primary data was collected directly from randomly selected farmers using a structured questionnaire. In contrast, the secondary data was obtained from different published, and unpublished government reports, especially from Sheka Zone agricultural and rural development office. The secondary data is used for triangulation purposes to validate the primary data obtained from the farmers. Data is collected through group discussion with concerned parties like Woreda agriculture and natural resource management offices, site supervisor, and key informant interview with Development agents.

Sampling techniques and sample size

Regarding the method used to draw the sample units from the target population (farmers in Masha Woreda), a multi-stage sampling technique was adopted. In the first stage, Sheka Zone is purposively selected based on the observed degree of reluctance in technology adoption by the farm households. From the three woredas in the zone, Masha Woreda is randomly selected in the second stage. In stage three, out of 19 kebeles in the woreda, five kebeles (Yina, Degelle, Wello, Ateso, and Gatimo) are randomly selected, and the final stage (stage 4) deals with selecting a total of 251 farm households proportionally from the kebeles chosen as a representative sample. The final questionnaire was distributed to these farm households. These 5 kebeles have 2,613 farm households, and the sample size is determined by using the statistical formula forwarded by Yemane (1967) by choosing the precision level to be 7 percent.

Table 1. Distribution of sample households in selected kebeles

Kebeles	Total farm household	Sample size
Yina	463	45
Degele	590	57
Wello	710	68
Ateso	450	43
Gatimo	400	38
Total	2613	251

Data analysis

The researcher used both descriptive and inferential analysis methods to answer the research question and associated objectives mentioned above regarding the data analysis techniques. The descriptive analysis makes use of the usual methods such as computing mean and frequency distributions using tables and graphs basically to support the inferential analysis. In the inferential analysis, the Double Hurdle model is used to estimate factors influencing the farmers' decision and intensity to adopt agricultural technologies in the study area.

Most adoption studies have used the Tobit model to estimate adoption relationships with limited dependent variables. However, the Tobit model is very restrictive for statistical reasons, making this model unsuitable for certain empirical applications. The Tobit model is also statistically restrictive because it assumes that the same set of variables determine both the probability of non-zero adoption and intensity use level. That is why recent empirical studies have shown the Tobit model's inadequacy in cross-sectional analysis, stressing alternative approaches' relevance.

Therefore, this study's appropriate model is the Double-Hurdle model initiated by Cragg (1971). The DH model assumes that farm households face two hurdles in any agricultural decision-making process, such as participation decision (the decision to adopt) followed by intensity (the production level decision). Hence, the Double Hurdle model allows for the simultaneous consideration of the determinants of technology adoption decision of the HHs and the determinants of use intensity through two separate stages. The Double Hurdle Model uses both probit and truncated regression at different stages. The first stage involves running a probit regression to determine factors affecting farm households' decision to participate in technology adoption. While in the second stage, truncated regression is used to analyze the intensity of adoption on the individuals who passed the first Hurdle (i,e on those participating in the technology market).

The Double Hurdle model helps a subset of the data pile up at some value without causing bias in estimating the continuous dependent variable's determinants in the second stage. Hence, it can be possible to obtain all the data in the remaining sample for

the participants. Thus, there are no restrictions regarding explanatory variables in each decision in the double Hurdle model. Stated differently, it is possible to separately analyze the determinants of adoption decisions and the extent of adoption decisions. Due to this separability, the estimates of production decisions can be obtained by using probit regression. The level of adoption decision can be analyzed using a truncated regression. According to Burke, the separability in estimation may not be mistaken.

The general form of the Double Hurdle model employed for analyzing farm households' decision for adoption and intensity of adoption of technologies in term of area coverage in hectare based:

$$D_i = z'\gamma + e_i \quad \ldots\ldots (1)$$

$$y_i^* = x'\beta + \varsigma_i \quad \ldots\ldots (2)$$

$$y_i = \begin{cases} y_i^* \;\; if\; z'\gamma + \varepsilon_i > 0 \; and \; x'\beta + \varsigma_i > 0 \\ 0 \;\; if\; z'\gamma + \varepsilon_i \leq 0 \; and \; x'\beta + \varsigma_i > 0 \; or \\ \quad if\; z'\gamma + \varepsilon_i > 0 \; and \; x'\beta + \varsigma_i \leq 0 \; or \\ \quad if\; z'\gamma + \varepsilon_i \leq 0 \; and \; x'\beta + \varsigma_i \leq 0 \end{cases} \quad \ldots\ldots (3)$$

$$where, (\varepsilon, \varsigma) BVN(0, \Sigma), \Sigma = \begin{pmatrix} 1 & \sigma\rho \\ \sigma\rho & \sigma \end{pmatrix}$$

Z and x respectively are the set of explanatory variables that enter the first and second hurdles. Di represents a latent variable indicating the household's participation decision, while Y* is a latent variable and measures the intensity of adoption. Lastly, y indicates the actual (observable) amount of intensity which can only be observed if the household is a potential adopter (D>0) as well as the actual adopter (Y*>0).

The sample version of the likelihood function for Equation (3) can be given as:

$$L = \prod_0 1 - F(\varepsilon > -Z\gamma, \varsigma > -x\beta)$$

$$\prod_+ F(\varepsilon > -Z\gamma, \varsigma > -x\beta) f(\varsigma | \varepsilon > -Z\gamma, \varsigma > -x\beta) \quad \ldots\ldots (4)$$

Where F(.) and f(.) indicating cumulative distribution function (CDF) and probability density function (PDF), respectively.

Since the error terms in the two decisions follow a bivariate normal distribution, their distribution can be shown as

$$f(\varsigma | \varepsilon > -Z\gamma, \varsigma > -x\beta) = \frac{\int_{-z\gamma}^{\infty} f(\varsigma) f(\varepsilon|\varsigma) d\varsigma}{\int_{-z\gamma}^{\infty} \int_{-x\beta}^{\infty} f(\varepsilon, \varsigma) d\varepsilon d\varsigma} = \frac{f(\varsigma) \int_{-z\gamma}^{\infty} f(\varsigma|\varepsilon) d\varsigma}{\Phi(z\gamma, x\beta/\sigma, \rho)} \quad \ldots\ldots (5)$$

As the conditional distribution of Di conditional on Y=Y* follows a normal distribution with mean $Z\gamma + \sigma\rho^{-1}(y_i - x\beta)$ and variance of $1 - \rho^2$, the Equation (5) can be further simplified as:

$$f(\varsigma | \varepsilon > -Z\gamma, \varsigma > -x\beta) = \frac{\Phi\{(z\gamma + \rho/\sigma(y - x\beta))/\sqrt{1 - \rho^2}\} \frac{1}{\sigma} \phi(y - x\beta)/\sigma}{\Phi(z\gamma, x\beta/\sigma, \rho)} \quad \ldots\ldots (6)$$

Hence the above sample likelihood function becomes;

$$L = \prod_0 1 - \Phi(Z\gamma, x\beta/\sigma, \rho)$$

$$\prod_+ (\Phi\{(z\gamma + \rho/\sigma(y - x\beta))/\sqrt{1 - \rho^2}\} \frac{1}{\sigma} \phi(y - x\beta)/\sigma) \quad \ldots\ldots (7)$$

Given the Equation (7), whether to adopt Cragg's Double Hurdle model or a simple Tobit model depends on its value ρ and γ. That is if ρ =0, the above equation gives the likelihood function for Cragg's model. On the other hand, if $\gamma = \beta/\sigma$, the appropriate model turns out to be Tobit. Whether the two hurdles (whether to adopt and how much to adopt) are independent can be tested using the likelihood ratio test

The general form of the Double-Hurdle Model employed for analyzing for

smallholders farm households' decision for adoption and intensity production tef technologies in term of area coverage in hectare based.

Measurement and definitions of variables for adoption of the dependent variables of the Double-Hurdle Model. The model's dependent variable takes a censored value depending on the farmers' decision to adopt or not adopt the improved technologies and the intensity of adoption if they decide to adopt the technology. In this case, it indicates the amount of fertilizer per hectare cultivated in the year 2018. A farmer is said to be an adopter if he/she uses inorganic fertilizer on his/her farmland.

The Independent variables and their definitions in the Double Hurdle Model: Adoption literature provide a long list of factors that may influence agricultural technologies' adoption. Generally, farmers' decision to use improved agricultural technologies and the intensity of the use in a given period is hypothesized to be influenced by a combined effect of various factors such as farm household-specific characteristics, socioeconomic and physical environments in which farmers operate.

Based on the previous study done on the adoption of improved crop technologies and the experience of the study area's farming system, farm household-specific characteristics' such as marital status and age of the household head, education level of the household head, religion of the farmer are considered. As institutional factors, access to roads, access to credit facilities, and extension services are considered. Additionally, variables such as previous output level and farm size were selected as potential variables hypothesized to affect the adoption decision and extent of adoption.

RESULTS AND DISCUSSION

Needless to state, the agriculture sector in Ethiopia is and continues to be the base of the country's economy, accounting for more than one-third of gross domestic product (GDP) and more than 80 percent of exports, as well as total employment (NBE, 2018). Ethiopia's agriculture is highly exposed to natural phenomena and beleaguered by periodic drought, soil degradation caused by overgrazing, deforestation, and poor infrastructure. Yet agriculture is the country's most promising resource and a possible means for self-sufficiency in food.

The controversy of Ethiopia's resource structure (labor and land abundance) and self insufficiency in food remains unsolved regardless of policy directions by the government. The country has continued to import food items from the rest of the world, though 80 percent of the labor force has been engaging in the sector,

Descriptive analysis

As shown from Table 2, out of 251 sampled farm households, 166 individuals are agricultural technology adopters, and the remaining 85 individuals are non-users. Average outputs produced by technology users are about 82.38 quintals per hectare with a standard deviation of 53.82. Those who didn't use any technology on average produce approximately 26.95 quintals per hectare with an associated deviation of 21.59.

Table 2. Mean output by adoption status

Adoption	Freq.	Mean output	Std. deviation
Non participant	85	26.95	21.59
Participant	166	82.38	53.82
Combined	251	63.61	52.53
Difference	-	-55.43	-
Ho: mean diff = 0 .00		Prob = 0.000	

The mean productivity difference between the two groups is about 55.43 quintal per hectare, and this difference is statistically meaningful, as can be checked using a t-test. The non-users can be treated as the ones who are less ready to take the risk (risk-

averse farmers) as the mean deviation for the users is relatively higher as compared to the mean deviation of the output for non-users. The argument is in line with the fact that technology in any sector is riskier and more return.

Farmers are reluctant to practice new technology on their farms as they are afraid to take the risk because they want to be safe and avoid failure. But those who are constantly involved in risk-taking activities have the probability of becoming successful. Therefore, the risk-return trade-off associated with new technology adoption can be considered one factor behind some farmers' reluctance to adopt agricultural technologies on their farmland.

Across their educational attainment, farmers' technology use improves. That means farmers with higher educational attainment are ready to use agricultural technology than individuals with lower educational backgrounds. On the other hand, there is no evidence that education improves agricultural productivity for non-users of technology.

Illiterate non-adopters, on average, produce 34.36 quintals per hectare, and this output declines to 33 quintals for 1-4th grand individuals. As education increases, the mean output level of the non-adopters is almost constant with no major change. Opposed to non-adopters, technology adopters' average productivity improves with educational attainment. Illiterate farmers' average productivity is about 61.46 quintal per hectare, and this figure rises to 94.86 quintals per hectare for grand 12 and above.

Table 3. Average output distribution across various attributes

Education	Non-Adopter		Adopter	
	freq	Mean output	Freq.	Mean output
Illiterate	25	34.36	13	61.46
1-4	4	33	7	90.14
5-8	23	21.13	38	58.87
9-12	27	24.30	59	90.86
>12	6	26.33	49	94.86
Total	85	26.95	166	8238
Marital status				
Single	3	35	3	94
Married	77	26.92	148	85.12
Divorced	4	20.75	12	53.42
Widowed	1	30	3	51.67
Extension Access				
Yes	36	26.69	146	89.67
No	49	27.14	20	92.20
Credit Access				
No	40	30.85	63	72.17
Yes	45	23.49	103	88.63
Sex				
Female	6	19.67	10	46.10
Male	79	27.51	156	84.71

In terms of marital status, single farmers are the most productive group with an average output of 35 quintals per hectare for non-adopters and 94 quintals per hectare for adopters, followed by married farmers (whose average output ranges about 27 quintals for non-users and 85 quintals for users.

On the other hand, access to extension services improves the decision to participate in the technology adoption. In contrast, it doesn't significantly affect the average productivity for both adopters and non-adopters. As shown from Table 3, out of 85 non-adopter farmers, 58% of farmers do not have access to extension, whereas only

42% have access to extension services. In terms of the average productivity of non-adopters, the one who has access to extension service produces 27 quintals per hectare. This figure is almost similar to the farmers who do not have access to extension service.

On the other hand, out of the total technology adopters (166 farmers), 88% of farmers have access to extension service, and the remaining 12% of farmers have not. In terms of their average productivity, farmers who adopt technology and have access to extension service on average produce 90 quintals per hectare. Farmers with no access to an extension on average produce 92 quintals per hectare.

Regarding farmers' access to credit facilities, out of the sampled households, 41% of farm households do not have access to credit facilities, whereas 59% have access to credit. In terms of technology use, out of the non-users, 47% have no access, whereas 53% have access to credit facilities. On the other side, 38% have no access to credit among the technology users, and 62% have access to it. One can conclude from the above figure that access to credit is not the inessential determinants of technology adoption decision in the study area as about 47 % of non-adopters have access to it and still decides not to adopt the technology on their farmland

The adoption decision of farm households are split gender-wise in Table 3, and accordingly, 6.37% of the farm households are female-headed. The remaining 93.63% of farm households are male-headed. Out of the total female-headed farm households, 37.5% are non-adopters, and 62.5% engage in technology adoption. In terms of average productivity, male-headed households are more productive than female-headed households in the study (27.51 vis-à-vis 19.67 quintals for non-adopters and 84.71 vis-à-vis 46.1 quintals per hectare for adopters).

Inferential analysis (Double Hurdle Model)

In this part, the data is estimated using the DH model after taking care of all the prior tests on the collected and managed data. To address the researcher's objective of measuring the decision and use intensity of technology in the study area, the researcher chooses the Double Hurdle model because of its superiority, as discussed in the previous sections.

The Double Hurdle estimates are reported in Table 4. Accordingly, the overall significance of the model is checked given the likelihood ratio test statistics (LR $chi^2(6)$ = 104.52) and its respective p-value (P > Chi2=0.00), which indicates the model is statistically meaningful. The goodness of fit, 52 percent of the dependent variable's deviation, is explained by the model (Pseudo R^2=052).

Table 4. Determinants of technology adoption (DH Model)

	1st Hurdle		2nd Hurdle	
Agri_Tech	Coefficients	P-values	Coefficients	P-values
Sex	0.48**	0.02	0.07	0.86
Education	0.04	0.35	0.07**	0.01
Extension	0.39**	0.01	1.11*	0.00
Age	-0.01*	0.00	-0.01	0.75
Family Szs	0.07*	0.00	0.01	0.74
Credit	-0.21**	0.02	-	-
Farm Sz	-0.03	0.17	0.07	0.14
Ln_sigma	-0.60	0.92	0.00	
/sigma	0.55	0.03	-	
N = 251	LR chi2(6) = 104.52	P > Chi2=0.00	pseudo R2=0.52	

** Significant at 1% level, ** significant at 5% level, *** significant at 10% level. Significance levels are based on the significance levels of the underlying marginal effects.*

Sex of the household doesn't significantly affect farm households' decision to adopt the agricultural technologies, whereas once the household decides to adopt the technology, to what extent it has to be used is partially determined by the sex of the household. Accordingly, compared to female-headed households, male-headed households have a higher likelihood of participating in technology adoption. On the other hand, the household's education level is estimated to affect farm households' decision to participate in the technology market. It doesn't have any significant impact on the intensity of technology use in the study area. Farm households with better educational attainment have a relatively higher probability of participating in the technology market, while the variable is statistically significant at 5 percent.

Other variables such as extension access and family size positively impact the use intensity of agricultural technology in the study area. In contrast, the household head and credit access age have a negative and significant impact on the use intensity of the technology in the study area. All variables but access to credit have their respective expected sign, and access to credit is negative, against the theory and intuition.

Empirically access to extension services is among the key determinants of technology adoption. Extension agents have a critical role in providing information to farmers about the access and the benefits of new technology and giving guidance on the farmland how and how much to use. Extension agents are assumed to serve as a bridge between technology innovators (research and development) and users of the same technology through facilitating information flow and reducing the transaction cost (Genius et al., 2010), (Mwangi & Kariuki, 2015). Apart from this finding, access to credit has been believed to facilitate technology adoption (Mohamed & Temu, 2008) by promoting the adoption of risky technologies by lessening the financial constraint of farm households and boosting household-risk bearing ability (Simtowe & Zeller, 2006).

Land size owned by the farm households is generally believed to play a significant role in the farmers' technology adoption decision (Mwangi & Kariuki, 2015). Many researchers have argued that land size is one determinant of technology adoption as land size can influence other factors determining the adoption decision (Lavison 2013).

Opposed to many studies that have reported a positive impact of farm size and technology adoption (Kasenge, 1998; Gabre-Madhin & Haggblade, 2001 Ahmed, 2004; Uaiene *et al*., 2009) this study has revealed no significant impact of land size on farmers' adoption decagons as well as the intensity of adoption. This finding is generally against the arguments of previous researches that farmers who have ownership of large farm sizes are likely to use new technology as they can be able to put aside part of their land to practice a new technology to avoid crop failure if used in their entire land. On the other hand, large farm size facilitates the use of other farm technologies (such as tractors) as it requires economies of scale to make sure profitability (Feder and Zilberman, 1985). But the latter argument doesn't work, especially for the study area, as land size in the study area is more or less distributed symmetrically and relatively small.

Impact of adoption on productivity

Farmers in the study area claim that technology has an adverse impact on their land productivity, as one reason behind the low rate of technology adoption. Cobb-Douglas production function was estimated to test the impact of technology on productivity, while technology use is entered as one explanatory variable.

The objective is to empirically test whether the claims by most of the small farm households in the study area about the ineffectiveness of agricultural technology in the study area by estimating the production function, including the technology adoption as

one of the determinants of productivity. They argue that the technology the government supplies them is incompatible with the soil's nature and contributes adversely to their land productivity. Apart from this claim, as shown in Table 4, fertilizer use is one of the statistically significant determinants of productivity in the study area. Accordingly, as compared to non-users, output increases by about 85 percent for technology users.

Table 4. Determinants of productivity

Output	Coefficients	Std. Error	P-values
M. status	-0.04	0.12	0.72
Religion	-0.00	0.08	0.98
Lnd size	0.13*	0.02	0.00
Education	0.09**	0.04	0.04
Extension	0.46*	0.12	0.00
Age	-0.01	0.05	0.38
Family Szs	0.07*	0.02	0.00
Distance_Road	0.01	0.49	0.76
Credit	0.02	0.99	0.81
FtlZr	0.85*	0.11	0.00
N = 251	F(10, 240) = 22.93	P > F=0.00	R2=0.49

** Significant at 1% level, ** significant at 5% level, *** significant at 10% level.*

Along with technology, output in the study area is determined by land size, education level of the household head, access to extension service, and family size. On the other hand, household characteristics such as marital status, religion, and age of the household head and institutional factors such as access to road and credit facilities have no significant impact on productivity in the study area.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

Population growth, land fragmentation, and associated over-utilization of land have been serious causes of low productivity, food self insufficiency, and malnutrition in developing countries in general and Ethiopia. Using agricultural technology such as fertilizer and improved seeds has been advocated to cure the soil's loss of natural fertility and associated low productivity. Apart from these consensuses, the degree of technology adoption varies spatially as well as temporally. Some of the possible explanations for the variation are capacity constraints (lack of credit access and high technology price), low educational attainment of the farm households.

The low rate of technology adoption, adopters' and no adopters' productivity difference is very significant and positive. In contrast, the variability of productivity (the standard deviation of output) is very large (about 53) within the technology adopters, which implies that the uniformity of the adoption is still a problem that might be emanated from farmers' low education level as well as constrained access to extension service.

Recommendation

Since technology adopters are more productive than their counterparts, the concerned stakeholders such as local and federal government, NGOs, and research institutions shall encourage technology adoption of local farm households to bridge the gap. Significant variation in terms of productivity (output per hectare) has been witnessed in the area. Therefore, the government should work (through the Development agents) to bring farmers on the same page regarding their technology adoption in the sector.

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Strategic priorities and accountability for allocating the state budget amid Covid-19 pandemic in Indonesia

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Abstract

This study explains about strategic priorities of state financial management for handling the Covid-19 pandemic in Indonesia. The impact of this pandemic has caused the country's financial posture in the state budget to be unbalanced, where receipts have decreased while in state spending has increased very sharply. Such conditions imply that the state budget deficit's widening exceeds the limit set by the law. The method used in this research method is a descriptive qualitative approach using literature data that can provide analysis of strategies to change the state financial management amid the Covid-19 pandemic. The study concluded that the government's strategic response in abnormal situations is an extraordinary matter with budget allocation priorities aimed at public health and safety, including medical personnel, protection and social safety nets for vulnerable people, and protection among business people. However, it requires accountable supervision, especially for the distribution of social assistance funds with experience prone to corruption practices so that it is not on target.

Keywords: *Covid-19, State finances, Strategic priorities*

JEL Classification: E61, G32, G38

INTRODUCTION

Covid-19 pandemic in Indonesia continues to add 21,944 new deaths. Task Force (Satgas) Covid-19 announced as of December 30, 2020, the number of infected reached 735,124 people, with the addition per day of 8002 people (Merdeka, 2020). The government takes preventive and curative approaches to suppress the spread of this dangerous disease. The implementation of Large-Scale Social Restrictions (Indonesian: *Pembatasan Sosial Berskala Besar* = PSBB) policy continues to be extended and tightened supervision and the application of health protocols. Meanwhile, the United Nations urges the international community to take any steps to address Covid-19 (News Wires, 2020). The capacity of countries in the world to face challenges of how to create extraordinary efforts to overcome Covid-19 (Bacq et al., 2020). Mitigation of this health disaster should be the priority of every government globally to the lowest point of transmission and mortality (Walker et al., 2020).

The complexity of the economic impact of Covid-19 threatens global economic resilience and enables an unpredictable economic crisis. They assumed the economic

impact of this pandemic in shocks due to negative supply conditions (Barua, 2020; Hausmann, 2020; Rahmany, 2021). Many workers are exposed to the virus to stop the production process (McKinsey & Company, 2020). Widespread contagion globally results in a workforce shortage so that a country's economic and financial infrastructure is under serious pressure. PSBB policies limit population interaction, and they impact reducing production and production distribution flows.

As an illustration, one of Indonesia's manufacturing centers in the Greater Jakarta industrial area stopped production during the first quarter of 2020 following the implementation of PSBB. It has had a very significant impact on output reduction, so that the achievement of purchasing managers index in April 2020 is only 27.5 lower than the achievement in April 2020 of 46.5 (Katadata, 2020). So far, it is known that state revenues from export taxes on manufactured goods are significant for the State Budget. If there is pressure in the form of a decrease in exports can threaten the stability of the posture of the State Budget itself (DetikFinance.com, 2020). A construction modeling the economic impact of the Covid-19 pandemic by Eichenbaum et al. (2020) shows that policies to suppress the virus's spread can save lives; on the other hand, they can exacerbate economic recession because a massive wave of layoffs follows it.

The contraction in economic growth related to the decline in state revenues also occurred globally, with a significant decrease in ratings experienced by almost all member states (International Monetary Fund, 2020). It is worse than the global financial crisis before. Related to gross domestic product, an assumption about the decline in Gross Domestic Product (GDP) In 2020 globally could touch the figure of more than 8 Trillion US Dollars Dollar (McKibbin & Fernando, 2020). Observing the worsening economic impact, the government established the country's financial policy with a priority strategy approach in terms of financing and in terms of revenue by reallocating from various sources of the State Budget that are not urgent, the government bond payment (SUN) and revising the legal basis with the redefinition of the budget deficit in the State Finance Law. The basis for strategic policy refocusing and reallocating the government budget against the background of abnormal conditions in the form of the Government Regulation in Lieu of Law (*Peraturan Pemerintah Pengganti Undang-Undang or Perppu*) No. 1 of 2020 (Kacaribu, 2020). Reorganize the priority scale of central and local government spending with an analysis of spending that has been budgeted since the beginning of the work program by refocusing on the budget in the health, social, and business sectors. Refocusing is also driven by declining assumptions of state revenue (Kacaribu, 2020).

Budget allocation is not limited to the capital expenditure budget to operational expenditures only, but other efforts can be carried out by reducing or moratorium on infrastructure projects, trimming on routine expenditures such as official travel costs, meeting expenditures, technical guidance, organizing ministry training, and institutions that collect significant budget allocations. Definition of state finances should be the frame of reference for managing the budget of a particular program (Atmadja, 1986; Musgrave, 1989; Suparmoko, 2013; Ulbrich, 1993). This article describes the government's response from the perspective of state financial management in handling Covid-19. State financial management related to the State Budget includes revenue sources, spending mechanisms, central and regional fiscal arrangements, and fiscal capacity and liabilities, both short and long term.

METHODS

The study of strategic priorities and accountability of government budget allocation amid the Covid-19 pandemic is designed with qualitative academic literature survey approach methods. This study rests on secondary data in document analysis with validity that can be accounted for so that its analysts are considered credible (Bowen, 2009). The data obtained through the search efforts of various sources both from the documents of ministries, state and international institutions, the results of research academics fiscal policy as well as the source of writings from journals and various mass media both print and electronic to describe the financial management of countries affected by the pandemic.

In the research stage that the authors did: first, the authors found the problem of pressure on the posture of the State Budget as a result of the spread of Covid-19 that caused economic contraction two quarters in a row so that Indonesia entered into recession; secondly collect secondary data on the up to date development of Covid-19 in Indonesia, the economic impact it causes, and the reallocation of government budgets obtained from scientific publications and official information from the Ministry of finance; third, classify and select data relevant to the country's financial management for handling Covid-19; fourth, data analysis by interpreting the main study of budget financing priority strategies in the field of public health, various stimulus, and allocation for national economic recovery; the fifth concludes this study.

RESULTS AND DISCUSSION

Priorities for public health and safety protection

The success in managing the state budget can be measured through the achievement of sustainable fiscal policy. However, the emergency impact of the Covid-19 pandemic has brought tremendous pressure on the spending side. To maintain the posture of the State Budget is not included in the critical condition, the government designed a policy to strengthen the revenue side by issuing Government Securities (SUN) in US Dollar (US Bond) denominations with a total nominal of USD 4.3 Billion. Consisting of USD1.65 Billion for 10.5-year tenors, USD1.65 Billion for 30.5-year tenors, and USD 1 Billion for 50-year tenors (Puspasari, 2020). Important early anticipation of handling Covid in overcoming the lack of budget (Rosewicz et al., 2020).

Under the authority given by Law No. 24 of 2002 on Government Securities, the Minister of Finance determines the results of SUN sales transactions in foreign currencies as Table 1.

Table 1. Transaction selling Government Securities (SUN) in US Dollar denomination

Series	RI1030	RI1050	RI0470
Tenor	10.5 years	30.5 years	50 years
Due date	October 15 2030	October 15 2050	April 15 2070
Pricing date		April 6 2020	
Issue date		April 15 2020	
Nominal issued	USD 1.65 Billion	USD 1.65 Billion	USD 1 Billion
Coupon rate	3.850%	4.200%	4.450%
Yield	3.900%	4.250%	4.500%
Price	99.573%	99.150%	99.009%

Source: Ministry of Finance of the Republic of Indonesia

The issuance of USD Bonds will be used to meet the State Budget's financing in

general, including costs for COVID-19 handling and recovery efforts. State budget financing through market mechanisms is an effort by the government to continue implementing fiscal policy positively, disciplined, and sustainable amidst volatile global economic conditions (Chapman, 2016). On the other hand, it also illustrates responsive fiscal policy to support 3 (three) government priority programs in handling COVID-19, namely handling health problems, providing social safety nets, and supporting the business world, especially MSMEs. A priority scale of financing for urgent programs is needed to balance the State Budget (Purba et al., 2021; Rossen & Gayer, 2008).

The state budget all-out support for handling the spread of Covid-19 includes testing, tracing, and treatment. The timely preparation of the 2021 State Budget indicates the government's serious efforts amid the country's difficult financial situation. DIPA/KL submission process and allocation list of Transfer to regions and village funds (TKDD) state budget 2021 earlier to support the handling of Covid-19, providing social protection, economic recovery, and various strategic development priorities. Determination of Covid-19 transmission has even reached the level of family clusters, social restrictions in the long term, and widespread, resulting in a domino effect of pressure on economic activities (Suparman et al., 2020). Handling Covid-19 and public health recovery are preconditions for economic recovery and reform implementation. The curative step is to provide vaccines to suppress and break the chain of Covid-19 spread (Rahman, 2021). On the other hand, the government continues to improve access to quality health services by paying attention to supporting health resources, national health insurance, strengthening central and regional coordination, and developing health resilience preparedness systems (Worldbank.org, 2020).

The release of Covid-19 gave rise to the government's strategic response by prioritizing spending in the health and safety sector, including medical personnel, to maximize the handling of Covid-19 outbreaks. With the publication of the minister of finance's official letter addressed to all Ministries/Institutions to relocate non-priority expenses posts. Based on the Ministry of Finance's Initial Study, the number of non-priority budgets that can be relocated for handling Covid-19 health disasters reaches 5 Trillion to 10 trillion, including criteria including funds that are still blocked, remaining tender funds, and canceled activities. In terms of expenditure for goods, the expense that will be reallocated is not urgent expenditure, and the activities are recommended to be reduced. The expenditure of such goods includes the expense for official travel both at home and abroad, expense related to meetings involving large numbers of participants both at home and overseas. Extraordinary conditions and full of uncertainty, demanding that the government respond quickly through the arrangement of an adaptive state budget to deal with economic turbulence impacts of the pandemic.

As of the end of February 2020, domestic travel spending was only realized at Rp 2.5 Trillion or contracted by 7.5% compared to the same period last year. Foreign service travel spending only realized Rp200 billion, contracted 42.8% compared to the same period last year. Overall, the official travel spending ceiling in 2020 reached Rp43.7 Trillion, which can be prioritized for handling Covid-19. In terms of capital expenditures, expenditures that are not a priority and there is no alliance because it is still blocked, still in the tender process, until the rest of tenders for capital goods procurement will also be reallocated. Many of the remaining tenders and funds were canceled at the Ministry of Public Works and Housing due to changing situation conditions. All of these were reallocated for Covid-19 handling. The revised time of

ministries/agencies spending is accelerated from the usual 5 days to 2 days to accelerate budget reallocation.

Significant pressure on the spending side encourages the reformatting of the State Budget in connection with the soaring urgent need to follow up on the health impacts of Covid-19, expand the social safety net for affected communities, as well as domestic economic recovery efforts. The government needs precise managerial accounting practices (Granof et al., 2016; Hansen & Mowen, 2007). The review of the State Budget structure is carried out through Presidential Regulation No. 54 of 2020, then again adjusted to Presidential Regulation No. 72 of 2020.

Refocussing and reallocating the budget as a tactical step by the Ministry of Finance in supporting the handling of health disasters that require a large and immediate budget. The terminology of the task force handling the spread of the Covid-19 pandemic under the National Disaster Management Agency (BNPB) is included in the preparation of operational budget needs prepared as in Table 2.

Table 2. Refocussing and reallocating the budget to handle the spread of Covid-19.

Allocation recipients	Amount	Notes
Ministry of Health	3.14 T	some
Deputy for Emergency Management BNPB	27.68 M	full
Deputy for Logistics BNPB	106.79 M	some
Task Force	12.78 M	full
National Armed Forces of Indonesia Headquarters	82 M	full

Source: Ministry of Finance of the Republic of Indonesia

In the context of efforts to save the community from the dangers of Covid-19, the Spokesperson of the Task Force handling Covid-19 explained that there had been quite a lot of progress achieved until the eleventh month period the distribution of vaccines throughout the region with storage by the target set. The implementation of vaccination will begin immediately without any constraints. The availability of ready-made vaccines, for vaccine raw materials available 15 million doses of Sinovac production, followed by the procurement of 50 million Novava vaccines, then the procurement of 50 million doses of Astra Zeneca, 50 million Pfizer vaccines, as well as a collaboration of Cvac-Gavi produced 54 million doses of vaccine as the last layer of inventory.

In addition to the curative approach, the government continues its preventive approach by preventing the spread of the Covid-19 virus. The general evaluation of social restrictions proved to suppress the spread, especially accompanied by increased public discipline. Standard Operating Procedure (SOP), which has been done in the form of testing, tracking, and treatment, will continue to be intensified with the target population target is even greater according to or exceed the indicators set by the World Health Organization (WHO). Operationally, officers at various levels of the Indonesian National Military, police, and involving various community organizations are working hard to monitor and improve the tracking system to ensure that new cases do not arise.

Government policy in handling the covid-19 pandemic prioritizes handling the health and safety of citizens, including medical personnel and medics. The main indicator of the policy is to prevent deaths, especially for frontline medics handling covid-19. Any efforts to prevent the transmission of Covid-19 must be accompanied by a level of public discipline in compliance with health protocols that so far have to be continuously improved.

Priorities for social protection.

Vulnerable communities affected by Covid-19 are increasingly experiencing deterioration. Before the Covid-19 cases spread, their conditions have been difficult, especially economically, now the purchasing power of vulnerable people is weakening, if such circumstances are not immediately handled can trigger a spike in poverty, conditions that easily trigger chaos then the government has channeled a number of budgets of Rp. 205.20 trillion to minimize the influence of Covid-19 from purchasing power. Details of the budget for the allocation of social protection Rp 203.90 trillion helped the board sector in the form of housing incentives MBR (Low-Income Communities) Rp 1.3 trillion. In essence, the policy of strengthening purchasing power serves as a barrier to accelerating the economic impact on people with declining purchasing power. Social safety net policies targeting grass-root communities in pandemic conditions are considered appropriate and fair measures. Still, technical problems in terms of accuracy of policy target data and the urgency of aid distribution time become an unsolved problems. On several occasions, the House of Representatives has reminded the government to improve social assistance distribution's overall management.

The community's purchasing power or the broader context as demand is related to the number of products available in increasing or decreasing conditions, followed by price adjustments as a reflection of the community's expenditure side. The picture of demand in Indonesian society is more than 60% of GDP in consumption and distribution. The community's economic structure tends to be low income, thus rationally the right step of the government with the priority of providing social protection first. Social assistance to cover basic needs at least targets the most vulnerable layers of socioeconomic communities due to COVID-19. The social protection scheme became urgent to be immediately distributed with a budget ceiling of Rp 203.9 trillion, followed by the MBR housing incentive scheme (Badan Kebijakan Fiskal, 2020).

The Hope Family Program (Indonesian: *Program Keluarga Harapan (PKH))* continued and expanded its recipient target by improving its effectiveness database to be more accountable for the budget of Rp37.4 trillion. The *Kartu Sembako* program, with a budget of Rp 43.6 trillion, to reduce household costs, is given electricity discounts for 450 VA and 900 VA with a budget ceiling of Rp 6.9 trillion. The social assistance program (Indonesian: *Bansos*) for non-Jakarta, Bogor Depok Tanggerang Bekasi (Jabodetabek) clusters amounting to Rp 32.4 trillion, specifically for Jabodetabek *Bansos* disbursed Rp 6.8 trillion, other important programs ranging from Direct Cash Assistance (Indonesian: *Bantuan Langsung Tunai (BLT)*) following the Village Fund Rp31.8 trillion and Workers Card of Rp20 trillion. Improving the demand side of society as a targeted policy amid the ongoing pandemic crisis is crucial to create economic resilience in the community. So in this context, budget management reflects the politics of pro-poor budgets, balancing the health sector and the economic sector, and balancing brake and gas control.

Table 3. Economic stimulus for handling Covid-19 in Indonesia

No	Stimulus forms	Types of stimulus	Description and stimulus objectives
1	Fiscal Stimulus	Relaxation of income tax (PPh), article 21	Relaxation for workers in the manufacturing sector for 6 months. Assisting worker liquidity in related sectors.
		Relaxation of income tax (PPh) article 22	Imports for 6 months for 19 specific sectors. Giving cash flow space as switching cost compensation.
		Reduction in income tax (PPh) article 25 by 30%.	Valid for 6 months intended for certain sectors. Giving cash flow space as switching cost compensation.
		Income tax restitution (PPn)	Accelerated for 6 months for 19 specific sectors. Helps the liquidity of the company.
		PPh Final Government Regulations no. 23 year 2018.	Relaxation for 6 months on PPh Final Government Regulations No.23 of 2018. Easing the burden on entrepreneurs, especially in the MSME sector
2	Non Fiscal Stimulus	Simplification of limited bans for export	Aims to improve the smooth export and competitiveness of export products. Completeness of Health Certificate and V-Legal is no longer a document of export requirements unless required by the exporter
		Simplification of limited bans for import	Aims to improve the smooth import and availability of raw materials
		Acceleration of export-import percentage for Reputable Traders	Differentiating the practice of services / supervision to 625 major customs partners (MITA) and 109 authorized economic operator (AEO) companies.
		Acceleration of export-import percentage in general.	Entrepreneurs can manage through the mechanism of the National Logistics Ecosystem.
3	Financial Sector Stimulus	Banking policy for Supporting economic growth stimulus including MSME debtors	Carried out to encourage optimization of banking intermediation function. Credit quality assessment/financing/provision of other funds refers to indicators in the form of the accuracy of principal and/or interest payments for loans up to Rp10 billion.
		Restructuring policy of MSME debtors in a more flexible way.	Maintaining financial system stability. Banks can restructure all credit/financing regardless of credit ceiling limits or types of debtors, including MSME debtors. The quality of credit/financing carried out by the restructuring is determined smoothly after the restructuring.
		Encouraging THE Empowerment of MSMEs	Supporting economic growth, especially the Micro, Small and Medium Enterprises (MSMEs) sector. Restructuring MSME credit/financing.
		Workers Incentive	Relaxation incentives in the Program Social Security Administering Agency Employment to workers to anticipate contracting the corona.

Source: Regulation of the Minister of Finance No.23/PMK.03/2020.

Priorities for businesses support

The economic impact of Covid-19 is not only on vulnerable communities but the business community is also hit hard enough that the production process is stopped partially or even largely stopped altogether. During the economic crisis in 1998, MSMEs can survive and are proud to be the last economic defense. In the covid-19 pandemic, MSMEs conditions are experiencing different situations. The production process became abnormal by more than 70%. In idle conditions due to the supply side of raw materials distorted. The rapid supply of imported products from foreign producer countries in line with the decrease in the number of local manufacturing production impacts the application of PSBB makes the problems of the business world more complex.

At the lower-middle-class level, the decline in purchasing power is triggered by a decrease in income due to the pandemic generating so that people's wiggle room becomes very limited or, even in some areas, is partially locked down. Contribution of spending power or the level of public consumption at the economic level can also experience braking based on consideration of vigilance or concern affected by Covid-19 infection.

The impact of PSBB throughout the region caused economic activity to decrease dramatically from indicators of oil and gas demand declining world oil prices were hit at the lowest point. The use of toll road services shrank by almost 80%. All modes of transportation are shrinking the number of transportation users is very significant both modes of air transportation, land transportation, and sea transportation

The problem of depreciation of business capital due to the pressure of the company's cash flow is sought through the channel with fiscal disbursements for the MSME sector in the form of MSME credit stimulus, including the budget ceiling of Rp. 34.15T is then distributed through the national banking distribution mechanism, channeling through rural banks and financing companies. The benefits received by the community of beneficiaries include a moratorium on installments and interest subsidies for Micro and Small Enterprises of 6% for the first three months and 3% for the next three months, as well as Medium Enterprises of 3% for the first three months and 2% for the next three months. The loan allocation of 6.47T was distributed through KUR, UMi, Mekaar, and Pawnshop with the ease received in delays in principal installments and interest subsidies for KUR, UMi, Mekaar, and pawnshops for six months. Credit allocation of Rp. 0.49T is distributed through Online, Operations, Farmers, LPDB, LPMUKP, and Local Government MSMEs. The convenience received in the form of relaxation is given a 6% interest subsidy for six months.

The accumulation of convenience received by the community through the variant of economic stimulus program can trigger innovations of micro-enterprises and MSMEs. Or at least as a cushion of the social safety net where the pull or breaking of community activities due to the pandemic does not result in the state entering a very severe scenario.

Social restriction policies to suppress the increasingly progressive trend of Covid-19 transmission are colluding negatively with the normality of corporate activities. The results of a recent survey BPS (2020) described that 40% of the companies surveyed had ceased operations with capacity reduction variants covering working hours, machinery, and workforce. In companies both Small Medium Enterprises (MSMEs) and Medium Enterprises (UMB) that can still survive to operate faced with the same problems that are crucial, among others, 80% are faced with a decrease in demand as a

consequence of customers/clients who are also affected by Covid-19.

Various academic studies and interpretation of survey results related to the impact of COVID-19 on the business world's existence can be used as a measure or criteria to analyze the benefits of economic stimulus programs as part of the grand design of national economic recovery holistically. The government needs to immediately evaluate the social assistance package that has been distributed, including economic stimulus in the business sector.

Conceptually evaluation provides an assessment of goals' achievement, not evaluating the objectives (Suparman et al., 2019). The target specification (goals) is then set because the goals are the criteria for the program's success. It must be stated specifically to obtain the benchmark criteria. These goals are often only stated in general or with a long-term scope, and sometimes even counter-productive and not related to program activities. Furthermore, to optimize the objectives of budget management policy for those affected by Covid-19 within the program evaluation framework, it is necessary to institutionalize evaluators who act as containers, as a process, as behavior, and as a tool to achieve goals.

Concerning the setting of the objectives of the evaluation of the budget management impact of covid-19 and to find out the level of evaluator elements to the main objectives of the evaluation, all evaluator components consisting of the Audit Board of Finance (BPK), the Audit Board of Finance and Development (BPKP), inspectorate general of the Ministry of Finance, Inspectorate General of the Ministry of Social Affairs and Inspector general of the relevant Ministry must understand comprehensively the main objectives of the policy of evaluating the management of the state budget impact of Covid-19, namely to validate (audit) the financial governance of the state in the pandemic to be aligned and not contrary to the State Finance Law as the basis of positive law.

The specifications of budget management policy evaluation activities for handling socioeconomic impacts carried out by evaluators contain more detailed objectives. In this context, the objectives of evaluators are: 1) to understand, analyze and provide an assessment of the development of budget absorption for handling affected by a pandemic from each evaluator. 2) Formulate policies related to the governance of the new budget version of Covid-19 conducted by stakeholders of the Ministry and Institutions leading the sector handling Covid-19 at the central and regional levels. 3) Mapping the performance of each of the main unit agencies mandated to evaluate the policy of changes in budgeting management.

The Wave of Covid-19 pandemic has impacted the joints of social life with rapid changes that were previously unexpected and not expected. The decline in economic activity in most countries in the world, including Indonesia. Policy formulation to spawn extraordinary government efforts in its handlers requires a valid and accurate database as a precondition so that the national economic recovery program during this pandemic can be achieved with a high success rate. Cross-sectoral evaluation across Ministries and Institutions handling the impact of Covid-19 on small and large businesses is experimental statistics to provide cutting-edge indicators (an early indicator) about businesses affected by the Covid-19 pandemic. Monitoring and evaluation can be done through an online survey platform to capture information about social phenomena and at the same time quantify data related to the condition of the company in the midst of a pandemic that can be seen in multi aspects, including operational, labor aspects, income aspects, difficulties faced, adaptation level, building optimism, to the assistance needed.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

This study explains the strategic priorities and accountability in allocating social assistance regarding the progression of the COVID-19 pandemic, which has led to new and growing death rates. The adverse effect on the national economy caused the downturn in the small and medium enterprises segment, triggered by the community's declining purchasing power. The state budget's impact in contraction in economic growth per quarter in a row led to an economic recession, and a potential economic crisis could be possible. Based on these precarious conditions, the Government of Indonesia has issued an extraordinary policy of handling this epidemic through a new strategic approach to state budget management that strengthens the spending side's acceptance and relevance in line with the handling of Covid-19.

On the budget revenue side, gathering from various sources of reallocation of central government spending, savings on state spending from non-urgent budget posts, and capital expenditures are not priorities. The current budget deficit is inevitable and is predicted to exceed the law's maximum threshold on state finances. In an abnormal state budget situation during the pandemic, the government can take extraordinary steps to formulate and implement policies to widen the budget deficit to save the economy and financial system. Extraordinary measures are necessary to secure the state budget accompanied by accountable and transparent evaluation to avoid economic crisis.

Recommendations

This study recommends that the Central Government through the Ministry of Finance must make various efforts to protect public health and take tactical measures in budget governance in an effort to minimize the impact of Covid-19 on the economic downturn of the community, MSME sector, and Industry in general so that social assistance continues to be extended.

The next budget allocation is focused on fiscal stimulus, non-fiscal stimulus, and fiscal stimulus. Limited data access in the middle of the pandemic by accessing secondary data in 2019 and data in 2020. It is recommended to other researchers to conduct follow-up research to monitor and evaluate the 2nd and 3rd semester and year 2021 economic growth and its impact on the economic sector in general.

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Coronavirus Diseases -19: an overview in education, agriculture, and communication perspectives

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Abstract

As it emerged at the end of December 2020 in Wuhan, China, Coronavirus has now spread to many countries, which affected several sectors of human life. This paper aims to describe the impact of covid-19 on education, agriculture, and communication in Indonesia. In education, COVID-19 impacted the teaching methods. Teachers utilized e-learning during the COVID-19 pandemic, such as Schoology, Edmodo, Google Classroom, Facebook, WhatsApp, and Zoom. In agriculture, coronavirus impacted downstream and upstream agriculture. As the main food producer, farmers should be protected from the dangers of the coronavirus to maintain food security. All people need to consume food based on agricultural products. In communication, coronavirus makes society change in the use of communication media. New media is more interactive and creates a new understanding of interpersonal communication.

Keywords: *Agriculture, Communication, COVID -19, Education*

JEL Classification: C65, Q10

INTRODUCTION

Coronavirus infection, usually called COVID-19 (Coronavirus Disease 19), is firstly found in Wuhan, China. China. The first case is related to the fish market in Wuhan. Since December 31, 2019, this case has been increasing rapidly then spread massively worldwide. Furthermore, this virus has spread globally then considered a global pandemic. (Yi-Chi et al., 2020). Mass media have followed the development of COVID -19 that news about renewal of COVID -19 status appears every day and increases month by month.

The COVID -19 outbreak in Indonesia impacted the tourism sector and spread to other sectors. Large-scale social restrictions, social distancing, and physical distancing, where people are encouraged to stay at home, hampered the activities of various sectors. It is assumed that Indonesia's economic growth will collapse in 2020, projected to fall between 1.0 - 1.8% (Yusuf et al., 2020).

The agricultural sector will also certainly be affected by the COVID-19 pandemic, but the impact is not as high as other sectors. During a pandemic, food availability in Indonesia remains stable, but the most problematic is in the downstream sector. The price of food is unstable and even very cheap, so it is detrimental to farmers. Unlike the education sector, this sector was changed during the pandemic, especially in the teaching system. Almost all schools and campuses are closed, so that the learning system uses online learning or e-learning. Moreover, in the communication system, unpredictable cases have become a challenge for journalists and the media company. Many journalists who are gathering news must research this virus because there is the probability of reporting wrong information unintentionally, which can result in misleading the public.

Therefore, in education, agriculture, and communication, the three sectors are important to study because these sectors are also affected by COVID-19. Also, these three sectors are important for human activities during the COVID-19 pandemic. The need for an adequate learning system so that students can still transfer knowledge easily, even though using online learning systems. Likewise, in the agricultural sector, community food must be ensured that it is still fulfilled during the COVID-19 pandemic. People don't starve because of a shortage of foodstuffs which are, of course, produced through agricultural activities. Then, providing accurate information and news is also useful through effective communication media in the COVID-19 pandemic.

METHODS

The study was conducted in Indonesia as one of the countries where suspected coronavirus (COVID-19) from March 2020 till now. The type of study is qualitative research, qualitative research about interviews and observations and case study, surveys, historical and document analysis (Hancock & Windridge, 2009).

This study was analyzed by descriptive analysis by using secondary data from various reliable documents and other relevant data and references. This article examines the function of documents as a data source in qualitative research and discusses document analysis procedures in the context of actual research experiences.

The article takes a nuts-and-bolts approach to document analysis. It describes the nature and forms of documents, outlines the advantages and limitations of document analysis, and offers specific examples of the use of documents in the research process (Bowen,2009).

RESULTS AND DISCUSSION

Education in COVID-19 pandemic

Ministry of Education and Culture Indonesia, during the COVID-19 outbreak, has a new policy of teaching and learning method stated in circular on education number 4 of 2020. It suggests that the learning process uses distance learning or study from home. Therefore, teachers in Indonesia switch their traditional teaching media into Learning Management System (LMS). Most universities in Indonesia have their learning and media resource or called Open Courseware or Open Educational Resources (OER) (Zainuddin & Keumala 2018). Unfortunately, the rest use free LMS and Social Networking Site (SNS) such as Schoology, Edmodo, Google Classroom, Facebook, WhatsApp, Zoom, etc. Dogoriti et al. (2014) said that though the schools have good infrastructure for Information and Communication Technology (ICT) to support the

learning and teaching process, the ICT tools are limitedly used by the teacher because they believed it time-consuming.

Meanwhile, both teachers and students in Indonesia believe that learning using ICT, LMS, or SNS is time-consuming. It is also affected by their mindset and geography. In contrast, those technologies can enhance teachers' skills (Sukarni et al. 2015), and blended learning can increase students' language skills (Banditvilai, 2016).

Before the pandemic, teachers in Indonesia have applied blended learning as their teaching method. It acknowledges students and gives them insight that technology is developing continuously and used in education. On the other hand, it teaches them to be internet literate persons needed in the industry (Lungu 2013). Now, during the pandemic, the purposes of using LMS as teaching and learning media have shifted. It has become a need and a must to use this to achieve the learning objectives designed before the outbreak.

Both teachers and students look for LMS and SNS suitable for their teaching and learning process demands. Some of them only use LMS, or both, or only SNS; however, both LMS and SNS have their functions. Dogoriti et al. (2014) argued that SNS brings more joy in learning and gives more freedom to students to express their ideas and interact with other students. It can involve students easily in the discussion under the instruction because SNS is direct and attractive. They also showed that LMS is considered too traditional and rigid with several rules and features. Even though LMS has a chatroom for informal discussion, students do not feel comfortable interact with their peers there. Therefore, using LMS and SNS as teaching and learning media is to engage students in teaching and learning, and students prefer informal learning settings. Teachers can probably agree with students that LMS or SNS will use to keep students' learning motivation stable because (poor) connection causes drama.

The teacher must think about the materials they will give because it decides the teaching activities to engage students. Nowadays, students prefer activities that retain values and knowledge. It does not mean that they dislike projects or homework. Still, they can learn subjects from interactions and attractive material since they get involved in the discussion and think critically. Bielousova (2017) stated that "interaction between a teacher and students and between students and educational content has a significant impact on the effectiveness of the educational process." Moreover, students thought the class was effective because the teachers used authentic materials such as journals and sources from the internet (Nur'Aini, 2017). Therefore, teachers should design materials and course which involve students in interactive discussion and authentic materials.

On the other hand, few teachers still believe teaching face-to-face is more effective than learning and teaching using LMS or SNS as teaching-learning media because it wastes time and needs more time. For this case, teachers should change their mindset because of government policy about the study at home. Since students have limited time for study and teachers, teachers should manage the time and materials effectively (Sulisworo, 2018). Teachers should choose interactive and attractive materials to engage students in discussion, and every student can take some value from the discussion. Therefore, the teacher must set the purposes of the subject, teaching method, and appropriate material for the subject (Bielousova, 2017).

Not only interactive and attractive materials, assessment in class online is also an indicator that teacher and students have a connection in an online class. Morgan & Allen (2020) state that assessment or evaluation informally in an online class can help

the teacher understand what problems students have during the discussion. They also suggest teachers evaluate students' activity and understanding continuously to keep students' learning motivation. Moreover, they suggest teachers can share the criteria or indicators of evaluation to know what they have to reach during the learning process. After the teacher understands the difficulties or problems faced by the students, the teacher will give feedback. Students need feedback to stay in discussion and focus on the learning process. Feedback can be about positive comments or reactions to students' projects (Morgan & Allen 2020).

The teacher does not always do the assessment, but peer or self-assessment can be an option. During the COVID-19 pandemic, students must also change their minds to be more responsible and honest because teachers cannot control students physically. Teachers can share scoring rubrics as a direction for students to assess themselves or their peers (Daragmeh, 2011). By giving assessments in the form of the rubric, students know that teachers pay attention to them and care about their achievement and understanding of the subject. Therefore, design assessment carefully determines the effectiveness of the teaching-learning process using ICT (Vu, 2015).

Designing a rubric for an assessment should consider some points such as validity and reliability (Morgan & Allen 2020). First, teachers have to make sure that the assessment measures the topic or material discussed. If it is not, it means that teachers measure nothing. Moreover, teachers should choose the forum carefully to evaluate or give feedback to make students feel comfortable receiving the evaluation. Teachers can utilize a private chat room or discussion box from LMS. In short, teachers should utilize their chosen LMS or SNS to give assessment and feedback, not only for giving materials and projects without direction and instructions. Second, teachers have to design the rubric with clear indicators and its description to avoid subjectivity. Sometimes fatigue and time influence teachers in giving evaluations then become bias. Furthermore, teachers have to design the task or assignment according to the students' ability. Teachers have to make sure that the instructions are clear and share the rubric if it is possible to give students clear guidelines for content, communicative achievement, organization, and language (Toledo & Costa, 2020).

In conclusion, during a pandemic, teachers and students must collaborate in the teaching-learning process. Students should put at the center of this process, but the teacher should ensure that the materials have been designed for an online class or distance learning. Attractive and various materials from the internet will be beneficial because students can access them by themselves. Teachers should not ignore the importance of evaluation and feedback. It can connect teachers and students. Students will consider that teachers are still caring and concern with students' development and progress. It will bring energy for them to work with the materials using LMS or SNS.

Agriculture in COVID-19 pandemic

During the COVID-19 pandemic, people are encouraged to consume healthy food so that the immunity can be stronger to fight the virus. In this case, food in Indonesia must not only be available but must also be affordable and beneficial for the body. Therefore, people's purchasing power for agricultural products would always be there even though the quantity would decrease. The rules relating to large-scale social restrictions will make some businesses related to food such as food stalls, hotels, and restaurants not permitted to operate during the large-scale social restriction applied by the government.

The most important aspect in pandemic season is food needs of the people could be met properly, both in quantity and quality. In this case, the balance of needs of agricultural products in Indonesia, such as rice, maize, garlic, meat, sugar, and cooking oil, is predicted to be higher than production capacity. For example, the estimated need for rice is 12,598,161 tons, while the inventory balance is only 8,580,303 tons (Ministry of Agriculture of Indonesia, 2020). Therefore, Indonesia has the potential to experience a scarcity of agricultural products. In line with the analysis conducted by Hanani (2020) that the existence of a COVID -19 pandemic in Indonesia, from June to September, food availability is still relatively safe, but the food availability will decrease from October to December 2020.

It is caused by several things, such as the COVID -19 pandemic, which allows disruption to agriculture. Production and distribution sectors to meet people's needs. During the COVID-19 pandemic, another factor has the potential for a food crisis to occur due to drought and long drought (Food and Agriculture Organization, 2020), which will begin in June. This will have an impact on some of Indonesia's agricultural production centres in Sumatra, Java, Kalimantan, South Sulawesi and Bali (Badan Meteorologi dan Geofisika, 2020). COVID -19 is not yet clear when it will end, so Indonesia needs various anticipatory turns into a food crisis. Another factor related to food is the disruption of imports from world food producers in America and China, where the coronavirus also attacks both countries with very high numbers.

The main problems in the agricultural sector during the COVID -19 pandemic are the risks of supply chain disruption and declining demand (Sustainable Development Goals Report, 2020). Due to decreased purchasing power in the industrial sector and society, many industries that require agricultural raw materials do not operate normally. People's purchasing power is decreasing because it is restricted to leave the house of work and the number of layoffs by company employees. So that people income and also the industrial sector will decline. The Economic Intelligence Unit (EIU) revised the growth of the agricultural sector in the COVID -19 pandemic period from 4.1% to 3.2% (-0.9%) (EIU in Yusuf, 2020). Under the condition of a pandemic, food prices will experience fluctuations that will threaten farmers as producers. Also, by Rahman (1997), farmers' risks are price fluctuations of agricultural commodities (Wulandari et al. 2020). It can be caused by weather, pest, and disease attacks (Anwaruddin et al., 2015). This condition brings lower production and farmers' demotivation. In another case, the price risk significantly impacts the farmers' consumption, supply of labor, and input decisions (Saha, 1994).

The impact of COVID-19 on the agriculture sector is not as high as the tourism, transportation, property, and construction sectors, expected to fall by 30%. In comparison, agriculture will predict a fall below 10% (Indrawan, 2020). New normal in the COVID -19 pandemic era will open a window of opportunity for the agricultural sector to make revitalization. The condition of complete closure in international trade will challenge the Indonesian agricultural production system. It has the opportunity to identify the weak points of the agriculture sector. In crisis conditions, aside from being an important part of the food supply, the agricultural sector will become a social safety net related to the fulfillment of community food needs. The agricultural sector is not only the sector that absorbs the most labor in Indonesia, even in times of crisis.

In agricultural production systems, in the case of the on-farm subsystem, the risk of farmers being exposed to the coronavirus is quite small because most of the

agricultural area is located in rural or remote areas that are vulnerable to the virus for the people who live in urban areas.

Most of those who are exposed to the coronavirus are urban people. Therefore, the large-scale social application is quite important for farmers who mostly live in rural areas by limiting the movement of urban people to return to villages as carriers. The high spread of the coronavirus is in the city centers. They are exposed due to travel out of the area or outside the city and then bring the virus into the area. Moreover, the large-scale social application is quite important for farmers who mostly live in rural areas by limiting the movement of urban people to return to villages as carriers.

One effort to avoid food warriors, in this case, farmers being exposed to the coronavirus, especially all their activities, must be outside the house to produce agricultural products. Even though the risk is quite small, it still needs to implement health protocols for farmers. As we know, however, most of the farmers in Indonesia have an average age of over 44 years, which is an age that is quite susceptible to coronavirus. The local government needs to conduct socialization and implement health protocols for farmers, such as masks and handwashing, and active supervision of health workers in the village. Also, poverty in rural areas is increasing, which is dominated by farmers with an average number of poor households in rural areas of 12.60 percent compared to urban areas with lower numbers of poor households by 6.5% (Central Bureau of Statistics 2017). Poverty and unemployment are among the main problems of Indonesia people (Central Bureau of Statistics 2017, Padjung 2018). As one of the main points for food security, farmers need to be protected in the COVID-19 pandemic.

In addition to health protocols for farmers, several efforts need to be intervened by the governments, for example, the provision and assistance of adequate stock of agricultural input facilities in rural areas. In this case, rural communities, both farmers and traders of production facilities, have limitations in traveling to the big city to buy farming equipment because a coronavirus will easily impact them. Therefore, the government must strive for agricultural inputs and equipment such as fertilizers, seeds, machines, and agricultural tools because farmers must produce sustainable agricultural products. In another case, government intervention in maintaining the stability of food prices is also important. At the beginning of COVID - 19, the price of food products dropped due to decreased purchasing power, the closure of some restaurants, and several companies that needed agricultural raw materials. Price uncertainty will be very detrimental to farmers as the main food producers. Based on Farias & Araujo, (2020), The regions affected by coronavirus showed a great impact on the price of agricultural products. The supply chain is essential to guarantee internal food security during the pandemic crisis.

Supply and demand need to be considered by the relevant government. Most agricultural products have to pass long supply chains in Indonesia before arriving in the consumers (Padjung, 2018). Therefore, to ensure reliable access to safe food for all people, food organizations must strengthen their operations to safeguard against various potential threats (Hecht et al., 2019). Since a long time ago, before the pandemic COVID-19 season, (Food Agriculture Organization, 2020) appealed to every country to maintain the smooth supply chain of foodstuffs to avoid social problems such as hunger and theft. Supply chains need to involve complex interactions in the agricultural sector such as farmers, availability of seeds, fertilizers and pesticides, processing plants, shippers, retailers, and so on (Ministry of Agriculture, 2020). Every country in the

world that is impacted by coronavirus needs to focus on food problems, assuring the availability and, to some degree, the price stability of basic foodstuffs. The government needs to ensure that all people have access to the basic food they need (FAO, 1983 & FAO, 2002).

Ideally, the supply chain and distribution of agricultural products from farmers to consumers can be through online distribution and sales, especially during the COVID-19 pandemic. Unfortunately, 61.7 percent of Indonesia's population who work as farmers (Patanjengi, 2020), with an average education of only elementary schools that are still categorized as poor communities (Ali, 2020), have not been able to handle agricultural activities and sale of agricultural products by online. In case, online sale is not yet the right solution for Indonesian farmers. Additionally, supporting subsystems, such as road infrastructure and communication in rural areas, have not been well-provided. It is necessary to apply a low-pain, high-gain policy to farmers who spearhead food security in Indonesia (Yusuf et al. 2020).

The Ministry of Agriculture has formulated strategic steps during the COVID-19 pandemic to address the scarcity and disruption of food distribution. The programs such as acceleration of agricultural production facility assistance programs, accelerating agricultural production specifically through labor-intensive activities, encouraging the smooth distribution of staple foods. Moreover, ensuring safe and affordable food by the community (Ministry of Agriculture, 2020). It needs to provide food and herbs in a pandemic crisis to support the immune system against infection the possibility of coronavirus-19 transmission through the food chain (Mcewen & Mcewen, 2017).

Media and COVID -19 information dissemination

People have grown restless since COVID-19 is reported. If numbers of COVID-19 patients are compared between the first month, this case is regarded remarkable. Because of COVID-19 news appearing, newsreaders have become confused and restless. With so much news at this time can give impacts to the public, for instance, public trust towards media because of various opinions and points of view about this virus's cases. Looking at the condition causes reporters, journalists, and media organizations to have an important role in following the development of reliable information and checking the fact from the information to be trusted information for the public.

One of the moving parts of this pandemic is the number of COVID-19 patients, which raises every day. Increasing the numbers of COVID-19 patients attracts the public's attention. Still, the government needs to communicate the story behind these numbers, what the government has done to respond to this virus, what people can do, and make sure that this story has information that can be justified to trust the government. The public also can feel more comfortable and calmer when general information about COVID-19 issues is clear and transparent.

Media production about COVID-19 responds to social and cultural development and then influences the development of those. Certain media such as television influence how we think about and react to the world. Media work in anyways and different social segments; all audiences are not influenced but interact with media in specific ways (Littlejohn & Foss, 2009). According to McLuhan (Littlejohn & Foss, 2009), every medium is the extension of the human mind. He also quoted from (Ellis & Goggin, 2015) that the biggest media will establish behavior and thought one day. When the media change the way the public thinks, arrange the information, and interact

with others, change. The switch of the way of thinking has been happening since media appear alternately, for instance, from paper to radio than television. Furthermore, the existence of the internet is called the second media age by Poster (2015).

There are two dominant opinions about media, such as the social interaction approach, which differentiates media based on how close between the media and the face-to-face interaction model. The old broadcast media are more concerned about the spread of information, which decreases the chance of interaction. It is recognized as informational media because it becomes reality mediation for consumers. Meanwhile, new media is more interactive and creates a new understanding of interpersonal communication. (Biocca & Levy, 2013) views new media (world wide web) as an open information environment., flexible and dynamic, enabling humans to develop new knowledge orientation and involve a democratic world about mutual distribution and more interactive and community-based empowerment. Cyberspace gives an artificial meeting room that expands social media and provides a place for sharing opinions broadly Soukup 2004 as cited in (Littlejohn & Foss, 2009).

According to social integration (Littlejohn & Foss, 2009), even interaction is not an important component in social integration through ritual. Thus, face-to-face interaction is not the main or basic standard for comparison of communication media. The public does not have much interaction with other people but with the media itself. People do not use media to tell others about something but because using media is self-ritual, deep meaning. People use media as a joint ritual which makes them recognize to be part of something bigger than themselves. Newer media create interaction with computer simulation. There is high-level interaction using the computer, not between certain people. The media equation theory states that we treat media as human and interact with media as if it is real. It explains why computer seems to have personality. This interaction between human-computer-human theoretically is called computer-mediated communication.

Computer-mediated communication (CMC) is a term used to communicate between two or more people who can interact using a different computer. In other words, the human communication process involves someone, in a certain context, by being involved in generating media as an objective. One form of communication can be categorized in CMC while two or more people communicate or share information through a computer which is new communication technology. Send and receive email using a mobile phone or smartphone, or even download or upload music, picture, and videos can be categorized as CMC. If mass communication will be categorized using media equally, CMC is mainly used for social interaction.

However, there is enough significant difference between interpersonal and face-to-face communication. In face-to-face interpersonal communication, participants' communication is at the same time and place. They can see each other’s facial expressions that show agreement or disagreement, like or dislike, and so on. It can be done instantaneously without time lag to adapt and understand the situation of communication. Therefore, simultaneous communication is called synchronous communication (Perry, 2004). CMC can be synchronous when someone participates in a chat room when s/he gets involved in synchronous CMC. Face-to-face communication and CMC seem similar when the participants get feedback simultaneously and adjust messages immediately based on feedback.

Based on setting context, CMC happens in the cyberspace domain. Cyberspace is a complex term to be defined, such as cyberspace in hardware. For instance, the global computer network is connected to infrastructures of communication that facilitate interaction among speakers in a long distance. Cyberspace is a knot and network or defined as an imaginary room between computers where people can establish themselves and the new world. Cyberspace is hardware and software that represent picture and opinion, i.e., both cannot be separated. It is all about cyberspace. This definition represents negotiation of material and symbolic elements, and each has a different load based on the experience (what has been done), such as checking email from PC. We can experience cyberspace as have profound experiences where our bodies and real identities are lost (Bell, 2006). Our identity becomes a virtual identity.

The role of trusted media sources is not only to ignore but also to deny fraudulent information. It is done to consider what audiences believe, such as trusted media, empathy towards those affected by COVID-19, or proper language use in delivering issues. Proper language use is very needed to break the public stigma. This virus cannot differentiate nationality, tribe, and so on, so there is no reason for journalists to write stigma that prejudice certain parties. Rather than write a stigma to impose, the journalist should offer more practical information for an audience such as web address of information about COVID-19 or washing hand tips and tips to avoid virus infection.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

In education, teachers utilized blended learning as the teaching method. Nowadays, teachers have to change into online learning during the pandemic. Students and teachers choose both LMS and SNS as tools for synchronous and asynchronous communication.

In agriculture (the upstream sector), farmers should have their health protected to continue to produce during the COVID-19 pandemic to avoid shortages of food supplies. Besides, the pandemic will impact the downstream sector due to low food consumption caused by the in-operation of several businesses related to the food industry and the community's purchasing power because many agricultural consumers lose their jobs.

In communication, COVID-19 will make society change in the use of communication media. The old media pays more attention to disseminating information which reduces opportunities for interaction. New media is more interactive and creates a new understanding of interpersonal communication.

Recommendations

In the teaching process, teachers take many times to learn operating internet things rather than their students. In this case, they should not forget the assessment because it is essential for their development and control of their comprehension.

Even though the impact of the COVID-19 pandemic is not significant in agriculture, the agricultural sector needs to be paid attention to by stakeholders to ensure food availability for Indonesian communities.

New media communications are recommended because it is flexible and dynamic, allowing humans to develop new knowledge orientations is cyberspace. It provides an

artificial meeting space that expands social media and provides a place to share opinions widely.

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An empirical nexus between poverty and unemployment on economic growth

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Abstract

The study examines the empirical nexus between poverty and unemployment on economic growth in Nigeria between 1980 and 2016. Auto-Regressive Distributed Lag (ARDL), Bound cointegration testing, and Error Correction Methods (ECM) were used to investigate the link between unemployment, poverty rate, and economic growth in Nigeria. Post estimation tests such as the Jarque-Bera test, Breusch-Pagan, ARCH test, and Ramsey reset test were also adopted in order to validate the research finding. The diagnostic tests further disclosed that the estimated model follows the Ordinary Least Square technique assumptions to attain efficiency and consistency of the model employed. The Jarque-Bera test suggests that residuals for both models are normally distributed, and the Breusch-Godfrey Serial Correlation (LM) test indicates that the hypothesis of no autocorrelation cannot be rejected. Interestingly, the ARDL and ECM results show that unemployment and poverty significantly impact economic growth both in the short and long run. Hence, the study recommended that the Nigeria government should ensure that adequate measures are put in place: Such as investment in education, agricultural sector reform, expansionary fiscal policy, intervention in micro-lending for small scale businesses by the government should be implemented to reduce the level of unemployment and poverty rate both in the short run and long run.

Keywords: *Economic growth, Poverty, Unemployment*

JEL Classification*:* O4, O15, J64

INTRODUCTION

Nigeria accommodates the largest population in the Sub-Sahara Africa region, with over one-hundred and eighty (180) million in 2016, based on United Nations reports. Despite this huge deposit in terms of human and natural resources, Nigeria has not driven its growth to sustainable paths; hence poverty and unemployment characterized the growth rate. It could be traced to poor resource management, excessive spending, and various government policies summersaults, making equitable production and proper income distribution unachievable (Akintoye, 2008).

Notably, Nigeria stands to be the world's paradox (World Bank, 1996). Evidence over the years continues to show that Nigeria's poverty rate contradicts the county's huge wealth of resources across the board, especially in the area of human and physical resources, which are being mismanaged and largely untapped. It is worrisome that a country with huge earnings of over $ 300 billion have failed to record remarkable

achievement in human capital development. Instead, it had rather retrogressed to be one of the ravaging poverty economies in the world (Umo, 1996). Unemployment and poverty are social phenomena. These ugly development bring about the ouster and frustrated expectations, which promote widespread indignation on the side of the trapped citizens living within the vortex of the poverty circle. In fact, conditions to take off from this object circle were being worsened by impotent poverty eradication programs with continuous neglect by the three government agencies. These predicaments resort to individual and group campaigns from different fronts, depending on situational factors and capacity (Salami, 2011).

Unemployment and poverty have nexus that can easily be causal to each other, i.e., unemployment from economic intuition could aggravate poverty. Although one might be employed and still live in abject poverty, this is connected to the scenario of underemployment. Market failure promotes unemployment and underemployment when factors of production are under-utilized. For example, low income demotivates labor as one of the key factors of production, reducing productivity. It is worthy to note that poor investment in the education and health sector of the Nigerian economy paves the way for poverty to strive (Olofin, 2012). Similarly, Yesufu (2005) opines that unemployment disrupts social progress, especially economic growth in Nigeria, enhancing general welfare loss in terms of productivity loss, thereby bringing about lower income.

Consequently, in Nigeria, studies on unemployment, poverty, and economic growth are numerous, with contrasting findings. Such studies include Bankole & Fatai (2013), Olajide & Oladipo (2009), Obadan & Odusola (2005), and others. Most scholars worked on either unemployment or poverty on economic growth, with less emphasis on the impact of unemployment and poverty on economic growth in Nigeria. Also, most of these studies used narrow scope and less sophisticated econometric tools. As a result of the neglect of these important arguments, a vacuum for this research to be carried out has been discovered. Therefore, it is very pertinent to investigate the impacts of unemployment and poverty on economic growth in Nigeria between 1980 and 2016.

This study's broad objective is to evaluate the impact of poverty and unemployment on economic growth in Nigeria and determine the causal effects and remedies in Nigeria. However, the specific objective is to investigate the trend of unemployment and poverty in Nigeria and to examine whether there is a long-run relationship between poverty and unemployment on Nigerian economic growth. With the expectation that through the findings and subsequent recommendations of this study, poverty and unemployment will be reduced (alleviated) to logical points.

The study shall be grouped (divided) into five sections. Section one contains the introduction. Section two elucidates the literature review. Section three explains the research methodology, while section four discloses the analysis of the data collected. Finally, section five explains the conclusion and recommendations.

LITERATURE REVIEW

This section comprises significant concepts in this study: conceptual issues, theoretical framework, and empirical review. The conceptual issues include key concepts and terms as it's related to unemployment**,** poverty and economic growth. The theoretical framework reveals theories underpinning the relationship between unemployment and poverty in terms of economic. In contrast, the empirical evidence reviews scholarly articles previously written before this study.

Unemployment can be defined perspectives; hence, it is a situation whereby someone is willing and able to work but cannot secure a suitable paid job. It is quite

worrisome when the labor age falls within the age bracket of the working population and still jobless, as it has been the order of the day in Nigeria. It is pertinent to note that unemployment can be in various forms; thus, cyclical unemployment occurs over cycles, as its name indicates. When the economy moves to a recession, many of the jobs are lost. Frictional unemployment occurs due to the normal turnover in the labor market and the time it takes for workers to find new jobs. Some workers change jobs in the course of the year in an economy. The time gap of job change is called friction, i.e., it takes time to match up potential employees with new employers. Structural unemployment resulting from industrial reorganization, typically due to technological change, rather than fluctuations in supply or demand.

Poverty has a wilder scope; hence it is a complex task to draw a specific conclusion from. As a result, series of definitions exist, which are drawn from different scholarly perspectives. Since World War defines poverty in monetary terms, the mainstream definition uses income level or consumption pattern in measuring poverty and estimating the number of the poor that fall below the poverty line with respect to income or consumption level (Grusky and Kanbur, 2006). However, complementary definitions have been drawn in recent years from other approaches (Sen, 1996). The basic needs approach by Streeten et al., 1981, the capabilities approach (Sen, 1999), and the human development approach (UNDP, 1990).

Economic growth is the general rise in the level of goods and services produced by an economy, typically a nation, over a specific period of time. It is measured as the percentage increase in the real gross domestic product (GDP), gross domestic product (GDP) adjusted for inflation. GDP is the market value of all final goods and services produced.

Empirically, Bankole & Fatai (2013) found a positive relationship between unemployment and the economic growth of Nigeria. Engel Granger and Cointegration test and Ordinary Least Square (OLS) techniques were adopted. Whereas, Alanana (2003) argues that unemployment is potentially treacherous as it sends a worrying signal to all segments of the Nigerian Society. The rate of youth unemployment in Nigeria is high, even at the period of economic normalcy, i.e., the oil boom of the 1970s (6.2%), 1980s (9.8%), and the 1990s (11.5%).

Moreover, Olajide & Oladipo (2009) show that savings and economic growth are cointegrated and positively related in the long run. Hence, the study indicates savings is an engine to economic growth through their impact on capital formation. The study is based on the relationship between savings and growth in Nigeria through the nonparametric cointegration test and OLS method.

Bakare (2010) examines the determinants of poverty and unemployment in Nigeria. Through the time series secondary data and parsimonious error correction mechanism, the study rising nominal wages and the accelerated growth of population, which affected the supply side through a high and rapid increase in the labor force relative to the absorptive capacity of the economy, appear to be the main determinant of high unemployment poverty rate in Nigeria.

Rizwanul (2004) argued that employment and gross per capita income influenced the poverty rate across forty-one. The study adopted the OLS and correlation matrix to submit that the poverty rate falls due to the high rate of employment, which increases per capita income. Again, Muhammad & David (2019) studied the nexus between Unemployment and Poverty in Niger State. The researchers adopted descriptive and a logistics regression model to 102 data randomly selected across the geopolitical region in the state. The study revealed that there was a proportionate link between poverty and

unemployment in Niger state. In a related study, Sinnathurai (2013) posits that economic growth, poverty, and industrial employment have significant effects on the age dependency ratio. The study employed OLS through data drawn from forty-one countries across different continents.

In view of the above diverse approach to the subject matter, it has been observed that most of the previous scholars failed to adopt more sophisticated econometric tools in their empirical analysis. Also, only few previous researchers perform post estimation tests that revealed the validity of their empirical results. Interestingly, this study intends to close the above-observed gaps to add to the body of the literature.

METHODS

This study is built from the Solow–Swan model, a theoretical model of long-run economic growth within the framework of neoclassical economics. The long-run economic growth assumption comprises capital accumulation, labor or population growth, and productivity increases commonly referred to as technological progress. It is a core neoclassical (aggregate) production function. The model was developed independently by Robert Solow and Trevor Swan in 1956 and superseded the Keynesian Harrod–Domar model, using a simple Production function given thus:

$$Y = F(K, L) \quad \ldots\ldots (1)$$

Where Y is income or output,
K denotes capital and
L denotes labor.
The model in equation (1) above is therefore specified transformed by introducing the explanatory variable poverty and unemployment that are key regressors. The model in equation (1) hereby becomes:

$$Y = f(GCF, UPR) \quad \ldots\ldots (2)$$

Other control variables to be included in the model have the inflation rate and consumption level

$$Y = f(UPR, NPI, INFR, HCE, GCF) \quad \ldots\ldots (3)$$

The model is transformed for empirical estimation thus:

$$RGDP = \beta o + \beta_1 UPR + \beta_2 NPI + \beta_3 INFR + \beta_4 HCE + \beta_5 GCF + U_t \quad \ldots\ldots (4)$$

Where:
RGDP = Real Gross Domestic Product
UPR = Unemployment rate
NPI= National Poverty Index
INFR= Inflation rate
HCE= Household Consumption Expenditure
GCF = Gross Capital Formation
Where U_t is the stochastic error term.

Unit root test

It is to check for the presence of a unit root in the variable, whether the variable is stationary or not. The Augmented Dickey-Fuller (ADF) is one of the measuring tools. The rule of thumb is that if the ADF test statistic is greater than the 5% critical value, we cannot reject the null hypothesis of unit root vice versa. It is empirically argued that whenever the unit root results show mixed or combination of integration order, i.e. (0) and (1), the appropriate method to adopt is ARDL Bound testing cointegration.

After the test for the order of integration, the order of integration was a mixture of I(0) and I(1). The next step is to carry out a bounds cointegration test. This test is used to check whether there is long-run relationship among the variables specified in the model. The generalized dynamic ARDL model is specified thus:

$Yt = \gamma_{0j} + \sum^{p}{}_{i=1} \alpha_j Y_1\text{-}i + \sum^{R}{}_{i=0} \delta'_j X_1\text{-}i + \mu j\boldsymbol{t}$ .... (5)

Where Y_{t} is a vector and variables in (X't) are allowed to be purely I(o) or I(1) or integrated; α and $\boldsymbol{\delta}$ are coefficients; γ is the constant; j=1, 2, …k; **P**, **R** are optimal lag orders; μjt is a vector of error terms, i.e., unobserved zero-mean white vector process (serially uncorrelated or independent). Note: the lag length P, R may not be necessary the same: P Lag is used for the dependent variable, while R is used for exogenous variables.

Hypothesis: $H_0 = \beta_1 j = \beta_2 j = \beta_3 j = \beta 4j = 0$ .... (6)

$H_i = \beta_1 j \neq \beta_2 j \neq \beta_3 j \neq \beta 4j \neq 0$ .... (7)

Where j= (1, 2, 3, 4)

$$\Delta Log\ RGDPt = \beta_{01} + \beta_{11} Log\ RGDP_1\text{-}i + \beta_{21} logUNP_2\text{-}i + \beta_{31} logGCF_3\text{-}i + \beta_{41} logINF_4\text{-}i + \beta_{41} logNPI_4\text{-}i + \beta_{41} logHCF_4\text{-}i + \sum^{p}{}_{i=1} \beta_{1j} \Delta Log\ RGDP_1\text{-}i + \sum^{R1}{}_{i=1} \beta_{2j} \Delta LogDSP_1\text{-}i + \sum^{R2}{}_{i=1} \beta_{3i} \Delta logGCF_1\text{-}i + \sum^{R3}{}_{i=1} \beta_{4j} \Delta logEDS_1\text{-}i + \mu_1 \boldsymbol{t} \quad \ldots\ldots\ldots\ldots \quad (8)$$

Error Correction Model (ECM)

The Error Correction Model (ECM) shows the speed of adjustment from short-run to long-run equilibrium. The a priori expectation is that the ECM coefficient must be negative and significant for errors to be corrected in the long run. It indicates that the higher the ECM, the more the speed of adjustment.

RESULTS AND DISCUSSION

This section explains summary (descriptive) statistics followed by the trend analysis of Real Gross Domestic Product, Inflation Rate, Gross Capital Formation, National Poverty Index, Household Consumption Expenditure, and Unemployment Rate. Also, statistical properties of variables were examined through the Augmented Dickey-Fuller test. Followed by Autoregressive Distributed Lags bound cointegration testing and error correction model test to evaluate the dynamic nature of the relationship between the dependent variable and independent variables.

Table 1. Summary of descriptive statistics

	RGDP	GCF	HCE	INFR	NPI	UPR
Mean	1926.825	2.740000	1.400000	19.34243	53.57459	11.45541
Median	392.6200	2.430000	2.370000	12.22000	53.60000	7.000000
Maximum	11064.07	1.570000	8.370000	72.84000	66.90000	33.15000
Minimum	7.690000	7.990000	2.530000	5.380000	40.20000	1.900000
Std. Dev.	3200.886	4.930000	2.310000	17.51549	6.825215	8.642497
Skewness	1.803241	1.671873	1.796999	1.707507	-0.047946	0.841401
Kurtosis	5.006517	4.129771	5.007984	4.681148	2.505535	2.583379
Jarque-Bera	26.25893	19.20457	26.12943	22.33656	0.391107	4.633318
Probability	0.000002	0.000068	0.000002	0.000014	0.822379	0.098602
Sum	71292.52	1.010000	5.170000	715.6700	1982.260	423.8500
Sum Sq. Dev.	3.690000	8.740000	1.920000	11044.53	1677.008	2688.939
Observations	37	37	37	37	37	37

The raw form of the data in Table 1 shows the distribution of values across the mean, median, and standard deviation. Skewness and kurtosis were displayed to explain

the shape and height of the normal curve. While the Jarque-Bera is a test statistic for normal distribution, it shows that series are normally distributed from the results above.

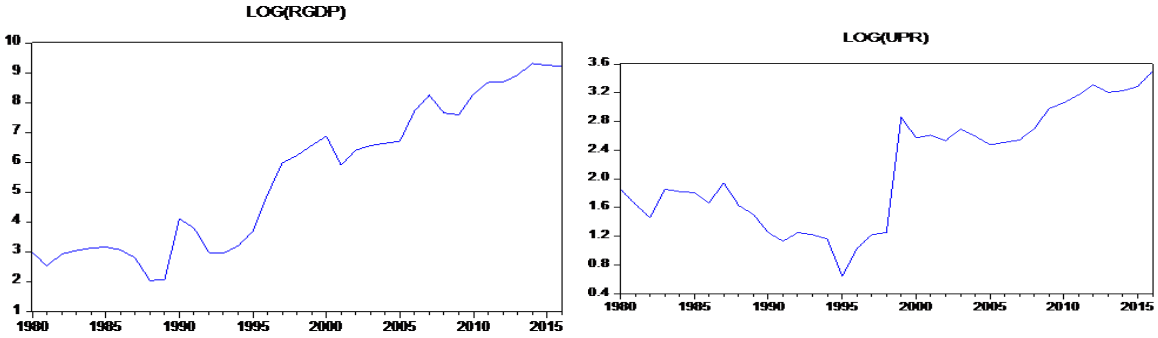

Figure 1. The real gross domestic product (RGDP) and Unemployment Rate (UPR), Nigeria, 1980 – 2015

Figure 1 shows the real gross domestic product fell from the onset and continues to rise shortly in 1981 at 2.97 till early 1990. But fall sharply through 1991 and rise quickly from 1994. The economy picked up in 1995 and sustained its growth till 2000 at 6.87. The economy fell in 2001 but recovered in the following year, and it keeps growing till it got to 9.22 in 2016. Meanwhile, the Unemployment rate started from 1.856298 in 1980, but drops through early-80's and rise sharply in 1984. Whereas in 1986 it falls shortly and later rose the following year. It declines continuously between 1995 and 1996, with a further rise from 2000 to 2016 at 3.50.

Table 2. Unit root results

Variable	At levels			1st difference			Level of integration
	ADF-Test	1% C.V	5% C.V	ADF-Test	1% C.V	5% C.V	
LOG(RGDP)	-0.2784	-3.6263	-2.9458	-5.5228	-3.6394	-2.9511	I(1)
LOG(HCE)	-5.4870	-3.6263	-2.9458	-9.4819	-3.6329	-2.9484	I(0)
LOG(GCF)	0.4372	-3.6394	-2.9511	-5.9111	-3.6394	-2.9511	I(1)
LOG(INFR)	-4.3548	-3.6268	-2.9458	-8.0300	-3.6329	-2.9484	I(0)
LOG(NPI)	-2.1958	-3.6268	-2.9458	-6.27043	-3.6329	-2.9484	I(1)
LOG(UNP)	-0.6615	-3.6268	-2.9458	-6.7778	-3.6329	-2.9484	I(1)

***Note**: CV denotes Critical Value, ADF implies* Augmented Dickey-Fuller

The outcome of unit root from Table 2 discloses that log of real gross domestic, gross capital formation, national poverty index, and unemployment rate series are integrated of order one I(1). In contrast, the log of household consumption expenditure and inflation rate variables are stationary at the level. The condition for Johansen cointegration is not met, hence the ARDL–Bound testing method of cointegration analysis is adopted to investigate the long-run relationship among the series.

Table 3. The bounds cointegration test result

ARDL Bounds Test		
Test Statistic	Value	k
F-statistic	6.908617	5
Critical Value Bounds		
Significance	I(0)Bound	I(1)Bound
10%	2.08	3.00
5%	2.39	3.38
2.50%	2.70	3.73
1%	3.06	4.15

The ARDL bounds test results show the hypothesis of no long-run relationship can be rejected at 5% significant levels among the series, as the F-statistic for the model is greater than 5% of both I (0) and I (1) bounds of 2.39 and 3.38 respectively. Therefore, there is a long-run relationship among the series.

Table 4. Long run multiplier coefficient of ARDL

Variables	Coefficient	Std. Error	t-Statistic	Prob.
LOG(HCE)	0.581959	0.149587	3.890434	0.0007
LOG(GCF)	0.210207	0.136796	1.536647	0.1380
LOG(INFR)	-0.476297	0.181817	-2.619653	0.0153
LOG(NPI)	-0.699448	0.947953	-0.737850	0.0481
LOG(UNP)	0.376366	0.239259	1.573050	0.0294
C	-13.14306	2.787882	-4.714355	0.0001

It can be inferred from the ARDL table that there is a positive relationship between RGDP and HCE, GCF, and UNP. In contrast, INFR and NPI had a negative relationship with RGDP. Also, all the variables were significant except GCF.

It is pertinent to note that when co-integration exists, the Engle-Granger Theorem establishes the encompassing power of the error correction mechanism over other forms of dynamic specifications. The following section reports the results of the Error Correction Mechanism.

Table 5. ARDL ECM

Variables	Coefficient	Std. Error	t-Statistic	Prob.
DLOG(RGDP(-1))	0.255071	0.062382	4.088841	0.0005
DLOG(HCE)	0.407483	0.093152	1.80052	0.0077
DLOG(INFR)	-0.667316	0.052018	-12.82846	0.0000
DLOG(NPI)	0.895584	0.744537	1.202874	0.2413
DLOG(UNP)	-0.394645	0.120437	3.276783	0.0033
CointEq(-1)*	-0.700193	0.089668	-7.808716	0.0000
R-squared	0.882838	Mean dependent var		0.191199
Adjusted R-squared	0.862638	S.D. dependent var		0.581323
S.E. of regression	0.215452	Akaike info criterion		-0.077348
Sum squared resid	1.346173	Schwarz criterion		0.189283
Log-likelihood	7.353592	Hannan-Quinn criteria.		0.014693
Durbin-Watson stat	1.826634			

Table 5 shows the short-run (dynamics) results. The optimal lag combination for the models is obtained via the Schwartz Information Criterion (SIC). This result explains the speed of adjustment to the equilibrium in the long run. It can be deduced that there is a direct relationship between RGDP and HCE, and NPI whereas, a negative relationship is shown with INRF and UNP. Interestingly, the Household consumption expenditure indicator shows a significant positive relationship with the real growth indicator, which means that a rise in household expenses brings about a rise in economic growth.

The result further shows that a 1% increase (decrease) in HCE on average leads to a 0.407483% increase (decrease) on RGDP. It conforms to the a priori expectation.

Conversely, the inflation rate was found to negatively affect growth, though a significant relationship exists. The result implies that as the inflation rate increases, real GDP decreases vice versa. Interestingly, it portrays the set a priori expectation. In real

terms, it shows that a 1% increase (decrease) in the consumer price index would lead to about a 0.667316% decrease (increase) in RGDP.

NPI shows that it has a direct link with RGDP but not significant. Lastly, UNP is found to have a significant effect on real growth with inverse direction. It implies that as UNP increases, RGDP decreases. The result further displays that1% increase (decrease) in UNP would lead to about a 0.394645% decrease (increase) in RGDP.

The coefficient of most importance is the ECM coefficient. The ECM term is well defined, which is negative and statistically significant at a 5% level. The coefficient is -0.700193, which indicates approximately 70.02 percent of the previous year's disequilibrium in the real gross domestic product is corrected by the estimated series. It also shows the speed at which the model converges to equilibrium. The magnitude of this coefficient implies that some of the selected variables correct nearly 70.02 percent of any disequilibrium in exchange rate fluctuations within one period (one year). The implication is that the present value of real GDP will adjust to changes in the estimated variables. It agrees with the findings of Rizwanul (2004) and Sinnathurai (2013) that established the link between poverty, unemployment, and economic progress from other economies.

Table 6. Results from diagnostic tests

Test	F-Stat (Prob)
Jarque-Bera test	2.625844 (0.269033)
Breusch-Godfrey test	2.478258 (0.1533)
ARCH test	2.557174 (0.4378)
Ramsey-Reset test	2.662932 (0.5027)

In order to establish the reliability of ARDL, Bound test, and cointegration analysis, it is theoretically pertinent to carry out the necessary diagnostics on the results. Notably, the results of the diagnostic confirm the consistency and reliability of the findings. Jarque-Beta test suggests that both models' residuals are normally distributed with a probability value is greater than 5% significant level. Breusch-Godfrey Serial Correlation (LM) test suggests that the hypothesis of no autocorrelation can be rejected because the probability value is greater than 5% critical value. The Ramsey-Reset test result, whose probability value is greater than 5%, indicates no functional specification in the estimated models. The ARCH test indicated that the hypothesis of the presence of heteroscedasticity could be rejected

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

The overall analysis indicates a short-run and long-run relationship between the two key variables (poverty & unemployment) and real gross domestic product in Nigeria. It is also concluded from the result that the inflation rate, national poverty index, and unemployment rate negatively affect the real gross domestic product. In contrast, the National poverty index was not significant, while gross capital formation had a positive relationship with real domestic product. Moreover, it is concluded that the Bound test confirmed that the variables estimated in the study are co-integrated.

Recommendations

The study recommends that the government should develop the following policy framework: firstly, there is a need for expansionary fiscal policy to redesign cash flow among the economic agents. Secondly, there is a need for a well-designed micro-lending policy for a small-scale enterprise and an improved educational policy to address poverty and unemployment. Lastly, attention should be shifted to agricultural improvement towards diversifying the Nigerian economy, leading to improved growth through high productivity.

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Inter-Regional Cooperation (KAD) based institution in the tourism sector in Madura

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Abstract

This study aims to analyze the Inter-Regional Cooperation (KAD) institution in the tourism sector in Madura to support Presidential Regulation Number 80 of 2019 concerning the *DEWI CEMARA* program (Tourism Village with Smart, Independent, and Prosperous Communities). This qualitative research has used the triangulation method for data collection. This study shows great potentials have supported tourism development in Madura; yet, they have complex problems. This problem has led to the establishment of the KAD in the tourism sector in Madura, whose aim is to exploit the regional potential and overcome tourism problems collectively using mutual benefit principles. From 2017 to the present, these objectives have not been achieved due to the following reasons: (1) KAD has not been supported by the commitment of regional heads who are willing to facilitate cross-sector and cross-regional cooperation and resources; (2) KAD has not been supported by cross-sectoral and cross-regional planning documents; (3) no good cooperation occurs among the government, the private sector and the community; and (4) moral hazard such as egoistic/opportunistic, free riders, and tragedy of common are still obviously seen.

Keywords: Government, Inter-regional, Moral hazard, Tourism, Tragedy of commons

JEL Classification: H1, H11, Z3

INTRODUCTION

To accelerate Economic Development in Madura, the government issued Presidential Regulation Number 80 of 2019, which contains 37 programs. One of the government policy programs is the *DEWI CEMARA* program (Tourism Village with Smart, Independent, and Prosperous Communities). To run this program requires support from all strong institutions ranging from villages to regions and across regions.

This new institutional economy needs to be supported by several institutional instruments such as rules of the game and players to overcome market failures caused by imperfect information, externalities, free riders, and tragedies of common to manage—all resources and provision of public goods (Lincoln, 2010). Institutions aim to regulate interaction patterns and direct actors' behavior so that order and the absence of opportunistic attitudes in distributing economic resources fairly and equitably can be guaranteed (Badulescu & Badulescu, 2017).

Inter-Regional Cooperation Based Institution or translated into Indonesian as

Kerjasama Antar Daerah (KAD) in Madura's field is a collaborative program involving four districts on Madura Island. KAD has objectives such as promoting agreement on common rules of the game and regulating cooperative relations for tourism actors regarding resource potential and provision of public goods across sectors and regions by always referring to the principle of mutual benefit. The slow development pace of tourism has previously driven the establishment of KAD in the tourism sector on Madura Island in Madura. This situation is caused by weak governance of tourism institutions such as sectoral egos and regional egos; Meanwhile, cooperation between stakeholders across sectors and regions is less harmonious.

To strengthen Madura Island's tourism development institution, four districts on Madura Island have agreed to establish KAD since 2017. The agreement was signed by four heads of regencies in Madura and approved by the Governor of East Java Province. Up to now, KAD, however, has not shown an optimal role in advancing tourism development in Madura.

Based on this background, this study aims to analyze the institutional KAD in the tourism sector in Madura by focusing on two aspects, namely: the rule of the games and players. Following these objectives, this paper's contribution is to evaluate the KAD institution's performance achievements in the tourism sector in Madura. The evaluation results are used as recommendations for improving the institutional performance of KAD in the tourism sector in Madura. It is recommended that formal and informal rules for playing should be in synergy to improve the institutional performance of KAD. Likewise, it is recommended that actors cooperate by their respective roles. The institutional performance of the KAD in the tourism sector in Madura becomes more effective and efficient.

This study uses the theoretical basis of the New Institutional Economics (NIE). NIE is relevant to be used as a theoretical basis for analyzing the institutional complexity of KAD in the Tourism Sector in Madura.

The institutional economic theory consists of three groups, namely: Neo-Classical Economics (NCE), Old Institutional Economics (OIE), and New Institutional Economics (NIE). NCE theory is a mainstream economic thought that emphasizes market mechanisms. NCE is built using the assumption of perfect competition that is not realistic in the real world, including perfect information, zero transaction costs, and free players in and out of the market (North, 1994; Furubotn & Richter, 2010).

OIE theory is a branch of economics that does not have a basic classical or neoclassical economics theory. The OIE theory opposes neoclassical thinking because, in its approach, it is considered that it does not include humanistic aspects. OIE theory is not a physical institution but rather economic behavior that is driven by considerations and feelings that generally apply in certain circumstances and times (Haris et al., 1995; North, 1990).

The NIE theory comes by modifying, developing, and opening the black box of the NCE and OIE theories' weaknesses in solving economic problems in the real world. NIE depicts imperfect information, transaction costs, and barriers to entry and exit from the market. Imperfect information has consequences for transaction costs. The imperfect information (asymmetric information), the higher the transaction costs incurred by economic actors. In the NIE's view, efforts are needed to minimize transaction costs.

In this study, the authors use four levels of evolution of the NIE theory to analyze the institutional KAD in tourism in Madura. Based on NIE, this study focuses on two aspects: The rule of the games and the players.

The four levels of evolution of the NIE theory (Williamson, 2000), namely: NIE

level, emphasize the relationship between formal and informal rules. Informal rules that have been embedded in society, such as tradition, religion, norms, customs, and mindset (embeddedness), are partly synergistic with formal rules and support KAD performance. Still, some other informal rules are not synergistic with formal rules and hamper KAD's performance. Informal rules that support the performance of KAD, namely: Islamic teachings on the virtue of carrying out activities in the congregation or collective action and the Madurese culture of voluntary cooperation. Meanwhile, informal regulations that hinder the performance of KAD include primordial culture, client patrons, and embeddedness as a mindset of inefficient bureaucratic behavior.

NIE level II emphasizes property rights' economics, which consists of rules of the game (law), politics, and government bureaucratic functions. In this case, regional autonomy has placed the regional head as the holder of property rights or the regional government bureaucracy's highest authority. Thus, the performance of the bureaucratic stakeholders of the four districts in Madura, members of KAD, is strongly influenced by the commitment of the regional head. The weak commitment of regional heads has implications for the low performance of KAD because it is related to resource access.

Level III emphasizes governance structures, sustainable contracts, and transaction cost economics. The presence of incompetent officials, changes in officials, and relatively short terms of office in the local government bureaucracy have resulted in rational opportunistic behavior, unsustainable contracts, and high transaction costs.

Level IV emphasizes resource efficiency and incentive structures. So far, the KAD game rules have not demonstrated authority, governance, and principal-agent relationships. It results in inefficient use of resources and low incentives for KAD members to perform well.

This NIE needs to be supported by several institutional instruments such as rules of the game and players to overcome market failures caused by imperfect information, externalities, moral hazard, free riders, and tragedies of common to manage all resources and provide public goods (Lincoln, 2010).

METHODS

This study uses a qualitative approach to reveal the meaning of the institutional phenomenon of KAD in the tourism sector in Madura. This research focuses on the meaning of non-sensual empirical facts and phenomena (noumena), so it is not nomothetic; the KAD institution in the tourism sector in Madura involves two institutional aspects: the rules of the game (rule of the games) and the actors (players).

This present study's data collection has been carried out using several techniques such as FGD, in-depth interviews, observation, and document review. This triangulation method becomes possible because the writer has direct access to any KAD activities and has built a good rapport with the key informants.

The FGD was attended by invited KAD member informants and discussed various matters according to the data and information needed. In-depth interviews in this study were carried out by interviewing KAD member informants at their respective assignments or places agreed upon to obtain the required data and information. Observation in this study was carried out by attending and observing various KAD events, including coordination meetings, festivals, exhibitions, calendar arrangements, and Madura tour packages. Document review is carried out by reviewing various document reports and research results related to Madura Tourism Development.

This present study's primary data sources are the informants or people who are purposively selected and considered to have a lot of information about the phenomenon

being studied. Meanwhile, the secondary data of this study are obtained from numerous documents.

This study has gone through several stages in data analysis: (1) collecting primary and secondary data (collection) from various sources and methods (triangulation); (2) reducing data (reduction) by summarizing, selecting, determining themes and patterns. As a result, the reduced data provide a clear and easy picture for the researcher to present the data; (3) presenting data (display). After data reduction, data are presented in narration, tables, graphs, matrix, or network forms, and (4) presenting a conclusion. Conclusions in qualitative research are in the form of a clear description or description of an object.

RESULTS AND DISCUSSION

Potentials and problems

Madura Island is a part of East Java Province which consists of four districts: Bangkalan, Sampang, Pamekasan, and Sumenep. The development of tourism in Madura is supported by marine tourism and Islamic Madurese culture's potential.

The potential of marine tourism in Madura Island is spread across many islands, with the largest number of islands (126 islands) in the Sumenep Regency. Madurese culture's potential has a strong Islamic color because the majority of the Madurese population is Muslim. The Islamic culture of Madura is indicated by a large number of mosques and prayer rooms, Islamic boarding schools, Islamic schools (*Madrasah*), and the graves of ulama.

Although Madura has great tourism potential, tourism development in Madura has been facing several problems, including:

1. Tourism destinations are not yet supported by accessibility, infrastructure, human resources, and a good investment climate;
2. Tourism marketing has not been supported by a good market, partnership, image, and promotion; and
3. The tourism industry has not been supported by a good database, certification, product competitiveness, business partnerships, business credibility, and environmental responsibility.
4. Tourism institutions have not been supported by commitment and good cooperation from cross-sector and cross-regional stakeholders
5. These problems cause tourism potential in Madura to below, and the result cannot facilitate other related sectors, community welfare, and regional income.

Rule of the games of KAD

Institutional economics is a branch of economics that studies the influence and role of formal and informal rules of play on economic performance at both the macro and micro levels (Bardhan, 1989; Commons, 2001; Hayami & Kikuchi, 1999; North, 1994; Yeager, 1999). Informal institutions are unwritten institutions in society, such as customs, traditions, agreements, conventions, and various names and designations. Meanwhile, formal institutions are written regulations such as laws, agreements, contractual agreements, economic, business, political, and other regulations, including agreements that apply at international, national, regional, and local levels, including formal institutions.

Informally, the collective action of KAD on Madura tourism is facilitated by social capital originating from Islamic religious norms and ethnic Madurese culture: (1) Islamic teachings that prioritize worship in groups (congregation) rather than

individually; (2) high self-esteem; (3) hard work ethic; (4) the culture of wandering or traveling; (5) strong kinship ties; (6) strong emotional ties between ethnic Madurese; and (7) a strong culture of group cooperation (Rahayuningsih, 2014).

Formally, the KAD in the Madura tourism sector is supported by some regulations:

1. Law No. 32 of 2004 concerning Regional Government. This law has mandated the importance of KAD to improve community welfare by referring to the principles of efficiency and effectiveness of public services, synergy, and mutual benefit;
2. Government Regulation No. 50 of 2007 concerning Procedures for Implementation of Regional Cooperation regulates KAD, such as the principles of cooperation, the subject of cooperation, objects and forms of cooperation, and procedures for cooperation. It includes provisions regarding BKAD and financing;
3. Presidential Regulation No. 5/2010 concerning RPJMN 2010-2014 (especially Book III) provides general direction on regional development in general and, in particular, the potential of KAD to build synergies between regions;
4. Presidential Regulation Number 80 of 2019 states that the acceleration of economic development in Madura is carried out through the development of transportation infrastructure and the development of *DEWI CEMARA*;
5. Regulation of the Minister of Home Affairs Number 22 of 2009 concerning Technical Guidelines for Regional Cooperation contains the scope of KAD technical instructions, namely: KAD technical guidelines and technical guidelines for regional cooperation with third parties;
6. Regulation of the Minister of Home Affairs Number 23 of 2009 concerning Procedures for the Guidance and Supervision of Regional Cooperation contains procedures for the guidance and supervision of KAD by the Minister of Home Affairs and the Governor in stages: exploration, negotiation, signing, implementation, and termination; and
7. Joint agreement of four regents in Madura approved by the Governor of East Java (Bangkalan Regent, Sampang Regent, Pamekasan Regent and Sumenep Regent on November 2, 2017 at Pamekasan Number 134.4 / 001 / 433.011 / 2017; Number 415.4 / 26 / XI / SEKBER / 434.011 / 2017; Number 847.4 / 432.401 / SEKBER / 11/2017; Number 415.4 / XI.06-SEKBER / 435.022.1 / 2017 concerning the Establishment of a Joint Secretariat for Inter-Regional Cooperation in the Madura Region.

To strengthen the institution and the KAD program's sustainability, actors with good morals need to support the game's formal and informal rules. In his book entitled The Theory of Moral Sentiments and Wealth of Nations, Adam Smith states that a country's harmony and economic welfare will be created if the country's economic institutions are based on good morals and a balance of bargaining power. If every economic actor is rational and profit-oriented, then economic institutions' problem is related to the presence or absence of good morality and balanced bargaining power. This principle has implications for transactions that can benefit one party but also harm another party.

The ideal rationality of economic actors is based on good morals (sympathetic/altruistic) so that the business process runs by applicable norms and benefit all parties. In reality, people encounter complex problems related to unbalanced needs and abilities. They have limited abilities, but it is not always the case with their unlimited needs. People are likely to become egoistic/opportunistic to fulfill these indefinite needs. For example, they manage to benefit themselves personally by all

means, which may harm others (Yustika, 2008).

In Madurese tourism KAD institution, moral hazard (egotistical/opportunistic, free rider, and tragedy of commons), imbalance in resources and commitment causes sectoral egos and regional egos that hinder KAD's performance are still identified, particularly in relation to the commitments of actors in implementing the rules of the game agreed.

The purpose of KAD

KAD in the tourism sector in Madura is expected to become a regulator and facilitator of cooperation from stakeholders across sectors and regions so that tourism development in Madura goes well.

The rational choice theory in economics states that humans are rational, meaning that all human actions aim to maximize their self-interest (self-interest / egoistic/opportunistic) benefits. Even the government apparatus, when making policies, does not detach themselves from being motivated to benefit their interests.

While socially humans cannot live alone, they need cooperation with other humans by carrying out complementarity and mutual benefit. This concept is a rational reason that drives people to take collective action to overcome various problems such as alleviating poverty, managing shared resources and public goods, increasing bargaining power, and paying attention to cost efficiency (Ritzer & Goodman, 2001).

Regarding tourism development in Madura, each district has different weaknesses and strengths. They finally have to work together to solve the problem by making better use of the tourism potential. Strong institutions for sustainability are needed to carry out group collaboration or collective action. Institutions are networking whose establishment comes from various patterns of interaction. Arsyad (2010) states that the interaction pattern can be seen from two aspects: the game and the actors' rules. The perpetrator is the party who constructs and implements the rules according to their status and role. KAD actors in the tourism sector in Madura consist of tourism stakeholders from four districts in Madura (Bangkalan, Sampang, Pamekasan, and Sumenep). The KAD actors have rules of the game in duties, functions, behavior patterns, values , and norms mutually agreed.

Each institution has one specific function: educational institutions, economics, religion, tourism, and others. Institutions have structures and roles recognized and accepted by society, including values, rules, norms, beliefs, morals, ideas, doctrines, desires, needs, orientation, etc. Organizational aspects contain structure, roles, relationships between roles, integration between sections, general structure, comparison of textual structures with real structures, authority structures, relations of activities with goals, aspects of solidarity, membership, profiles, patterns of power, etc. (Sudaryanto, 1999).

Each institution has specific goals such as (1) directing individual behavior to achieve mutually planned goals; (2) increasing certainty and order in society according to the rules of the game; (3) reducing opportunistic behavior through the formation of structures or patterns of interaction between individuals; and (4) limiting human behavior that tends to cheat in distributing economic resources fairly and equitably (Libecap, 1989; Ostrom, 1990; North, 1994; Kasper & Streit, 1999; Suradisastra, 2008).

Under Law No. 32 of 2004, the general objective of KAD is to improve community welfare based on the efficiency and effectiveness of public services, synergy, and mutual benefits. In particular, the objectives of the KAD in the tourism sector in Madura are as follows:

1. to optimize the strategic role of the tourism sector to encourage the development of various other related sectors;
2. optimizing the utilization of regional potential based on considerations of efficiency, synergy, and mutual benefit across sectors and regions;
3. gather greater strength to face problems and work with a higher level of productivity and efficiency;
4. achieve higher progress. Each area transfers knowledge, experience, skills, and information to each other. Thus, each region will try to advance or develop itself from the results of joint learning;
5. increase bargaining power. Each region will be able to have a better bargaining position and strive for their interests to external parties and higher government structures;
6. prevent conflict. Regions that were previously competing or already involved in the conflict can be more tolerant and try to benefit from or learn from the conflict;
7. create justice. Each region will feel that it benefits from transparency in cooperative relations. Each region involved in the collaboration has equal access to the information created or used;
8. maintain cooperation sustainability. Each region is committed to maintaining mutually beneficial relationships in a sustainable manner;
9. eliminating sectoral egos. Tourism development is multi-sector in nature;
10. eliminate the ego area. The regional ego tendencies can be minimized, and a vision of togetherness can grow together.

KAD has the duty and function to assist Regional Heads in carrying out several things such as management, monitoring, and evaluating the implementation of tourism development, providing input and suggestions. KAD also has the authority to coordinate member regions to plan joint activity programs. There needs to be a commitment to balanced cooperation between KAD and all regional heads in Madura. The commitment of the regional head strongly influences the performance of KAD in achieving its goals.

Starting from 2017 to 2020, KAD has made various efforts to strengthen institutions such as (1) implementing an agreement on a joint secretariat with KAD every two years, starting from Sampang and then moving to Sumenep; (2) hold regular meetings with KAD stakeholders to coordinate and agree on various matters; (3) forming a WhatsApp group under the name Madura Raya as a communication medium; (4) agree on the Visit Madura program with professional management which is funded jointly; (5) compile an annual event calendar for four districts in Madura which are collaborated in the Madura visit package; (6) compiling tour packages covering four districts in Madura; (7) participated as a participant in the 2019 Majapahit International Fair exhibition event on behalf of *Madura Raya* and won first place; (8) compiling a plan to organize the 2020 Madura Raya festival; (9) make plans to celebrate the anniversary of each district with the concept of togetherness. Each district invites four regional heads and a complete range of regional leaders; (10) synergistically compile the tourism planning documents across regions based on local potential and wisdom; and (11) implementing the *DEWI CEMARA* program.

Some of the problems that hinder institutional strengthening in KAD are as follows: (1) the function of the joint secretariat with KAD is ineffective due to moral hazard and imbalance in commitment between KAD and regional heads; (2) regular meetings with KAD stakeholders to coordinate and agree on various matters are not effective because several districts are not present, those who attend are representatives who do not have the authority to make decisions. As a result, the results of the meeting

were only minutes without being realized; (3) the WhatsApp group with the name Madura Raya as a joint communication medium has not been functioning effectively because there has not been active participation from the regional head; (4) the annual calendar of events for the 4 districts in Madura which were collaborated in the Madura visit package has not been realized; (5) tour packages covering 4 districts in Madura have not been realized; (6) the plan to hold Madura Raya festival 2020 until the end of 2020 has not been realized; (7) Only Sumenep Regency, Bangkalan Regency, the tourism planning documents have been completed since 2018 but until now they have not been ratified, Sampang and Pamekasan Districts are still in the process of being drafted; (8) weak commitment of regional heads and regional leaders as indicated by budget allocations, human resources, facilities and infrastructure that are not in accordance with needs, as well as various important events that are not attended by 4 regional heads and a complete range of regional leaders; (9) there is no strong commitment from stakeholders across sectors to support tourism development; (10) combining several fields in one service causes less focus on tourism development. For example, The Department of Tourism, Culture, Youth and Sports; and (11) placement of tourism agency leaders and staff are not by their competencies and needs.

The weakness of this institution creates feelings of disappointment and reduces the spirit of togetherness. In the long term, it is feared that this problem will reduce mutual trust and disrupt the sustainability of KAD.

KAD models

KAD in the tourism sector in Madura uses the principles of transparency, accountability, effectiveness, consensus, mutual benefit, and advances for all parties. Under its principles, the Madura Tourism KAD model combines three complementary models: The handshake Agreement Model, the Joint Agreement, and the Jointly-formed authorities.

The KAD Model of Handshake Agreement refers to political commitment and trust among cooperating regions. This form of cooperation is quite efficient and more flexible due to the support of strong social capital such as mutual trust, strong emotional ties as fellow Madurese, and shared interests in developing tourism as a source of regional income and community welfare.

The KAD Joint Agreement model refers to the participation of all members in carrying out the cooperation process. Each member has the same control and responsibility for all activities and cooperation.

KAD uses a jointly-formed authorities model that takes the form of a Joint Secretariat. Local governments of KAD members agree to delegate control, manage and assume responsibility to a body consisting of representatives from the relevant local governments. This agency has the authority to execute policies, programs, and activities it administers.

Several regencies have agreed to take on the secretariat's role with KAD in turns every two years. In the first period (2017-2019), the joint secretariat of KAD Madura was Sampang Regency. The next period (2020-2021) is Sumenep Regency. In addition to the joint secretariat, each district also has a sub-secretariat that also involves district government staff from each Madura KAD member.

The joint secretariat has the mandate as the party responsible for coordinating the implementation of mutually agreed programs.

KAD resources

According to Government Regulation no. 50 of 2007, BKAD personnel come

from government employees from SKPD in the region, and they are members of the secretariat. BKAD is led by a Coordinator, namely Assistant 1 for Regional Government Government. In the running KAD, the coordinator is assisted by the Secretary, Deputy Secretary, General Affairs, and Program and Reporting Affairs, which are occupied by Assistant 1 staff for Government Affairs. To carry out public services cooperation, KAD coordinates with SKPD to prepare plans, compile programs in the environment, tourism, and transportation.

The availability of human, financial, facilities, and infrastructure is an important input for implementing KAD policies. The financing source for implementing the BKAD plan is each region's responsibility, whose members come from government and non-government institutions.

Whereas regional heads have low commitment, the need for human, financial, facilities and KAD infrastructure cannot be fulfilled. Also, this situation is exacerbated by the lack of enthusiasm for cooperation from cross-sector and cross-regional stakeholders.

KAD actors

The social interdependence and resource limitations of the four districts in Madura have formed an incentive structure for KAD members to carry out Mutually Beneficial Collective Action, pool resources to optimize the management of tourism potential and solve limited resources (Miller, 1977).

KAD in the Madura tourism sector is a collective action involving several actors, namely: government, private, civil society, and academics. The government is the Central Government, the Provincial Government of East Java, and the four district governments in Madura. The central government acts as a regulator and provider of funds for tourism development. The Provincial Government of East Java has a role in coordinating tourism affairs involving the four districts in Madura. The local governments of the four districts in Madura play a role in implementing the agreements made by Inter-Regional Cooperation Agency (BKAD).

The private company is involved in tourism development in Madura, and they play a role as a contributor to CSR funds, investors, tourism industry actors, and government cooperation partners. Communities are religious leaders, cultural figures, traditional leaders, and groups involved in tourism development activities in Madura. Academics come from higher education institutions and play a role in compiling planning documents, research, and community empowerment through outreach, education, training, and mentoring activities.

Collective action is facilitated by social capital and has been proven to have reduced transaction costs in supervision and enforcement of regulations due to interdependence between group members. An individual's decision-making considers the costs and benefits of resource use for him and needs other individuals' expectations. It is related to the social character of the Madurese community; a strong orientation to interdependence, expectations of individual behavior, and norms of reciprocity. The agreed social or customary sanctions make incentives to violate rules or become free riders can be suppressed (Rohima, 2013).

KAD Madura Tourism's collective action's success and sustainability are influenced by social capital's cognitive and structural aspects. Social capital's cognitive aspect is social capital, which includes mental processes (internalization of awareness) of norms, values, attitudes, or behavior (beliefs), etc. The internalization process affects the morale of the collective action actors. Their actions are influenced by dynamic

factors, including the quality of trust, solidarity, cohesiveness, cooperation, generosity, and others. The final output of the internalization process is ideas or expectations that lead to collective behavior that guarantees collective benefits. Cognitive social capital exists in the form of civic culture and has a strong influence on behavior. Social capital in this category usually called predispose, encourages people to take beneficial collective action (Mutually Beneficial Collective Action). Another characteristic of social capital in this category is intrinsic or not physically visible.

The structural aspects of social capital are the building blocks of how social capital is structured. Therefore, in contrast to cognitive social capital, social capital has extrinsic or physical characteristics according to structural aspects. But both have in common that the final output is also in the form of ideas or expectations that lead to beneficial collective action—structural social capital in the form of networks, groups, or other interpersonal relationships. The dynamic factor is the horizontal and vertical relationship. Structurally, social capital takes the form of social organization, which facilitates beneficial collective action. Therefore, social capital in this category is commonly referred to as assets.

Social capital's cognitive and structural aspects converge on ideas or expectations that lead to mutually beneficial collective action behavior. Cognitive social capital affects why communities are willing to take beneficial collective action, while structural social capital functions to facilitate beneficial collective action. Social capital in cognitive and structural aspects will be more effective if supported by complementary interactions between formal and informal institutions (Krishna & Uphoff, 1999).

Formal and informal norms facilitate the cognitive aspects of the Madura Tourism KAD. Formal norms include regulations related to KAD. Informal norms include Islamic religious norms and Madurese cultural norms derived from Islamic teachings (congregation). Meanwhile, the structural aspects of the Madura Tourism KAD were facilitated by BKAD.

Internalization of formal and informal norms is a social capital from a cognitive aspect that affects the actors' rationality to take collective action in the KAD of Madura Tourism.

The establishment of the KAD in the tourism sector in Madura is an implementation of the formal norms of law no. 32 of 2004, Government Regulation no. 50 of 2007, Regulation of the Minister of Home Affairs Number 22 of 2009, and Regulation of the Minister of Home Affairs Number 23 of 2009.

The establishment of the KAD in tourism in Madura is an implementation of informal norms derived from the teachings of Islam and Madurese culture. One of the motivations for the collective action of KAD is to carry out Islamic teachings that prioritize collective action (congregation) rather than individuals. This teaching motivates the Muslim community in Madura to take collective action (in congregation) in life, including tourism management. Like the congregational prayer services held at the mosque, the Madura Tourism KAD's collective action is carried out on the awareness, volunteerism, and good intentions of the perpetrator for the good of himself or his group. *Ghutong Rojhung* culture or Gotong Royong, ethnic ties and strong kinship are social assets that support the collective action of KAD.

The collective action of KAD in the tourism sector in Madura is rational because each actor has the goal of benefiting from the cooperation carried out through pooling the resources owned by all KAD members (Goldfield & Gilbert, 2018).

The rationality of KAD Madurese tourism actors supported by good morals (altruistic/sympathetic) will form social capital, which has positive implications in the

form of productive, effective, efficient behavior and positively impacts all parties in the short and long term. On the other hand, rationality supported by moral hazard (egoistic/opportunistic) forms social capital, which has negative implications such as the tragedy of the commons and has a negative impact on all parties in the short and long term (Hausman & Mcpherson, 1993).

Heterogeneous collective action groups have greater potential for moral hazard because there is a tendency that everyone wants to cooperate with others who have something in common. The existence of moral hazard behavior (egotistical/ opportunistic, free rider, and tragedy of common) triggers another moral hazard. Group size also influences collective action's success: the larger the group size, the more efficient, the greater the potential for moral hazard. KAD in the tourism sector in Madura is a homogeneous collective action group with a relatively small size, so that the potential for moral hazard is also relatively small. Without a strong commitment from all regional heads and their staff, the institution and performance of KAD will become weak.

Among all sectors, the tourism sector is the most strategic sector to facilitate other sectors' development. However, developing the tourism sector requires support from other sectors. Among the four districts that are members of KAD Madura, each has different potentials and resources. The low awareness of mutual needs between sectors and regions causes sectoral and regional egos to emerge.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

Madura tourism development is hampered by the weakness of the KAD institution in the Madura tourism sector: (1) the KAD program has not been supported by the commitment of all regional heads to facilitate cross-sector and cross-regional cooperation and meet resource needs; (2) KAD has not been supported by a synergy of planning documents across sectors and regions; (3) there are no good cooperation between the government, private sector and society; and (4) indications of moral hazard, such as: egoistic/opportunistic, free riders, and tragedy of commons.

Recommendations

Strengthening the Madura tourism sector's KAD institution requires a written commitment agreement from all regional heads in Madura. This agreement functions to facilitate cross-sectoral and cross-regional stakeholder cooperation, fulfill resources according to needs, and minimize potential moral hazards, such as: egoistic/opportunistic, free riders, and tragedy of commons.

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Rural and urban poverty models on Sumatra Island

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Abstract

This study aims to analyze rural and urban poverty on Sumatra Island, Indonesia, and its determinants. The variables tested in the model are HDI (Human Development Index), GRDP (Gross Regional Domestic Product), and per capita expenditure. The data used is panel data for the provinces on Sumatra Island in the period 2011 - 2019. The analysis tool uses a panel data regression model. The study results found that during the 2011 - 2019 period, the rural poverty rate on Sumatra Island was 11.68 percent, relatively higher than in urban areas, 9.22 percent. The poverty gap index and poverty severity index in rural areas are also relatively higher than in urban areas. The research results also found that the poverty level in rural areas is significantly affected by HDI, while the GRDP and per capita expenditure does not significantly affect.

Keywords: *Expenditure per capita, Gross Regional Domestic Product, Human Development Index, Poverty*

JEL Classification: E21, E23, I32, R10

INTRODUCTION

Sumatra Island is one of the large islands with the largest number of provinces in Indonesia. There are 10 provinces on Sumatra Island, namely the provinces of Aceh, North Sumatra, West Sumatra, Riau, Jambi, Bengkulu, South Sumatra, Bangka Belitung, Riau Islands and Lampung. With the largest area and number of provinces, Sumatra Island has a significant role in improving the Indonesian economy. Therefore, various development efforts have been carried out intensively in the provinces on the island of Sumatra.

However, the facts show that the development carried out on Sumatra Island has not improved the welfare of the people optimally. In 2019, the average poverty rate for the provinces on Sumatra Island reached 9.81 percent, above the national average of 9.22 percent.

Apart from the relatively high poverty level, poverty is also rather unequal between rural and urban areas. In 2019, the rural poverty rate reached 10.75 percent, while it was only 8.12 percent in urban areas. With a larger rural population than urban areas (the proportion of the rural population on Sumatra Island is 55.90 percent), this

high level of rural poverty certainly has a broad impact on the welfare of the people in general Sumatra Island.

This study aims to analyze poverty models in rural and urban areas in Sumatra Island. This model is expected to provide information on the differences/similarities in the causes of poverty in rural and urban areas and at the same time become the basis for the formulation of poverty reduction policies.

The term poverty refers to the condition of a person or group of people who are unable to fulfill their minimum needs based on a certain standard of living. Poverty is a complex problem because many related factors influence it. According to Mikelsen (2003), thinking about poverty changes over time but is basically related to the inability to meet basic needs.

Lack of income and assets to meet basic needs such as food, clothing, housing, and health and education are the basic causes of poverty. Besides, poverty is also related to limited employment opportunities. Usually, those categorized as poor are unemployed, and education and health are generally inadequate (Simatupang & Junaidi 2020). Furthermore, Kuncoro (2000) argues that poverty is caused by: 1) a pattern of resource ownership that causes an unequal income distribution. The poor have only limited and low-quality resources; 2) differences in the quality of human resources. The low quality of human resources means that their productivity will also below, which in turn will lower wages; 3) differences in access to capital.

Based on this and several previous studies such as Zuhdiyati & Kaluge (2017), Biyase & Zwane (2017), Andykha et al. (2018), Nizar et al. (2013), Rocha (2006), Azizah et al. (2018), Sangadah et al. (2020), Junaidi et al. (2020) and others, the poverty model in this study is approached through three aspects: aspects of the quality of human resources, conditions, economic growth, and expenditures to meet the needs of life. Measurement of the quality of resource sources uses the HDI indicator, economic conditions, and growth using the GDP indicator and expenditure to meet the needs of life using the per capita expenditure indicator.

METHODS

The data used in this study are secondary at the provincial level in Sumatra during the period 2011 - 2019. The data is sourced from the Central Bureau of Statistics of the Republic of Indonesia.

The data is processed descriptively to describe the characteristics of poverty between provinces and between rural and urban areas on the island of Sumatra. The characteristics of poverty use three indicators: poverty level, poverty depth index, and poverty severity index.

Furthermore, analyzing rural and urban poverty models using panel data regression models are used as follows:

$$Y_{1it} = \beta_0 + \beta_1 HDI_{it} ++ \beta_2 GRDP_{it} + \beta_3 PP_{it} + \varepsilon_{it} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(1)$$

$$Y_{2it} = \beta_0 + \beta_1 HDI_{it} ++ \beta_2 GRDP_{it} + \beta_3 PP_{it} + \varepsilon_{it} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(2)$$

Where:

Y_1 : Rural poverty rates

Y_2 : Urban poverty rates

HDI : Human Development Index
GRDP : Gross Regional Domestic Product
PP : Expenditure per capita
i : Cross section (10 provinces in Sumatra Island)
t : 2011 to 2019
ε : *Error term*

RESULT AND DISCUSSION

Poverty in rural and urban areas in Sumatra Island

At the macro level, the poverty level of an area describes the percentage of the population with per capita expenditure below the poverty line. Other measures of assessing poverty are the poverty gap index and the poverty severity index. The poverty gap index is a measure of the average expenditure gap of each poor person against the poverty line. The higher the index value, the farther the population's average expenditure is from the poverty line. The poverty severity index provides an overview of the distribution of expenditure among the poor. The higher the index value, the higher the expenditure inequality among the poor.

The average poverty rate, poverty gap index, and poverty severity index for provinces in Sumatra Island during the 2011 - 2019 period are shown in Table 1.

Table 1. Average poverty rates, poverty gap index, and poverty severity index for provinces in Sumatra Island, 2011 - 2019

Province	Rural			Urban		
	Poverty rate	Poverty gap index	Poverty severity index	Poverty rate	Poverty gap index	Poverty severity index
Aceh	19.45	3.57	0.97	11.14	1.76	0.42
North Sumatra	10.24	1.82	0.49	9.74	1.60	0.41
West Sumatra	8.26	1.20	0.27	5.74	0.90	0.21
Riau	8.78	1.34	0.33	6.49	0.92	0.20
Jambi	7.19	1.01	0.22	10.66	1.67	0.44
South Sumatra	13.72	2.22	0.56	12.96	2.12	0.54
Bengkulu	16.77	2.77	0.71	16.43	2.88	0.75
Lampung	15.56	2.50	0.61	10.21	1.57	0.37
Bangka Belitung	7.10	0.94	0.20	3.17	0.41	0.08
Riau Islands	9.68	1.13	0.25	5.70	0.83	0.21
Average	11,68	1,85	0,46	9,22	1,47	0,36

Based on Table 1, it can be seen that on average during the 2011 - 2019 period, the rural poverty rate in the provinces on Sumatra Island reached 11.68 percent, while in urban areas, it was only 9.22 percent. Except for Jambi Province, the rural poverty rates in the provinces in Sumatra Island are relatively higher than those in urban areas.

In general, it can be argued that the depth index and severity index of rural poverty are also relatively higher than in urban areas. It can be interpreted that in addition to the high level of poverty, expenditure inequality (by poverty line and among the poor) in rural areas is relatively higher than in urban areas.

Rural poverty model in Sumatra Island

Based on the Chow test and Hausman test, the random effect model is obtained as the best model in analyzing rural poverty on the island of Sumatra Island. The rural poverty model is given in Table 2.

Table 2. An estimated model of rural poverty in Sumatra Island

Method: Pooled EGLS (Cross-section random effects) Swamy and Arora estimator of component variances				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	34.41419	5.985277	5.749807	0.0000
HDI?	-0.324703	0.093706	-3.465134	0.0008
GRDP?	-1.04E-06	5.08E-06	-0.204886	0.8381
PP?	1.79E-06	1.09E-05	0.163780	0.8703
Random Effects (Cross)				
_Aceh--C	7.686607			
_North Sumatra--C	-1.166346			
_West Sumatra--C	-3.265568			
_Riau--C	-2.166946			
_Jambi--C	-4.739286			
_South Sumatra--C	1.471280			
_Bengkulu--C	4.656164			
_Lampung--C	3.080188			
_Bangka Belitung--C	-4.874291			
_Riau Islands--C	-0.681804			
Effects Specification				
			S.D.	Rho
Cross-section random			4.898243	0.9704
Idiosyncratic random			0.855575	0.0296
Weighted Statistics				
R-squared	0.276908	Mean dependent var		0.678878
Adjusted R-squared	0.251684	S.D. dependent var		0.974777
S.E. of regression	0.843233	Sum squared resid		61.14964
F-statistic	10.97790	Durbin-Watson stat		0.699111
Prob(F-statistic)	0.000004			

The F test shows that simultaneous HDI, GRDP, and per capita expenditure significantly affect rural poverty levels in Sumatra Island. Furthermore, based on the coefficient of determination, it shows that 27.69% of changes in the level of rural poverty in Sumatra Island are influenced by HDI, GRDP, and per capita expenditure.

Even so, only partially HDI has a significant effect while GRDP and PP have no significant impact on urban poverty in Sumatra Island. The coefficient value shows that an increase of 1 percent in HDI will reduce the poverty rate by 0.32 percent.

Urban poverty model in Sumatra Island

Based on the Chow test and Hausman test, the random effect model is obtained as the best model in analyzing urban poverty on the island of Sumatra. The urban poverty model is given in Table 3.

The F test shows that simultaneous HDI, GRDP, and per capita expenditure significantly affect urban poverty levels in Sumatra Island. Furthermore, based on the

coefficient of determination, it shows that 62.76% of changes in the level of urban poverty in Sumatra Island are influenced by HDI, GRDP, and per capita expenditure.

Tabel 3. An estimated model of urban poverty in Sumatra Island

Method: Pooled EGLS (Cross-section random effects)				
Swamy and Arora estimator of component variances				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	43.48391	4.212359	10.32294	0.0000
HDI?	-0.495925	0.065115	-7.616184	0.0000
GRDP?	7.84E-07	3.58E-06	0.218887	0.8273
PP?	2.60E-06	7.43E-06	0.350423	0.7269
Random Effects (Cross)				
_Aceh--C	2.008992			
_North Sumatra--C	0.340648			
_West Sumatra--C	-3.124625			
_Riau--C	-2.231430			
_Jambi--C	1.193441			
_South Sumatra--C	2.710256			
_Bengkulu--C	6.925482			
_Lampung--C	-0.243588			
_Bangka Belitung--C	-6.171987			
_Riau Islands--C	-1.407189			
	Effects Specification			
			S.D.	Rho
Cross-section random			4.168383	0.9810
Idiosyncratic random			0.580826	0.0190
	Weighted Statistics			
R-squared	0.627636	Mean dependent var		0.428146
Adjusted R-squared	0.614647	S.D. dependent var		0.922959
S.E. of regression	0.572944	Sum squared resid		28.23073
F-statistic	48.31900	Durbin-Watson stat		1.022762
Prob(F-statistic)	0.000000			

Even so, as well as the rural poverty model, only partially HDI has a significant effect while GRDP and PP have no significant impact on urban poverty in Sumatra Island. The coefficient value shows that an increase of 1 percent in HDI will reduce the poverty rate by 0.49 percent.

Discussion

Poverty on Sumatra Island, both in urban and rural areas, is significantly affected by HDI. These results are in line with poverty models from various previous research results such as Zuhdiyati & Kaluge (2017) in their research on 33 provinces in Indonesia, Andykha et al. (2018) in Central Java Province, and Susanti (2013) in West Java Provincie.

Dartanto and Nurkholis (2013) found that the dynamics of poverty in Indonesia are determined by education and health (as an indicator of HDI). This linkage of education to poverty was also found by Biyase & Zwane (2017) and Maloma (2016) in South Africa, Garza-Rodriguez (2015) in Mexico, Hyder & Sadiq (2010) in Pakistan, and Alifah et al. (2020) in West Sumatra Province.

GRDP or economic growth does not have a significant effect on poverty. It is also

supported by previous studies, including Zuhdiyati & Kaluge (2017), Alifah et al. (2020), and Prasad (1998) in Fiji. However, the results of this study are different from those of Nizar et al. (2013), Hasan & Quibria (2002), Rusdanti & Sebayang (2013), Andykha et al. (2018), and Barreto (2005). They found a significant influence between economic growth (GDP) on poverty levels.

Per capita expenditure does not have a significant effect on poverty. Previous studies also supported it, including Zudiyati & Kaluge (2017) and Supriaman (2020). However, the results of this study are different from the findings of Rocha (2006), Azizah et al. (2018), Sangadah et al. (2020), who found a significant influence between expenditure per capita and poverty.

HDI is a determining factor for poverty in both rural and urban areas, which implies that human resource development is a key factor in poverty alleviation. The acceleration of economic development without being followed by the acceleration of human resource development will not be able to eradicate poverty fundamentally.

Furthermore, the fact that GDP does not significantly affect the poverty level shows that economic growth has not been enjoyed equally by all levels of society, especially the poor. Likewise with the expenditure per capita. The increase in expenditure does not reflect an increase in the income of the poor. It is estimated that the increase in expenditure is due more to the increased consumption of middle and upper-income people.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

The average level of poverty in rural areas on Sumatra Island is relatively higher than in rural areas. This high poverty level in rural areas is also followed by a relatively higher expenditure inequality (by poverty line and among the poor) compared to urban areas.

Poverty in Sumatra Island, both in rural and urban areas, is influenced by the quality of human resources (HDI). At the same time, the GRDP and per capita expenditure does not have a significant effect. It implies that the quality of human resources is a key factor in poverty alleviation. Economic development will only be successful in alleviating poverty if carried out simultaneously with human resource development.

Recommendations

In formulating poverty alleviation policies, the government must focus more on development that is oriented towards improving the quality of human resources and the productivity of society. In addition, the development that is being carried out should also be able to increase the distribution of welfare both among community groups and between regions.

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