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Social Return on Investment of PT Badak NGL SALIN SWARA Program

Dwi Thia Putri[1]✉ , [2]**Irfan Hidayat**, [3]**Yuli Gunawan**
[1,2,3]PT Badak NGL

Article Information

Abstract

PT Badak NGL through its CSR (Corporate Social Responsibility) programs contributes to Sustainable Development (SDGs) realization. One of its CSR programs is Salin Swara which is related to a community waste program aiming at creating society's collective awareness of common waste and household waste management to preserve the environment. This quasi-qualitative study attempted to assess the social impact received by salin swara stakeholders and the amount of social impact resulting from this program compared to the investment made by PT Badak NGL. In data analysis, this study used triangulation techniques to map the advantages of this program (qualitative) and the Social Return on Investment-SROI method (quantitative). To collect the data, in-depth interviews, Focus Group Discussions, and secondary data reviews were done. Practically this study provides an overview for companies to evaluate their CSR programs using the SROI method, while the results can be a basis for optimizing the next CSR program. Based on the SROI method, Salin Swara program gained a score of 2.33, meaning that the program benefitted 2.33 times the investment issued. In addition, the value of it's benefit was Rp.31,302,849 with a total investment of Rp.13,437,500.00. The outcome value was dominated by the outcome of the workers Social Security Agency or BPJS Ketenagakerjaan death insurance claims (67%). It shows good program performance because the payback period has been obtained in the same year when the program was carried out.

✉ Corresponding author :
Address: PT Badak NGL
E-mail: dwithiap@gmail.com

INTRODUCTION

Before the Millenium Development Goals (MDGs) campaign ended, in September 2015 in New York, United States the United Nations has hold the 70th General Assembly which became a new point of global development by agreeing on Sustainable Development Goals containing 17 goals and 169 targets as the follow-up of the Millennium Development Goals agendum that had not yet been realized (Panuluh, S., & Fitri, M. R, 2016). The United Nations (UN) Declaration was then followed up by the government with the signing of Presidential Regulation no. 59 of 2017 on July 4, 2017 regarding the implementation of the Achievement of the Sustainable Development Goals. ISO 26000 also supports the implementation of the Corporate Social Responsibility as a function of ISO (International Organization for Standardization) and develops the "ISO 26000 Guidance Standard" based on the widespread belief that social responsibility is very important for organization survivability (ISO 26000 and the SDGs, 2018).

A company must realize society's welfare as a part of its business expansion which may harm environmental and social balance. Some efforts to realize this welfare are by providing society with various benefit programs, such as improving the facilities of education, health, economy, environment and others called Corporate Social Responsibility (CSR). A company that adopts this program often expands its business to a site that enables them to give contributions to society. One thing to note is today's CSR must support sustainable development (Elalfy et al., 2020; Lu et al., 2021)

As a leading natural gas company in Indonesia, PT Badak NGL located in Bontang City, East Kalimantan Province its demanded to meet social obligations or CSR through participation in community empowerment projects. Community empowerment considered an alternative to foster the welfare of people surrounding the company by solving particular problems. This program is realized through development initiated by the community to improve their situations.

The community empowerment done by PT Badak NGL was located in Tanjung Laut Indah Village in Bontang City. This region is often get flooded due to piles of garbage in the river or community residential areas that produce waste every day. Because of the indiscipline of residents in disposing of waste, the waste accumulates at several points so that water is blocked from flowing and causes flooding.

Knowing the previously mentioned problem, the CSR team of PT Badak NGL planned Salin Swara (Community Independent Waste Program) run by Bank Sampah Pesisir group, a group that manages waste banks, as a community that cares about waste and a community forum empowerment. The spirit of realizing Sustainable Development Goals (SDGs) and solving waste issues in Tanjung Laut Village encouraged PT Badak NGL with support from the community to do CSR to help manage waste. Here, PT Badak NGL is more likely to be responsible for the consequences or outcome than the output during these CSR activities. It is because an output technique is not considered the best way to assess program success. A good program will benefit and improve its participants. Hence, Social Return on Investment (SROI) helps to achieve sustainable development because every program will be evaluated in terms of effectiveness after knowing the results (Wibisono, et al., 2021). According to New Economics Foundation, SROI is an analytical study that converts any impact into currency based on selected indicators aiming at managing welfare, economy, socety, and environment, and it compares the pre and post-condition of money being invested. SROI also promotes long-term sustainable achievement because every program will be evaluated based on it's effectiveness according to the subsequent consequences.

Regarding the previous explanation, this study aimed to evaluate the social impact of Salin Swara waste management on the stakeholders and the amount of social impact compared to the investment made by PT Badak NGL calculated using the SROI method. There are less studies who use SROI to explain the research problems become the gap of this research.

RESEARCH METHODS

This study was quasi-qualitative research. It is a research design related to post-positivism (Bungin, 2020). Before dealing with difficulty, it starts with a theory first. In the beginning, researchers required the use of theories in the positivism paradigm to answer phenomena and social situations. This concept is used during the formulation of problems, data collection, and data analysis. After that, the researchers used a triangulation method qualitatively to check the beneficial effects of this program. This method is suitable for learning SROI because it has its framework to direct the researchers through research and strengthen qualitative arguments.

This study focused on the social impact of the waste management program Salin Swara of PT. Badak NGL was calculated using the SROI ratio. Here, the data were collected from the Salin Swara research sites in Tanjung Laut Indah and Kampung Selangan, Bontang Lestari Village in South Bontang Sub-district, Bontang City, East Kalimantan Province. In terms of data, this study used primary and secondary data collected using a qualitative method, namely purposive sampling. Purposive sampling was done to map the outcome of all parties involved (key stakeholders), especially the beneficiaries.

In collecting the data, the researchers used in-depth interviews with key informants, Focus Group Discussion (FGD), and secondary data reviews in a way to collect information. Triangulation (qualitative) and Social Return on Investment (SROI) were the analysis tools in the quasi-qualitative method (quantitative). In a qualitative study, the validity test covers trust, transferability, dependence, and confirmability (Sugiyono, 2007). SROI is considered well-developed social impact valuation tool and has been widely used in the UK, Europe, and North America (Watson & Whitley, 2017). However, not many empirical studies have been conducted to provide evidence of the implementation of the SROI method (especially in Indonesia) to evaluate CSR programs.

RESULTS AND DISCUSSION

PT Badak NGL in Bontang City, East Kalimantan Province contributes to the realization of Sustainable Development Goals through its CSR program or known as Comdev (Community Development). Its mission is to hold community empowerment programs that are independent and based on the environment, and actively participate in community development which later will create shared value for stakeholders.

People who live in Tanjung Laut Village, a village situated in coastal areas tend to have a littering habit. It causes the environment to become dirty and shabby when the flood hits. Besides, this bad habit causes a health problems in form of skin disease. What motivates the littering is the location a landfill site that is considered far away by the community, even for people in Kampung Selangan who live in the middle of the Southern waterlogged area of Bontang City. The people in this village must take a boat to the mainland to throw garbage in a landfill site, and it surely costs a lot of time and money. What is more, the majority of people in Tanjung Laut Indah Village and Kampung Selangan have low economic levels whose occupations are fishermen and seaweed farmers.

Concerning this situation, PT Badak NGL attempted to solve this problem by running CSR programs on the basis of the Community Independent Waste Program (Salin Swara) with helps of the Bank Sampah Pesisir group. Salin Swara program supported the implementation of the Bontang City Regional Long Term Development Plan (RPJMD) year 2016-2021. Its vision is "Strengthening Bontang as a Maritime City with Industrial Culture that Relies on the Quality of Human Resources and the Environment for Community Welfare" (Bappeda Kaltim, 2016).

Recommendations and regulations are considered no longer effective but involving community initiatives directly can be a breakthrough that is more effective through community empowerment which will be led by the Bank Sampah Pesisir group as an

environmental care group in Bontang City. With the Salin Swara program, it was hoped that the community will be able to independently manage the waste in their environment to improve the quality of the environment.

PT Badak NGL focuses more on outcomes for the community than output. To facilitate the assessment of its impact the researchers used a SROI method. This method uses a financial quantification (monetization) calculation approach to evaluate program impact. In carrying out this task, the impact scores are compared to the value of investment costs spent. SROI is a metric that can be used to decide whether a program is beneficial for the short term or long term.

This strategy helps determine who receives benefits and the amount of money from a particular program. In this way, the advantages of a program can be distributed fairly or unfairly based on the main goals, or it is centered on a party when the less advantaged party is supposed to earn benefits. SROI is a method that analyzes and explores the effects of a program after being implemented. Compared to other investment tool such as incremental ratio, SROI will give more comprehensive analyses (Purwohedi, 2016). In PT Badak NGL, the SROI calculation mechanisms in the impact of CSR management referred to the order written in (Nicholls, et al., 2009).
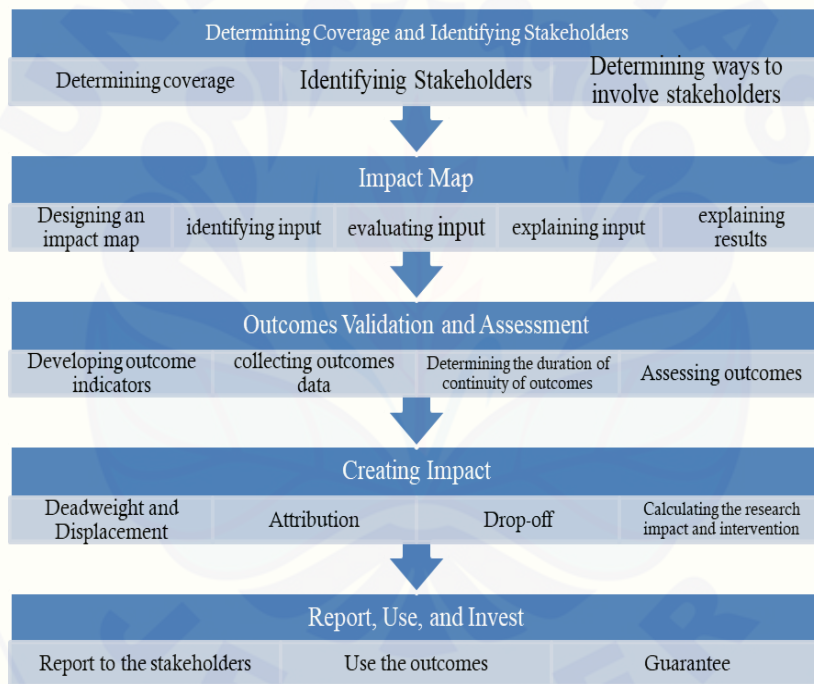
Figure 1. SROI Calculation Stages for PT Badak NGL SALIN SWARA Program
Source: (Nicholls, et al., 2009)

The stakeholders mentioned in this analysis were those who had great influence and receive the greatest benefits from this program. In the Salin Swara program, the major target was the customers of Bank Sampah Pesisir or waste bank in Selangan unit. Another recipient was PT Badak NGL as the funding support. In details, the benefits received by the stakeholders are explained as follows:

Table 1. Stakeholders as the Beneficiaries of the Salin Swara Program

Stakeholder	Information
Customers of *Bank Sampah Pesisir*	A total of 49 people, the majority of whom work as fishermen and are responsible for sorting and collecting family waste to create a cleaner and healthier household waste environment and increase income through the gold savings system.
Customers of *Bank Sampah* in Selangan Unit	A total of 22 people, the majority of whom work as fishermen
PT Badak NGL	The host of the programs run by the CSR Unit and in collaboration with external parties, commits to improving the welfare of the people of Tanjung Laut Indah Village.
BPJS Ketenagakerjaan in Bontang	The company engaged in the field of employment security. It cooperates in the Salin Swara program by providing a waste-saving service as a substitute for the monthly premium fee.
PT Pegadaian	The company engaged in pawning and gold savings. It cooperates with the Salin Swara Program by providing gold savings services using waste savings.

Source: SROI 2021 research data processing.

Besides the above stakeholders, some parties contributed to the success of the program, They were the Bontang Environment Agency as supervisor and coach, Kelompok Duta Peduli Sampah or waste care group which worked together in education, socialization, and human resources in several activities, and Tupperware as a sponsor in several events. Despite being involved in the Salin Swara program as a supporting party, those parties cannot be included in the SROI assessment because their contributions have not been able to provide benefits up to the outcome level.

The researchers used an effect calculation approach and financial assessment (monetization) for each parameter of the impact after identifying which stakeholders to include, their participation in the implementation, and their influence. This theory of change is part of phase 2 of the SROI which involves impact mapping. According to (Krlev, et al., 2013) SROI produces solid data that can be used to communicate with boards, stakeholders, and the general public about how the organization has an impact. In addition, these findings provide internal management with information about strategic decision-making and project selection.

Input and output identification was done after knowing the stakeholders who became the target of Salin Swara program. However, the SROI assessment of the beneficiaries which was related to the time spent was not included an input value. Therefore, the input value of this program was the result of the expenditure provided by PT Badak NGL in carrying out program activities.

Table 2. The Input and Output of SALIN SWARA Program

No	Activity	Input Value	Output
1.	Facilitated 1-time trash pick-up at the Ocean Day and Environment Day commemoration events.	Rp. 6,320,500.00	A total of 2,800 kg of waste from along the coast was picked up
2.	Socialization of the waste saving system and the gold saving system from waste in collaboration with PT Pegadaian.	Rp. 3,142,000.00	The registration of 71 waste bank customers to become members of the gold savings account.
3.	Waste sorting and weighing at the Waste Bank.	Rp. 800,000,00	The registration of 30 people as customers of PT Pegadaian and BPJS Ketenagakerjaan.
4.	FGD by *Bank Sampah Pesisir* group.	Rp. 2,025,000,00	The establishment of the *Bank Sampah Pesisir* and *Bank Sampah* in Selangan Unit
5.	Group Licensing and Legality Management (Forming Group Notary Deed)	Rp. 750,000,00	
6.	Surveying the location of the *Bank Sampah* in Selangan.	Rp. 400,000,00	

Source: SROI research data processing, 2021

The success of the programs run by PT Badak NGL, Tanjung Laut Indah Villagers in the South Bontang Sub-district, and the supporting community can be seen from changes found after the programs. In detail, the outcome of various activities and overview of changes from the beneficiaries can be seen in table 3. Prior to SROI, two steps were carried out, namely deciding the outcome value and impact fixation (NEF, 2009, 2010; Ryan and Lyne, 2008).

First stage: determining outcome value. This value was calculated using several indicators based on the information provided by the stakeholders. The number of households that achieved benefits from the sub-program fluctuated depending on the number of their improvement. Hence, evaluation was made based on standard price.

Table 3. The Outcome Assessment Salin Swara

No	Outcome	Indicator	Assessment Approach; (year/1x time)	Information source
	Ocean Day and Environment Day Commemoration			
1.	The community was able to create a clean beach environment and did not have the potential to damage coral reef ecosystems in the high seas which is felt by the entire general public (Rp. 1,400,000)	Savings on waste transportation costs.	The standard price for waste transportation services by Bontang City environmental agency is the accumulation of one transportation (Rp. 500,000/ton)	Customer interviews & internet resources.

No	Outcome	Indicator	Assessment Approach; (year/1x time)	Information source
	Socialization of the Waste Savings System			
2.	The community of Tanjung Laut Indah and Selangan Villages could manage their household waste into gold savings balances through participation as customers of the Gold Savings Account, which was obtained by 71 people (Rp. 16,330,000)	Savings in administration fees per year and registration fees for Waste Bank customers who are members of gold savings; and gold savings were obtained from the results of the customers' waste savings.	The Registration fee is Rp. 50,000, while the administration fee per year is Rp. 30,000. It was known that the average value of the customer's gold savings was Rp. 150,000	Interview with the Head of the Waste Bank and the BPJS Ketenagakerjaan of Bontang City.
	Waste Sorting and Weighing in the Waste Bank			
3.	People who are the users of BPJS Ketenagakerjaan users gained a social safety net. This outcome was obtained by 30 people (Rp. 6,048,000)	People can pay their monthly BPJS Ketenagakerjaan fee using waste saving	Payment of insurance premiums per year per customer is Rp. 201,600.	Interview with customers and employments of Waste Bank.
	Waste sorting and weighing at the Waste Bank			
4.	Obtaining a BPJS Ketenagakerjaan death insurance by 1 family (Rp. 42,000,000)	The cost of claiming is Rp. 42,000,000.	The Death insurance claim by 1 customer is Rp. 42,000,000	Interview with the chief of *Bank Sampah Pesisir*

Source: SROI 2021 research data processing

Second stage: Impact Fixation. Salin Swara program has successfully gained its best performance through the support from PT Badak NGL. There are four considerable factors in determining a value, namely deadweight, displacement, attribution, and drop-off (the SROI Network, 2012). The first factor, deadweight, achieved 50% due to the contribution of waste bank officers in socializing BJS. It achieved such a percentage in the outcomes of the BPJS of the Waste Bank and BPJS death claim. Salin Swara only facilitated the collection and weighting of waste in BPJS of the Waste Bank and BPJS insurance claim. Therefore, the outcome value of this program in this activity was Rp. 3,024,000. The second factor, displacement gained 0% in all sub-programs outcomes or there was no single person who got disadvantaged in this program. The third factor, attribution was realized in the activity of the Gold Saving System. It was calculated by dividing the intervention fund from PT Pegadaian per person by IDR 80,000 with the investment fund from PT Badak NGL per person by IDR 44,250 plus interview funds from the pawnshop per person of IDR 80,000. Here, the result obtained was 64% because of an investment intervention from PT Pegadaian who facilitated the beneficiaries who became it's customers of it. The fourth factor, drop off showed no decline in participation of the beneficiaries indicated by its value of 0%.

SROI calculation of PT Badak NGL Salin Swara program resulted in 2.33. It explained that the social program outcomes gained 2.33 times greater than the investment

fund. It was noted that the outcome value was Rp.31,302,849, while the total investment was Rp.13,437,500. The investment made by PT

Badak NGL through the Salin Swara program has passed the investment break-even point.

Table 4. The Results of SROI Value and Payback Period Calculation

PT Badak SROI Calculation	
Outcome/Year	**Amount**
1. Improvement in clean beaches which are not potential to harm coral reef ecosystems on the high seas	Rp1,400,000
2. Ownership of gold savings from waste sorting activities	Rp5,878,800
3. Ownership of social security net from waste sorting activities	Rp3,024,000
4. Obtaining BPJS Ketenagakerjaan insurance claim (death insurance)	Rp21,000,000
Total Outcome	**Rp31,302,800**
Disc Factor	1
PV Total Outcome	**Rp31,302,800**
Salin Swara Program Investment	Rp13,437,500
Disc Factor	1
PV Total Investment	**Rp13,437,500**
SROI Value	**2,33**

Source: SROI research data processing, 2021

Sensitivity analysis was carried out to determine which factor had the greatest impact on the SROI calculation model. In this study, it was done to the outcome aspect without including the outcome of the insurance claim to know the amount of SROI if the insurance claim was not obtained.

In the sensitivity analysis, there applied an assumption of outcome increased by 50% for all programs. Based on table 5, the most sensitive activity was BPJS insurance claim by 33.54%. It indicated that the outcome from this aspect gained the greatest contribution from the total

value of outcomes, although the investment made in this aspect was not the greatest. The sensitivity scenario of BPJS claim without outcome showed the SROI value of 0.77 with the program has not yet received a payback. In other activities, the 50% increase scenario appeared after BPJS claims, followed by gold savings with a variance value (9.99%), and waste bank activities (4.83%). Meanwhile, the coastal repair was known to only have the smallest variation of change, namely 2.17% of the SROI value, although it had the highest investment value than other activities.

Table 5. The Results of SROI Values on Sensitivity Analysis of the Salin Swara Program

Skenario	Sensitivity	SROI Changes	Variance
Beach Reparation Outcome	50 %	2.39	2,17%
Gold Saving Outcome	50 %	2.55	9,99%
Waste Bank Outcome	50 %	2.44	4,83%
Insurance Claim BPJS Outcome	50 %	3.11	33,54%
Without Insurance Claim BPJS Outcome	-100%	0.77	-66,95%

Source: SROI research data processing, 2022

Regarding the results of this analysis, efforts need to be made for gold savings since it had the highest variation (when there is no outcome from the BPJS insurance claim). The more waste managed, the higher gold savings to obtain and the cleaner environment will be. However, if one member is only able to manage limited waste, it can be promoted by applying this gold saving scheme to other people.

CONCLUSION

This study gives a practical contribution by providing an overview for companies to evaluate their CSR programs through SROI method. It is because the results of this method can be used as a basis for program optimization. In this study, the SROI value of Salin Swara program in Tanjung Laut Indah Village and Kampung Selangan was 2.33. It is the accumulated benefits felt by the community within 2021. This value means that the value of program has surpassed its total investment, so there is no need to analyze the value projection since SROI has exceeded the payback figure.

Even though the SROI value has surpassed the payback, the Salin Swara program needs to do some improvements, namely: 1) performing a monitoring activity and periodic evaluation in World Ocean Day to make the program sustained. In addition, publication needs to be expanded to increase people attention and interests to participate. In this way, people will keep participating and improving sustainable marine ecosystem. 2) Expanding the community network of waste bank beneficiaries. There needs some efforts to optimize services to the community in waste collection, particularly in the waste collection agenda. Additional human resources can be done to create more optimum services to the community. When the services become more optimal, the community will be more encouraged to join this activity. 3) facilitating training and assisting eco enzyme production (compost and simple composter) to the stage of marketing their products to the public. A project feasibility study on the beneficiaries needs to be conducted with hope that there will be economic motivation in production activities. 4) strengthening relation among stakeholders wand all beneficiaries to increase participation in innovation.

REFERENCES

Acharya, Nikhil S. 2010. *Social Returns on Investment (SROI): A proposed modified method for Nonprofit Organizations (NPO's).* University of Minnesota.

Arvidson, Malin. 2014. The Social Return on Investmentin Community Be Friending. *Jurnal Public Sector Management.*

Bappeda Kaltim. *2016. [RPJMD Kota Bontang 2016-2021].* Tersedia di https://e-arsip.bontangkota. go.id/images/RENSTRA_Bapelitbang_Kota_ Bontang_2016_-_2021.pdf

Bungin, B. (2020). *Post-Qualitative Social Research Methods.* Kencana Prenadamedia.

Cahya, B. T. (2014*). [Transformasi Konsep Corporate Social Responsibility (CSR)*]. Iqtishadia. Vol. 7 No. 2. September 2014. Hlm. 203-222.

Donnie Cahya Gumilang Silalahi, Haryo Santoso, H. S. (2017). [*Analisis Sosial Return on Invesment Pada Kewirausahaan Sosial Studi Kasus di Upreneur AIESEC UNDIP].*

ElAlfy, A., & Weber, O. (2019). Corporate Sustainability Reporting the Case of the Banking Industry. 211, 32.

ISO 26000 and the SDGs (2018). *International Organization for Standardization 2018. Available at* https://www.iso.org/files/live/sites /isoor g/files/store/en/PUB100401.pdf Download ed: 2018.12.5.

Jalal & Kurniawan, F. (2013). [*Investasi Sosial: Perspektif CSR Strategis untuk Pengembangan Masyarakat oleh Perusahaan].* Social Investment Indonesia: The Indonesian Social Investment Forum.

Khairunnisa, K., Pribadi, A. B., & Prabowo, F. S. A. (2019). Analysis of Social Return On Investment (SROI) To Measure The Social, Environment, And Economics Impact On The National Fattening Sheep Program (Studi At Pesantren Al-Ittifaq). *Jurnal Ilmu Sosial Politik Dan Humaniora*, *2*(2), 33–42. https://doi.org/10.36624/jisora.v2i2.44.

Kiroyan, Noke, 2006. [*Good Corporate Governance (GCG) dan Corporate Social Responsibility (CSR) Adakah Kaitan di Antara Keduanya?"],* Economics Business Accounting Review, Edisi III, SeptemberDesember 2006, Hal. 45-58.

Krlev, et al. 2013. Social Return on Investment (SROI): State-of-the-Art and Perspectives. Available at https://archiv.ub.uni-heidelberg.de/volltext server/18758/1/CSI _SROI_Meta_Analysis_2013.pdf.

Lawlor, E., Neitzert, E., & Nicholls, J. 2008. Measuring Value: A Guide to Social Return on Investment (SROI). *The New Economics Foundation, Second edition*, 56. https://commdev.org/wp content/uploads/

2015/06/Measuring-Value-A-Guide-to-Social-Return-on-Investment.pdf.

Lu, J., Liang, M., Zhang, C., Rong, D., Guan, H., Mazeikaite, K., & Streimikis, J. 2021. Assessment of corporate social responsibility by addressing sustainable development goals. Corporate Social Responsibility and Environmental Management, 28(2), pp. 686–703. doi: https://doi.org/10.1002/csr.2081

Meilanny Budiarti Santoso, Rivani Adinegara, Slamet Usman Ismanto, Idim Mumajad, H. M. (2018). Assessment of the Impact of Csr Implementation Social Investment. *Jurnal Pemikiran Dan Penelitian Administrasi Bisnis Dan Kewirausahaan*, *3*(2), 153–167.

Moody, Michael et all. 2015. Measuring Social Return on Investment: Lessons from Organizational Implementation of Sroi in The Netherlands and The United States. *Jurnal Nonprofit Management & LeadershipVol: 26 No. 1*.

New Economics Foundation (NEF) (2009), A Better Return: Setting the Foundations for Intelligent Commissioning to Achieve VFM, New Economics Foundation (NEF), London.

New Economics Foundation (2009). *A guide to Social Return on Investment*. Available at https://neweconomics.org/uploads/files/aff3 779953c5b88d53_cpm6v3v71.pdf

Nicholls J., Lawlor E., Neitzer E., Goodspeed T. 2012. A guide to social return on investment. London: Cabinet Office.

Nicholls, J., Lawlor, E., Neitzer, E., & Goodspeed, T. (2009). A guide to Social Return on Investment. *Development*, *3*(January), 55. https://doi.org/10.1108/17508610780000720

Panuluh, S., & Fitri, M. R. (2016). [*Perkembangan Pelaksanaan Sustainable Development Goals (SDGs) di Indonesia*]. Biefing Paper 02, infid (Sustainable Development Goals (SDGs)), 1–25. Retrieved from http://www.sdg2030 indonesia.org/an-component/media/upload book/Briefing_paper_No_1_SDGS_-2016-Meila_Sekar.pdf

Purwohedi, Unggul. 2016. [*Social Return on Investment (SROI): sebuah teknik untuk mengukur manfaat/dampak dari sebuah program atau proyek*]. Yogyakarta: Leutikaprio.

PT Badak NGL. 2021. [*Laporan Social Return on Investment PT Badak NGL Tahun 2021*]. Bontang: PT Badak NGL.

Rusdin. (2016). Corporate Social Responsibility (CSR) Disclosure and the Implications of Earning R.

Ryan, P.W. and Lyne, I. (2008), "Social enterprise and the measurement of social value: methodological issues with the calculation and application of the social return on investment", Education, Knowledge and Economy, Vol. 2 No. 3, pp. 223-237.

Sugiyono. (2007). [*Metode Penelitian Kuantitatif Kualitatif dan R&D*]. Alfabeta.

Sugiyono. (2017). [*Metode Penelitian Pendidikan (Pendekatan Kuantitatif, Kualitatif, dan R&D)*]. Alfabeta.

Soesilowati, E., Indriyanti, Dyah R., & Widiyanto. 2011. [*Model Corporate Social Responsibility Dalam Program Pemberdayaan Petani Holtikultura*]. Jurnal Ekonomi Pembangunan. Vol. 12, No.1. Hal. 102-117 esponse Coefficient (ERC). *Jurnal AdBispreneur. Vol. 1 No. 2 Agustus 2016. Hlm. 153-164.*

The SROI Network. (2012). *A Guide to Social Return on Investment*. UK Cabinet Office: Office of the Third Sector.

Undang-Undang Republik Indonesia. No. 18 Tahun 2008. [*Tentang Pengelolaan Sampah*]. Jakarta.

United Nations Global Compact (2013). Global Corporate Sustainability Report 2013 http://www.unglobalcompact.org/docs/abou t_the_gc/Global_Corporate_Sustainability_R eport2013.pdf Downloaded: 2014. 11.12.

Watson, K., & Whitley, T. (2017). Applying social return on investment (SROI) to the built environment. Building Research & Information, 46(8), 875-891.

Performance and Poverty Convergence in North Sumatra

Arif Rahman[1✉], **[2]Sukma Hayati Hakim**, **[3]Muhammad Syafii**

[1,2,3]Faculty of Economic and Business, Universitas Sumatera Utara

Article Information	Abstract
	North Sumatra is one of the growth centers in Indonesia. However, its number of poverty is one of the highest nationally. This study aimed to see the performance and prove whether there is a convergence of poverty in North Sumatra Province during the years 2011-2021. The analytical method used included quantitative descriptive analysis. Through the Klassen quadrant which was divided into two periods, it can be seen that some regions have moved quadrants and some other regions have moved towards quadrant lines at different levels. The situation showed serious inequality in some areas that were in quadrant 4. The results of the Williamson index showed that the degree of inequality in poverty levels between regions tended to decrease, although there has been an increase in several years of observation. Through the sigma convergence test, it was strongly indicated that there was a dispersion of poverty levels between regions towards one common ground. It has been further confirmed by the absolute beta convergence test. Real income per capita and RLS that included in the conditional convergence model have proven to accelerate the process of poverty convergence between regions in North Sumatra.

⬚ Corresponding author :
  Address: Jl. Komisi D No.17 Medan Timur Sumatera Utara
  E-mail: arifrahman@usu.ac.id

INTRODUCTION

Ending poverty is one of the seventeen goals in Sustainable Development Goals or SDGs. In line with an idea stated in the Outcome Document Transforming Our World: The 2030 Agenda ror Sustainable Development, the very first goal of SDGs is to end poverty in all its forms everywhere. This goal must be the theme for development, the main agendum, and sustainability that underlies various other development goals, such as infrastructure, tourism, food, energy, and others (Bappensa, 2022). The expected economic growth continuity for poverty alleviation seems to face some constraints. It was found that different intensity and speed of development among regencies somehow increase poverty disparities and possibly open up dispersion opportunities.

In this study, the concept of diminishing returns on capital and workforce by neo-classical economists was adopted into a poverty format. It was inspired by Solow's growth model (1956) which predicts that poor countries will grow faster than rich countries. With the same technological access, countries who have low income with low capital are possible to have higher marginal products, and this greater capital accumulation, those poor countries can grow quickly. Unfortunately, some previous studies have different conclusions. R. J. Barro, (1991), Pritchett (1997), Rodrik (2013), and recent literature, Johnson & Papageorgiou (2020) found that over a long period of time, on average, poor countries do not grow faster than rich countries indicated by the results of comparison between the initial and the following condition of Gross Domestic Product (GDP) per capita which showed no significant changes. On the other hand, Patel, et al. (2021) rebut it in his study that since the mid-1990s poor countries have been able to grow faster than poor countries, but not as fast as middle-income countries.

Adams (2003) found that growth is a significant medium to alleviate poverty in developing countries. Economic growth reduces poverty because any growth contributes to small impact on income inequality. When economic

growth is measured using average consumption, there will find a strong relationship between growth and poverty alleviation. A similar thing happens when the growth is measured using GDP per capita, although it is not significantly strong. Crespo Cuaresma, et al. (2022) have proved that by combining poverty reduction growth elasticity derived from Bourguignon (2004) and proportional poverty convergence framework from Ravallion (2012) the poverty reduction proportion for a particular economic growth is smaller in some poor countries. That is why poor countries can progress faster due to the convergence effect of average income, but smaller poverty alleviation than the level of income.

Poverty alleviation is a major indicator in measuring development performance. continuous and progressive economic growth is expected to reduce poverty rate. It is because the rise of growth poles and polarization will influence two states, namely backwash effect and spread effect. The attraction of those two effects on surrounding environment leads to two conditions, namely convergence and divergence.

We were interested in investigating the performance and poverty convergence rate in North Sumatera as a region which contributes the largest Gross Regional Domestic Product (GRDP) in Sumatera Island until 2021, namely 23.37 percent and ranked 5 in the national economy scale. It shows that North Sumatera is a center for economic growth in Indonesia. However, the population in this province is quite large, namely 1,343,860 or ranked 3 after West Java, East Java, and Central Java with the poverty rate of 9.01 percent. All these number and percentage increased compared to 2020, along with other provinces.

There found some cities whose poverty was extreme, including Gunung Sitoli City, North Nias, West Nias, Nias, and South Nias. All these five cities belong to Nias Islands. The following figure 1 divides poverty conditions in two categories, namely high and low. Regions were grouped by calculating the average poverty rate during 2011-2021 in each regency and city. The red dividing line is the average poverty rate

between regions during the year of observation. The average result was obtained from the average sum of each regency and city divided by the total cross section, which was 12.13 percent. Regions that are above this figure are categorized as areas with high poverty, while areas that are below the average number are classified as areas with low poverty. The details can be seen in the following image:
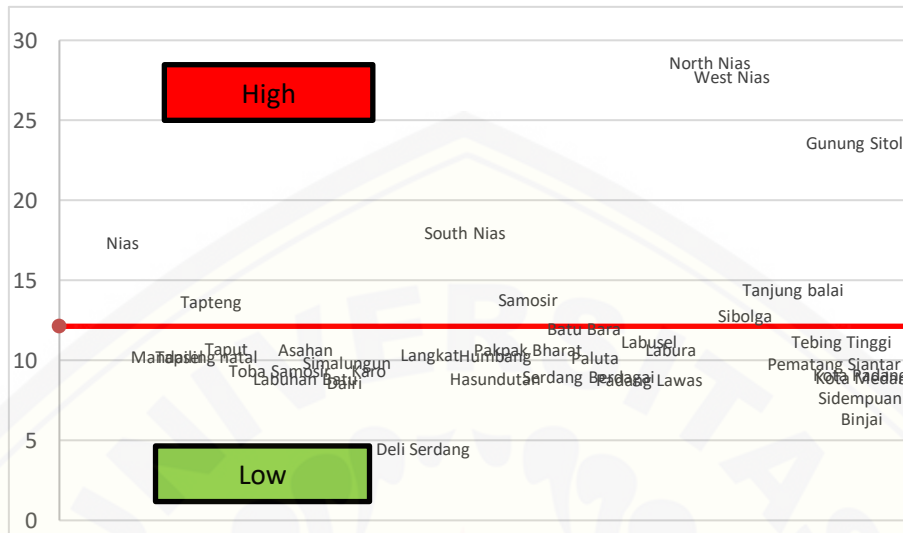
Figure 1. Poverty Clusters among Regencies/ Cities in North Sumatera in 2011-2021
Source: Statistics Indonesia (processed)

There were 10 regencies with high poverty rate, consisting of all regions in Nias Islands, Central Tapanuli, Samosir, Tanjung Balai, Sibolga, and Batu Bara. It can be seen from the distribution of dots which are close to the middle line. Based on a convergence concept, if there is a dispersion leading to a meeting point, all regions will move to dividing line.

Didia (2018) in her study analyzed factors influencing development inequality in Kedunsepur regency to find any convergence in it. She finally found investment and participation rate of workforce have no significant impact on inequality, while Human Development Index (HDI) and number of populations do. Also, it is known that convergence has happened in Kedungsepur region. In addition, Setiawan, et al (2020) analyzed farmer exchange rate, manufacturer sector growth, agricultural sector growth, schooling period length, informal workers percentage on poverty rate, the effect of industrial sector ratio on agriculture, and education ratio on income inequality, and the relationship between the poverty and income inequality rates in Java, Bali, and Lampung.

They used pooled data and correlation analyses. In findings, it is stated that the industrial sector effect is greater than agricultural in reducing poverty, namely -0.47 percent: -0.40 percent. Farmer Exchange Rate (FER) and informal education ratio have no significant effect on poverty, informal education has a positive relationship with poverty, manufacturer sector productivity ratio and agricultural sector have significant contribution in reducing inequality, and elementary education ratio has no significance to inequality.

Zulham, et al. (2019) studied economic growth convergence in east coast of North Sumatera. They concluded that the inequality in that area during 2003-2015 experienced increase and decrease. The independent variable (working people, number of poor people, and schooling length average) greatly influence the speed of economic growth convergence in the east coast of North Sumatera.

The previous study findings regarding east coast of North Sumatera economic convergence motivated the researchers to deeply investigate another aspect, namely the

divergence. According to the findings of Crespo Cuaresma, et al's study (2022) the convergence effect of average income can cause poor regions to experience rapid growth, but smaller poverty reduction. Moreover, the poverty reduction proportion among regions in North Sumatera can lead to a meeting point, or vice versa depending on the speed of poverty reduction offset by a slowdown in developed regions.

This study used some instruments to detect poverty rate. First, convergence analysis model was used to determine the development of poverty dispersions among regencies and cities in North Sumatera province. Conceptually, when economic growth and per capita income get slowdown, other regions will have great chances to catch up. Second, the hypothesis build in this study was if this situation takes place, then ideally it can also reduce the poverty gap between regions in North Sumatra. Third, real per capita income was an instrument acted as a proxy for population productivity and welfare and the average length of schooling (RLS) as a reflection of the education dimension to see the magnitude of its influence on changes in the speed of convergence/divergence and its partial effect on poverty levels. It was strongly suspected that real per capita income and RLS were negatively related to poverty. Thus, the present study attempted to analyze the performance and poverty rate convergence among regencies and cities in North Sumatera within 2011-2021.

RESEARCH METHODS

This study strived for examining the performance and the convergence or divergence of poverty rate in 33 regencies and cities in North Sumatera within 2011-2021 using the data from Statistics Indonesia of North Sumatera Province, covering poverty rate, number of poor people, GRDP based on constant price (ADHK) and schooling length average. The real per capita income was adjusted based on the number of people from the 2010 and 2020 censuses processed by calculating geometric projections from 2010 to 2021. The population projection results became the divisors of ADHK GRDP

published by Statistics Indonesia. Then, all convergence data were converted into natural logarithm form.

In terms of analytical mode, this study used descriptive and quantitative analyses. To see the performance of poverty and real per capita income, Klassen typology was used. It divides performance between regions into 4 quadrants, where the average value of the poverty level and real income per capita between regions forms the quadrant line. Another measuring tool was the Williamson index to see the degree of inequality in poverty between regions. If the index value is close to 0, then it is more evenly distributed, but if the value is away from 0 then it is more unequal. The Williamson index formulae is as follows:

$$IW = \frac{\sqrt{\sum((Yi-Y)^2 fi/n}}{Y} \quad ....(1)$$

Where, IW is the Williamson index, Yi is the poverty level of area i, Y is the average poverty rate, fi is the number of poor people in area i, and n is the total number of poor people.

Convergence occurs when the economic condition in poor regions grow faster than that of rich regions, so poor countries tend to catch up with rich countries in terms of the level of income or product per capita. The second concept is related to cross sectional dispersions. Here, convergence will occur when the estimated dispersions, for example by the logarithmic standard deviation of per capita income or production in a group of regions, decreases over time. The first convergence tends to produce a second type of convergence, but this process is offset by new disturbances which tend to increase the dispersion. The model builds on the assumption that the random perturbation of changes in production and the rate of technological progress is the same for all economies (Barro, R. J., 2004).

The analytical instrument to examine any convergence was sigma convergence analysis and beta convergence analysis. The first beta convergence analysis examined absolute terms. It used the following equation:

$$\ln Y_{it} = (1 + \beta) \ln Y_{it-1} \quad ....(2)$$

Where, Y_{it} is the level of poverty in a particular year and Y_{it-1} is the previous year poverty. When the condition is $-1 < \beta < 0$, it can be concluded that there is a convergence of economic growth in the regions and periods. Oppositely, an absolute convergence will not happen if the value is $\beta < -1$ or $\beta > 0$. Then the β is close to -1, the speed of a convergence is high, but then the value of β is near 0, the speed is slow. Moreover, to see the length of time needed to eliminate half of the inequality, the following formula was used:

$$t = \frac{-\ln(0,5)}{\beta} \text{ or } t = \frac{\ln(2)}{\beta} \dots\dots\dots\dots\dots\dots (3)$$

The next analysis was to include panel data regression model on the conditional convergence analysis using the following equation:

$$\ln Pov_{it} = (1 + \beta)\, lnPov_{it-1} - \beta_2 PDRB\ riil\ perkapita_{it} - \beta_2 RLS_{it} + \mu_{it} \dots\dots\dots\dots\dots\dots\dots (4)$$

Here, Povit means the level of poverty in the current year's regencies and cities, and Povit-1 is the level of previous year's poverty. The poverty level covers people whose per capita expenditure was below poverty line. $PDRB\ riil\ perkapita_{it}$ is the current year's regencies and cities per capita real income obtained from dividing ADHK GRDP of each cross section by the total population. The number of residents each year of observation was calculated based on geometric projections from population census data in 2010 and 2020. RLS_{it} is the average length of schooling in the city and regencies for the current year, namely the number of years taken by residents aged 25 years and over in undergoing formal education. Finally, μ_{it} is disturbance variable (unobserved effect). Then, chow test was performed to determine the best model among common effect and fixed effect. When the fixed effect model was chosen, the next step is performing a hausman test to choose the best model among fixed effect and random effect. When the result is random effect, another step is a LM test to select between common effect and random effect models.

RESULTS AND DISCUSSION

Poverty was initially observed with mapping Klassen quadrant. This instrument is beneficial to see possibilities of convergence to emerge and the performance of each region grouped into 4 quadrants. Two indicators examined in this quadrant were poverty level and real income of per capita of each regency and city. Here, the researchers divided two periods of time to notice the performance progress of each region towards those two indicators. The first period to observe ranged from 2011-2015.

In 2011-2015 period, 10 regions categorized in quadrant 1 were Medan City, Batu Bara Regency, Labuhanbatu, South Labuhanbatu, North Labuhanbatu, Karo, Pematang Siantar, Deli Serdang, Asahan, and South Tapanuli. This quadrant illustrates the below average poverty along with the above average real income of per capita. Those in this quadrant are said to be developed regions. In addition, quadrant 2 reflects regions which are potential and developing with somewhat high poverty and income levels. Regions belonged to this quadrant were Sibolga City and Tanjung Balai City.

Quadrant 3 covers regions which are depressed with low poverty and real income of per capita levels. There were 14 regencies or cities in this quadrant, including Padangsidimpuan City, Binjai, Tebing Tinggi, North Padang Lawas Regency, Padang Lawas, Serdang Bedagai, Simalungun, Langkat, Dairi, Humbang Hasundutan, Toba Samosir, Mandailing Natal, North Tapanuli, and Pakpak Bharat. Following quadrant 3, quadrant 4 includes lagging regions with high poverty level and low real income of per capita. Those who belonged to this quadrant were Gunung Sitoli City, West Nias Regency, North Nias, South Nias, Nias, Samosir, and Central Tapanuli.

Figure 2. The Klassen Typology on the Poverty and Real Income Per Capita of Regencies and Cities in North Sumatera Province in 2011-2015
Source: Statistics Indonesia (processed).

According to the division of the second period of quadrant, some regions shifted from one quadrant to another. Batu Bara Regency shifted from quadrant 1 to quadrant 2, while Pakpak Bharat Regency shifted from quadrant 3 to quadrant 4. Sibolga City seemed to move away from the central point of quadrant 2 which was initially had crossover on the vertical line. There also found two regions shifted from quadrant 3 to quadrant 1, namely North Padang Lawas Regency and Padang Lawas Regency. Additionally, Gunung Sitoli City moved to the left from its initial line to quadrant 2 area. In this second observation, there were 11 regions in quadrant 1, covering Medan City, Pematang Siantar, South Labuhanbatu Regency, Labuhanbatu, North Labuhanbatu, Deli Serdang, Karo, Asahan, South Tapanuli, North Padang Lawas, and Padang Lawas Regency. The exclusion of Batu Bara Regency from quadrant 1 along with the inclusion of North Padang Lawas Regency and Padang Lawas made the number of regencies and cities in this quadrant increase to 11 regions.

Quadrant 2 gained three new regions, namely Batu Bara Regency, Sibolga City, and Tanjung Balai. Then, in this period quadrant three had eleven regions, namely Padangsidimpun City, Binjai, Tebing Tinggi,

Serdang Bedagai Regency, Langkat, Simalungun, Toba Samosir, Dairi, Humbang Hasundutan, Mandailing Natal, and North Tapanuli. Conversely, quadrant 4 got a new member, namely Pakpak Bharat Regency and other previously mentioned regions. Overall, the Klassen typology has not yet been able to portray changes of regions to be in a common ground. However, shifts among periods indicated positive development in almost all regions. These results are in line with a study by Rusdi, et al (2019) which concludes that Provinces in Sumatera Island belongs to provinces who are in quadrant 2 or regions which have high growth, but low income during 2012-2016. Another previous study by Sari (2020) divided North Sumatera regions into three zones, namely east coast, west coast, and Lake Toba. It is known that most of regions in Lake Toba are lagging, while those in east coast are relatively more developing than that of west coast of North Sumatera.

Regarding these findings, the main focus on reducing development performance gap is to pay special attention to all regions in quadrant 4 to shift to quadrant 2 or 3 for then having abilities to proceed to quadrant 1. In details, the second period Klassen typology observation can be seen as follows:
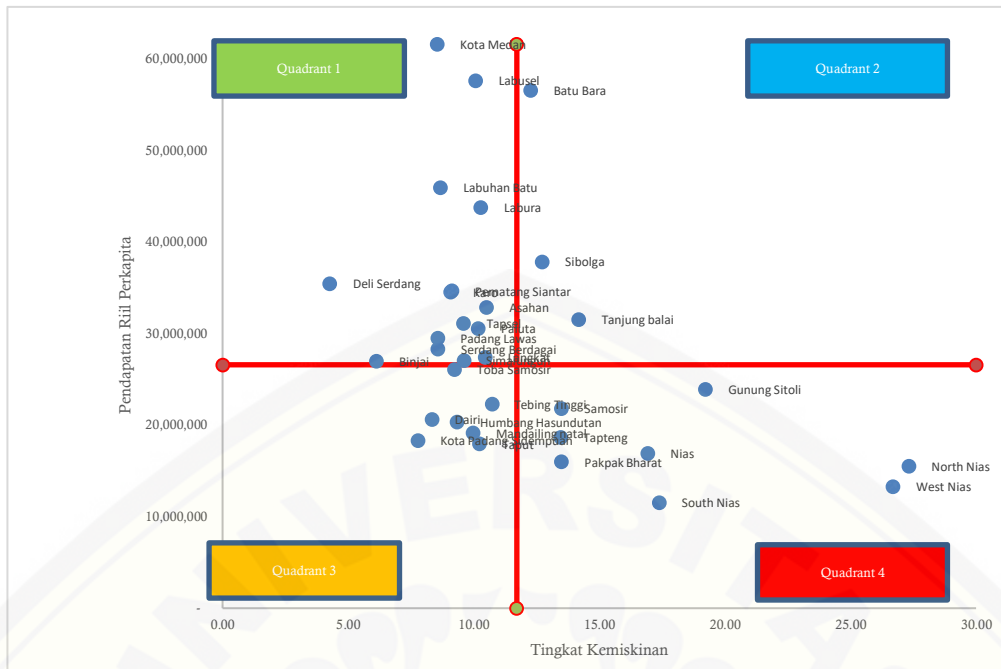
Figure 3. The Klassen Typology on the Poverty and Real Income Per Capita of Regencies and Cities in North Sumatera Province in 2016-2020
Source: Statistics Indonesia (processed)

Besides using Klassen typology, the inequality among regencies and cities was determined using Williamson index. This index is good at detecting the existence of convergence. In the following figure, the index line tends to fluctuate, in which within 2011-2013 the line tended to rise, while in the next year until 2017 it experienced a stable downward trend, and from 2018 to 2020 it more fluctuated. The index line tends to rise and fall, but is more dominated by the decrease in index numbers or leads to the reduction of poverty. It became a gateway to explore deeper and re-confirm the convergence that occurred through sigma and beta convergence analysis. A study conducted by (Rusdi et al., 2018) calculated the Williamson index in terms of per capita income. The results show that the disparity of per capita income between regions in North Sumatra is in the low category, although from 2012 to 2016 the numbers tended to increase.
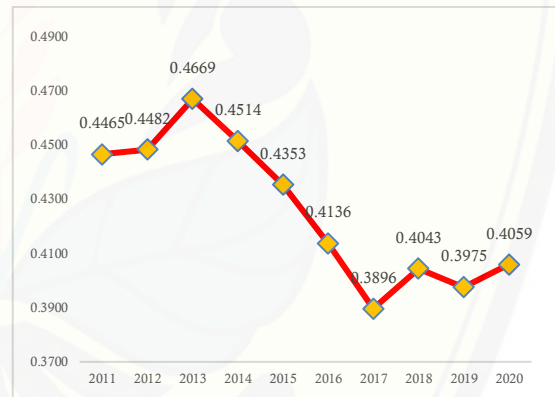
Figure 4. The Williamson Poverty Index between Regencies/Cities in North Sumatra Province.
Source: Statistics Indonesia (processed)

The next step to make sure any convergence or divergence of the poverty development among regions was to see the sigma convergence value. In this test, the observation was focused on the shift of standard deviation of poverty level (natural logarithm data) among regions since 2011 until 2021. The following figure 4 shows the line movement that tends to decrease. In the beginning, the deviation seemed increase from 0.3849 in 2011 to 0.3979 in 2013.

Then the following year the deviation rate fell steadily from 0.3979 to 0.3648 in 2017. However, the deviation rate increased again in 2018 amounted to 0.3752 and again decreased until 2021 by 0.3690. These results provided a strong indication of the dispersion of poverty levels between regions in North Sumatra Province towards a convergence point (convergence).
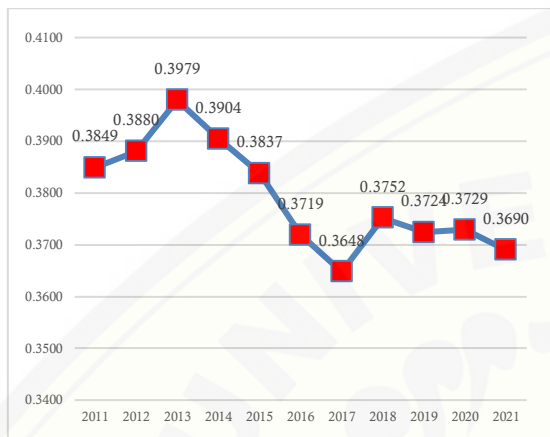
Figure 5. The Standard Deviation of Poverty Levels in North Sumatra Province 2011-2021.
Source: Statistics Indonesia (processed)

This current study also attempted to review the movement of the of real income of per capita standard deviation, given this variable became a predictor variable discussed in this study. Information regarding the dispersion of real income of per capita surely can strengthen the reliability of conditional beta convergence test. Based on the data analysis, there found a line which tended to rise higher, indicating the direction of real income per capita of North Sumatra was divergence. The real incomde per capita disparity arouse among the regions emerged doubts about the level of influence of this variable on poverty convergence in North Sumatra. The absolute number of this indicator which continues to increase every year but is not supported by the intensity of its distribution in each region illustrates the existence of a productivity gap between residents of each region. This situation portrayed the ability to reduce poverty in each regency or city.
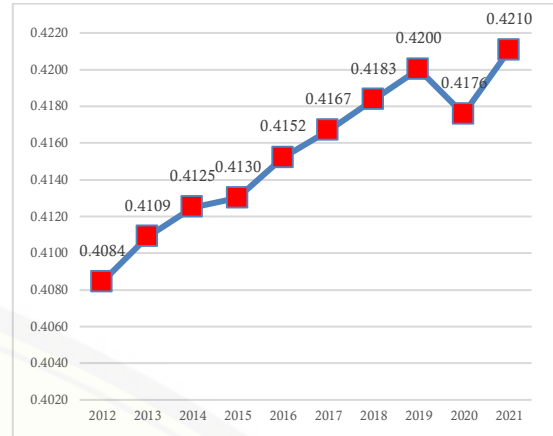
Figure 6. The Standard Deviation of Real Income Per Capita Regency/City of North Sumatra Province in 2012-2021.
Source: Statistics Indonesia (processed)

Furthermore, absolute beta convergence was performed to ensure whether there was poverty convergence between regencies and cities as illustrated by the coefficient values. Values arising from this test can be utilized to indicate the speed of current convergence after going through panel data regression tests to determine the best model.

Table 1. Absolute Beta Chow Test

Effect Test	Statistic	d.f	Prob
Cross-section F	2.064129	(32,39)	0.0009
Cross-section Chi-square	66.414461	32	0.0003

Source: Data Processed, 2022

The above results showed that the probability value of chi-square cross-section was 0.0003 or below 5 percent alpha. In other words, the best model in this test was fixed effect model. After that, this model was compared to random effect model using hausman test.

Table 2. Absolute Beta Hausman Test

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	45.864889	1	0.0000

Source: Data Processed, 2022

Hausman test was used to determine the best model among fixed effect and random effect. Since the results showed the probability of a random cross section gained 0.0000 or below 5

percent alpha, this meant that the best model to estimate was the fixed effect model. The estimation results from the fixed effect model can be seen in table 3 below:

Table 3. The Estimation Results of Absolute Beta Fixed Effect Model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.456078	0.066587	6.849403	0.0000
LN_POV_1	0.804137	0.027276	29.48113	0.0000

Source: Data Processed, 2022

The estimation results of fixed effect model indicated that the predictor variable, namely lag 1, the poverty level, had a significant effect on the poverty level in the current year with the probability value of 0.0000. Moreover, the above results show the value $(1+\beta)$ was 0.8041. To determine the condition of convergence, it is necessary to have a value of below zero and above -1. The value of which is between 0 and 1 illustrates the convergence of poverty levels between districts and cities in North Sumatra Province. The value $(1+\beta)$ was 0.8041, indicating that the value of β was -0.1959. This value of meant that absolute convergence had a convergence speed of 19.59 percent.

Furthermore, to calculate the half life, the researcher used the formula $t = \frac{LN(2)}{0,1959}$, and gained the result of 3.5382, meaning that to cover the half of the total inequality there needs about 3.5 years, while the whole needs 7 years. After processing data to answer absolute convergence, the next step was to observe the amount of coefficient value changes produced and any influence from other variables by adding possible variables to influence poverty level. The variables were real GRDP per capita as a proxy for the level of productivity and people welfare and schooling average length (RLS) as a proxy for education dimension. Then, to choose the best model, the initial step was to perform chow test as follows:

Table 4. Chow Test of Conditional Beta Convergence

Effects Test	Statistic	d.f.	Prob.
Cross-section F	2.048102	(32,327)	0.0010
Cross-section Chi-square	66.311522	32	0.0003

Source: Data Processed, 2022

Regarding the above table, the probability value of F cross-section was below 5 percent alpha. It mean that the best model was fixed effect.

Table 5. Hausman Test of Conditional Beta Convergence

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	46.445632	3	0.0000

Source: Data Processed, 2022

Hausman test showed that the random cross-section probability value was 0.0000. Since it was below 5 percent alpha, it meant that fixed effect became the best model. Prior to estimation, the real data were converted into two forms, namely logarithm and natural logarithm. Natural logarithm tends to gain smaller standard error, and this logarithm is the format for deciding the result. Then, the results of fixed effect model estimation to see conditional beta convergence are presented in the following table 6:

Table 6. Estimation Results of Conditional Beta Convergence based on Fixed Effect Model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.964801	0.242930	3.971511	0.0001
LN_POV_1	0.747187	0.036783	20.31352	0.0000
LN_REAL_GDP_PERCAP	-0.001564	0.008930	-0.175141	0.8611
LN_RLS	-0.160780	0.072092	-2.230199	0.0264
R-squared	0.983926			
F-statistic	571.8900	Prob(F-statistic)		0.000000

Source: Data Processed, 2022

Based on the above fixed effect model estimation, there found changes in the coefficient value of poverty level from 0.8041 to 0.7471. In addition, by having β value of 0.2529, the convergence process speed among regions in North Sumatera after including real GRDP per

capita and RLS as predictor variables was 25.29 percent. A conditional convergence model obtained faster convergence speed effect, or the inclusion of RLS and real GRDP per capita boosted the ongoing process of convergence. Another datum is the model obtained F-statistics value smaller than 5 percent alpha which meant that the independent variable simultaneously had a significant effect on the level of poverty. With R-squared of 0.9839, the variation of poverty level was able to be explained by predictor variables by 98.39 percent.

Regarding the analysis, the probability value of RLS was 0.0264 or below 5 percent, indicating that this variable had a significant effect on the level of poverty in North Sumatera Province with low error rate. Moreover, its coefficient was -0.160780, so if the RLS increases by 1 percent, it will reduce the poverty rate in North Sumatra by 0.16 percent. Having RLS affected poverty level strengthens the existing theory that education is dominant at driving development. Education ease of access until university, especially for the poor will expand the influence of this indicator to reduce the existing poverty rate. It is in line with a study by Hadi (2019) that there is a strong and negative relationship between RLS and poverty level. In his study, RLS has its impact on the poverty in East Java province regencies or cities.

Unfortunately, the variable of real GRDP per capita had not significant effect on the poverty level. It was known from the high probability value of 0.8611 or above the tolerance level of t test. This condition was reinforced by the results of sigma convergence on real income per capita which showed divergence condition. It might happen due to the population productivity disparities in North Sumatera. Here, the absence of good connectivity between poor and development activities somehow created a productivity gap between the poor and the rich widened. Further, productivity gap will affect the income gap in society, so there is a need for an in-depth monitoring and evaluation on the programs that have previously been implemented to alleviate poverty in North Sumatera. Also, breakthroughs must be done to involve the poor

people in available development activities. This results are different from that of Elria (20160) who concludes that GRDP per capita has a negative and significant effect on the poverty in West Kalimantan Province. This difference possibly happens because of the different reference of GRDP use of the current prices and constant prices between North Sumatera and West Kalimantan. Lacks of similar studies using the exactly the same indicators to describe this phenomenon caused the findings have limited comparisons.

CONCLUSON

Based on the mapping of poverty and real income per capita performance through Klassen typology in two periods of observation, it can be concluded that some regions shift to different quadrant, while some others move towards different levels of quadrant lines. Baru Bara Regency shifts from quadrant 1 to quadrant 2 and Pakpak Bharat Regency shifts from quadrant 4 from quadrant 3. Moreover, Sibolga City moves away from the middle point of quadrant 2 which was previously had crossover in a vertical line. However, there are also two regions experienced significant shifts from quadrant 3 to 1, including North Padang Lawas Regency and Padang Lawas Regency. The rest is Gunung Sitoli City which moves towards quadrant 2 area. These findings have proved a serious inequality in some regions in quadrant 4.

In terms of Williamson index, the inequality degree of poverty among regions in North Sumatera Province tends to decrease, although there has been an increase in some years. In 2011-2013, the index line direction increases, however in the next year until 2017 it experienced steady downward trend, and since 2018 until 2022 it fluctuates more often.

Based on the results of sigma convergence test, there obtained a strong suspicion of poverty level dispersion among regions in North Sumatera Province leading to a common ground. It was even reinforced by the results of absolute beta convergence test which concludes that there is a poverty convergence

among regions. Apart from that, the addition of indicators of real income per capita and RLS to the convergence model are proved to boost the process of poverty convergence among the regions. In the partial test, the average length of schooling (RLS) has a significant effect on the poverty level, while real income per capita has no significant effect on the poverty level in North Sumatra.

REFERENCES

Adams, R. H. (2003). *Economic Growth, Inequality, and Poverty Findings from a New Data Set, The World Bank Poverty Reduction and Economic Management Network Poverty Reduction Group*. *February*. http://econ.worldbank.org.

Barro, R. J., and S.-M. (2004). Economic growth. In *Water Quality International* (Second Edi, Vol. 1997, Issues 9–10). The MIT Press. https://doi.org/10.4324/9781351242936-16

Barro, R. J. (1991). Economic growth in a cross section of countries. *Quarterly Journal of Economics*, *106*(2), 407–443. https://doi.org/10.2307/2937943

Bourguignon. (2004). *The Poverty-Growth-Inequality Triangle*.

Crespo Cuaresma, J., Klasen, S., & Wacker, K. M. (2022). When Do We See Poverty Convergence?*. *Oxford Bulletin of Economics and Statistics*, 1–19. https://doi.org/10.1111/obes.12492

Didia, K. A. (2018). Analysis of Development Inequality in Kedungsepur Area. *Economics Development Analysis Journal*, *7*(2), 210–216. https://doi.org/10.15294/edaj.v7i2.21387

Elria, L. (2016). *[Analisis Pengaruh PDRB Perkapita, Pendidikan, dan Tingkat Pengangguran Terhadap Tingkat Kemiskinan Kabupaten/Kota di Provinsi Kalimantan Barat]*. *Jurnal Pembangunan Dan Pemerataan*, *5*(2).

Hadi, A. (2019). [*Pengaruh Rata-Rata Lama Sekolah Kabupaten/Kota Terhadap Prosentase Penduduk Miskin Kabupaten/Kota Di Provinsi Jawa Timur Tahun 2017]*. *Media Trend*, *14*(2), 148–153. https://doi.org/10.21107/mediatrend.v14i2.4504

Johnson, P., & Papageorgiou, C. (2020). What remains of cross-country convergence? *Journal of Economic Literature*, *58*(1), 129–175. https://doi.org/10.1257/JEL.20181207

Patel, D., Sandefur, J., & Subramanian, A. (2021). The new era of unconditional convergence. *Journal of Development Economics*, *152*. https://doi.org/10.1016/j.jdeveco.2021.102687

Pritchett, L. (1997). Pritchett. *American Economic Association*, *11*(3), 3–17.

Ravallion, M. (2012). Why Don ' t We See Poverty Convergence? *American Economic Review, Forthcoming*.

Rodrik, D. (2013). Unconditional convergence in manufacturing. *Quarterly Journal of Economics*, *128*(1), 165–204. https://doi.org/10.1093/qje/qjs047

Rusdi, M., Barika, Izharudin, & Rospida, L. (2018). [*Disparitas Pembangunan Ekonomi Antar Provinsi Di Pulau Sumatera Tahun 2012 -2016]*. *Jurnal Ekonomi Dan Kebijakan Publik*, *1*(2).

Sari, E. (2020). North Sumatra: Development of Regional Potential in Spatial and Non-Spatial Dichotomies. *Jornal of Architecture and Urbanism Reasearch*, *3*(2), 140–153.

Setiawan, A. H., Agunggunanto, E. Y., & Hayati, B. (2020). Analysis of Poverty and Inequality in Java, Bali, and Lampung. *Economics Development Analysis Journal*, *9*(1), 55–64. https://doi.org/10.15294/edaj.v9i1.37865

Solow, R. (1956). A Contribution to the Theory of Economic Growth. *Journal of Economics*, *70*(1), 65–94.

Zulham, T., Sirojuzilam, Bahri, S., & Saputra, J. (2019). Supply chain strategy for convergence of regional economic growth East Coast North Sumatera, Indonesia. *International Journal of Supply Chain Management*, *8*(5), 325–335.

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Does Fiscal Decentralization Affect Poverty? An Empirical Study

Ariyani Widyastuti[1][✉], [2]Agung Nusantara

[1,2]Master of Management, Faculty of Economics and Business, Universitas STIKUBANK

Article Information	Abstract
	The Poverty percentage in Central Java ranked two throughout Java Island after DI Yogyakarta Province. It surely causes gaps and inequality between regions in Central Java Province. This study attempted to analyze the effects of fiscal decentralization, fiscal balance fund, and economic growth on the poverty in 35 regencies/ cities in Central Java Province within 2016-2020. By using a quantitative approach, this study used a panel analysis with a Fixed Effect Model (FEM) method. Based on the results of panel data regression analysis results, fiscal decentralization and fiscal balance fund had no relationship with the poverty in Central Java. On the other hand, economic growth had positive and significant effects. High economic growth will reduce poverty rate when the economic activities carried out are padat karya which aims at absorbing workforce. High workforce absorption will reduce the poverty rate.

[✉] Corresponding author : Ariyani Widyastuti
Address: UNISBANK, Jl. Tri Lomba Juang No.1, Semarang 50241,
Jawa Tengah, Indonesia. Tel:+62-24-831-1668.
E-mail: ariyaniwidyastuti@mhs.unisbank.ac.id

INTRODUCTION

Poverty is a country developmental problem. According to Ragnar Nusrke (Prasetyoningrum, 2018) if poverty is not alleviated, a country will be trapped in a vicious circle of poverty. This circle describes poverty can happen because of low savings, low investment, lack of capital, low productivity, low income which affects low savings, and others (Prasetyoningrum, 2018). Another possibility of poverty is people inability to organize their lives appropriately. Here, development is actually made to achieve welfare and done by developing community economy as an effort to counter social issues such as poverty and unemployment.

The percentage of poor people in Indonesia in 2017 was the lowest, namely 7.49 percent. However, it kept increasing in the next year until 9.99 in 2020 (Statistics Indonesia, 2022). Central Java was a province with a fairly high poor people percentage or rank 2 after DI Yogyakarta. In 2017 to 2019, the percentage of poor in Central Java happened to decrease from 12.62% in 2017 to 10.80% in 2019, but increased critically to 11.41% in 2020 (Statistics Indonesia, 2022). The first year of COVID-19 pandemic greatly affected Central Java employment and unemployment by having an increase in the poverty percentage as much as 1.72 percent in 2020 with which previously was 1.5 percent in 2019 (Statistics Indonesia, 2022).

A possible effort to reduce poverty is by optimizing fiscal decentralization (Daforsa & Handra, 2019). The financial statistical data of Central Java regency/ city government indicate that the realization of fiscal balance fund receipt from 2016 to 2020 increased, although it inclined in 2019. Thoroughly, the receipts from 2016 to 2018 were 2.2 trillion rupiahs, 8.017 trillion rupiahs, 11.067 rupiah respectively, but in 2019 there was a downturn to 10.9 trillion in 2019 followed by an increase in 2020 by 11.7 trillion (Statistics Indonesia, 2022).

Similar situation existed in Central Java economy which showed a positive trend from 2016 to 2019, but significant downturn in 2020 due to COVID-19 pandemic. In details, the percentages in 2016 until 2019 were 5.25%, 5.26%, 5.3%, and 5.36% respectively, but in 2020 the amount decreased to -2.65% (Statistics Indonesia, 2022).

In its implementation, the fiscal decentralization in Central Java still met some problems proved by the increase in fiscal balance fund allocation every year. However, this increase was not in line with the poverty alleviation rate. By having regional autonomy supported by transfer fund from the government, economic growth and poverty reduction are expected to happen stably in each region. Fiscal decentralization holds an important role in regional autonomy because it is a medium provided by local governments to foster community welfare independently based on regional potential. However, there found some constraints regarding the management of regional net revenue, corruption, central government monitoring, and lack of community participation (Christia, 2019).

The fiscal decentralization initially designed to reduce poverty needs to be investigated further because the previous studies regarding this issue have resulted different findings. Some previous studies state fiscal balance fund has significant impact of poverty (Fitryanti & Handayani, 2020; Manek & Badrudin, 2017; Ningsih & Noviaty, 2019; Vitara Agatha & Uliansyah, 2021). A study by Maulana & Masbar (2018) shows that fiscal decentralization has a positive and significant effect on poverty. Different results were found by (Syamsul, 2020), namely fiscal decentralization has a negative and insignificant effect on the poverty level of the people in Indonesia.

Other studies explain fiscal balance fund contributes significant impact on poverty (Gumelar & Khairina, 2021; Manek & Badrudin, 2017; Paulus, Koleangan, & Engka, 2019). Oppositely, some other studies conclude fiscal balance fund has nothing to do with poverty (Vitara Agatha & Uliansyah, 2021). According to Agyemang-Duah et al. (2018), the relationship between fiscal decentralization and poverty reduction is still a matter of debate because study findings are more specific based on time and

country. Furthermore, Szarowska (2018) argues that fiscal decentralization which has a positive impact on a country within a certain period cannot be used as a benchmark that intergovernmental public financial transfers will also have a positive impact at the same time in other regions. Moreover, Martinez-Vazquez & Mcnab (2001) mention that there is no definite answer (uncertainty) to questions related to decentralization, so it can be concluded that further research is needed.

Previous studies have proved that economic growth and poverty have a significant relationship (Ardian, Yulmardi, & Bhakti, 2021; Rusdarti & Sebayang, 2013; Safuridar, 2017; Zahroh, Muniarty, & Julaiha, 2020). Unfortunately, other studies indicate that economic growth has no significant effect on poverty (Nurhidayah, Hendikawati, & Articles, 2018). Due to these debatable findings, the present study intended to fill the gap regarding the effects of fiscal decentralization, fiscal balance fund, and economic growth on poverty.

RESEARCH METHODS

This study used a quantitative approach by analyzing secondary data in form of panel data sourced from the combination of time series and cross-sectional data of 35 regencies/ cities in Central Java taken from Statistics Indonesia and the Directorate General of Fiscal Balance, Ministry of Finance of the Republic of Indonesia. Moreover, the population in this study was the realization report of regencies / cities in Central Java, economic growth, and poverty rate within the period of 2016-2020.

In analyzing the data, the researchers employed a panel data regression model (panel pooled data) which is the combination of time series and cross section. It aims at modeling independent variables and dependent variables in a certain time period (Gujarati, Porter, & Mardanugraha, 2013). The analytical model specifications in determining regression function model were based on the function model of Fiscal Decentralization Degree variable, Special Allocation Funds, General Allocation Funds,

Revenue Sharing Funds, Economic Growth. It was intended to determine whether those variables have a significant effect on Poverty. In details, the model equation was as follows:

$$Y_{it} = \beta_0 + \beta_1 DDF_{it} + \beta_2 DBH_{it} + \beta_3 DAU_{it} + \beta_4 DAK_{it} + \beta_5 GROWTH_{it} + \mu_{it} \ ...... (1)$$

Where, Y represents Poverty; DDF illustrates Degree of Fiscal Decentralization; DBH is Profit Sharing Fund; DAU is General Allocation Fund; DAK is Special Allocation Fund; and GROWTH is Economic Growth. β_0 is a constant (the amount of the dependent variable if the independent variable is considered constant), 1... 5 is the value of the variable coefficient, μ is the residual value (confounding factor) outside the model, i is the cross section, and t is the time series.

Model testing was performed to determine the best model to estimate the panel data regression. It tested Common Effect Model (CEM), Fixed Effect Model (FEM), and Random Effect Model (REM) using Chow test, Hausman test, and LM test. In terms of a classical assumption test in linear regression, OLS estimation method was included, covering normality, autocorrelation, multicollinearity, and heteroscedasticity test. Statistically, this analysis can be measured by a series of tests, consisting of a coefficient of determination (R^2) and a simultaneous significance test (F statistic test) (Kuncoro, 2011).

RESULTS AND DISCUSSION

During 2016-2020, there were 17 regencies/ cities in Central Java Province having worrisome poverty rate, namely Wonosobo Regency (18,484), Kebumen Regency (18,268), Brebes Regency (17,806), Purbalingga Regency (16,866) , Rembang Regency (16.57), Pemalang Regency (16.484), Banjarnegara Regency (16.106), Banyumas Regency (13.994), Sragen Regency (13.538), Klaten Regency (13.348), Demak Regency (12.89), Grobogan Regency (12,676), Purworejo Regency (12,524), Blora Regency (12,31), Cilacap Regency (12,304),

Magelang Regency (11,652), and Wonogiri Regency (11,576).

Figure 1. Poverty in Central Java Province in 2016-2021
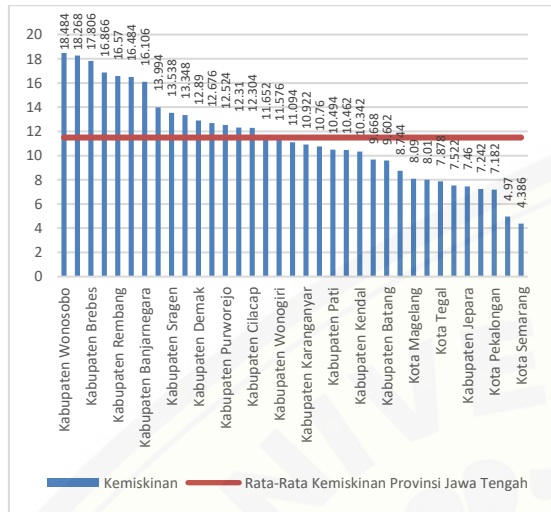
Source: Central Java Statistics Indonesia, 2022

Once the mapping has been done, the next step was to perform model selection test to determine the best model among CEM, FEM, and REM through Chow, Hausman, and LM tests. In Chow test, the F-statistical value (0.0000) was smaller than the p-value of 5 percent, so the best model in the Chow test was the FEM model. In the Hausman test, the F-statistic value was 0.0000 so that H0 was rejected and H1 was accepted. Therefore, the best model for Hausman test was the FEM model. Two tests that have been conducted have chosen FEM as the best model, so the most suitable regression model in this study was FEM (Fixed Effect Model).

Table 1. The Results of Selection of Regression Model

Test	F-Stat Value	Hypothesis and Result
Chow Test	0.0161	H0: CEM turned out to be the best model (p-value > 5%) H1: FEM turned out to be the best model (p-value < 5%) Result: H0 was rejected, FEM was chosen.

Test	F-Stat Value	Hypothesis and Result
Hausman Test	0.0000	H0: REM turned out to be the best model (p-value > 5%) H1: FEM turned out to be the best model (p-value < 5%) Result: H0 was rejected, FEM was chosen
Conclusion		Two tests chose FEM, so the best model was FEM

Source: Processed Data, 2022

A variable is said to be significant in the model if it has a t value less than 5 percent alpha. The model in this study explained the effects of DDF, DBH, DAU, and DAK, growth of Central Java Province on poverty in which poverty was the dependent variable, while some others were the independent ones.

Table 2. The Results of Data Estimation Using Fixed Effect Model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	11,811	4,981	2,371	0,019
DDF	0,052	0,061	0,848	0,398
DBH	0,005	0,004	1,270	0,206
DAU	0,378	0,558	0,678	0,499
DAK	-0,778	0,524	-1,483	0,141
GROWTH	0,064	0,030	2,117	0,036

Source: Processed Data, 2022

Based on the results of the regression, there obtained the following equation:

$$\text{Poverty} = 11.811 + 0.052 DDF + 0.004 DBH + 0.378 DAU - 0.777 DAK + 0.064 PDRB + \mu_{it}$$

The R squared test was performed to know the extent to which the independent variables affected the dependent variable. Since the model R-squared value was 0.929987, DDF, DBH, DAU, DAK, and growth had an effect of 92.9 percent on the poverty rate, while the remaining 8.1 percent was explained by other variables outside this model.

Table 3. The Results of R2 Test

R -Square Test	
R-squared	0.929987
Adjusted R-squared	0.909762

Source: Processed Data, 2022

A variable is said to be significant in the model if it has a probability value of t statistic less than 5 percent alpha. Due to the greater value obtained, the model in this study was considered able to explain the effect of DDF, DBH, DAU, DAK and growth on poverty in Central Java. Table 2 indicated that DDF, DBH, DAU and DAK had no effect on poverty in Central Java Province. This was proved by the values of t-statistic which was greater than 5 percent alpha, namely 0.3982; 0.2062; 0.4989; and 0.1405. Meanwhile, growth had a significant effect with a probability value of 0.0361 or less than 5 percent alpha. Here, it is understandable that good economic growth will lead to poverty reduction in Central Java Province.

In terms of panel data regression analysis, fiscal decentralization had no effect on the poverty in Central Java Province indicated by the t-value of 0.3982 and a coefficient value of 0.052089. It turned out so because high fiscal capacity is surely expected to reduce the poverty in a particular region. However, the fact was the opposite. The findings of this study are in line with a previous study that the fiscal decentralization degree will not have significant impact on poverty (Maryanti and Endrawati, 2010). Another study explains high fiscal decentralization means high income by the government to increase employment and reduce poverty (Jolianis, 2014; Dewi et al., 2018).

The fiscal balance fund had no effect on the poverty in Central Java indicated by t-values of 0.2062; 0.4989; and 0.1405 with a coefficient value of 0.004879; 0.378306; and − 0.777638. This happened because of the lack of effectiveness, less optimum, and inappropriate target of budget allocations in balancing funds (Anwar, Palar, & Sumual, 2016). Actually, the allocation of this fund was given to leading sectors to reduce poverty. Unfortunately, the present DAU allocation is more focused on regional routine expenditures, such as personnel expenditures, education, health and others. Meanwhile, DAK was more intended for physical expenditures that cannot reduce poverty quickly. Especially with the COVID-19 pandemic in 2020, there was a policy of changing the budget structure, where the priority of its use was more focused on handling the pandemic and its impact. The findings of this study are in accordance with a study by Vitara Agatha and Uliansyah (2021) which concludes that the balance fund has nothing to do with poverty. However, other studies describe different findings (Anwar, 2016, Jolianis, 2014). Supposedly, the increase in DAU, DAK, and DBH can support the government to reduce poverty because balance fund actually has a significant role in regional development, especially those with high dependence of this fund (Ferdiansyah, Risma Deviyanti, & Pattisahusiwa, 2018). In addition, another study argues balance fund can give positive effects on economy because high availability of funds is logically able to encourage the economy (Paat et al., 2019).

Based on the panel data regression analysis, growth had a significant effect on the poverty in Central Java Province with the t-value of 0.0361 and the coefficient value of 0.064023. This positive coefficient value indicated a negative effect on the poverty because economic growth boosted poverty rate due to income gap, limited access, and poor qualities growth. However, poverty rate will only experience a temporary increase because if the economic growth has reached its peak, the poverty will get reduced (Ravallion, 2004). Furthermore, the findings of this study contradict to a classical theory by economists that economic growth will reduce poverty and income gap, although it is in the early stage of growth. Here, the regression analysis results have proved that an increase in economic growth was not followed by a decrease in poverty rate.

Similarly, the results of this study are relevant to the initial phase of Kuznets' hypothesis that economic growth can reduce inequality and poverty in a certain period of time (turning point). The Kuznets' hypothesis concerns about analyzing problems regarding economic endogenous variables, such as technology, population, and institutions (Tietenberg and Lewis, 2015), not to mention to

political stability and political democratization scale increase (the democratization which supports policy changes in redistribution and inequality reduction).

The economic growth in Central Java has triggered the increase in poverty. It was due to the income inequality and limited access for the poor. However, in terms of turning point, the poor has started feel the existence of job vacancies, unemployment reduction, and increase in economic activities with which the inequality will reduce, and the absorption of workforce will increase. The Trickle Down Effects theory further explains that economic growth can only be enjoyed by a certain group of people at first, until in time it will trickle down when people spend the results they get. In this way, new economic growth can be felt by the poor, so that they are finally able to reduce poverty.

Other studies show that high economic growth can lead to large job opportunities as long as the economic activities are based on *padat karya* or a program aimed at preparing human resources to work at jobs created by the government (Diwakar, Lemma, Shepherd, & Willem te Velde, 2019) (Diwakar et al., 2019; Tsaurai, 2021). When employment is high, poverty rate is expected to reduce (Xie & Cao, 2021). However, the fact is the higher economic growth, the higher poverty rate is. It is probably because some economic sectors prefer capital-intensive to labor-intensive. Poverty is a complex problem for every single region. To alleviate it, it is necessary to have an adequate budget. Local governments, especially Central Java, need to increase revenue by exploring existing potentials so that they can increase PAD for poverty alleviation.

The results of panel analysis model indicated the cross-section effects on the poverty rate in Central Java. In addition, regions which were largely affected were Wonosobo Regency (19,176117); Kebumen Regency (19.120311); Purbalingga Regency (17.581505); Banjarnegara Regency (17.022677); and Pemalang Regency (17.146235). It happened due to the low level of education, poor health quality, limited regional investment, and limited job opportunities.

Furthermore, the other five regencies/cities with low effects on poverty were Semarang City (1.973767); Salatiga City (4.573867); Brebes Regency (5.128843); Kudus Regency (6.886086); and Pekalongan City (7.080863). It was because these five regions were experiencing rapid development in terms of economy, so the economic growth in terms of local revenue, workforce, and investment capital expenditures were also increasing.

CONCLUSION

Regarding the findings, it is known that the model has a simultaneous statistical significance, while partially, fiscal decentralization and balance fund have no effect on poverty. Therefore, it is only the economic growth which does so. Then, the regression analysis results indicate the degree of fiscal decentralization has negative impact, but not significant on poverty. Another result is, the balance funds of DAU, DAK, and DBH have no significant effect on poverty, and again, the regression analysis results explain it is only economic growth which significantly affects poverty reduction.

Some suggestions given are the balance fund from the central to regional government is supposed to be more allocated on poverty in terms of demand, namely providing social programs to empower community as an effort for reducing poverty. Besides, budget diversification needs to be made to alleviate poverty so that the alleviation is not only sourced from balance fund. Also, the regional government is supposed to increase its fiscal capacity through the development of regional learning commodity-based economic activities and extensification of local revenue.

The dependence of local governments on transfer funds from the central government needs to be minimized so that regions can independently manage their own finances. Moreover, regions with small income are necessary to optimize local potential to be the source of revenue. It is because poverty

alleviation needs sufficient financial support in order to absorb a large workforce.

REFERENCES

Agyemang-Duah, W., Kafui Gbedoho, E., Peprah, P., Arthur, F., Kweku Sobeng, A., Okyere, J., & Mengba Dokbila, J. (2018). Reducing poverty through fiscal decentralization in Ghana and beyond: A review. Cogent Economics and Finance, 6(1), 1–14. https://doi.org/10.1080/23322039.2018.1476035

Anwar, M. L., Palar, W. S., & Sumual, J. I. (2016). [*Pengaruh DAU, DAK, PAD Terhadap Pertumbuhan Ekonomi dan Kemiskinan (Kota Manado Tahun 2001-2013)*]. *Jurnal Berkala Ilmiah Efisiensi,* 16(2).

Ardian, R., Yulmardi, Y., & Bhakti, A. (2021). [*Pengaruh Pertumbuhan Ekonomi, Indeks Pembangunan Manusia, dan Tingkat Pengangguran Terbuka terhadap Tingkat Kemiskinan di Provinsi Jambi*]. *Jurnal Ekonomi Aktual,* 1(1), 23–34. https://doi.org/10.53867/jea.v1i1.3

Badan Pusat Statistik. (2022). [*Kemiskinan dan PDRB. Jawa Tengah*]: Badan Pusat Statistik Provinsi Jawa Tengah.

Daforsa, F., & Handra, H. (2019). Analysis of village fund management in poverty alleviation at Pasaman Regency, West Sumatra. *Jurnal Perspektif Pembiayaan Dan Pembangunan Daerah*, 6(6).

Diwakar, V., Lemma, A., Shepherd, A., & Willem te Velde, D. (2019).Economic Tranformation and Poverty.

Ferdiansyah, I., Risma Deviyanti, D., & Pattisahusiwa, S. (2018). [*Pengaruh pendapatan asli daerah, dana alokasi umum, dana alokasi khusus, dan dana perimbangan terhadap belanja daerah*]. *INOVASI*, 14(1), 44–52. Retrieved from http://journal.feb.unmul.ac.id/index.php/INOVASI

Fitriyanti, N. I., & Handayani, H. R. (2020). Pengaruh Pendapatan Asli Daerah, Dana Alokasi Khusus, dan Belanja Daerah Terhadap Tingkat Kemiskinan (Studi Kasus 35 Kota/Kabupaten di Jawa Tengah 2012-2016). *Diponegoro Journal of Economics*, 9(2), 79–90. Retrieved from https://ejournal2.undip.ac.id/index.php/dje

Gujarati, D. N., Porter, D. C., & Mardanugraha, E. (2013). [*Dasar-dasar Ekonometrika*] (5th ed.). Jakarta: Salemba Empat.

Gumelar, A., & Khairina, N. (2021). Analisis Pengaruh Dana Perimbangan Terhadap Kemiskinan (Studi Kasus Kabupaten/Kota di Sulawesi Tengah 2015-2019. *Jurnal Ekonomi-QU*, 11(2).

Kuncoro, M. (2011). [*Metode Kuantitatif; Teori dan Aplikasi untuk Bisnis dan Ekonomi*] (4th ed.). Yogyakarta: UPP STIM YKPN.

Manek, M., & Badrudin, R. (2017). [*Pengaruh Pendapatan Asli Daerah dan Dana Perimbangan terhadap Pertumbuhan Ekonomi dan Kemiskinan di Provinsi Nusa Tenggara Timur*]. *Telaah Bisnis*, 17. https://doi.org/10.35917/tb.v17i2.49

Martinez-Vazquez, J., & Mcnab, R. M. (2001). National Tax Association Cross Country Evidence on The Relationship Between Fiscal Decentralization, Inflation, and Growth. *Journal of Finance*, 94(2).

Maulana, I., & Masbar, D. R. (2018). [*Desentralisasi Fiskal Kemiskinan di Indonesia (Studi Kasus: Indonesia Bagian Timur]*. *Jurnal Ilmiah Mahasiswa*, 3(1), 80–88.

Mulok, D., Kogid, M., Asid, R., & Lily, J. (2012). Is economic growth suficient for poverty alleviation? Empirical evidence from Malaysia. Cuadernos de Economía, 35, 26–32. Retrieved from www.elsevier.es/cesjef

Ningsih, E. K., & Noviaty, D. E. (2019). [*Pengaruh Pendapatan Asli Daerah dan Dana Perimbangan terhadap Pertumbuhan Ekonomi Provinsi Sumatera Selatan 2014-2018]*. *Ekonomis: Journal of Economics and Business*, 3(2), 91. https://doi.org/10.33087/ekonomis.v3i2.67

Nurhidayah, T., Hendikawati, P., & Artikel, S. (2018). Pengaruh Realisasi APBD Terhadap Pertumbuhan Ekonomi dan Kemiskinan dengan Statistical Mediation Analysis Info Artikel. Jurnal MIPA, 41(2), 111–120. Retrieved from http://journal.unnes.ac.id/nju/index.php/JM

Oyvat, C. (2015). Structural Change and The Kuznets Hypothesis. *Greenwich: Greenwich Political Economy Research Centre*.

Paat, D. C., Koleangan, R. A. M., Rumate, V. A.,. [*Pengaruh Pendapatan Asli Daerah dan Dana Perimbangan Terhadap Pertumbuhan Ekonomi Serta Dampaknya Pada Kemsikinan di Kota Bitung]*. *Jurnal Pembangunan*, 1(4).

Paulus, D. I. S., Koleangan, R. A. M., & Engka, D. S. M. (2019). [*Analisis Pengaruh Pad, Dau Dan Dak Terhadap Kemiskinan Melalui Belanja Daerah Di Kota Bitung]*. Jurnal Pembangunan Ekonomi Dan Keuangan Daerah, 19(2), 1–18. https://doi.org/10.35794/jpekd.15781.19.2.2017

Ravallion, M. (2004). Pro-Poor Growth: A Primer. Washington DC. Retrieved from http://econ.worldbank.org.

Ridho, I. N., Domai, T., & Wachid, A. (2013). [*Analisis Kinerja Pada Bidang Pendapatan Dalam Mengelola Daerah (Studi pada Dinas Pendapatan Pengelolaan Keuangan dan Aset Daerah Kabupaten Ponorogo)]*. *Jurnal Administrasi Publik* (JAP), 1(2), 221–230.

Rusdarti, & Sebayang, L. K. (2013). [*Faktor-faktor yang Mempengaruhi Tingkat Kemiskinan di Provinsi Jawa Tengah*]. *Jurnal Economia*, 9(1).

Safuridar. (2017). [*Pengaruh Pertumbuhan Ekonomi Terhadap Kemiskinan di Kabupaten Aceh Timur*]. *Ihtiyadh*, 1(1), 37–55.

Saputra, D. (2016). [*Analisis Pertumbuhan Ekonomi dan Tingkat Ketimpangan Antar Kabupaten/Kota di Provinsi Jawa Barat*]. *CR Journal Creative Research for West Java Development*, 1-16.

Syamsul. (2020). [*Desentralisasi fiskal dan tingkat kemiskinan di indonesia*].*Akuntabel*, 17(1), 140–147. Retrieved from http://journal.feb.unmul.ac.id/index.php/Akuntabel

Szarowska, I. (2018). Effect of macroeconomic determinants on non-performing loans in Central and Eastern European countries. *International Journal of Monetary Economics and Finance*, 11(1), 20–35. https://doi.org/10.1504/IJMEF.2018.090564

Tietenberg, T., & Lewis, L. (2015). Enviromental & Natural Resource Economics 10th Edition. New Jersey, USA: Pearson Education Limited.

Vitara Agatha, S., & Uliansyah, B. A. A. (2021). [*Pengaruh Desentralisasi Fiskal dalam Pengentasan Kemiskinan dengan Pertumbuhan Ekonomi sebagai Variabel Mediasi di Provinsi Papua*]. *Jurnalku*, 1(3), 156–176. https://doi.org/10.54957/jurnalku.v1i3.30

Xie, J., & Cao, Y. (2021). Empirical Study of the Relationship between Financial Development and Economic Growth Based on Intelligent Algorithms Based on Wireless Network Communication. Mobile Information Systems, 2021. https://doi.org/10.1155/2021/3738580

Zahroh, A. A., Muniarty, P., & Julaiha. (2020). Effect of Economic Growth on Poverty in Bima City. *Ilomata International Journal of Management*, 1(2), 59–64. Retrieved from https://www.ilomata.org/index.php/ijjm

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Determinants of Carbon Emissions in 10 ASEAN Countries

Ermatry Hariani [1]✉ , [2]Retno Febriyastuti Widyawati, [3] Andi Lopa Ginting

[1,2]Faculty of Economics and Business, University of Wijaya Kusuma Surabaya
[3]Faculty of Economics, Open University

Article Information	Abstract
	Rapid economic development in ASEAN countries from many aspects of the global economy and energy outlook. Increased consumption of fossil fuels leads to an increase in CO_2 emissions (ACE, 2021). The problem of increasing CO_2 caused by economic development in ASEAN needs to be studied more deeply what variables will in the economic development affect the increase in CO_2 emissions. The purpose of this study is to test and obtain empirical evidence on determinants of carbon emissions in 10 ASEAN Countries (Brunei Darussalam, Indonesia, Cambodia, Lao PDR, Myanmar, Malaysia, Philippines, Singapore, Thailand, Vietnam) during 2010-2018. Some of the factors that were taken in this study, there are Gross Domestic Product (GDP), total population (PDDK), and industrial growth (MANF). This study uses panel data (time series and cross section). In using the method of regression of panel data is performed uji chow and uji hausman, and elected, namely the fixed effect model. Results of the study proved that all independent variables (GDP, total population, industrial growth) have a significant effect on carbon emissions. The conclusion is that by looking at all the independent variables in this study that affect the increase in CO_2 emissions, it must be considered in the future how to control these variables in order to reduce CO_2 emissions. The findings of this study are that the variables of GDP, total population and industrial growth cause an increase in CO_2 emissions, this is in accordance with the theory

✉ Corresponding author :
Address: Jl. Dukuh Kupang XXV No.54
FEB, University of Wijaya Kusuma Surabaya
E-mail: ermatryhariani@uwks.ac.id

INTRODUCTION

According to Todaro in Candra (2018) Environmental quality issues are not only a problem for developed countries or developing countries, but have become a problem for all countries in the world. Environmental quality problems can occur due to the amount of pollution from factories, smoke from motor vehicles, and also forest fires that can result in decreased environmental quality. Therefore, the development of environmental quality is needed apart from development in the economic sector.

Sources of emissions CO_2 is mostly large (80%) caused by the activities of humans or referred to anthropogenic emission, namely fossil fuels burning while the rest (20%) comes from the activities of deforestation and degradation of forests (Sukadri, 2012).

ASEAN as an association collection of Part of a great country developing with a high population and fast growth. ASEAN is predicted an residents of its 700 million people in the year 2030 will provide contributions great for the growth of emissions of CO_2 as a whole (OECD, 2011). Driving factor emissions of CO_2, in Dietz, T., & Rosa (1997) caused by many factors anthropogenic, for example : (1) a resident; (2) economic activities; (3) technology; (4) political and economic institutions; (5) attitudes and beliefs. From the five factors mentioned, population, income, and technology is considered as the driving principal of the emission of CO_2.

Suparmoko (1998) argues that with the increasing number of population will increase the demand for goods and services that must be provided to fulfill the needs of the population. So it will have an impact on the number of production sources of nature to fulfill of the consumption of energy residents. As a result, the resources of nature is getting decreased and pollution of the environment is getting increased along with the growth of population. This causes the Gas House Greenhouse (GHG) thinned.

Factor two, namely acivities economy which is reflected from economy growth (GDP).

Each country will always trying to improve the economy growth and make economiy growth as a target economy and the success of the economy of a country in long term. Economy growth is as a measure of achievement the country from a period to next period to produce goods and services. Economic growth is needed and one of the sources of increasing the standard of living of a population whose numbers continue to increase.

ASEAN is the region that contributes the largest producer of CO_2 emissions, this is because almost the average asean country has industries that produce CO_2 emissions. The power generation industry is the main source that produces CO_2 emissions by accounting for as much as 37% of global CO_2 emissions. According to Frieler et al in general, CO_2 emission levels can be caused by the growth of industrialization. The rapid growth of industrialization has created major challenges for the environment, particularly in terms of energy consumption and CO_2 emissions (Candra, 2018). The year in this study started from 2010 - 2018 due to limited data at the latest World Bank until 2018.

The gap in this research is that the results of this study state that the GDP variables, namely GDP and Total Population, have a positive relationship or have a significant effect on increasing CO_2 emissions. While in other studies, namely research from Begum R A, Sohag, Abdullah S M S (2015), it states that if the results also demonstrate that both per capita energy consumption and per capita GDP has a long term positive impacts with per capita carbon emissions, but population growth rate has no significant impacts on per capita CO_2 emission. However, the study suggests that in the long run, economic growth may have an adverse effect on the CO_2 emissions in Malaysia.

Based on the background behind the above, the authors are interested to know the effect of gross domestic product, total population, and industrial growth to carbon emission in the 10 ASEAN countries in 2010-2018.

RESEARCH METHODS

This study uses research descriptive methods with quantitative approach, research descriptive is used to determine the effect of gross domestic product, total population, and industrial growth on the carbon emissions. While the quantitative approach emphasizes more on measurement theories with numerical variables and data analysis. The data used in this research is secondary data. Data obtained from the World Bank and several articles of the journal are related. The data used in this study, among others: gross domestic product, total population, industrial growth and carbon emissions in 2010-2018. This study took 10 ASEAN countries (Brunei Darussalam, Indonesia, Cambodia, Lao PDR, Myanmar, Malaysia, Philippines, Singapore, Thailand, Vietnam) due to the limited availability of data in the World Bank.

Dependent variable on this study is carbon emissions (CO2), measured in Metric Tons per capita. While the first independent variable is gross domestic product (GDP), measured in current US$. The second independent variable is total population (PDDK), measured in person. The third independent variable is industrial growth (MANF), measured in current US$. The analytical tool used is the panel method. There are 3 methods used to work with panel data, namely: Pooled Least Square (PLS), Fixed Effect Model (FEM), Random Effect Model (REM) (Gujarati, D. and Dawn C, 2009). In this panel data, a Chow test is carried out to determine whether an appropriate model for this study is the Chow test. The Chow test looks at the right common effect or fixed effect model to determine panel data. Furthermore, the Hausman test is used to determine the appropriate estimation model, whether Fixed Effect or Random Effect will be selected. The Hausman test follows a Cross-section random assessment, so the decision to choose the suitability of the model can be decided correctly. Next, the lagrange multiplier test is used to determine the right estimation model whether random effect or common effect will be selected. In this study, the lagrange multiplier test was not carried out because the results on the Chow and Hausman tests were consistent with the selected fixed effect model. This study modifies Akram (2012) model so that it becomes:

$$CO2_t = \alpha_1 + \sum_{j=1}^{k} \beta_{11}GDP_{t-j} + \sum_{j=1}^{k} \beta_{12}PDDK_{t-j} + \sum_{j=1}^{k} \beta_{13}MANF_{t-j} + \varepsilon_t \dots\dots\dots\dots(1)$$

Where CO2 is the carbon emissions; GDP is Gross Domestic Product, PDDK is total population; MANF is an industrial growth; α is constanta ; t is time; j is countries; β is coefficient of each variable; and ε is the error term.

The next step is to test the statistical determination ($R2$), t test, F test. The coefficient of determination (R2) is essentially to measure how far the the model's ability to explain the dependent variable. T test is used to see whether or not each independent variable is significant to the dependent variable. The F test is carried out to see whether or not the independent variable is simultaneously (overall) significant to the dependent variables (Kuncoro, 2011). After panel data regression and the selected model was taken, the classical assumption test was carried out which included normality test, test multicollinearity, and heteroskedasticity test.

RESULTS AND DISCUSSION

Carbon emissions produced by 10 ASEAN countries during 2010-2018, the highest is Brunei Darussalam country of 14-17 metric tons per capita. 95 percent of Brunei Darussalam's total exports are petroleum and gas commodities. Despite this, the country is still working on an energy transition. Energy transition is an inevitability that cannot be ignored. Because energy transition efforts can have an impact on environmental recovery. The second largest is Singapore by 8 metric tons per capita, then the third largest is Malaysia by 6-7 metric tons per capita. While the smallest carbon emissions production is the Myanmar country of 0,1-0,6 metric tons per capita.
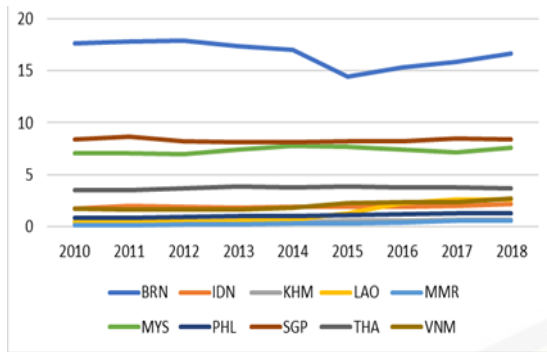
Figure 1. Carbon Emissions in 10 ASEAN Countries (Metric Tons Per Capita).
Source: Data Processed, 2022

The regression result of panel data in this study, the value of R2 is 0.997757. This shows that independent variables together are able to explain dependent variables by 99%.

From the regression results it is also known that the probability of F is 0.000000. When compared to the 5% alpha sign, the probability of F is less than the level of alpha significance. This indicates that all independent variables together have a significant effect on dependent variables.

Table 1. The results of panel data regression with the selected fixed effects model (FEM)

Variable	Coefficient	t-statistic	Prob
C	1.295898	2.167514	0.0333
GDP	4.40E-05	2.246140	0.0276
PDDK	3.57E-08	3.582536	0.0006
MANF	-4.98E-12	-2.163149	0.0336
R-squared	0.997757		
Adjusted R-squared	0.997408		
F-statistic	2854.799		
Prob(F-statistic)	0.000000		
Durbin-Watson stat	1.032067		

Source: Data Processed, 2022

To see the effect of each independent variable on the dependent variable by using the test t. Probability of test result t compared to 5% alpha significance rate. From the output results in table 1, this indicates that the probability of a variable GDP is 0.0276, where the value is less than the alpha of 5%. This means that the GDP variable has a significant effect on carbon

emissions. Next is the probability of a total population variable (PDDK) of 0.0006, where the value is less than the alpha significance level of 5%. This means that total population variable (PDDK) have a significant effect on carbon emissions. The last is an industrial growth variable (MANF) with a probability of 0.0336, which is less than the alpha significance level of 5%. This means that industrial variables have a significant effect on carbon emissions.

Discussion

From the results of panel data regression with the Fixed Effect Model, the following regression equation is obtained:

$$CO2it= 1.295898 + 4.40E\text{-}05GDPit + 3.57E\text{-}08PDDKit - 4.98E\text{-}12MANFit + Uit \dots (2)$$

The further discussion of the factors that affect the carbon emissions is explained below:

•Effect of Gross Domestic Product (GDP) on Carbon Emissions. The highest GDP during 2010-2018 was Singapore, second is Brunei Darussalam, third Malaysia, fourth Thailand, fifth Indonesia, sixth philippines. GDP growth in Vietnam and Lao PDR is narrowly proportional, as well as Cambodia and Myanmar countries. Below is a chart of GDP growth in 10 asean countries.

Figure 2. Gross Domestic product (GDP) in 10 ASEAN Countries (current US$)
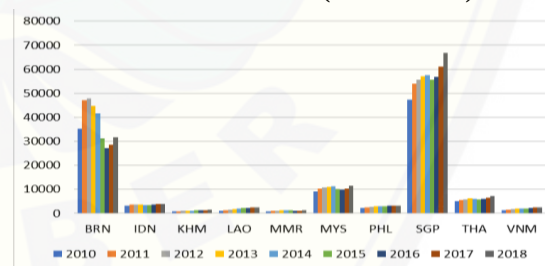
Source: Data Processed, 2022

The results of this study indicate that when gross domestic product (GDP) increases by 1 percent, it will increase carbon emissions by 4.40E-05 percent. According to the Environmental Kuznets Curve (EKC) hypothesis, economic development represented by Gross Domestic Product (GDP) per capita, in the early stages of industrialization will be accompanied by increased damage environment.

It has to do with behavior and needs society to improve the level of the economy regardless of the impact on long-term sustainability. After reaching a certain point of GDP per capita, the economy will transition to a service sector that requires the exploitation of resources less accompanied by increased public environmental awareness, resulting in damage the environment will decrease (Candra, 2018). The results of this study are the same as those of Lean, H H. and Smyth (2010): The results from the Granger causality tests suggest that in the long-run there is unidirectional Granger causality running from electricity consumption and emissions to economic growth.

This research is also the same as other research, namely from Pejovic, Karadzic, Dragasevic (2021): (1) two-way relationship between gross domestic product and CO2 emissions, (2) two-way negative relationships between CO2 emissions and energy consumption from renewable sources, (3) no causality has been established between gross domestic product and energy consumption from renewable sources (4) the sign of the relationship in the direction from gross domestic product to CO2 emissions is negative, while in the opposite direction is positive.

This study is in line with Mohsin, M. Naseem, S. Sarfraz, M. and Azam (2022) research on investigating the relationship between environmental sustainability and economic growth in European and Central Asian countries using the 1971-2016 annual data series. The result a significant negative relationship for the long run and a positive relationship for the short-run between CO2 emission and GDP authorizes the worsening of environmental sustainability is because of economic growth for a longer term.

During the research period, the largest population is Indonesia was about 240 million to 260 million people, followed by the Philippines of about 93 million to 106 million people. The three countries with the most population, Vietnam between 87 million and 95 million people, followed by Thailand, Myanmar, Malaysia, Cambodia, Lao PDR, Singapore, and the least populated Brunei Darussalam is about 380 thousand to 420 thousand people.

Figure 3. Total Population in 10 ASEAN Countries (Person)
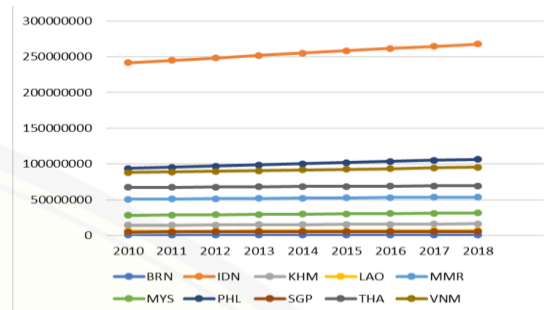
Source: Data Processed, 2022

Regression panel data shows that total population has a significant effect on carbon emissions. The coefficient of the total population variable is 3.57E-08 with a probability of 0.0006 explaining that a 1% increase in total population will be followed by an increase in carbon emissions of 3.57E-08 percent. In general, pollution caused by CO2 emissions comes from 2 (two) activities, namely: natural and human (anthropogenic) such as CO2 emissions from transportation, waste, and consumption of household (domestic) electrical energy. usually CO2 emissions resulting from human activities (anthropogenic) are relatively high in concentration so that it will disrupt the balance system in the air and in the end can damage the environment and human welfare. The increasing population causes human activities to increase as well. Human activities are inseparable from energy consumption, both electrical energy and others, the use of fuel for cooking for the community, both from LPG, oil soil and firewood, this is a pollutant source of increased emissions of carbon dioxide (CO2) gas.

This study is in line with research Gao, C. Tao (2021). The results illustrate that the carbon emission situation due to trade in China is partly shaped by inter-provincial migration at the national level. While the contribution of migration varies widely across subregions due to regional economic development and unequal carbon intensity, migration-focused emission control strategies should be discriminatoryly

scaled up to better understand China's shared energy conservation and emission reduction policies. It can be concluded if the population density increases in an area it will increase carbon emissions. This study is also in accordance with Yeh, J, C., Liao, C (2017) research, stated that population size and age structure greatly affect energy consumption which will ultimately increase carbon dioxide (CO2) emissions in Taiwan during the 1994-2014 period. This research is also the same as other research, namely from Fao, Zhou, Zhang, Shao (2021): The results show that urban population aging increases urban household carbon emissions at levels both below and above 0.083, while this positive impact is comparatively smaller when urban population aging is above 0.083.

During the research period, the country that had the highest industrial growth was Indonesia, followed by Thailand, then Malaysia, followed by the Philippines and Singapore. The country with the slowest industrial growth is Lao PDR.

Figure 4. Industrial Growth in 10 ASEAN Countries (current US$)
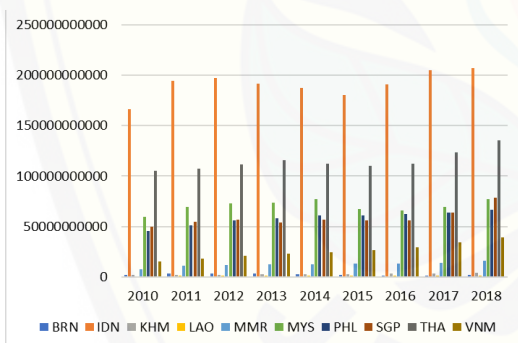
Source: Data Processed, 2022

The results show that the value of industrial growth has significant effect on carbon emissions. The MANF variable coefficient of -4.98E-12 with a probability of 0.0336 explains that every 1% increase in industrial growth, it will decrease carbon emissions by 4.98E-12 percent, and it can be interpreted that the growth variable of the industry has a significant relationship but has a negative impact on the carbon emissions variable. The results of this study are in accordance with the kuznet theory. Based on kuznets view, severe environmental damage will

be prone to occur in developing countries. This happens because in the early phases of industrialization growth. It focuses only on how the economy is growing rapidly and absorbing a lot of labor. Environmental issues have not been high on the agenda and the government has not been heavily involved in the effort improvement of the market system. The negative externalities that arise are environmental degradation by various indicators, namely increasing emissions of carbon dioxide (CO2), sulfur dioxide (SO2), nitrogen oxides (NO), ozone (03), and particulate matter (dust) (Arief, 2016)

The results are in line with Rahman, M M and Kashem (2017) research on Carbon emissions, energy consumption and industrial growth in Bangladesh from 1972 to 2011. Where the results of his research are the industrial production and energy consumption have significant positive impact on the carbon emissions both in the short and long-runs.

This study is the same as the results of research from Yu Y (2018) that CO2 emissions will have an upward trend in the future. As a result, speeding up construction of the sanatoria industry as well as adjusting of the energy and industry structures is proposed as effective ways to control CO2 emissions. This research is the same as the research from Raza (2022): the manufacturing sectors' technological progress has a positive impact while the industrial sectors' technological progress has mix impact on CO2 emissions. This study is also the same as the results of research from Hu Y, Yu Y (2021) and research from (Li, 2022).

The findings of this study are that all independent variables such as GDP, Total Population and Industrial Growth have an influence on increasing CO2 emissions, which means that if each variable increases by 1%, CO2 emissions will also increase by 1% and this is in accordance with the existing theory.

CONCLUSION

In this research discusses the effect of variables such as GDP, total population, and industrial growth on carbon emissions in 10 ASEAN countries (Brunei Darussalam,

Indonesia, Cambodia, Lao PDR, Myanmar, Malaysia, Philippines, Singapore, Thailand, Vietnam). The results of this study show that all independent variables such as GDP, total population, and industrial growth have a significant effect on carbon emissions. So if the amount of GDP, total population and industrial growth increases, it will increase carbon emissions in 10 ASEAN countries during the research period.

Based on the results of the study, the implication is that the government must pay attention to environmental aspects, especially the problem of environmental damage or degradation caused by human activities and economic activities such as industrial growth that causes increased carbon emissions. For that it needs government policies in controlling carbon emissions, for example such as controlling population growth, bosst the implementation of environmentally friendly industries, etc.

REFERENCES

ACE (2021) *ASEAN CO2 Emissions from Coal-Fired Power Plants: A Baseline Study*. Jakarta. Available at: https://aseanenergy.sharepoint.com/PublicationLibrary/Forms/AllItems.aspx?id=%2FPublicationLibrary%2F2021%2FReport%2FReport_ASEAN CO2 Emissions from CFPP - A Baseline Study %28July 2021%29.pdf&parent=%2FPublicationLibrary%2F2021%2FReport&p=true&ga=1.

Akram, N. (2012) 'Is Climate Change Hindering Economic Growth Of Asian Economies?', *Asia-Pacific Development Journal*, 19(2), pp. 1–18.

Arief, A. M. (2016) 'The Effect of Gross Domestic Product Per Capita on Carbon Dioxide Emissions in Indonesia in the Period 1961-2011', *Jurnal Ilmiah, FEB UNIBRAW*, pp. 1–12.

Begum R A, Sohag, Abdullah S M S, J. M. (2015) 'CO2 Emissions, Energy Consumption, Economic and Population Growth in Malaysia', *Renewable and Sustainable Energy Reviews*, 41, pp. 594–601. doi: https://doi.org/10.1016/j.rser.2014.07.205.

Candra, K. A. (2018) 'Analysis of the Effect of Economic Growth and Foreign Investment on Carbon Dioxide Emissions in Eight ASEAN Countries for the Period 2004-2013', *Calyptra: Jurnal Ilmiah Mahasiswa Universitas Surabaya*, 7(1), pp. 2646–2661.

Dietz, T., & Rosa, E. A. (1997) 'Effects of population and affluence on CO2 emissions', in *Proceedings of the National Academy of Sciences, USA*, pp. 175–179. doi: doi:10.1073/pnas.94.1.175.

Fao, Zhou, Zhang, Shao, and M. (2021) 'How Does *Population* Aging Affect Household Carbon Emissions? Evidence From Chinese Urban and Rural Areas', *Energy Economics*, 100, p. 105356. doi: https://doi.org/10.1016/j.eneco.2021.105356.

Gao, C. Tao, S. H. et al (2021) 'Effect of Population Migration on Spatial Carbon Emission Transfers in China', *Energy Policy*, 156. Available at: https://doi.org/10.1016/j.enpol.2021.112450.

Gujarati, D. and Dawn C, P. (2009) *Basic Econometric, 5th ed*. New York: McGraw-Hill.

Hu Y, Yu Y, and M. (2021) 'Selection of Carbon Emissions Control Industries in China: An approach Based on Complex Networks Control Perspective', *Technological Forecasting and Social Change*, 172, p. 121030. doi: https://doi.org/10.1016/j.techfore.2021.121030.

Kuncoro, M. (2011) *Quantitative Methods: Theory and Applications To Business and Economics. Ed.4*. Yogyakarta: YKPN.

Lean, H H. and Smyth, R. (2010) 'CO2 emissions, electricity consumption and output in ASEAN', *Apllied Energy*, 87(6), pp. 1858–1864. doi: https://doi.org/10.1016/j.apenergy.2010.02.003.

Li (2022) 'Path-Breaking Industrial Development Reduces Carbon Emissions: Evidence From Chinese Provinces, 1999–2011', *Energy Policy*, 167, p. 113046. doi: https://doi.org/10.1016/j.enpol.2022.113046.

Mohsin, M. Naseem, S. Sarfraz, M. and Azam, T. (2022) 'Assessing The Effects of Fuel Energy Consumption, Foreign Direct Investment and GDP on CO2 Emission: New Data Science Evidence from Europe & Central Asia', *Fuel*, 314. doi: https://doi.org/10.1016/j.fuel.2021.123098.

Nachrowi, N. Djalal and Usman, H. (2006) *Popular and Practical Econometrics Approaches to Economic and Financial Analysis*. Jakarta: LPFE Universitas Indonesia.

OECD (2011) 'Southeast Asia: Growth Remains Solid in the Medium Term – 5.6% In 2012-2016, According to OECD'.

Pejovic, Karadzic, Dragasevic, B. (2021) 'Economic Growth, Energy Consumption and CO2 Emissions in the Countries of the European Union and the Western Balkans', *Energy Report*, pp. 2775–2783. doi: https://doi.org/10.1016/j.egyr.2021.05.011.

Rahman, M M and Kashem, M. A. (2017) 'Industrial Growth in Bangladesh: Empirical Evidence from ARDL Cointegration and Granger Causality Analysis', *Energy Policy*, 110, pp. 600–608. doi: https://doi.org/10.1016/j.enpol.2017.09.006.

Raza (2022) 'Estimating The Multiple Impacts of Technical Progress on Bangladesh's Manufacturing and Industrial Sector's CO2

Emissions: A quantile Regression Approach', *Energy Report*, 8, pp. 2288–2301. doi: https://doi.org/10.1016/j.egyr.2022.01.005.

Sukadri, D. S. (2012) 'REDD dan LULUCF (Cooperation between the Ministry of Forestry, DNPI, dan UN-REDD Indonesia'.

Suparmoko, M. (1998) *Economics of Natural Resources and Environment*. Yogyakarta: BPFE.

Yeh, J, C., Liao, C, H. (2017) 'Impact of population and *economic* growth on carbon emissions in Taiwan using an analytic tool STIRPAT', *Sustainable Environment Research*, 27(1), pp. 41–48. doi: https://doi.org/10.1016/j.serj.2016.10.001.

Yu Y, D. Y. R. and C. F. F. (2018) 'Impact of population aging and industrial structure on CO2 emissions and emissions trend prediction in China', *Atmospheric Pollution Research*, 9(3), pp. 446–454. doi: https://doi.org/10.1016/j.apr.2017.11.008.

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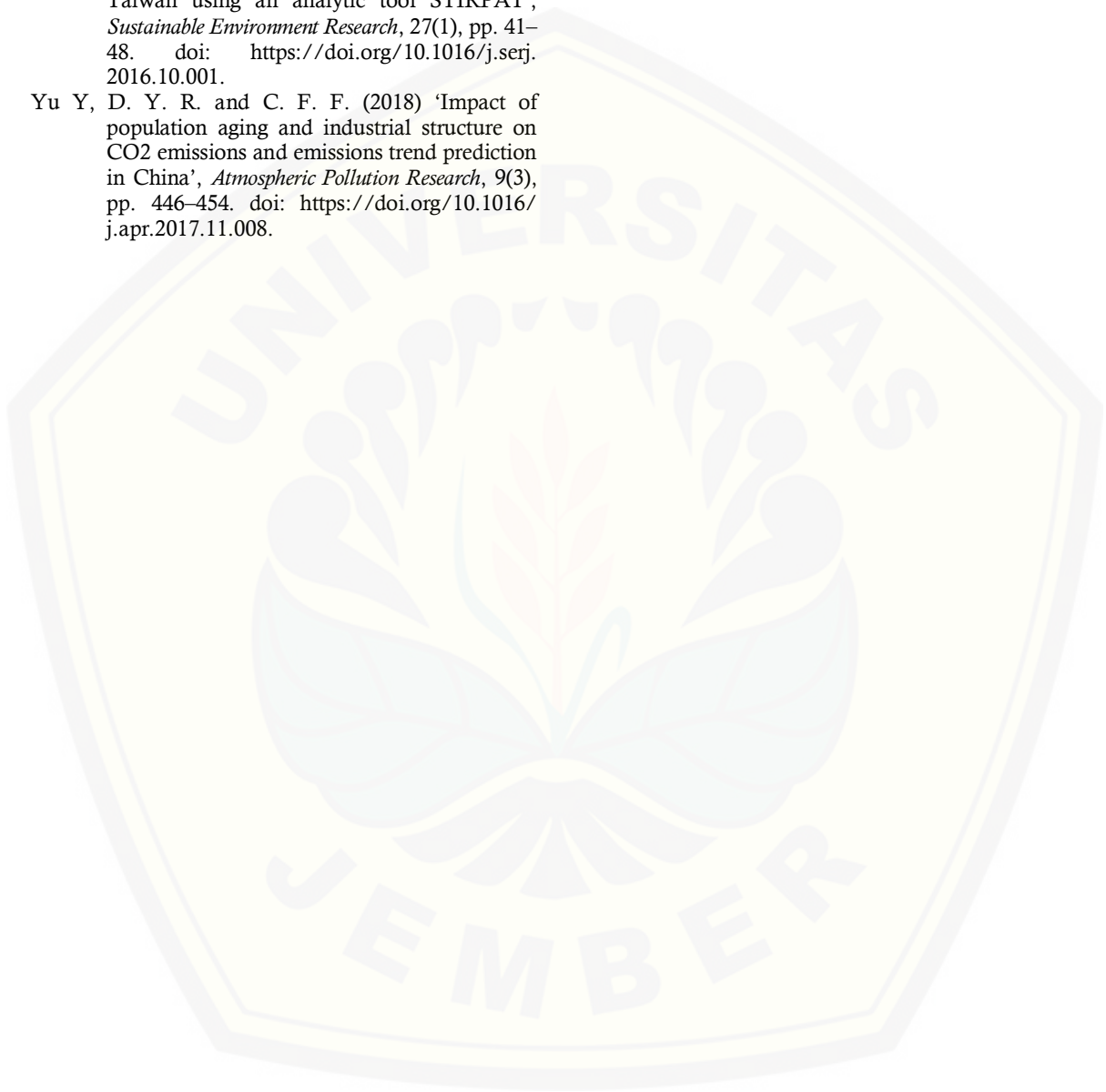
Role of Investment and Macroeconomic Variables on Unemployment in Indonesia

Weni Hawariyuni[1]✉ , [2]Monika Andrasari
[1,2]Universitas Sumatera Utara

Article Information

Abstract

This study aims to analyze the effect of Foreign Direct Investment (FDI), domestic investment, and other macroeconomic variables towards decreasing unemployment rate in Indonesia. The macroeconomic variables applied in this study composed of inflation, Gross Domestic Product (GDP), Provincial minimum wage, and poverty. This study employed Ordinary Least Squares (OLS) model and panel data from 2010 – 2020 for 34 provinces in Indonesia. This study indicated that GDP and FDI play crucial role in decreasing number of unemployment rate in Indonesia. These two independent variables had negative and significance relationship with number of unemployment rate in Indonesia. It means that if GDP and FDI raise led decreasing on number of unemployment rate in Indonesia. Meanwhile, domestic investment and other macroeconomic variables including inflation, provincial minimum wage, and poverty indicated having insignificant relationship with number of unemployment rate in Indonesia. This study concluded that GDP and FDI have important role in decreasing numbers of unemployment in Indonesia. It means that if GDP and FDI raised significantly causing more job opportunities for unemployment in Indonesia. This study is expected to give contribution for Indonesia Government and Economic policy makers to minimize numbers of unemployment in Indonesia.

⊡ Corresponding author :
Address: FEB Universitas Sumatera Utara
E-mail: wenihawariyuni@usu.ac.id

INTRODUCTION

One of the most troubling phenomena at the end of 2019 was the increasing unemployment rate in Indonesia. The Central Statistics Agency (BPS) noted that within a period of six months, the number of unemployed in the country had increased by 230,000. BPS data as of August 2019 showed that 7.05 million people did not have a job, a figure which had increased by 3.3 percent from the February total of 6.82 million. The Open Unemployment Rate (TPT) also rose from 5.01 percent in February 2019 to 5.28 percent in August 2019. However, this figure was an improvement on the 5.34 percent of the previous August. TPT indicates the working-age population included in the unemployment group (The Indonesian Institute, 2020).
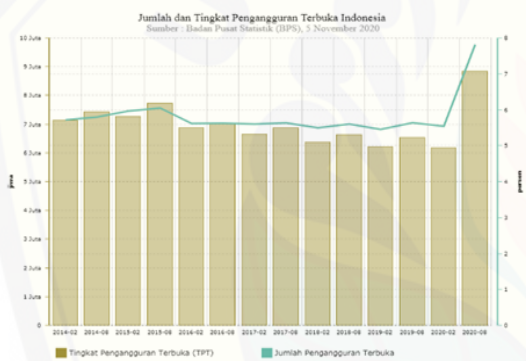
Figure 1. Open Unemployment Rate and Number of Unemployed as of August 2020 Source: Central Bureau Statistics, 2021

In August 2020, the number of unemployed increased by 2.67 million to 9.77 million people, in line with the increase in the size of the workforce of 2.36 million to 138.22 million people. Unemployment is a problem for all countries in the world ; rates that are too high will disrupt their national stability. Therefore, every country attempts to maintain the rate at a reasonable level. In macroeconomics, the problem of unemployment is discussed in relation to the labor market and is related to the balance between the level of wages and labor.

The Investment Coordinating Board (BKPM) recorded that the level of investment in 2020 was Rp. 826.3 trillion, a growth of 2.1%

from the Rp. 809.6 trillion of 2019, and a figure exceeded the 2020 target of IDR 817.2 trillion.

Indonesian investment is dominated by domestic investment (PMDN), at Rp 413.5 trillion, or 50.1 % of total investment. This figure grew by 7% from the 2019 total of IDR 386.5 trillion. On the other hand, foreign investment (PMA) fell by 2.4% from the 2019 figure of Rp 423.1 trillion to Rp 412.8 trillion, or 49.9% of total investment .

Emerging markets (capital markets in developing countries), such as that of Indonesia, have always attracted the entry of investors and international diversification. As argued by Muazi and Arianti (2013), economic growth in such countries has different characteristics to that in developed countries, meaning it will be more profitable to invest in them. Therefore, the government establishes policies which encourage the creation of a conducive national business climate for investors, which will strengthen economic competitiveness and accelerate the increase in investment . Indeed, FDI is generally seen to make a significant contribution to capital accumulation and to generate the transmission of advanced knowledge and technology, which can accelerate long-term growth rates in developing countries (An & Yeh, 2020).

In addition to improving the investment climate and overcoming the unemployment problem, among other advantages, is by observing it from a macroeconomic point of view. The economic growth of a country can be said to be beneficial, as seen from the macroeconomic variables used as measures of the performance of economies. Among these are controlling inflation and poverty, increasing economic growth, and regulating minimum wages; macro variables that can contribute to reducing the unemployment rate in Indonesia.

Monetary policy is employed to control inflation. Economists argue that in the long run a high inflation rate indicates a poor economy and prompts central banks to raise interest rates, causing a contraction in the real sector. Quoted from Insukrindo in Heru Perlambang, 2010's research . Monetary policies implemented by the authorities to influence monetary variables

include controlling the money supply, SBI interest rates, and exchange rates. In general, such policies achieves internal and external balance. Internal balance is usually indicated by the creation of a high balance of work , the achievement of a high economic growth rate, and maintenance of a low inflation rate. In general, such policies achieves internal and external balance. Internal balance is usually indicated by the creation of a high balance of work , the achievement of a high economic growth rate, and maintenance of a low inflation rate. On the other hand, internal balance is usually indicated by a healthy balance of payments.

Okun's Law, developed by Arthur Melvin Okun, states that unemployment and economic growth are inversely proportional (negative). The higher the rate of economic growth, the lower the unemployment rate. Economic growth is one of countries' economic problems in the long term. In macro analysis, the level of economic growth is measured by the development of the real national income achieved by a country or region. Such growth can be used as a policy tool to achieve the targetted unemployment rate or the economic growth achieved to predict the unemployment rate . Okun's Law aims to assist the Indonesian government in suppressing high unemployment rates. Job creation or reducing unemployment is one of the current priorities of the government and is seen as a long-term benefit. Increasing economic growth through GRDP can be used as a policy tool to achieve a specific unemployment rate and can be employed to predict the unemployment rate in the coming year (Astari et al., 2019).

The wage rate is also closely related to the problem of unemployment. Wages are compensation received by a work unit in the amount of money paid . The wage rate has a positive and negative effect on the unemployment rate. The negative effect is that an increase in the rate will cause an increase in production costs, leading to an increase in product prices. Such a price increase will mean consumers will reduce their purchases. This situation causes producers to reduce production and the number of workers employed, so ultimately unemployment will

increase. At the same time, the positive effect can be seen in terms of the supply of labor; an increase in the wage rate will make the supply of labor increase, so the unemployment rate will fall. Wages are significant for both parties. For producers, they are production costs that must be reduced as efficiently as possible. For workers, wages are a source of income for them and their families, and a source of community expenditure. The level of wages is an essential factor in determining acommunity's living standard.

Based on the discussion above, it can be seen that foreign investment, domestic investment, and macroeconomic variables such as the inflation rate, poverty, economic growth, and wage rates will contribute significantly to the decline in the unemployment rate in Indonesia. Therefore, research is carried out "Analysis of the role of Foreign Investment (PMA), Domestic Investment (PMDN) and Macroeconomic Variables Towards Decreasing Unemployment Rate in Indonesia ."

The study aims to identify the factors that could affect the unemployment rate in Indonesia. More specifically, the objectives are: to establish the factors that influence the unemployment rate in Indonesia, identify which factors are the most dominant in influencing the unemployment rate in Indonesia, ascertain the influence of FDI, PMDN, the inflation rate, SBI, GDP, and the regional minimum wage (UMR) simultaneously and partially on the unemployment rate in Indonesia.

RESEARCH METHODS

The study used panel data which was a combination of time series and cross sections from the period 2010-2020 from 34 provinces in Indonesia, obtained from BPS and BKPM, together with supporting data from journals and books. The 34 provinces were Aceh, North Sumatra, West Sumatra, Riau, Jambi, South Sumatra, Bengkulu, Lampung, Bangka Belitung, Riau Islands, DKI Jakarta, West Java, Central Java, DI Yogyakarta, East Java, Banten, Bali, West Nusa Tenggara, East Nusa Tenggara, West Kalimantan, Central Kalimantan, South

Kalimantan, East Kalimantan, North Kalimantan, North Sulawesi, Central Sulawesi, South Sulawesi, Southeast Sulawesi, Gorontalo, West Sulawesi, Maluku, North Maluku, West Papua and Papua.

An econometric model was used to analyze the effect of the independent variable on the dependent variables. To establish the level of influence of the independent variable on the dependent variables, panel data analysis can be employed. The analysis model for this panel data is as follows:

$$Y= f (PMA, PMDN, Inflasi, Kemiskinan, PE, UMP) \quad (1)$$

$$Yit = \beta0 + \beta1PMAit + \beta2PMDNit + \beta3INFLASIit + \beta4KEMISKINANit + \beta5PEit + \beta6UMPit + \varepsilon it \quad (q)$$

Where, Y is Unemployment in Indonesia, PMA is Foreign Investment in Indonesia, PMDN is Domestic Investment in Indonesia, Inflasi is Inflation Rate in Indonesia, Kemiskinan is Number of Poor People in Indonesia, PE is Indonesian economic growth, and UMP is Provincial Minimum Wage in Indonesia. To establish the level of influence of the independent variable on the dependent variables, panel data analysis can be employed. The analysis model for this panel data is as follows:
Table 1.

Table 1. Chow Test

Effect Test	Statistics	Prob
Cross-section F	16.762530	0.000***
Cross Section Chi-square	365.356214	0.000***

Source: Data Processed, 2022

The results in Table 1 show that the probability F value is 0.0000 < 0.05. This means that H1 is accepted, so FEM was employed. The results indicate that in this case FEM is better than CEM. As FEM was selected based on the results of the Chow test, future research would conduct the Hausman test to decide between FEM or REM.

Researchers used the Hausman test to determine the best model between the fixed effects approach (FEM) and the random effects approach (REM). If H0 is accepted, then REM is employed. However, if H1 is accepted, so FEM was used. Table 2 shows the Hausman test results

Table 2. Hausman Test

Effect Test	Chi-Sq Stat.	Prob
Cross-section random	44.773710	0.000***

Source: Data Processed, 2022

The results in Table 1 show that the probability F value is 0.0000 < 0.05. This means that H1. The test shows a p-value of 0.0000 <0.05, so H1 is accepted; this means that the FEM is more appropriate to use than the REM one.

RESULTS AND DISCUSSION

Based on the best model estimation, fix effect model is the best model to used in this research model. Table 3 shows the estimation results of the fixed effects approach.

Table 3. The Fixed Effect Model (Result Estimation)

Variable	Coefficient	Std Error	T-Statistic	Prob.
INF	0.042810	0.03154	1.357554	0.1755
Log (PDRB)	-3.8267	0.83931	-4.55293	0.0000
Log (UMP)	0.47679	0.31074	1.53436	0.1259
Log (PMA)	-0.1762	0.08861	-1.93141	0.0543
Log (PMDN)	-0.0432	0.05604	-0.87101	0.3844
Log (Kemiskinan)	0.65525	0.54105	1.21106	0.2267

Source: Data Processed, 2022

The estimation results of the FEM approach show that macroeconomic variables, for example inflation, have a negative and insignificant effect on the unemployment rate in

Indonesia. The value of the influence of inflation on the unemployment rate is -0.04, which indicates that an increase of 1% will result in a fall in the unemployment rate of 0.04%. The increase is one of the factors caused by the economic growth factor. However, this estimation result is not in line with Vladi and Hysa's (2019) research, which show that inflation affects inflation reduced the unemployment rate in the Western Balkans. The results of their research are also supported by Djohan (2016), who states that inflation, investment, and GDP simultaneously reduce the unemployment rate in Indonesia. The results of this study are also different from the research conducted by Astrid and Soekaptjo (2018), who show that inflation has a positive and significant impact on falls in the unemployment rate in Indonesia.

The estimation results of the FEM approach show that the GRDP variable has a negative and significant effect on the open unemployment rate (TPT) in Indonesia, at the level of 1% (0.000) based on the p-value. The value of its influence on TPT is -3.82, which signifies that each 1 percent increase in GRDP will reduce the open unemployment rate by 3.82 percent. The estimation results follow Okun's Law (Mankiw, 2006), which states that there is a negative relationship between economic growth represented by GRDP or GDP (Gross Domestic Product) and the unemployment rate. The law states that every increase in GDP above 2.5% will reduce the unemployment rate by 1%.

The results of this study are in line with those of Aisyahturido (2020), Duma (2017), Ronny (2012), and Dian (2019), who show that economic growth through GDP has a negative and significant effect on the reduction in unemployment in North Sumatra. Vladi and Hysa (2019) also show that all macroeconomic variables, including GDP, significantly impact the unemployment rate in the Western Balkan countries. In addition, Djohan (2016) shows that GDP also affects the unemployment rate in Indonesia, while Wardiansyah (2016) states that economic growth through GDP could reduce the unemployment rate on the island of Sumatra in Indonesia.

Based on the estimation results obtained from the fixed effect regression approach (FEM), the UMP (provincial minimum wage) has a positive and insignificant effect on the unemployment rate in Indonesia. The results show that the inflation value was 0.47. Nevertheless, the results are not in accordance with the research conducted by Aisyahturido (2020), who shows that UMP has a positive and significant effect on reducing the rate. This indicates that the higher the UMP, the higher the unemployment rate in Indonesia due to the increased competition between workers to receive a better salary than previously. It is also because the demand for labor is lower than the number of workers available on the labor market. Moreover, employers will also make efficient use of labor if the UMP increases too much. Entrepreneurs use this strategy to reduce production costs.

This study is not in accordance with those of Alghofari (2010) or Ari (2016), who found that the UMP had a positive and significant influence on the unemployment rate in Indonesia. They argue that if wages are set below the government's UMP level, this will create high levels of unemployment. Furthermore, if viewed from the entrepreneurs' perspective, an increase in the UMP will increase the efficiency of expenditure made by entrepreneurs. Employers will reduce the workforce if there is an increase in the UMP. In addition, Dian (2019) found that the UMP was able to reduce the unemployment rate in Indonesia.

Research shows that FDI (foreign investment) has a negative and significant effect on the unemployment rate in Indonesia. The value of the PMA regression results is 0.171, which shows that each 1% increase in FDI in Indonesia will reduce the unemployment rate by 0.71%. This means that the entry of FDI into Indonesia will reduce the unemployment rate. PMA investors are expected to create many jobs in the country.

This study is in line with research conducted by Vladi and Hysa (2019), which showed that FDI could reduce the unemployment rate in the Western Balkans. It is

also in line with the findings of Balcerzak and Żurek (2009), that FDI could reduce the unemployment rate in Poland. PMA also reduces the unemployment rate in Indonesia (Djohan, 2016).

Alecsandru (2014) shows that the role of FDI is crucial in reducing the unemployment rate. The study shows a causal relationship between foreign direct investment inflows and unemployment in four of the thirteen European countries studied: Hungary, Malta, Bulgaria, and Estonia. Meanwhile, Astrid and Soekapdjo (2018) also show that FDI has a negative and significant relationship with the rate of decline in unemployment in Indonesia.

In accordance with the theory proposed by economists, namely Todaro and Smith (2020) and Jhingan (2016), the entry of FDI into developing and third countries will help their economic growth through job creation. Jhingan (2016) states that FDI is necessary to accelerate economic growth in such countries. Foreign Capital helps in industrialization, building up the overhead capital of the economy, and creating wider employment opportunities. Foreign capital brings not only money and machines but also technical skills. He opened up remote areas and worked on new, untapped resources. The risks and losses at the pioneering stage are also borne by foreign capital. Foreign Capital helps modernize society and strengthen the state and private sectors (Jhingan, 2016).

Todaro and Smith (2020) show that the growth of FDI into developing countries is very fast through private multinational corporations. FDI increased globally by around US\$ 13 billion in 1970, increasing further by around US\$ 200 billion in 1990. In developing countries, FDI has increased by around US\$ 520 trillion.

PMDN (domestic investment) has a negative but insignificant influence on the unemployment rate in Indonesia; its value of -0.04 indicates that an increase of 1% will reduce the rate by 0.04%.

This study is in line with research conducted by Astrid and Soekapdjo (2018), who found that there was no significantly positive nor negative relationship between PMDN and any

reduction in the unemployment rate in Indonesia. The results of this study indicate that PMDN does not affect the rate in the country. However, the results of this study are different to the research conducted by Muazi and Fitri (2010), Maráfiah (2016), and Jufrida (2016). All the results of this study indicate that PMDN has a positive and significant impact on reducing open unemployment in Indonesia, which means that it can create jobs and directly reduce the level of open unemployment.

The effect of poverty shows positive but insignificant results on the unemployment rate in Indonesia. The poverty variable value of 0.65 indicates that a rise in poverty of 1% will increase poverty by 0.65%. It can thus be interpreted that an increase in the number of poor people will increase the open unemployment rate in.

The results of this study are different from the results of research conducted by Muhammad and David (2019), who show that poverty has a positive and significant relationship with increases in the open unemployment rate in Niger. Research conducted by Aderounmu et al. (2021) using the ARDL (autoregressive distributive lag) approach to cointegration with the bound test also shows that poverty has a positive and significant effect on the increase in the unemployment rate in Nigeria.

CONCLUSION

This study shows that GRDP and FDI have a negative and significant effect on reducing the open unemployment rate in Indonesia. Increases in these will result in a fall in the rate. On the other hand, PMDN and other macroeconomic variables such as inflation, UMP, PMDN, and poverty have no effect on reducing the unemployment rate. The conclusion is that the role of GRDP and FDI influences the reduction of the open unemployment rate in Indonesia; an increase in GRDP and an increasing level of FDI inflows will create employment opportunities. This research could be helpful for the Indonesian government when developing economic policies to reduce the unemployment rate in the country.

REFERENCES

Andi Mar'afiah.(2016). The Effect of Foreign Direct Investment (FDI) and Domestic Investment on Economics Growth in Makassar city. STIE Pembangunan Indonesia Makassar, *Economix*, 4(1).

Ardi Afrizal. Analysis on the Role of Domestic and Foreign Direct Investment, and it's Effect on Job Opportunity for Economic Growth in Jambi for the period of 1990-2008. Sekolah Tinggi Ilmu Ekonomi Muhammadiyah Jambi, *Jurnal Development*, 18–47.

An, T.-H. T., & Yeh, K.-C. (2020). Growth effect of foreign direct investment and financial development: new insights from a threshold approach. *Journal of Economics and Development*, ahead-of-p(ahead-of-print). https://doi.org/10.1108/jed-08-2020-0108

Bambang Sugiyono Agus Purwono, Masroni, Abd. Muqit.(2017). Strategy of Windmill Utilization for Vertical with Naca Type 3412. Jl. Soekarno – Hatta No. 9, Malang 65141, Indonesia

Balcerzak, A. P., & Żurek, M. (2011). Foreign Direct Investment and Unemployment : VAR Analysis for Poland in the Years 1995-2009. *European Research Studies*, XIV(1)

Berument, M. H., Dogan, N., & Tansel, A. (2009). Macroeconomic policy and unemployment by economic activity: Evidence from Turkey. *Emerging Markets Finance and Trade*, 45(3), 21–34. https://doi.org/10.2753/REE1540-496X45030

Bobby Kresna Dewata, I Wayan Yogi Swara. The Effect of Total Expor, Labour and Wage on Foreign Direct Investment in Indonesia, *E-Jurnal EP* Hal 350-358, Vol. 02 ISSN No 2303-0178. Denpasar Bali: Universitas Undayana.Universitas Udayana.

Chairul Nizar1, Abubakar Hamzah, Sofyan Syahnur. The Effect of Investment and Labour on Economic Growth and It's Relationship with Poverty Alleviation in Bnada Aceh, Indonesia. *Jurnal Ilmu Ekonomi Pascasarjana Universitas Syiah Kuala*. Vol 1 (2): pp 1-8.

Chodorow-reich, G. (2016). *The Limited Macroeconomic Effects of Unemployment Benefit Extensions.*

Firdaus Jufrid, Mohd. Nur Syechalad, Muhammad nasir.(2016). Analysis the Effect of Foreign Direct Investment (FDI) and Domestic Investment on Economic Growth in Banda Aceh, Indonesia. (*Darussalam Journal of Economic Perspectives*) 2.1: 54-68.

Gusti Agung Ayu Ratih Meita Sari ,I Gde Kajeng Baskara,(2018). The Effect of Economic Growth, Interest Rate, and Exchange Rate on Foreign Direct Investment in Indonesia, Universitas Udayana, Bali, Indonesia.

I Ketut Sumadiasa, N. M. T. (2014). The Effect of Electricity and Foreign Direct Investment on GDP Growth in Province of Bali during the period of 1993 - 2014, Fakultas Ekonomi dan Bisnis Universitas Udayana (Unud), Bali , Jurnal EP Unud, 925–947.

Kornelius Johan Pan Budi Marwoto Dini Pratiwi,(2016). Analysis the Effect of Economic Growth, Inflation, and Investment on Unemployment in Indonesia. Management Program STIE-IBEK Bangka Belitung Pangkal Pinang, Indonesia *Jurnal Progresif Manajemen Bisnis*, 13(2), 20-32

Messayu Eliza. (2013). Analysis the Effect of Macroeconomics variabel on Foreign Direct Investment in Indonesia. Universitas Brawijaya, Malang.

Muazi, N. M., & Arianti, F. (2013). Analysis the Effect of Foreign Direct Investment and Domestic Investment on Indonesia Economic Growth. di Jawa Tengah 1990 – 2010. 2(2005), 1–9. *Diponegoro Journal of Economics*, 2(1), 259-267

Mutiara Shifa. Analysis the Effect of Inflation on Unemployment in Medan city, Universitas Negeri Medan. *Jurnal Ilmu Ekonomi*, Fakultas Ekonomi Pascasarjana Universitas Negeri Medan.

Pesliakaite, J. (2015). Determinants of unemployment in CEE-10 economies: the role of labour market institutions and the macroeconomic environment in 2002-2012. MPRA Paper, No. 66041. http://mpra.ub.uni-muenchen.de/66041/

Pratiwi, N. (2015). The Influence of Inflation, BI Interest rate, and Exchange rate on Foreign Direct Investmnet and Economic Growth in Indonesia for the period of 2004 – 2013. *Jurnal Administrasi Bisnis S1 Universitas Brawijaya*, 26(2), 86310

Prasaja, M. H. (2013). The Effect of Foreign Direct Investment, total population, and Inflation on educated unemployment in Jawa Tengah for the period of 1980 – 2011. *Economics Development Analysis Journal*, 2(3), 72–84

Putu Kartika Dewi,Nyoman Triaryati.(2015). The Effect of Economic Growth, Interest rate, and

Tax on Foreign Direct Investment. Universitas Udayana (UNUD), Bali, Indonesia. *Doctoral dissertation*, Udayana University.

Sugianto, Yul Tito Permadhy (2020). The Factors Determine Unemployment and Solution Used to Overcome the Unemployment Problem in the Village of Bojongcae, Cibadak Lebak Provinsi Banten.

Şıklar, İlyas; Kocaman, Merve (2018): FDI and macroeconomic stability: The Turkish case, European Financial and Accounting Journal, ISSN 1805-1846, *University of Economics, Faculty of Finance and Accounting*, Prague, Vol. 13, Iss. 1, pp. 19-40,http://dx.doi.org/10.18267/j.efaj.204

Tandelilin, Eduardus. 2010. *Portfolio and Investment, Theory and Application*. Edisi Pertama. Yogyakarta : Kanisius

The Indonesian Institute. (2020). Analysis Opportunity and Challenges of Omnibus Law on Job Creation. www.*theindonesianinstitute*.com

Thu-Ha Thi An. (2020). Growth effect of foreign direct investment and financial development: new insights. *Graduate Institute of National Development*, National Taiwan University, Taipei, Taiwan.

Tevi Mahriza, Syamsul Amar B.(2019). The Effect of Domestic and Foreign Direct Investment , Labour Force and Infrastructure on Economic Growth in West Sumatra. *Jurnal Kajian Ekonomi dan Pembangunan*, 1(3), 691-704.

Vasile Alecsandru Strat, Adriana Davidescu (Alexandru), Andreea Maria Paul (Vass), (2015). FDI and The Unemployment - A Causality Analysis for The Latest EU Members. *2nd Global Conference on Business, Economics, Management and Tourism*, 30-31 October 2014, Prague, Czech Republic

Vanda Ningrum. Foreign Direct Investment and Labour Force in Industry Sector. Pusat Penelitian Kependudukan-Lembaga Ilmu Pengetahuan Indonesia (PPK-LIPI). *Jurnal Kependudukan Indonesia*, 3(2), 29-43.

Vladi, E., & Hysa, E. (2019). The Impact of Macroeconomic Indicators on Unemployment Rate : *Western Balkan Countries*. January. https://doi.org/10.4018/978-1-5225-7561-0.ch009

Zahrina Zata Lini, Hardi Sasana (2019). The Influence of Globalization on Unemployment in ASEAN Countries. *Jurnal REP (Riset Ekonomi Pembangunan)*, 4(1), 13-26. Universitas Diponegoro.

Zeb, N., Qiang, F., & Sharif, M. S. (2014). Foreign Direct Investment And Unemployment Reduction In Pakistan. *International Journal of Economics and Research*, 5(2), 10–17.

Correlation of Financial Innovation, Stock Market, Cryptocurrency on Economic Growth

Waluyo Jati[1], [2]Rachmawaty Rachmawaty✉, [3]Holiawati, [4]Iman Syatoto

Economic and Business Faculty, Pamulang University, Indonesia

Article Information	Abstracts
	Indonesia has had the critical issue of economic growth in the last ten years which the trend of economic growth was declining year by year, in 2011 GDP growth YoY was 6.5% then declined become 5% in 2019 (before Covid-19 pandemic) and worst in Pandemic Era become -5.3%. This research aims to provide an understanding of the effect of short term and long term of Financial Innovation, Stock Market and Cryptocurrency on Indonesia's economic growth using the Vector Error Correction Model (VECM) method. The methode was chosen based on Stationary Analysis and Cointegration Test. It is shown that the data was non-Stationary and the result of Cointegration Test there was a conintegration at 0.05 level. Enrich with the analysis in Impulse Response and Variance Decomposition to obtain the fluctuated economic growth impacted by those variables on a monthly basis, which previous researchers have not researched. The results showed that the correlation of the Stock Market, Financial Innovation and Cryptocurrency to Indonesia's economic growth, in the long run, all the variables give a positive correlation. Still, in the short-run, only the stock market and economic growth give a positive correlation. The result of the long and short run of VECM is supported by Impulse response and variance decomposition that stock market has the most significant impact to economic growth.

INTRODUCTION

Researching the driven factors of economic growth is challenging for Regulators and Researchers. In this paper, the economic growth as measured by GDP growth quarterly basis (Rudriger, 2006), Indonesia as emerging country face the critical issue of economic growth in the last ten years which the trend of economic growth was decline year by year, as shown in

Figure 1. in Q1 2011 GDP growth YoY was 6.5% then decline become 5% in Q4 2019 (before Covid-19 pandemic) and worst in Q2 2020 was -5.3% (the first quarter of Covid-19 pandemic). The Covid-19 pandemic, which started transmitted globally according to WHO was in March 2020, impacted to health, social and economic aspect, according to IMF's report (IMF, 2020), GDP as global has declined 4.9% in Q2 2020 due to economic disruption.
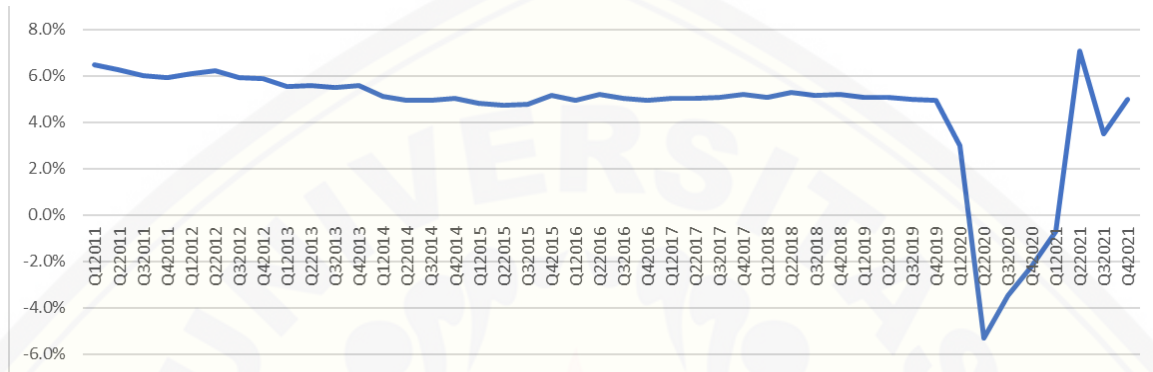
Figure 1. Indonesian Gross Domestic Product Growth
Source: Data Processed, 2022

Encountering the pandemic, Central Banks Globally release some policies such as increasing the scale of asset purchase, enhanced liquidity provision and limited the borrowing cost, the action followed by Financial Regulators by modify the policy of bank loan repayment terms and release of capital and liquidity buffers to support supply and quality of credit (GFSR, June 2020). Financial Authority Services of Indonesia (OJK) during the pandemic release some policies in the financial sector, such as POJK No. 11/POJK.03/2020, renewed by POJK no.48 /POJK.03/2020, the policy regarding financing restructuring such as asset quality assessment, for example, decrease interest rates, more extension of the credit's period, lower of principal arrears, decrease in interest arrears, offering credit facilities, offering conversion credit, and setting temporary Equity Participation, etc.

Several researches have been done to investigate various proxy variables of economic growth such as financial development, financial innovation, capital market development, foreign direct investment, and initial coin offering. Some

researchers have conducted the correlation between financial development and economic growth with the result is positive correlation across the countries such as Azam et al. 2016; Qamruzzaman & Wei (2018), financial development consists of both banking Industry and capital market. According to Liang & Reichert 2007, the Advanced financial sector is measured by broad money (M2), money market mutual funds and, innovative financial products in the stock market and prudent risk management. Azam et al. (2016), come out with the research result that there was a correlation between economic growth, foreign direct investment stock market and inflation in China, Singapore, Bangladesh and India.

Digital Finance such as Initial coin offerings (ICOs) is a new alternative to generate capital, especially for venture capital and angel finance (Howell, 2020). The various alternatives for business will impact to productivity and then increase economic growth as well. However, the example of ICOs such as bitcoin in Indonesia could be treated as investment products which not directly related to productivity; according

Kusumastuty et al., (2019) Bitcoin is the famous cryptocurrency in Indonesia, almost 50% who are understand cryptocurrency will know bitcoin and tread it as investment product.

Financial innovation is driven by financial development in process, service and new product alternatives. Information Technologies savvy creates a great room for better customer services, financial management efficiency and at the same time optimizes the accumulation of capital allocation. (Ansong et al. 2011). Implementation of technological innovation in financial development create sustainable economic growth in the long run (Chou and Chin 2011; Orji et al. 2015). Financial innovation also impacts to productivity and the result increase economic growth (Silve and Plekhanov 2014). Financial institution has function as an intermediary body of funding unit and lending unit, financial innovation creates the role of better financial support in trading and commerce activity (Shittu 2012; Cheng and Degryse 2014).

However, there is a possibility of financial innovation driven by risk/return incentives for an individual as well as institution player. Financial innovation will give a positive impact if it can reduce the cost of capital without an increase in systemic risk (Qamruzzaman & Wei, 2018). A ration of broad could measure financial innovation to narrow money (M2/M1) which indicates the real cash balance and income elasticities, has been done by Ansong et al. (2011); Bara & Mudzinggiri (2016); Qamruzzaman & Wei, (2017); Qamruzzaman & Wei, (2018). Bank Indonesia as regulator and guardian of monetary policy setting the number of Broad Money (M2) and Flexible Inflation Targeting Framework (ITF). The number of M2 was monitored in the purpose to achieve the target inflation to control pricing and economic system.

A well-established capital market, especially stock market, directly impacts productivity and increases economic growth, Barna and Mura. (2010); Cooray. (2010); Shin. (2013). However, Husain. (2006) had different opinions that stock markets in developing countries have little impact on economic growth,

including Indonesia, while Ghosh and Revilla (2007), Lipinsky and Ong (2014) reported not effectiveness and not full capacity of Asia's stock markets. The stock market in Indonesia is under-regulated by Indonesia Stock Exchange (IDX), reactivated in 1977, IDX was not operated during 1956 – 1977 due to nationalism progress from Dutch's companies by the Indonesian Government. According to Indonesia Stock Exchange (IDX), one of the performance indicators is represented by the Indonesia Stock Exchange Composite (IDX Composite), which measured the aggregate performance of main board and development board stock in IDX.

Some studies regarding the correlation between GDP and stock market have been done, with the result is a significantly positive relationship between GDP and stock market performance in India (Reddy 2012); and Indonesia (Setiawan, n.d. 2018). According to Azam et al. 2016; in Bangladesh, China, India and Singapore; stock market development has a significant function in economic growth. According to Director of Trading and Member of the IDX, CNBC, 2021; during the pandemic, there was an increase in transactions from domestic retail investors. This is a positive catalyst to reduce the pressure on the stock market which the large capital outflows have shaken since the beginning of this year. During the pandemic, the number of retail customers increase significantly 70% compared to the last year with 51% of trading have been done by retail transactions.

The new digital era in financial transaction, has created the new money as transaction and investment tools, name cryptocurrency. According to Briere et al. (2013), Bitcoin is one of popular cryptocurrencies used as a financial instrument and alternative investment with diversification benefits. Cryptocurrency is a digital currency and has a unique character compared to fiat money, because cryptocurrency has a decentralized system which means no relationship with Government or any party; everyone can manage and produce it according to consensus and has a supply limitation, however since cryptocurrency has been trade as

digital money and new investment tools, it could give effect to supply and demand of production globally. The correlation of cryptocurrency among the monetary variable of Indonesia has been conducted by Kusumastuty et al., 2019 using VAR method with the result at the first-period inflation and interest rate don't have a significant impact; the impact showed at the second period.

Based on the explanation above, it is important to understand the variable of Indonesia's economic growth from the point of view financial innovation, development of the stock market and pricing of cryptocurrency in Indonesia Rupiah.

RESEARCH METHODS

The data is processed using Eviews 9 with quantitative descriptive analysis method and if the data used is stationary at the level using Vector Autoregression (VAR) analysis tool, but if the data used is stationary at the first difference thus using Vector Error Correction Model (VECM). VECM provides easier procedure to analyze the long-run and short-run effects from the data process. Thus VECM can be used to model cointegrated and non-stationary time series data it become VECM is different from VAR, so VECM is often referred to as the restricted form of VAR (Sulistiana, 2017).

The VAR method was first discovered by Sims in 1980 and is a multivariate analysis that provides a systematic way of capturing dynamic changes in multiple time series, and has a credible and easier to understand approach to data description and forecasting, structural inference, and analysis policy. The estimation results of the VAR model can be seen through the Impulse Response Function (IRF) and Variance Decomposition (VDC) of a variable against other variables or against itself, both IRF and VDC.

VECM, which Johansen and Juselius developed in 1990 as a VAR-stricted from concept, offers an easy working procedure to separate long-term and short-term components. This additional restriction is given due to the existence of non-stationary data forms at the level

level, so the VECM model can be used to model the data (Sulistiana, 2017). This is in accordance with the research objective, namely to determine the long-term and short-term contribution of Islamic banking to Indonesia's economic growth.

The VAR method was first discovered by Sims in 1980 and is a multivariate analysis that provides a systematic way of capturing dynamic changes in multiple time series, and has a credible and easier to understand approach to data description and forecasting, structural inference, and analysis. policy. The estimation results of the VAR model can be seen through the Impulse Response Function (IRF) and Variance Decomposition (VDC) of a variable against other variables or against itself, both IRF and VDC. VECM, which Johansen and Juselius developed in 1990 as a VAR-strict from concept, offers an easy working procedure to separate long-term and short-term components. This additional restriction is given due to the existence of non-stationary data forms at the level level, so the VECM model can be used to model the data (Sulistiana, 2017).
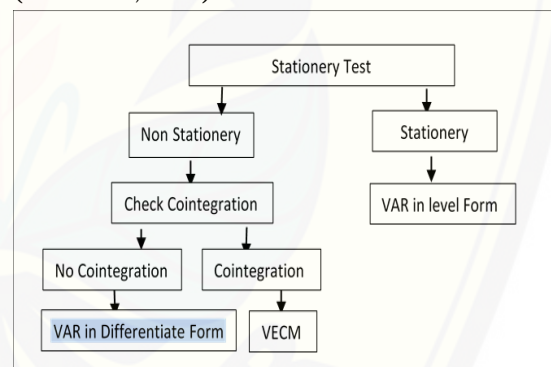
Figure 2. Model Development How to Choose VAR/ VECM.
Source: Riffin & Feryanto, 2021

In the cointegration test, the presence or absence of cointegration is based on the Trace and Max Eigen tests. If Trace-statistic value is smaller than the critical value, then (no cointegration) is accepted, it means the model is VAR in Differentiate Form. If the Trace-statistic value be greater than the critical value then (there is cointegration) received, it means the model is VECM.

The basic equation of VECM according to (Emy Widyastuti & Nena Arinta, 2020) will be as follows:

$$\Delta Y_t = \mu_{\circ\chi} + \mu^1{}_\chi{}^t + \pi_\chi Y_{t-1} + \sum_{k=1}^{i=1} rix\Delta Y_{t-1} + et \quad \dots\dots\dots\dots (1)$$

Where, Y is Variables Vector in the obtained analysis, $\mu_{\circ\chi}$ is Interception Vector, $\mu_{1\chi}$ Coefficient Vector, t is time trend, $\pi x = \alpha x$ is βy included cointegration equation Y_{t-1} is variable in level, rix is Matriks of regression coeffisien, dan et is error term.

The applied VECM equation for this research based on the elaboration of equation (1):

$$\Delta\,GDP = \mu_{\circ\chi} + \mu^1{}_\chi{}^t + \pi_\chi GDP_{t-1} +$$
$$\sum_{k=1}^{i=1} \Delta rix\,IDX_{t-1} + \sum_{k=1}^{i=1} \Delta rix\,BITC_{t-1} +$$
$$\sum_{k=1}^{i=1} \Delta rix\,M1/M2_{t-1} + et \quad \dots\dots\dots (2)$$

Where, GDP is Indonesia Growth Economic, IDX is Stock Market, BITC is Cryptocurrency, and M1/M2 is Financial Innovation.

Based on the Cointegration Test Criteria using MacKinnon-Haug-Michelis, the result of the model in this research is VECM which is at least cointegration as shown in Table 13, in Result and Discussion point.

Based on Literature, the hypothesis in this research that there was correlation among Financial Innovation (Silve and Plekhanov 2014), Stock Market (Barna and Mura. 2010; Cooray. 2010; Shin. 2013), Cryptocurrency (Kusumastuty et al., 2019) and Indonesia's Economic Growth will be analyzed using Impulse Response Test.

The data used in this study is secondary data in the form of quarterly data from Q1 2016 to Q4 2021, Time period is 5 years has included financial crisis due to Subprime mortgage in 2018 , COVID 19 in Indonesia started in the beginning of 2020. The variables data was chosen based on the literature research has been done by Ansong et al. 2011, Kusumastuty et al.,2019, Barna and Mura. 2010. Variable's definition and data sources as shown in Table 1.

Table 1. Research Data Descriptions

Variable	Description	Source of Data	Measurement
Financial Innovation (MI/M2)	M1/M2	Central Bank Indonesia	Percentage (%)
Stock Market (IDX)	IDX Composite	Indonesian Stock Exchange (IDX)	Logarithmic Natural (LN)
Cryptocurrency (BITCOIN)	Bitcoin's Transaction	Coin market cap	Logarithmic Natural (LN)
Indonesia Growth Economic (GDP)	GDP quarterly	Central Bureau Statistics Indonesia	Percentage (%)

Source: Data Processed, 2022

The measurement of GDP consists of two type, first is nominal GDP and the second is real GDP. The definition of nominal GDP is the value of goods and services measured at current prices, which can increase either because prices rise or quantities rise. While the definition of Real GDP is the value of goods and services measured using a constant set of prices (Mankiw, 2010:24). In this research, the author uses the real GDP to measure GDP growth. Description of data statistic in Table 2, which explain the distribution of data:

Table 2. Statistic Data Variable

	GDP	IDX	BITC	M2/M1
Mean	3.67	8.66	18.27	3.91
Max	5.02	8.70	18.42	3.90
Median	7.07	8.79	20.56	4.30
Min	5.32	8.42	15.52	3.40
Std. Dev	-3.17	-0.11	-1.43	-0.18
Skewness	1.80	0.79	0.30	0.54
Kurtois	4.90	2.37	2.30	4.36
Jarque-bera	16.55	2.89	0.84	3.01
Probability	0.00	0.24	0.66	0.22
Sum	88.03	207.79	438.54	93.90
Sum Sq. Dev	231.18	0.26	47.32	0.77
Observation	24.00	24.00	24.00	24.00

Source: Data Processed, 2022

The standard deviation is a measurement of variance data to the mean, which the higher the standard deviation is, the higher of the variance data to the mean. Based on Table 232, shows that only economic growth (GDP) has the biggest amount (3.17) while other variables have less amount.

In order to enhance the research about economic growth, in this paper will be conducted analyze the impulse response and variance decomposition of economic growth. By analyzing through this method, we expect to understand the response in monthly basis and how much the contribution of each variable to the economic growth.

RESULTS AND DISCUSSION

The result of the Stationery test using Unit Root Test was stationary in level 1 and the result of the cointegration test based on MacKinnon-Haug-Michelis shown that there are 1 cointegrating equation at level 0.05 as shown in Table 343. As explained in Figure 2. How to Choose Model VAR/ VECM, if there is a cointegration, then the proper model is VECM.

Table 3. Cointegration Test

Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.84	68.23	63.87	0.02
At most 1	0.46	28.67	42.91	0.58
At most 2	0.36	15.45	25.87	0.53
At most 3	0.24	5.93	12.51	0.46

Source: Data Processed, 2022

Where, Trace test indicates the value of 1 cointegrating eqn(s) at the 0.05 level. *denote rejection of the hypothesis at the 0.05 level, and **MacKinnon-Haug-Michelis (1999) p-values.

The purpose of Cointegration test is to analyze whether there is a cointegration in the residual regression, if there is a cointegration, it means the correlation among the variables will be stable in the long run.

Table 4. Equation Long Run of VECM

Variable	Coefficient	Std. Error	t-Statistic
GDP	0.03	-0.00	-9.88
BITC	0.10	-0.01	-6.92
M2/M1	0.73	-0.16	-4.51
IDX	0.01	-0.00	-3.40

Source: Data Processed, 2022

The equation of VECM for the long run as shown in Table 4. Coefficient of Variables has positive sign, it explains that in the long run financial innovation, Cryptocurrency prices, Stock market prices and economic growth has positive correlations. This result was in line with the result of some researchers, as mentioned by Silve and Plekhanov, 2014 for financial innovation, Reddy 2012 and Setiawan, n.d. 2018 for the stock market.

Table 5. Equation Short Run of VECM

Variable	Coefficient	Std. Error	t-Statistic
CointEq1	-23.64	-19.93	1.19
D(IDX(-1))	0.47	-18.67	-0.03
D(IDX(-2))	-7.12	-11.01	0.65
D(GDP(-1))	0.06	-0.44	-0.14
D(GDP(-2))	-0.09	-0.26	0.34
D(BITCOIN(-1))	-1.16	-1.36	0.85
D(BITCOIN(-2))	- 0.72	-1.15	0.63
D(M2M1(-1))	-17.94	-13.75	1.31
D(M2M1(-2))	- 8.77	-7.77	1.13
C	- 0.04	-0.70	0.05

Source: Data Processed, 2022

While in the short run, the equation of VECM as shown in Table 565. In short-run correlation among the variables as shown in Table 5, the positive coefficient in Stock Market in difference level 1 and economic growth in difference level 1 while others have negative correlation.

The Response of Economic growth (GDP) to the fluctuated movement of other variables was analyzed using Impulse Response Test. The response of economic growth will be recorded in a monthly basis through X-axis, and the amounts of responses in percentage, if there are shocks in one standard deviation at other variables, will be described in Y-axis.
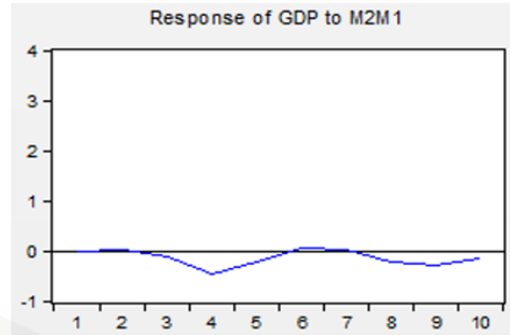
Figure 3. Respond Economic Growth to Financial Innovations.

Based on Figure. 3. If there is a shock in Financial Innovation (M2/M1) then the response of economic growth (GDP) up to 3 months earlier there are no respond, and will be recorded -1% during 3 months up to 6 months.
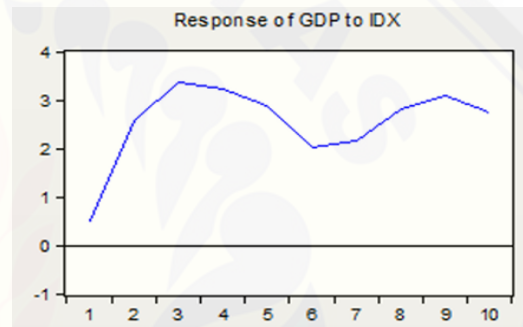
Figure 4. Respond Economic Growth to Financial Innovations.

Economic growth showed more responsive to the shock in the stock market, in Figure 4. the response can be obtained since the first month and become responsive at around 3.5% in the third month. Therefore, it is important to maintain the stability of the stock market.
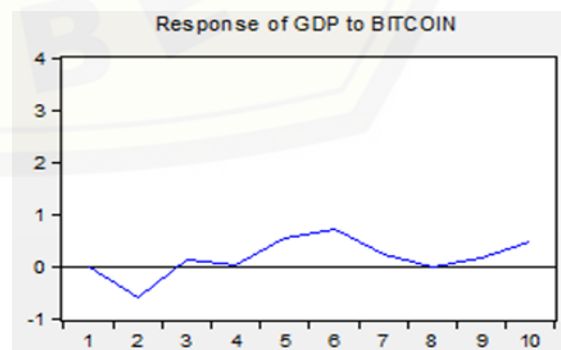
Figure 5. Respond Economic Growth to Cryptocurrency

The shock in cryptocurrency will be responded by economic growth after the first month, and the response becomes positive respond below 1% after the third month as shown in Figure 5
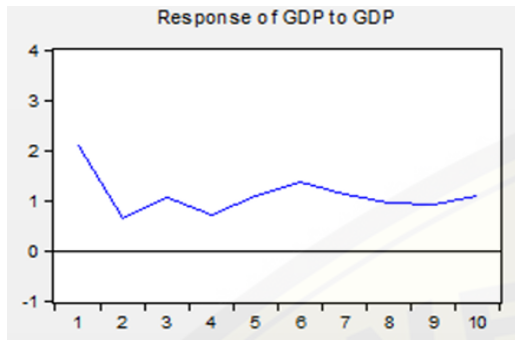
Figure 6. Respond Economic Growth to Economic Growth

Figure 6. explains that the shock in economic growth will be impacted to economic growth itself, in the earlier of second month the negative respond from 2% up to 1% will be impacted to economic growth and will be stable around 1% in the following month.

Table 6. Variance Decomposition of GDP

Period	S.E.	IDX	GDP	BITC	M2M1
1	2.13	5.35	94.65	-	-
2	3.45	57.49	39.37	3.14	0.01
3	4.93	74.71	23.63	1.59	0.07
4	5.96	80.64	17.60	1.09	0.67
5	6.73	81.44	16.43	1.48	0.65
6	7.19	79.22	17.96	2.24	0.58
7	7.60	79.10	18.29	2.10	0.52
8	8.16	80.47	17.19	1.82	0.52
9	8.78	81.89	15.95	1.60	0.55
10	9.27	82.10	15.70	1.67	0.53

Source: Data Processed, 2022

Variance decomposition of the movement economic growth in the 10 months was recorded in table 6. At the third month, it is shown that 74.7% economic growth fluctuated was caused by stock market, 1.5% by cryptocurrency and only 0.07% by financial innovation. The impact of stock market becomes bigger in the following month then in the tenth month it become 82.1% while cryptocurrency become 1.67% and 0.53%

in financial innovation. Thus, the result of variance decomposition of economic growth is aligned with the result of impulse response in Figure 4.

The comparison of this research with other reseach that in the long run financial innovation, Cryptocurrency prices, Stock market prices and economic growth has positive correlations. This result was in line with the result of some researchers, as mentioned by Silve and Plekhanov, 2014 for financial innovation, Reddy 2012 and Setiawan, n.d. 2018 for the stock market.

According to Indonesia Financial Authority (OJK), some actions was taken by Indonesia government in order to increase the performance and keep the stability of stock market and financial innovation such as, released permission of online register for investor in stock market, during the pandemic era there are phenomena the increasing of retail investor especially millennial generation, based on Indonesia Stock Exchange, the growth of new investors in 2011 is 103% and 81% of them are Millennial (Director of Stock Exchange Indonesia – CNBC, 2022). Even though the number of Initial Public Offering (IPO) has been decreased during the pandemic in 2020 up to 2022, but there were some attractive such as Mitral (State Owner company), Bukalapak and GOTO (digital startup companies). Foreign Capital Outflow in March 2020 during the first pandemic has been recover to Net Inflow which make Stock Exchange become more stable. In Financial Innovation, Bank Indonesia as regulator and guardian of monetary policy setting the number of Broad Money (M2) and Flexible Inflation Targeting Framework (ITF). The policy regarding cryptocurrency in Indonesia is treat cryptocurrency as a commodity and it is not allowed as legal money/ digital money. The regulation was written in Peraturan Badan Pengawas Perdagangan Berjangka Komoditi Number 5/2019, The regulation defines crypto-assets as intangible commodities in the form of digital assets, using cryptography, peer to peer networks, and distributed ledgers to set up new

units, verify transactions, and secure transactions without interference from other parties.

CONCLUSION

The correlation of stock market, Financial Innovation and Cryptocurrency to Indonesia economic growth in this paper has been conducted by VECM and the result in line with previous researcher, that in the long run all the variable give positive correlation, but in short-run only stock market and economic growth give positive correlation. The result of long and short run of VECM is supported by Impulse response and variance decomposition that stock market has the biggest impact to economic growth. Since stock market was influenced by foreign capital, Government should put prioritize action if there are capital outflow and encourage retail to be more familiar with stock exchange. External factor that impact to stock market volatile is interest rate which setting by Federal Reserve USA, Exchange Rate of USD-IDR, the volatile of commodity and mining price in global market since attractive share in Indonesia are belong to commodity and mining production.

Financial Innovation and Cryptocurrency give impact to economic growth in long run, since it takes more time to adjust financial innovation to economic growth, however since the number of money circulate in market can impact to inflation and will be impact to interest rate then it is also can impact to stock market. Cryptocurrency will be give more impact to economic growth if it is treated as legal money in trading.

REFERENCES

Ansong, Abraham, Edward Marfo-Yiadom, and Emmanuel Ekow-Asmah. (2011). The Effects of Financial Innovation on Financial Savings: Evidence from an Economy in Transition. Journal of African Business 12: 93–113.

Azam, M., Haseeb, M., Samsi, A. B., & Raji, J. O. (2016). *Stock Market Development and Economic Growth : Evidences from Asia-4 Countries. 6*(3), 1200–1208

Bank Indonesia. (2022) Retrieved Feb 23th, 2022, from https://www.bi.go.id/id/fungsi-utama/mon eter/default.aspx

Barna, F., Mura, P.O. (2010), Capital market development and economic growth: The case of Romania. Annals of the University of Petrosani, Economics, 10(2), 31-42.

Briere, M., Oosterlinck, K. & Szafarz, A. (2013). Virtual currency, tangible return: Portfolio diversification with bitcoins. (CEB Working Paper No. 13/031 September). Université Libre de Bruxelles: Solvay Brussels School of Economics and Management, Centre Emile Bernheim

Chou, Yuan K., and Martin S. Chin. (2011). Financial Innovations and Endogenous Growth. Journal ofEconomics and Management 25: 25–40.

Cooray, A. (2010), Do stock markets lead to economic growth? Journal of Policy Modeling, 32, 448-460.

Country Evidence. London: European Bank for Reconstruction and Development, p. 28

Cheng, Xiaoqiang, and Hans Degryse. (2014). The Impact of Bank and Non-Bank Financial Institutions on Local Economic Growth in China. Journal ofFinancial Services Research 37: 179–99

Direktorat Jendral Keuangan. Retrieved March, 5th, from: https://www.djkn.kemenkeu.go.id/kpknl-kupang/baca-artikel/13817/Aktivitas-Pasar-Modal-Indonesia-Di-Era-Pandemi.html

Director of Trading and Member of the IDX, CNBC, 2021. Retrieved March, 5th, from https://www.cnbcindonesia.com/market/2020 1023134938-17-196606/jangan-kaget-selama-pandemi-banyak-yang-jadi-investor-saham

Director of Indonesia Stock Exchange, CNBC, 2022,. Retrieved June, 6th, from https://www.cnbc indonesia.com/market/20220125105039-17-310196/investor-di-bei-tembus-775-juta-didominasi-milenial-gen-z

Emy Widyastuti, & Nena Arinta, Y. (2020). Perbankan Syariah dan Pertumbuhan Ekonomi Indonesia: Bagaimana Kontribusinya? *Al-Muzara'Ah*, *8*(2), 129–140.

Global Financial Stability Report. (2020). Retrieved Feb 26th, 2022 from : https://www.imf.org/en/Publications/GFSR/ Issues/2020/06/25/global-financial-stability-report-june-2020-update

Ghosh, S., Revilla, E. (2007), Enhancing the Efficiency of Securities Markets in East Asia. World Bank Policy Research Working Paper 4129, Washington.

Husain, I. (2006), Development of Asian Bond Markets: Current Situation and Future Prospects", Keynote Address Delivered at 10th General Meeting of Asia-Pacific CDC Group Held at Karachi on November-9, 2006.

Howell, S. T. (2020). *Initial Coin Offerings : Financing Growth with Cryptocurrency Token Sales. 33*(212), 3925–3974.

HY Liang, AK Reichert.(2007). Economic Growth And Financial Sector Development. *The International Journal of Business and Finance Research. Vol1. No.1.*

IMF. (2020). World Economic Outlook Update June

2020. *International Monetary Fund*, *2*, 6. https://www.imf.org/en/Publications/WEO/Issues/2020/06/24/WEOUpdateJune2020

Kusumastuty, C., Wulandari, D., Narmaditya, B., & Kamaludin, M. (2019). Do Monetary Variables Affect to Cryptocurrency Price? Lesson From Indonesia. *Jurnal Ekonomi Dan Studi Pembangunan*, *11*(2), 131–142. https://doi.org/10.17977/um002v11i22019p131

Lipinsky, F., Ong, L.L. (2014), Asia's Stock Markets: Are there Crouching Tigers and Hidden Dragons?", IMF Working Paper, WP/14/37. Monetary and Capital Markets Department, International Monetary Fund.

Mankiw N.G. (2010). Macroeconomics. 7th ed. Worth Publishers, New York.

Peraturan Badan Pengawas Perdagangan Berjangka Komoditi (Bappebti) No 5 Tahun 2019, tentang Ketentuan Teknis Penyelenggaraan Pasar Fisik Aset Kripto

Qamruzzaman, M., & Wei, J. (2018). Financial innovation, stock market development, and economic growth: An application of ARDL model. *International Journal of Financial Studies*, *6*(3). https://doi.org/10.3390/ijfs6030069

Reddy, D. V. (2012). Impact of Inflation And GDP on Stock Market Returns In India. International Journal of Advanced Research in Management and Social Sciences, 6. 120-136

Riffin, Amzul., Feryanto. (2021), *Analisis Time Series Model VAR-VECM* (Working Paper). Economic Management Faculty, IPB University, Indonesia

Rudriger, Dornbush. (2006). Ekonomi Makro. Edisi Kedelapan. Jakarta: Media Global Edukasi

Setiawan, S. A. (n.d.). Does Macroeconomic Condition Matter for Stock Market? Evidence of Indonesia Stock Market Performance for 21 Years. *IV*(1), 27–39.

Shittu, Ayodele Ibrahim. (2012). Financial Intermediation and Economic Growth in Nigeria. British Journal ofArts and Social Sciences 4: 164–79

Shin, Y. (2013), "Financial markets: An engine for economic growth", The Regional Economist, Federal Reserve Bank of St. Louis, Central of America Economy

Silve, Florent, and Alexander Plekhanov. (2014). Institutions, Innovation and Growth.

Sulistiana, I. (2017). Model Vector Auto Regression (VAR) and Vector Error Correction Model (VECM) approach for inflation relations analysis, Gross Regional Domestic Product (GDP), world tin price, BI rate and rupiah exchange rate. Integrated Journal of Business and Economics, 1(2), 17–32.

Economics Development Analysis Journal

How Does Financial Inclusion Affect Economic Growth and Income Inequality?

Annisa Zanuar Rahma[1] , [2]Faaza Fakhrunnas✉

[1,2]Universitas Islam Indonesia

Article Information	Abstract
	Financial inclusion is an important element in creating inclusive economic growth. The availability of easy access to public services can facilitate all levels of society. This study focuses on analyzing the effect of financial inclusion on economic growth and income inequality in countries based on their income categories. The research object is 440 observations with secondary data using cross-section and time-series data for 11 years, 2010 - 2020, and using objects from 40 countries in the world based on their income categories. This research uses panel method regression analysis. The results of panel data regression show that financial inclusion affects economic growth and income inequality when estimated with complementary variables, inflation, and the rule of law. In its effect on economic growth, financial inclusion has proven to be influential in the categories of lower-middle-income and high-income countries. Meanwhile, in terms of its impact on income inequality, financial inclusion is proven to affect the lower-middle-income and upper-middle-income categories of countries. The results of this study become a consideration for countries based on their income categories to increase financial inclusion so that policies can be achieved to improve people's welfare through financial inclusion.

⌧ Corresponding author :
  Address: Universitas Islam Indonesia
  E-mail: fakhrunnasfaaza@uii.ac.id

INTRODUCTION

Inclusive finance which shows the freedom of society in accessing financial facilities can also be referred to as economic liberalization. Financial liberalization has a significant positive effect on the quality of investment and the volume of savings. Goldsmith (1969) argues that financial intermediation positively impacts growth caused by increased efficiency and the importance of investment. Meanwhile, McKinnon (1973) explained the impact of financial liberalization that drives growth. According to McKinnon (1973), the financial sector can increase the volume of savings and the quantity and quality of investment.

Saving activity is one of the drivers of investment but is a negative function of the real interest rate. Savings will decrease when driven by accelerating inflation or a decline in the nominal interest rate. According to McKinnon (1973), money reserves are essential to forming capital. They are developing an inclusive financial system by providing savings and financial services to all economic actors. In addition, King and Levine (1993) stated that about one-third of the inequality in developing countries could sooner or later be eliminated by increasing development in the financial intermediation sector. Financial inclusion describes the ability of the community to enjoy easy access to financial services in the form of transactions, savings, payments, credit, and insurance.

Access to public financial services has become an important part of the development process in many countries. Increasing access to public financial services has a positive impact on the financial sector, which can then become a driving force for increased economic growth. This is because financial access can accelerate the efficient allocation of productive resources to reduce the cost of capital (Nwafor and Yomi, 2018). Improving the quality of human resources through access to adequate financial services, can increase affordable monetary financing activities.
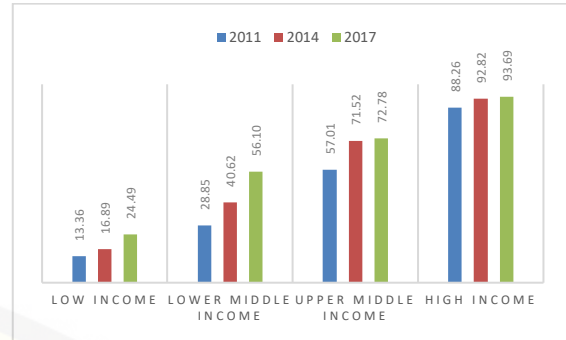
Figure 1. Percentage of Accounts of Financial Institutions Age above 15 years.
Source: World Bank, 2021 (Processed)

Morever, Figure 1 explains the percentage of accounts of financial institutions aged 15 years and over showing that people have accounts, either in their name or with other people at banks or other financial institutions. The data was obtained based on the Global Financial Index Database survey conducted by the World Bank in the period 2011, 2014, and 2017. Overall, people aged 15 years and over who have accounts with financial institutions has increased worldwide. Based on the category, it can be concluded that the income condition of the country influences the availability of public access services in the financial sector.

In the context of financial sector growth that leads to financial inclusion, it needs to be realized in the ease of access and availability of formal financial services such as bank deposits, credit, and insurance for the whole community (Kim, Yu, and Hassan, 2018). Through the availability of access to adequate financial services, of course, can provide convenience for the community to improve welfare. The link between the financial sector and real economic growth has developed into a trickle-down effect concept. Financial inclusion can reduce poverty because income distribution can ultimately encourage increased economic growth (Beck, Demirgüç and Levine, 2007).

Based on the income categories of countries in the world, it is necessary to know how the application of financial inclusion can influence increasing economic growth and reducing income inequality in countries based on their income level categories. As research has

been conducted by Demirgüç-Kunt & Klapper (2013) and Allen et al, (2016) found that economic growth as measured by the proxy indicator of GDP per capita has a positive and significant effect on variations in financial inclusion in the level of account penetration, savings and loan activities between low-income, middle-income, and high-income countries. Research on financial inclusion that compares the country's categories and low income, lower middle income, upper middle income, and high income has not been done much. Most only research on a smaller scale in specific categories.

High economic growth is not necessarily followed by an increase in people's welfare. Problems related to poverty and income inequality are still things that cannot be avoided by many countries, even countries with high economic growth. Therefore, through an increase in financial inclusion, it can provide access to services in the financial sector so that people can enjoy the convenience of accessing banking services to improve their welfare. According to Kabakova & Plaksenkov (2018), a country's financial inclusion is not only determined by factors in the financial market, but is also determined by the entire ecosystem, including economic, social (Robert, Tilman and Nina, 2014), political (Beck, Demirgüç-Kunt and Honohan, 2009), and technological advances (Adner and Kapoor, 2010).

Financial inclusion has contributed to the development of the financial sector, which indirectly reduces poverty and income distribution inequality to be a driver of a country's economic growth. In addition, improving financial access services that are adequate and accessible to all segments of society can enhance the welfare of the poor. Financial inclusion can ensure increased public access it the provision of efficient financial services and accelerate the creation of capital that can provide opportunities for the poor (Dupas et al., 2016). Therefore, developing an inclusive financial system is the right solution to increase development and economic growth.

This difference in country categories based on income levels has implications for public

access to financial services. This is reinforced by the conditions of poverty and income inequality that are often found in countries with middle and low categories. Low financial inclusion in countries with high-income inequality conditions causes the marginalization of the poor due to inequality of economic opportunities (Nwafor and Yomi, 2018). Therefore, providing access to financial services to the public is necessary to accelerate inclusive economic growth in all countries. Several previous research that has been carried out have found many different effects between financial inclusion and economic growth, and also income inequality. This difference in influence is due to differences in the proxy variables used to explain financial inclusion and differences in the countries selected to be used as research subjects.

Therefore, this study seeks to answer the effect of financial inclusion by using a variable approach that explains the effect of financial inclusion on economic growth and income inequality by looking at the categories of countries based on their income levels. The financial inclusion proxy variable approach is based on the division of dimensions of financial inclusion according to Sarma (2008), banking penetration, availability of banking services, and use of banking services.

Several studies related to the impact of financial inclusion on economic growth and income inequality have been carried out, such as Sharma (2016), Ratnawati (2020), Nwafor and Yomi (2018), Khera et al, (2021), Onaolapo (2015), Erlando, Riyanto and Masakazu (2020), Neaime and Gaysset (2018), and Omar and Inaba (2020). Besides, the different from those previous research, this study is comparing financial inclusion by income category. The income categories country is income, lower-middle-income, upper-middle-income, and high-income. Thus, the point of view presented in this study can provide a new perspective on how to compare the level of financial inclusion in the world based on income categories.

The research gap of this study is comparing the level of financial inclusion by income category, can provide recommendations

for policymakers to improve the provision of public access to financial services. Especially for countries with low-income and middle-income categories to adapt and adjust policies related to providing access to public services to create inclusive economic development. This research focuses on improving previous research on the effect of financial inclusion on economic growth and income inequality. Moreover, as already studied by Erlando, Riyanto and Masakazu (2020), Ratnawati (2020) Neaime and Gaysset (2018) and Sharma (2016), this study provides a different point of view by comparing the level of financial inclusion based on income categories, namely low income, lower middle income, upper middle income, and high income. Thus, the point of view presented in this study provides a new perspective on how to compare the level of financial inclusion in the world based on income categories.

RESEARCH METHODS

This panel data analysis uses a time series for 11 years, namely 2010 - 2020, by considering the period that has been free from the crisis so that the condition is stable. Several steps were taken to analyze the static panel data regression model to find a good regression result. It was first tested with three models, namely common effect, fixed effect, and random effect. Furthermore, a model suitability test was conducted to determine the best model through the Chow, Hausman, and Lagrange multiplier. After obtaining the best model, the next step is to test the classical assumption, consisting of the multicollinearity and heteroscedasticity tests. This study uses secondary data from various sources such as World Development Indicators, World Governance Indicators, International Monetary Fund, Standardized World Income Inequality, and Statistics.

The panel data analysis method was chosen because it has several advantages, including panel data, a combination of time series and cross-section data, which can provide more data to produce a greater degree of freedom. In addition, by combining information

from time series and cross-section data, it can overcome problems that arise when there is a problem of eliminating variables (omitted variables). Referring to Ratnawati (2020), Nwafor & Yomi (2018) and Onaolapo (2015), this study uses a panel data regression equation model. This study has two equations of the research model because it uses two dependent variables. The research equation for economic growth is as follows:

$$lnPDB_{it} = \beta_0 + \beta_1 lnCOM_{it} + \beta_2 LOAN_{it} + \beta_3 INF_{it} + \beta_4 LAW_{it} + e_{it} \ ....(1)$$

Then, the equation with the dependent variable of income inequality is as follows:

$$GINI_{it} = \beta_0 + \beta_1 lnCOM_{it} + \beta_2 LOAN_{it} + \beta_3 INF_{it} + \beta_4 LAW_{it} + e_{it} \ ....(2)$$

The lnPDB is natural log of economic growth in country i with period t, GINI show the gini coefficient in country I with period t, lnCOM show the natural log of the number of commercial bank branches per 100,000 adults in country I with period t, and LOAN show an outstanding loan from a commercial bank (%of GDP) in country I with a period t, last, the symbol of I show the 40 countries in the world by income category.

The research data used is GDP per capita, with the Gini coefficient as the dependent variable. Then, the independent variables used are the number of commercial bank branches per 100,000 adults and the outstanding loans from commercial banks to GDP. The selection of a proxy for the number of commercial bank branches is an essential element in terms of financial access services throughout the country. Without commercial bank branches that are available and can facilitate the public, access to financial services can be hampered. Then, the proxy for the outstanding loans from commercial banks to GDP is chosen because the flow of funds to borrowers will lead to an efficient and sustainable financial system. Thus, outstanding loans from commercial banks to GDP can measure economic performance in terms of funding. Therefore, by selecting these two indicators as proxies for financial inclusion, it is

possible to measure the level of access to financial services from all walks of life.

This study also adds complementary variables, namely the inflation rate as measured by the GDP deflator and the rule of law as measured by the rule of law indicator. The object of this research is 440 observations with secondary data using cross-section and time-series data for a period of 11 years, namely 2010 - 2020, and using objects from 40 countries in the world based on their income categories, with details of ten low-income countries, ten lower-middle-income countries, ten countries upper middle income, and ten high-income countries.

This study uses two models to explain how the influence of financial inclusion on economic growth and income inequality are interrelated. A country with high-income inequality conditions needs to improve access to public financial services that can provide adequate and easy-to-reach financial services. Thus, it can increase community economic activity, encouraging regional economic growth.

Countries with high-income inequality tend to experience lower economic growth. This is in line with the inverted U concept developed by Kuznets (1955), which states that in an economy that has just entered an initial growth condition, then the distribution of income tends to be poor. Because the existing opportunities and opportunities have been taken advantage of by an already better economy, thus, an economy with higher inequality conditions will lead to inefficiency in the economy, which causes low economic growth. Therefore, the government has not been able to transfer income and

expenditure immediately due to the low-income level.

The number of commercial bank branches is the total number of commercial bank branches in the country reported annually by the central bank through the Financial Access Survey (Sarma, 2008). According to Sharma (2016), the contribution of savings and credit can be used as the primary determinant of economic performance. Therefore, a proxy indicator of the proportion of loans to GDP is used as a measure to describe the use of banking system services by the public. The selection of indicators was based on research by Neaime & Gaysset (2018), Kim et al., (2018), Sharma (2016), Khera et al., (2021), Ratnawati (2020), and Onaolapo (2015), which used these indicators. To show the penetration of banking by the public, it is vital to use it as a measure of financial inclusion.

RESULTS AND DISCUSSION

This result and discussion describe the effect of financial inclusion by using the proxy of the number of commercial bank branches and the proportion of loans to GDP on economic growth as measured by gross domestic product and income inequality as measured by the Gini coefficient in each country category based on income levels. Then, the results of this analysis compare how the main factors in financial inclusion that affect economic growth and income inequality differ in each country category based on their income level. The category of state income based on income is divided into four categories, namely low income, lower middle income, upper middle income, and high income.

Table 1. Descriptive Statistics

Variable	Mean	SD	Min	Max
Low Income Countries				
PDB	US$697,213	US$151,550	US$428,926	US$1.194,03
GINI	0,54	0,06	0,33	0,65
lnCOM	3,47	2,10	0,62	8,74
LOAN (%)	16,13	9,46	1,75	41,07
INF (%)	4,43	5,11	11,58	36,99
LAW	-0,70	0,40	-1,50	0,12

Variable	Mean	SD	Min	Max
Lower Middle-Income Countries				
PDB	US$2.193,79	US$1.014,19	US$785,502	US$4.167,73
GINI	0,44	0,08	0,28	0,60
lnCOM	10,02	6,29	1,75	24,88
LOAN (%)	4,30	3,09	11,05	14,25
INF (%)	0,41	4,46	-1,42	21,26
LAW	-0,51	0,33	-1,20	0,75
Upper Middle-Income Countries				
PDB	US$8.074,154	US$3.157,825	US$2.437,53	US$14.613,04
GINI	0,42	0,09	0,24	0,72
lnCOM	20,21	11,03	8,97	56,22
LOAN (%)	52,92	27,98	11,16	120,78
INFL (%)	7,78	9,67	-1,04	50,62
LAW	-0,03	0,33	-0,88	0,65
High Income Countries				
PDB	US$406.878	US$3.765.429	US$12.447,44	US$3.95e+07
GINI	0,33	0,02	0,25	0,36
lnCOM	42,34	20,50	56,53	95,93
LOAN (%)	104,66	50,04	34,46	216,64
INF (%)	1,13	1,22	-1,88	5,56
LAW	1,33	0,51	0,24	2,10

Source: Data Processed, 2022

The descriptive statistics of research variables are presented in Table 1. The table shows a sizeable financial inclusion gap between countries by category, as shown by the significant difference between the minimum and maximum value of the indicators. The World Bank divides countries into four categories based on their income level. The World Bank divides countries into four categories based on their income level. The first category is low-income, with a GNI per capita below USD 1.085. second, namely, the lower middle-income class with a GNI per capita income between USD 1.086 – USD 4.255. Then, the upper middle-income countries with a GNI per capita income between USD 4.256 – 13.205. Meanwhile, the category that Lastly, high income has a GNI per capita income above USD 13.206.

Based on the results of descriptive statistical analysis of each country category, it can be seen that countries with high-income categories have a higher value of gross domestic product per capita. In addition, it can be seen that the condition of income inequality in high-income countries is lower than in other categories of countries. Moreover, it also explains that economic conditions in high-income countries are better than in different categories of countries. Then, the highest score on the financial inclusion proxy indicator was obtained by countries in the high-income category. That proves that countries with high-income categories have better levels of financial inclusion.

The model in this research is already fit because it meets the assumption of BLUE (Best Linear Unbiased Estimator) and is free from multicollinearity, heteroscedasticity, and autocorrelation problems. The heteroscedasticity has been fit by the robust standard error. According to Bai et al., (2020), they proposed a robust standard error with unknown clusters. Robust standard errors are obtained from what is often referred to as the heteroskedasticity-consistent covariance matrix estimator

(HCCME). It was proposed by Huber and rediscovered by White. In econometrics, the HCCME standard errors may be White's standard errors or Huber/White standard errors (Adkins and Hill, 2011).

Table 2. Result of the Economic Growth and Financial Inclusion

Variable	Low Income	Lower Middle Income	Upper Middle Income	High Income
lnCOM	0,09	0,40***	-0,22*	0,04*
	0,63	4,58	-1,80	1,71
LOAN	0,02	0,55*	-0,30	-0,09
	-0,05	1,69	-1,46	-0,43
INF	0,29	-0,37	-0,94***	1,94
	1,07	-1,27	-5,45	1,13
LAW	0,27**	0,37	0,38**	0,85***
	2,13	1,70*	2,32	3,45
Constanta	6,61***	6,71***	9,80***	9,45***
	38,62	19,81	25,16	18,73
Observations	110	110	110	110
R-squared	0,0022	0,4963	0,0313	0,3055
Adjusted R-squared	-0,0201	0,5620	0,2675	0,2933
F Statistic	*Wald Chi2*(4)	*Wald chi2*(4)	*Wald chi2*(4)	*Wald chi2*(4)
	22,27***	61,25***	62,58***	17,73***
Standard Error	0,8382	0,9056	0,9195	0,5840

Note:***,**,* each significant at the level 1%,5%,10%.
Source: Data Processed, 2022

Based on the estimation results of the selected model, the Wald chi2 value is 22.27 in the low-income country category, 61.25 in the lower-middle-income country, 62.58 in the upper-middle-income country category, and 17.73 in the high-income category. The results obtained by Wald chi-squares are significant at the 1% level. The Wald chi value in each country category is greater than the critical chi-square value in df 4 of 13.28, 9.49, and 7.78 at the 1%, 5%, and 10% levels, respectively. This proves that the variables on financial inclusion and the complementary variables consisting of inflation and the rule of law are simultaneously able to influence economic growth. When there is an increase in the dependent variable, it can contribute to economic growth as measured by GDP per capita. These results prove the statement of McKinnon (1973), who argues that financial liberalization through the financial sector can increase the quantity and quality of investment in promoting economic growth.

The coefficient determination of the low-income financial inclusion category toward economic growth is 0.22%. Thus, financial inclusion and the complementary variable shown by inflation and the rule of law can explain economic growth of 0.22%, while other variables explain the 99.88%. This low r-square result is because the banking structure available in low-income countries is not yet sufficiently developed in terms of access to financial services for the public (Neaime and Gaysset, 2018). Access to public financial services has not yet provided a practical impact on increasing community productivity, so it has not contributed to the economy that can boost economic growth.

In the lower middle-income category, the determinant coefficient is 49.63 for economic growth. Thus, financial inclusion and the complementary variables shown by inflation and the rule of law can explain economic growth of 49.63%, while other variables explain the 50.37%. In the upper middle-income category, the determinant coefficient is 3.13%. Thus, financial inclusion and the complementary variables shown by inflation and rule of law can explain economic growth of 3.13%, while other variables explain the 96.87%. Then, the high-income category shows that the coefficient determinant is 30.55%. Thus, financial inclusion and the complementary variable show by inflation and the rule of law can explain

economic growth of 30.55%, while 69.45% is explained by other variables.

In the low-income countries category, it shows that there is no significant effect between financial inclusion and economic growth. This insignificant result is because the banking structure available in low-income countries is not yet sufficiently developed in terms of access to financial services for the public (Neaime and Gaysset, 2018a). Access to public financial services has not yet provided a practical impact on increasing community productivity so it has not contributed to the economy that can boost economic growth. People have not been able to enjoy access to financial services that can encourage activities in the financial sector and the end, will increase economic growth in low-income countries.

These results also provide evidence that the available banking products have not been able to reach the entire community, which in turn will increase economic activity, which has an impact on increasing output. This finding proves that the flow of loan funds circulating in the community has not reached and facilitated all levels of society. That is, an increase in loans or credit is less productive in increasing economic growth. This is because the existing flow of credit funds is mainly used for spending in the real sector (Seven and Coskun, 2016). Therefore, the flow of funds affects the monetary sector, such as the capital market. This also implies that people with strong capital can only reach the flow of loan and credit funds. Thus, it has not been able to encourage the community's economic activities as a whole. This result is in line with research by Sharma (2016), which proves an insignificant relationship between the proportion of loans and economic growth, which can be caused by the enactment of the level of non-performing assets in low-income countries.

In addition, this result is also in line with the findings of Erlando et al., (2020), who found that financial inclusion on the usability dimension hurts economic growth. The available banking structure can sometimes not facilitate the entire community, thus making the public less interested in using these services. In addition,

this also proves that the existing flow of credit and savings funds has not been utilized for economic development activities in the form of funding for small, micro, and medium enterprises (MSMEs), which can encourage increased economic activity to contribute to economic growth.

In lower middle-income country categories, shows a significant influence between financial inclusion and economic growth. Availability of access to financial services in the form of affordable bank branches for all people is crucial in increasing output which will ultimately increase economic growth. The ease of access to banking services and expanding the reach of bank branches and ATMs provide positive economic prospects. Because giving easy access to banking services to the general public at low rates, it can encourage economic growth through efficient allocation of funds for the entire community (Sharma, 2016).

This finding indicates that a higher loan rate can encourage the economic growth of a country in the lower-middle-income category. Financial inclusion, as measured by the proportion of loans to GDP, can increase investment activities with high added value to encourage economic growth through increased output. Bank loans play a role in financing a country's economy. With the availability of loans that enable a household to carry out better consumption and investment activities, an increase in loans provided by banks can increase productivity and thus encourage higher economic growth. This result follows the argument of Goldsmith (1969), who argues that there is a positive effect of financial intermediation on change caused by increased efficiency and volume of investment.

In the Upper middle-income category, financial inclusion does not significantly affect economic growth. This insignificant effect occurs because the number of commercial bank branches in upper-middle-income countries has not facilitated access to public financial services as a whole. Thus, people, especially those with low incomes, cannot enjoy the benefits of the banking system. These results indicate that an increase in the number of commercial bank

branches per 100,000 hurts economic growth. This means that the availability of banking services has not provided easy access to finance for the entire community.

Thus, there is no flow of funds in the community's cash and credit movements, which ultimately hampers economic growth. This finding is contrary to that which proves that Burgess & Pande (2005) the ease of availability of banking services can encourage the movement of cash and credit in society through money flow. This result is in line with Naceur & Ghazouani (2007) findings, which state that bank development hurts 11 countries in the Middle East and North Africa. In addition, the results of this study are also supported by research findings by Khan (2011), which found a negative effect of financial inclusion on economic growth. This insignificant result indicates an increase in loans or credit in upper-middle-income countries that are less productive in encouraging economic growth. Credit circulation is mainly used for spending in the real sector (Seven and Coskun, 2016). Thus, the inflow of funds affects the monetary sector, such as the capital market (Erlando, Riyanto and Masakazu, 2020). In addition, this insignificant result may occur because financial inclusion achieved through rapid credit growth or unregulated intermediation of funds can impact financial stability, which results in depressed economic growth Mehrotra & Yetman (2015). These findings are in line with the findings by (Erlando et al., 2020), proving that the dimensions of the use of banking services proxied by the proportion of total deposits and loans to GDP show significant adverse results. In high-income countries, a significant effect is evidenced by the proxy indicator of the number of commercial bank branches. These findings indicate that the banking system has developed quite well. This is evidenced by high access to banking financial services and is supported by high gross domestic product growth as well.

The availability of banking services that have a positive effect indicates that all levels of society have utilized the availability of commercial bank branches. This has contributed to economic activity, particularly in the financial sector. The ease of access and use of financial services for the community has proven to support economic growth. These results are consistent with research conducted by Kim et al., (2018), which found a positive influence between financial inclusion and economic growth and found reciprocal causality with each other. In addition, these results are also supported by the findings of Sharma (2016), who found a positive relationship between economic growth and various dimensions of financial inclusion, including banking penetration.

In the proxy indicator of the proportion of loans to GDP, it was found that the results were not significant for economic growth. These findings do not significantly affect economic growth with existing credit in high-income countries. This insignificant result can occur because financial inclusion achieved through rapid credit growth or unregulated intermediation of funds can have an impact on financial stability, which results in depressed economic growth Mehrotra & Yetman (2015) In addition, this insignificant effect occurs because credit circulation is mostly used for spending in the real sector. Thus, the inflow of funds affects the monetary sector, such as the capital market (Erlando, Riyanto and Masakazu, 2020).

This result certainly contradicts the argument of King & Levine (1993), which provides empirical evidence that supports the banking system as a solid financial intermediary leading to economic growth in capital accumulation that can increase people's productivity. This insignificant effect is in line with research conducted by Mehrotra & Yetman (2015), which proves that access to financial services in the form of savings and credit does not always have a positive impact. However, the results of this study are supported by research findings by Sharma (2016), which found that the amount of credit in proportion to GDP did not show a significant relationship to economic growth. This means that in using banking services in the form of credit, consider the level of non-performing assets in the banking sector of high-income countries.

Table 3. Results of the Income Inequality and Financial Inclusion

Variable	Low Income	Lower Middle Income	Upper Middle Income	High Income
lnCOM	0,04	-0,007	0,07***	0,0003
	1,01	-0.42	5.51	0.24
LOAN	-0,49	-0,13***	-0,09**	0,01
	-1,69	-2.97	-2.30	0.88
INF	-0,04	0,09	0,06*	-0,07
	-0,43	0.65	1.90	-0.54
LAW	0,07*	0,08**	-0,01	0,001
	-2,76	2.15	-0.72	0.06
Constanta	0,52***	0,55***	0,25***	0,31***
	11,51	7.42	6.40	8.46
Observations	110	110	110	110
R-squared	0,1212	0,3148	0,2648	0,0710
Adjusted R-squared	0,0021	0,4249	0,1652	0.3427
F Statistic	F(4,9)	Wald chi2(4)	F(4,9)	Wald chi2(4)
	7,56***	77,62***	8,02***	9,87**
Standard Error	-0,8828	0,8335	-0,7610	0,8680

Note:***,**,* each significant at the level 1%,5%,10%.

Source: Data Processed, 2022

Based on the estimation results, the F statistic value is 7.56 in the low-income category, and the F value is 8.02 in upper-middle-income countries, which shows a significant value at the 1% level. Then, in lower middle income and high-income countries, each of them shows a significant wald chi squares value at the 1% level. These results indicate that the financial inclusion proxy variable and the complementary variables, namely inflation and the rule of law, significantly affect income inequality in all country categories. An increase in the independent variables, namely financial inclusion, inflation, and the rule of law, can reduce income inequality in low-income countries.

The value of coefficient of determination shows a high value in the lower-middle-income and upper-middle-income categories. Meanwhile, the low-income and high-income categories show a small coefficient of determination. For low income, the coefficient of determination is 0.0021, which means that only 0.21% of financial inclusion variables and complementary variables can explain variations in income inequality. Then, financial inclusion and the complementary variable can explain income inequality in the lower middle-income category for 42.49%, while other variables explain the 57.51%. In the upper-middle-income category, financial inclusion and the complementary variable can explain income inequality for 26.48%, while other variables explain 73.52%. Then, financial inclusion and the complementary variables can explain income inequality in the high-income category just for 7.1%, while other variables explain 92.9%.

Low-income categories, shows that financial inclusion has no significant effect on income inequality. This insignificant effect arises because the banking structure in low-income countries is not well developed, especially in terms of access to financial services which can effectively impact income inequality and poverty (Neaime and Gaysset, 2018a). This indicates that an increase in commercial bank branches indicates that banking penetration does not reduce income inequality in low-income countries.

The availability of commercial bank branches that should facilitate access to financial services by the public has not been felt by all community members. The ineffectiveness of the financial sector causes the lower labour productivity due to less than optimal allocation of funds. In addition, the lack of development in the number of commercial bank branches causes a low level of competition, so bank loan margins will increase with low-interest rates, ultimately unable to provide incentives for savings (Neaime and Gaysset, 2018a).

The insignificant results on the loan proxy also show that the use of loan facilities that have been used for activities such as savings and investment has not been able to have a significant effect in low-income countries. This insignificant result is in line with the findings by Erlando et al.,(2020)., which prove that an increase in financial inclusion on the usability dimension derived from the proportion of savings and credit indicators encourages wider income inequality. According to him, banking institutions need to pay attention to product innovation based on technology and internet systems to be accepted and benefit all levels of society. These findings are in line with the opinion expressed by Todaro & Smith (2011), which states that the higher the income inequality, the fewer people who qualify for access to financial services such as loans and other credits.

In lower-middle-income categories, the significant variable is shown by an outstanding loan from commercial bank branches, but not for the variable number of commercial bank branches. This insignificant effect arises from the structure of financial institutions and banking in lower-middle-income countries that are not sufficiently developed to provide financial services effectively to the public. Thus, the poor have not been able to enjoy optimal financial access services. The benefits of a developing banking system in lower-middle-income countries do not seem to be felt and reach more poor people.

Meanwhile, the proxy indicator for outstanding loans from commercial bank branches shows a significant effect on income inequality. An increase in the proportion of loans circulating in the community can increase people's income, thereby reducing income inequality. These findings are consistent with the results of research by Beck et al., (2009), which states that financial inclusion can improve the financial condition and standard of living of the poor to reduce income inequality.

In upper middle income, it shows a significant but positive relationship, so it is not according to the research hypothesis. This positive influence indicates that an increase in financial inclusion in the form of the number of commercial bank branches does not necessarily benefit people with low incomes. Many of the banking products provided are not following the conditions of society in several countries. Thus, access to financial services can only facilitate people with sufficient capital conditions. Thus, people with low incomes cannot access banking product services.

The proxy indicator of outstanding loans from commercial bank branches shows a significant effect on economic growth. These results indicate that access to financial services in upper-middle-income countries has reached all levels of society, especially in loan products that can facilitate an increase in the income of low-income people. The fulfillment of easy and affordable access to financial services for the whole community will enable the community to integrate better into active economic activities (Ratnawati, 2020). Thus, financial inclusion can boost the income of low-income people, which ultimately reduces income inequality. These findings follow research by Beck et al., (2007) which states that financial inclusion can improve the financial condition and standard of living of the poor to reduce income inequality. In addition, these results also prove another study by Park & Mercado (2015), which found empirical evidence of a negative and significant relationship between financial inclusion and income inequality and poverty.

In high-income categories, financial inclusion does not significantly affect income inequality. This result is not significant because the structure of financial and banking institutions that are available can only reach people with high incomes. In addition, the banking products provided can only facilitate people with strong capital, so they cannot get people with low incomes.

These results prove that increasing financial inclusion through increasing the number of bank branches is not efficient in reducing income inequality in high-income countries. This means that the increase in bank branches widens income inequality. These results prove that the distribution of the number of

commercial bank branches has not been reached by people with low incomes. Thus, the benefits of the availability of new commercial bank services can be accessed by the public with strong capital.

This finding suggests that most of the funds flowing through credit or loans from commercial banks have not facilitated low-income communities. This means that the flow of loan funds can only use by people who have substantial capital (Erlando et al., 2020). In addition, this is because people with high incomes can only use the products available from financial institution loans. This finding also proves that loan facilities are used primarily for consumptive activities, not investment or savings, so income inequality cannot be affected. In addition, the proportion of loans can only facilitate people with high incomes. These results indicate that the flow of credit funds has not been used for community economic development through the improvement of micro, small and medium enterprises

These findings are in line with research by Erlando et al., (2020) which found that the flow of loan funds was not used in community economic development and the improvement of micro, small and medium enterprises. Thus, causing widespread inequality. Ratnawati (2020) also found evidence that the proportion of credit and loan deposits has no effect on the economy in Eastern Indonesia and developing countries in Asia.

Based on the research analysis results, it can be seen that financial inclusion contributes to economic growth. In its effect on economic growth, simultaneously, each income category proves a significant result. Thus, financial inclusion can simultaneously contribute to increasing economic growth globally. These results demonstrate the statement of McKinnon (1973), who argues that financial liberalization through the financial sector can increase the quantity and quality of investment in promoting economic growth.

Based on the comparison of the coefficient of determination for each category, countries with the lower-middle-income category prove the value of the coefficient of determination is the

highest among other categories. This demonstrates that financial inclusion contributes significantly to economic growth in the lower-middle-income category. Meanwhile, the lowest coefficient of determination is in low-income countries. These results indicate that financial inclusion only contributes very little to economic growth in low-income countries. This proves that the condition of financial inclusion in low-income countries has not been appropriately developed so it cannot facilitate the entire community.

Effect on income inequality shows that each model in each country category has a significant impact on income inequality. This significant effect is supported by the argument of Beck, Demirgüç-Kunt and Levine (2007), which states that financial inclusion can improve the financial condition and living standards of the poor to reduce income inequality. In addition, the effect of financial inclusion variables on income inequality is also evidenced by Todaro and Smith (2011), which state that the higher the income inequality, the fewer people who qualify for access to financial services such as loans and other credits.

Based on the coefficient of determination, the lowest value is obtained in high-income countries, and the following order is in low-income countries. These findings indicate that financial inclusion only slightly affects income inequality in low-income and high-income countries. Then, the highest coefficient of determination is shown by the lower middle-income category and the second highest in the upper middle income. These results indicate that both categories have provided excellent and equitable banking service facilities throughout the region.

The ineffectiveness of the financial sector causes lower labour productivity due to less than optimal allocation of funds. In addition, the lack of development in the number of commercial bank branches causes a low level of competition. Bank loan margins will increase with low-interest rates, ultimately unable to provide incentives for savings Neaime and Gaysset (2018). These results show that a lot needs to be addressed in

the financial service system so that it can reach all levels of society.

Based on the results of the comparative analysis, it can be concluded that the financial inclusion variable is proven to contribute to and encourage economic growth and reduce income inequality. Each country category proves different results on each proxy indicator. This can happen due to the different characteristics of different countries.

CONCLUSION

implications in the financial sector that are important in all countries by income category. Increasing economic growth through financial inclusion can be achieved by providing access to financial services that can reach and facilitate all levels of society, reducing income inequality. The government, the central bank, and other financial institutions need to work together to develop financial services infrastructure and improve financial service networks in all regions, especially in disadvantaged areas. Financial institutions need to provide formal financial service products that are innovative and adapted to the needs and conditions of the community. Furthermore, economic activities in developing countries need to be encouraged to increase people's per capita income.

The availability of adequate access to financial services aims to reduce the number of unbanked people who do not have access to financial services. Because having access to banking services such as loan services can increase the community's capacity in choosing appropriate financial service products. Thus, increasing financial inclusion is vital in improving people's living standards. Meanwhile, the development of the financial sector through the small, micro, and medium enterprises sector that supports low-income communities is essential. Therefore, the government and financial institutions and banks can improve the products and services of the banking system, which leads to an increase in the entrepreneurial sector to contribute to economic activity.

The analysis of this study only focuses on the effect of the number of bank branches and the proportion of loans on GDP as a proxy of financial inclusion on economic growth and income inequality. Although the results of this study found a significant simultaneous effect of financial inclusion proxies on economic growth and income inequality, this study has not considered the differences in the countries used as observations. In addition, research analysis on the proxy indicators used has not measured mobile phone transactions which are currently being widely used by the public. Meanwhile, the study of this research only focuses on its effect on economic growth and income inequality. So, we don't know how it affects the poverty rate in all countries. Therefore, the authors recommend further research to explore further how financial inclusion affects poverty in the world. Not to forget, the author recommends further research to use proxy indicators adapted to current conditions, in term of considering the transaction variable by mobile phone transactions on its effect on world poverty.

REFERENCES

Adkins, L.C. and Hill, R.C., 2011. *Using Stata for Principles of Econometrics*. Fourt Edit ed. New York: John Wiley & Sons, Inc.

Adner, R. and Kapoor, R., 2010. Value creation in innovation ecosystems: How the structure of technological interdependence affects firm performance in new technology generations. *Strategic Management Journal*, 31(3), pp.306–333. https://doi.org/10.1002/smj.821.

Allen, F., Demirguc-Kunt, A., Klapper, L. and Martinez Peria, M.S., 2016. The foundations of financial inclusion: Understanding ownership and use of formal accounts. *Journal of Financial Intermediation*, [online] 27, pp.1–30. https://doi.org/10.1016/j.jfi.2015.12.003.

Bai, J., Choi, S.H. and Liao, Y., 2019. Standard Errors for Panel Data Models with Unknown Clusters. *Journal of Econometrics*. [online] https://doi.org/10.1016/j.jeconom.2020.08.006.

Beck, T., Demirgüç-Kunt, A. and Honohan, P., 2009. Access to financial services: Measurement, impact, and policies. *World Bank Research Observer*, 24(1), pp.119–145. https://doi.org/10.1093/wbro/lkn008.

Beck, T., Demirgüç-Kunt, A. and Levine, R., 2007. Finance, inequality and the poor. *Journal of Economic Growth*, 12(1), pp.27–49. https://doi.org/10.1007/s10887-007-9010-6.

Burgess, R. and Pande, R., 2005. Do rural banks matter? Evidence from the Indian social

banking experiment. *American Economic Review*, 95(3), pp.780–795. https://doi.org/10.1257/0002828054201242.

Demirgüç-Kunt, A. and Klapper, L., 2013. Measuring financial inclusion: Explaining variation in use of financial services across and within countries. *Brookings Papers on Economic Activity*, (SPRING 2013), pp.279–321. https://doi.org/10.1353/eca.2013.0002.

Dupas, P., Karlan, D., Robinson, J. and Ubfal, D., 2016. Banking The Unbanked? Evidence From Three Countries. *National Bureau of Economic Research*, pp.5–24.

Erlando, A., Riyanto, F.D. and Masakazu, S., 2020. Financial inclusion, economic growth, and poverty alleviation: evidence from eastern Indonesia. *Heliyon*, [online] 6(10), p.e05235. https://doi.org/10.1016/j.heliyon.2020.e05235.

Goldsmith, R.W., 1969. *Financial Structure and Development*. New Haven: Yale University Press.

Kabakova, O. and Plaksenkov, E., 2018. Analysis of factors affecting financial inclusion: Ecosystem view. *Journal of Business Research*, 89(January), pp.198–205. https://doi.org/10.1016/j.jbusres.2018.01.066.

Khan, S.H.R., 2011. Financial inclusion and financial stability : are they two sides of the same coin ? *Indian Bankers Association & Indian Overseas Bank, Chennai*, [online] (November), pp.1–12. Available at: <https://www.bis.org/review/r111229f.pdf>.

Khera, P., Ng, S., Ogawa, S. and Sahay, R., 2021. *Is Digital Financial Inclusion Unlocking Growth? IMF Working Paper Monetary and Capital Markets Department Is Digital Financial Inclusion Unlocking Growth?* 167.

Kim, D.W., Yu, J.S. and Hassan, M.K., 2018. Financial inclusion and economic growth in OIC countries. *Research in International Business and Finance*, [online] 43(October 2016), pp.1–14. https://doi.org/10.1016/j.ribaf.2017.07.178.

King, R.G. and Levine, R., 1993. Finance, entrepreneurship and growth. *Journal of Monetary Economics*, 32(3), pp.513–542. https://doi.org/10.1016/0304-3932(93)90028-E.

Kuznets, S., 1955. Economic Growth and Income Inequality. *The American Economic Review*, [online] 45(1), pp.1–28. Available at: <https://www.jstor.org/stable/1811581>.

McKinnon, R.I., 1973. *Money and Capital in Economic Development*. Washington,Dc: Brookings Institution Press.

Mehrotra, A. and Yetman, J., 2015. Financial inclusion - issues for central banks. *BIS Quarterly Review*, (March), pp.83–96.

Naceur, S. Ben and Ghazouani, S., 2007. Stock markets, banks, and economic growth: Empirical evidence from the MENA region. *Research in International Business and Finance*, 21(2), pp.297–315. https://doi.org/10.1016/j.ribaf.2006.05.002.

Neaime, S. and Gaysset, I., 2018a. Financial inclusion and stability in MENA: Evidence from poverty and inequality. *Finance Research Letters*, [online] 24(May 2017), pp.199–220. https://doi.org/10.1016/j.frl.2017.09.007.

Neaime, S. and Gaysset, I., 2018b. Financial inclusion and stability in MENA: Evidence from poverty and inequality. *Finance Research Letters*, [online] 24, pp.199–220. https://doi.org/10.1016/j.frl.2017.09.007.

Nwafor, M.C. and Yomi, A.I., 2018. The Nexus between Financial Inclusion and Economic Growth: Evidence from Nigeria. *International Journal of Research and Innovation in Social Science (IJRISS) |Volume*, [online] II(Iv), pp.2454–6186. Available at: <www.rsisinternational.org>.

Omar, M.A. and Inaba, K., 2020. Does financial inclusion reduce poverty and income inequality in developing countries? A panel data analysis. *Journal of Economic Structures*, [online] 9(1). https://doi.org/10.1186/s40008-020-00214-4.

Onaolapo, A.R., 2015. Effects of financial inclusion on the economic growth of Nigeria (1982-2012). *International Journal of Business and Management Review*, 3(8), pp.11–28.

Park, C.-Y. and Mercado, R.J., 2015. Financial Inclusion, Poverty, and Income Inequality in Developing Asia. *SSRN Electronic Journal*, (426). https://doi.org/10.2139/ssrn.2558936.

Ratnawati, K., 2020. The Impact of Financial Inclusion on Economic Growth, Poverty, Income Inequality, and Financial Stability in Asia. *The Journal of Asian Finance, Economics and Business*, 7(10), pp.73–85. https://doi.org/10.13106/jafeb.2020.vol7.no10.073.

Robert, C., Tilman, E. and Nina, H., 2014. *Financial inclusion and development: Recent impact evidence*. [online] *Focus Note*. Washington,DC. Available at: <http://www.cgap.org/sites/default/files/FocusNote-Financial-Inclusion-and-Development-April-2014.pdf>.

Sarma, M., 2008. *Index of Financial Inclusion: Some Empirical Results*. https://doi.org/10.1007/978-81-322-1650-6_28.

Seven, U. and Coskun, Y., 2016. Does financial development reduce income inequality and poverty? Evidence from emerging countries. *Emerging Markets Review*, [online] 26, pp.34–63. https://doi.org/10.1016/j.ememar.2016.02.002.

Sharma, D., 2016. Nexus between financial inclusion and economic growth: Evidence from the emerging Indian economy. *Journal of Financial Economic Policy*, 8(1), pp.13–36. https://doi.org/10.1108/JFEP-01-2015-0004.

Todaro, M.. and Smith, S.C., 2011. *Economic*

Development. 11th ed. Harlow: Pearson Education. Thank you for the comment, but this sentence is not taken from any source. This sentence is the result of the author's analysis based on the results of panel data regression estimates*Financial Inclusion (Global Findex) Database*.

Economics Development Analysis Journal

Rethinking Strategies To Improve Economic Development In Bandung Regency

Novi Eka Ratnasari[1]✉ , [2]Sinta Ningrum, [3]Elisa Susanti, [4]Nova Magdalena Ginting

[1,2,3,4]Department of Public Policy, Faculty of Social and Political Sciences, University of Padjadjaran

Article Information	Abstract
	The success of regional development is strongly influenced by the ability to develop the regional potential. This research aimed to determine the potential and strategies of regional development, especially in Bandung Regency through an economic sector analysis approach. The method used in this research was descriptive by using an economic sector analysis approach through location quotient, Klassen typology, and shift-share analysis methods. Those were then combined with a document review of the RPJMN year 2020-2024, RPJMD of the Bandung Regency Government year 2016-2021, RTRW of the West Java Provincial Government year 2009-2029, and RTRW of the Bandung Regency Government year 2016-2036 supported by literature from journals, data, and other reports from the central and local governments relevant to the research. The results of this study are useful for the government, especially the Bandung Regency government to further develop its leading sector, namely the processing industry sector by planning the relocation and grouping of mature types and forms of industry per industrial area and developing the geothermal energy sub-sector as a form of creation and utilization of environmentally friendly renewable energy. To improve the economics of both sectors, it is necessary to collaborate them with relatively underdeveloped sectors.

◻ Corresponding author :
Address: Faculty of Social and Political Sciences, University of Padjadjaran
E-mail: novi21001@mail.unpad.ac.id

INTRODUCTION

Regional development is an effort to integrate all resources, including nature, human, and technology into harmony and balance by considering the environment's ability to accommodate (Mahi, 2016). The existence of regional development is inseparable from its relationship with economic development and regional planning (Stimson, Stough and Roberts, 2006). The development itself has the essence of being an organized effort and can be coordinated to manifest many legally valid options to the community so that they can meet their living needs and improve welfare (Mahi, 2016). The existence of regional development will trigger economic development and have an impact on economic growth characterized by an increase in people's per capita income (Zahonogo, 2017; Aditama, 2018).

Meanwhile, planning is defined formally as an effort to achieve goals by determining the most appropriate action. The creation of planning will facilitate the formulation of the most appropriate strategies and policies to achieve goals (Machsun, 2018). In its planning, the government also prepares spatial planning published in the Regional Spatial Plan (RTRW) document. The RTRW document is prepared in stages, starting from the National Spatial Plan (RTRWN), Provincial Spatial Plan (RTRWP), and RTRW regency and city. The three spatial plans collected in a development plan are used to implement sustainable development planning in every region in Indonesia. Given the importance of spatial planning in an area, preparing policy formulation must consider many aspects and involve all stakeholders so that the results are of high quality and can be appropriately implemented (Napitupulu, Hakim and Noor, 2016)

Previous researches on the analysis of the mainstay economic sector gave the result that the development of the mainstay economic sector potential is one of the efforts that can be made to develop an area, which will have a positive impact on increasing the economy in the region and the surrounding regions. In addition, there are several other impacts, such as increasing people's and local incomes, job creation, and reducing poverty (Tri Basuki and Gayatri, 2009; Aditama, 2018; Hutajulu, Nasir and Arwansyah, 2018; Darma Putra and Yuli Pratiwi, 2019; Syapsan, 2019; Rukmana et al., 2020; Kharisma et al., 2021; Mamola, Marsega and Yulianti, 2021).

Data sourced from the Statistics Indonesia (BPS) state that the area of Bandung Regency, when viewed from a geographical aspect, is at the coordinates of 107o 22' - 108o 50' East Longitude and 60 41' – 70 19' South Latitude with an altitude of 500 m to 1,800 m above sea level and a land area of 176,238.67 Ha. Bandung Regency has thirty-one (31) sub-districts, with a population density of 2,056 people per km2. The percentage of land use in Bandung Regency is 40.71% used for agricultural areas; 21.63% is used for protected areas; and the remaining 37.66% is used for cultivation areas (BPS Kabupaten Bandung, 2021).

The contribution of Bandung Regency can be seen through the Gross Regional Domestic Product (GRDP) value. GRDP can be used when measuring the level of prosperity in a region.
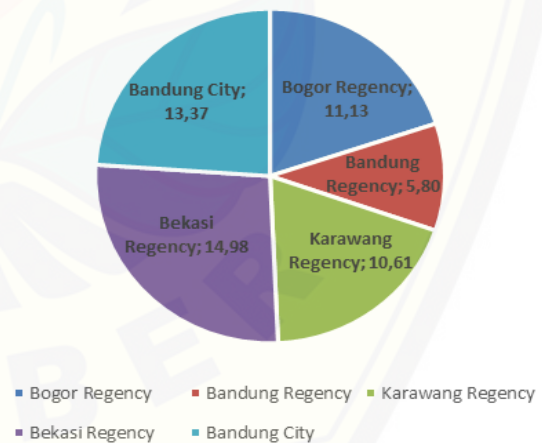

Figure 1. The Distribution of GRDP Based on Prevailing Prices in Major Regencies/Cities in West Java Province, 2020 (Percent)
Source: The Central Statistics Agency, 2021

Assumed from the picture of GRDP distribution based on the prevailing price in major regencies/cities in West Java Province in 2020, it is known that Bandung Regency occupied the fifth position with a percentage of

magnitude of 5.80%. Even though it ranked five, there is a reasonably far percentage difference with Karawang Regency which was ranked fourth with a value of 4.81 percent. Even, more significant difference was found when Bandung GRDP is compared to that of Bekasi Regency, which occupied the first position, namely 9.18 percent.

From the GRDP distribution image based on the prevailing price of regencies and cities in West Java province in 2020, there was a significant inequality between regencies and cities, and this occurred because of the inequality of resources distribution that caused an economic disparity, causing the concentration of economic activity to occur only in certain regions (Irawan, 2014)

The economic growth rate between Bandung Regency and the four closest regencies and cities in the 2016-2019 timeframe had almost the same growth pattern, around 5-7%. Then in 2020, the five regencies and cities faced a fairly sharp contraction in economic growth, with details: (1) Bandung City by 2.28 percent, (2) Bandung Regency by -1.87 percent, (3) West Bandung Regency by -2.41%, (4) Cimahi City by -2.26 and (5) Sumedang Regency by -1.14 percent.

To determine the ability of economic resources, shifts, and economic structure of Bandung Regency, GRDP value based on Current Prices per Business Field from year to year can be the reference. In 2016-2020 the economy of Bandung Regency had potential sectors to be developed to improve its economy, namely: (a) the processing industry sector, (b) the large trade and retail sector, car and motorcycle repairs, (c) agriculture, forestry, and fisheries, (d) construction, (e) transportation and warehousing, (f) educational services, (g) provision of accommodation and drinking food, (h) government administration, defense, and compulsory social security, (i) information and communication, (j) mining and quarrying.

To know which of the potential sectors can become the mainstay of the economy, a series of economic sector analysis approaches must be carried out. From this analysis, sectors which have high potential to become mainstay possible export sectors in supporting the economy of Bandung Regency can be revealed. In addition, to support success in the development of the sector, support needs to be given by proper regional spatial planning because mistakes in regional spatial planning will hinder the development of the empowerment of the mainstay sectors.

Regional development can be said to be an effort to harmonize various resources, including natural resources, human resources, and technology. Also, the territory development must still consider the environment ability to containerize all these resources. Regional development is carried out to reduce growth disparities and welfare gaps between regions (Mahi, Regional Development, Theory and Application, 2016).

In the development of the territory, basic principles are useful as a growth center, which is not only internalized to the territory, but also concern to the effect of distribution that can be beneficial to the surrounding region as well as national. In regional development, cooperation efforts are needed for development among regions because it is the key to support the success of regional development, where the pattern of regional development is integral, namely the result of the integration of areas covered by the region through an equality approach so that when planning regional development, market mechanism must be taken into account (Mahi, 2016).

Various studies related to regional planning, regional development, and the determination of leading sectors were found to only have partial investigation. Therefore, by referring to the important and strategic role owned by Bandung Regency as one of the economic buffer areas in West Java Province and the suboptimal contribution to the GRDP of West Java Province and seeing the possibility of combining regional spatial planning policies made by the government with the determination of the potential of leading economic sectors, the authors researched Bandung Regency

development strategies through an economic sector analysis approach".

RESEARCH METHODS

This paper presents the report of descriptive analysis research to determine the potential and strategies of regional development, especially in Bandung Regency based on quantitative approach to economic sectors by taking data from the official public database provided by Statistics Indonesia (BPS) of The West Java Provincial Government and The Bandung Regency Government, The Regional Development Planning Agency of West Java Province, The Bandung Regency Government Legal Documentation and Information Network (JDIH) website, the JDIH website of the Audit Board of the Republic of Indonesia (BPK), and other reliable sources relevant to this study.

The data taken from BPS were GRDP data based on prevailing prices per business field for the 2016-2020 period owned by the Bandung Regency Government and GRDP and data based on prevailing prices for the 2016-2020 period owned by the West Java Provincial Government. The data that have been obtained were then processed using the Location Quotient, Shift Share Analysis, and Klassen Typology methods, with a data processing intermediary in the form of Ms. Excell. The results were juxtaposed with the policies of the regional spatial plan (The RTRW which belongs to the West Java Provincial Government, and The RTRW which belongs to the Bandung Regency Government) and development planning policies (the National Mid-Term Development Plan (RPJMN) and the Regional Medium Term Development Plan (RPJMD) which belong to the Bandung Regency Government) to assess whether the two policies are appropriate and harmonized in supporting the mainstay potential sectors in the regency of Bandung.

The first step was to determine the location quotient of potential economic sectors in Bandung Regency. Location Quotient (LQ) method is a method of comparing the role of a particular sector in an area with the role of the same sector at the broader regional level (it can be provincial or national, depending on the regional level that is the initial reference) (Aditama, 2018). Its function is to determine the amount of specialization level or reliability of each sector (Khusaini, 2015).

$$LQ = (Xi/X)/(Zi/Z) \dots\dots\dots\dots\dots\dots(1)$$

In the above equation, LQ is the location quotient value, Xi is the GRDP sector i in related regencies/cities, X is the GRDP in related regencies/cities, Zi is the GRDP sector i in related provinces, and Z is the GRDP total in related provinces.

If the LQ>1 the sector is a mainstay sector, if the LQ<1 the sector is not a mainstay sector, and if LQ=1 the relevant sector in the regency has the same level of privilege as the provincial level (Khusaini, 2015).

The determination of the pattern and structure of growth over each economic sector in each region can be measured using a typology analysis of the class. This analysis is carried out by comparing the growth rate of each sector in a particular region with the wider region and comparing its contribution to the total GRDP of a sector in a particular region with the wider region. The results of this analysis can be used to estimate future economic growth opportunities, and be considered in the formulation of regional development policies (Mukhlis et al., 2018; Hamad, Rashid and Ahmed, 2021).

After that, Klassen typology analysis was carried out. Klassen's Typological Analysis divides sectors into four quadrants. Quadrant I is for the developed and rapidly growing sector. In this quadrant, the growth rate of GRDP in the specific sector (Pi) is greater than that of in the broader regional GRDP or called as reference (P), and the value of the contribution to the GRDP (Xi) owned by the specific sector is greater than the contribution of that specific sector to the broader regional GRDP or called as reference (X). The coat of arms for this classification is Pi > P and Xi > X.

Quadrant II is for the advanced but depressed sector. In this quadrant, the growth rate of the specific sector in the GRDP (Pi) is

lower than the growth rate of specific sector in the broader regional GRDP that is the reference (P), but has a sector contribution value to the GRDP (Xi) greater than the contribution of the sector to the broader regional GRDP that is the reference (X). The coat of arms for this classification is Pi < P and Xi > X.

Quadrant III is for the potential or developing sector. In this case, the specific sector has a greater growth rate of GRDP (Pi) than a specific sector in the broader area which is the reference (P). However, this particular sector has a smaller contribution to the GRDP (Xi) than

another sector contribution to the GRDP of the wider region to which it refers (X). The coats of arms for this classification are Pi > P and Xi < X.

Quadrant IV is for the underdeveloped sector. In this quadrant, a specific sector has a smaller growth rate of GRDP (Pi) than the growth rate of a sector in the broader regional GRDP (P) and has a sector contribution value to GRDP (Xi) which is also smaller than the contribution of that specific sector to the broader regional GRDP that is the reference (X). This classification is denoted by Pi < P and Xi < X

Table 1. Classification of GRDP Sector According to Typology Klassen

Quadrant I A sector that is advancing and growing rapidly (developed sector) Pi > P dan Xi > X	Quadrant II Developed but depressed sector (stagnant sector) Pi < P and Xi > X
Quadrant III Potential sectors (developing sector) Pi > P and Xi < X	Quadrant IV Sectors that are relatively lagging behind (underdeveloped sector) Pi < P and Xi < X

Source: Mukhlis et al (2018), Hamad, Rashid and Ahmed (2021)

In the third step, a shift-share analysis was carried out. A shift-share analysis is an analytical method to determine the growth of sectors that have the potential to become mainstay sectors for the economy in an area within a certain period (Mamola, Marsega and Yulianti, 2021). A shift-share analysis is widely used in analyzing regional economy (Knudsen, 2000). It breaks down the level of growth levels into structural components and competitive components (Khusaini, 2015). The mathematical equation for the shift-share is:

$$SS = Nij + Mij + Cij \dots\dots\dots\dots\dots\dots (2)$$

In the above equation (a) Nij has a positive weight or Nij > 0 if sector i experiences faster growth, while Nij has a negative weight or Nij < 0 if sector i experiences slower growth, (b) Mij has a positive weight or Mij > 0 if sector i has a faster-growing mix, while Mij has a negative weight or Mij < 0 if sector i has a slower growing mix, and (c) Cij has a positive weight or Cij > 0

if sector i is competitive while Cij has a negative weight or Cij < 0 if sector i is not competitive.

In addition to analyzing the economic sectors in Bandung Regency, as a final step, the authors reviewed the relationship between the results of the LQ calculation, Klassen typology, and shift-share analysis with the implementation of regional spatial policies and regional development planning policies that have been prepared by the local government, to obtain a more reliable picture so that it can provide further strategies in the development of the mainstay sector.

RESULTS AND DISCUSSION

The calculation of the mainstay economic sector in The Bandung Regency was carried out using Location Quotient (LQ) Analysis, Klassen Typology Analysis, and Shift-Share Analysis. These three analysis tools are quite easy to implement and can provide quite comprehensive results.
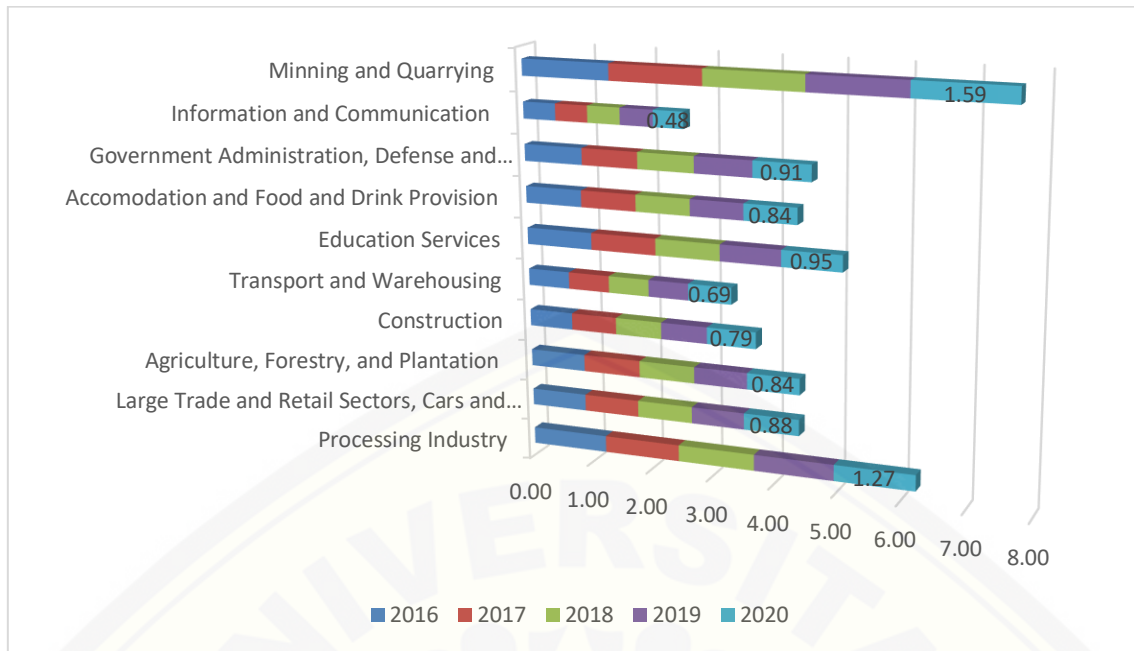
Figure 2. Results of Location Quotient Analysis of Mainstay Sector Bandung Regency in 2016-2020
Source: Data Processed, 2021

The results of the LQ analysis of the ten mainstay sectors of Bandung Regency showed that only the processing industry sector and the mining and quarrying sector consistently obtained LQ>1 in the period 2016 to 2020. For the education services sector, in the 2016-2018 period it got LQ>1, but in the 2019-2020 period it decreased to an LQ value of <1, while other sectors in the 2016-2020 period tended to consistently have LQ values <1. By referring to the consistency of the LQ values, the possible mainstay sectors are the manufacturing sector and the mining and quarrying sector due to their strong influence on economic growth in Bandung Regency.

Manufacturing sector deserved to be the mainstay given its contribution to the GRDP of Bandung Regency that always dominated at around 50 percent of the total GRDP of Bandung Regency. Surprisingly, as a growing sector, the mining and minerals sector kept making progress although the amount of its contribution to GRDP was not very large when compared to other sectors, such as the wholesale and retail trade

sector, car and motorcycle repair, or the agriculture, forestry, and fisheries sectors. This indicates that the mining and quarrying sector in Bandung Regency actually held enormous economic potential, but has not been optimally developed by the Bandung Regency Government.

The previous results were reinforced by the results of the Klassen typology analysis on ten sectors: (1) the processing industry sector, (2) the large trade and retail sector, car, and motorcycle repairs sector, (3) agriculture, forestry, and fisheries sector, (4) construction sector, (5) transportation, and warehousing sector, (6) educational services sector, (7) accommodation, and food and drink provision sector, (8) government administration, defense, and compulsory social security sector, (9) information and communication sector, (10) mining and quarrying sector by comparing the rate of GRDP with the sector's contribution to the total GRDP as presented in the following table:

Table 2. Classification of the GRDP Sector of Bandung Regency in 2016-2020 based on Klassen Typology

Quadrant I	Quadrant II
A sector that is advancing and growing with rapid • Processing industry sector • Mining and quarrying sector	Developed but depressed sector • Education services sector
Quadrant III	**Quadrant IV**
Fast growing sector • Large trade and retail sector, car and motorcycle repairs • Construction sector • Transport and warehousing sector	Sectors that are relatively lagging behind • Agriculture, forestry, and fisheries sector • Accommodation and food and drink provision sector • Government administration, defense, and compulsory social security sector • Information and communication sector

Source: Data Processed, 2021

Based on the Klassen Typology classification, the advancing and growing rapidly sectors in quadrant II were the processing industry sector and the mining and quarrying sector. Quadrant II, as a developed but depressed area, was only filled by the education service sector. Quadrant III, as a fast-growing area, was filled by the large trade and retail sector, car and motorcycle repair, construction sector, and transportation and warehousing sector. In addition, a large number of sectors were in quadrant IV, relatively lagging sectors, namely the agriculture, forestry, and fisheries sector, the accommodation, eating and drinking supply sector, the government administration sector, defense and compulsory social security, and the information and communication sector.

After the previous classification, the shift-share analysis was performed to The GRDP of Bandung Regency and The GRDP of West Java Province based on valid prices from 2016 to 2020. It obtained 10 potential sectors with positive economic growth in Bandung Regency. The total value of regional economic growth (Nij) was 1,141.31 (positive) as well as sectoral, so it can be said that because economic growth in West Java Province has been running positively, the value of sectoral economic growth in Bandung Regency also had a positive value. The highest Nij was achieved by the mining and quarrying sector (226,72), while the lowest Nij belonged to the information and communication sector (52,84), while the manufacturing sector was ranked sixth (96,90
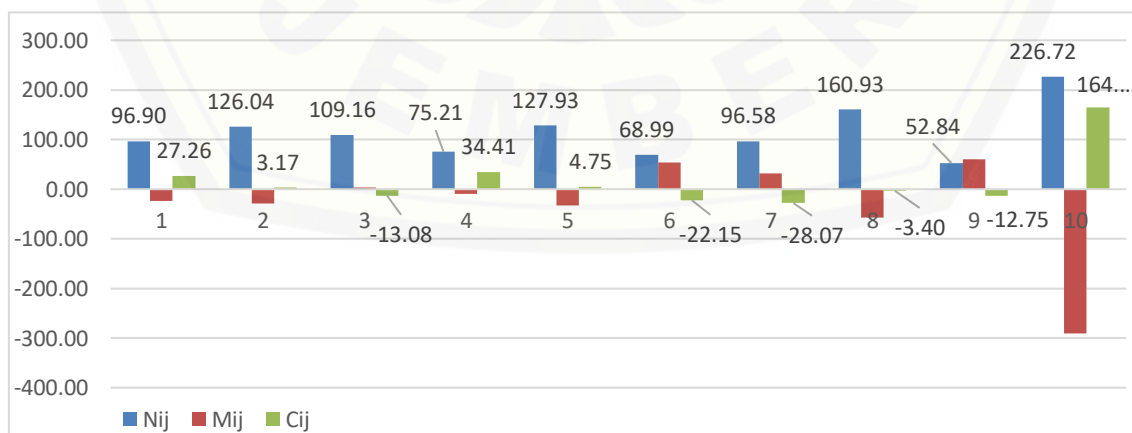

Figure 3. The Results Mainstay Sector Shift Share Analysis of Bandung Regency in 2016-2020
Source: Processed Data, 2021

The the industrial mix (Mij) showed a total negative value of (-296,02), indicating a number of sectors had a negative effect on the industrial mix, namely the manufacturing industry sector (-24,16), the large trade and retail sector (-29,21), the construction sector (-9,63), the transportation and warehousing sector (-32,69), the government administration sector, defense and compulsory social security (-57,53), and the mining and quarrying sector (-291,30),. Here, there found only four sectors remained positive. Meanwhile, the overall influence of competitive advantage (Cij) was positive (154,72). However, when viewed sectorally some sectors had a negative Cij value, namely the agriculture, forestry, and fisheries sector (-13,08), the education service sector (-22,15), the accommodation and drinking provision sector (-28,07), the government administration sector, defense and compulsory social security (-3,40), and the information and communication sector (-12,75). Lastly, the highest value of the influence of competitive advantage was obtained by the mining and quarrying sector.

After looking at the results of the analysis of 10 potential economic sectors in Bandung Regency, it was found that the sectors that obtained the best LQ and Klassen Typology analysis results were the manufacturing sector and the mining and quarrying sector, while the highest Shift Share value was obtained by the mining and quarrying sector. Interestingly, there was a significant difference between the two sectors in terms of contribution to the Gross Regional Domestic Product, namely the manufacturing sector has always dominated, while the mining and quarrying sector has not. This shows that the mining and quarrying sector has not developed its economic potential well enough even though the sector had promising economic potential. Therefore, further discussions will be focused on the processing industry sector and the mining and quarrying sector.

To maximize the development of these two sectors in moving the wheels of the Bandung regency economy, it is necessary to review the alignment between spatial planning policies and development planning policies. In this study, it was limited to the National Medium-Term Development Plan (RPJMN) Policy and the Bandung Regency Government's Regional Medium-Term Development Plan (RPJMD) Policy with the West Java Provincial Spatial Plan Policy and the Bandung Regency Regional Spatial Plan. The alignment will facilitatee the implementation and evaluation of policies for the achievement of economic development goals.

The first sector to discuss is the manufacturing industry sector. The existence of industrial activities carried out in an area cannot be denied that they impact the community members and the surrounding environment. These impacts can be both positive and negative. The positive impact obtained is an increase in welfare and prosperity due to increased income and opening up a fairly high number of job opportunities; exporting products from overseas processing industries can help increase the country's foreign exchange and create comparative reliability both for the region and for the country (Kilavuz and Topcu, 2012; Adeusi and Aluko, 2015; Shikher, 2017; Nwosa, 2018). Meanwhile, the negative impact often afflicts the natural environment sustainability due to industrial waste disposal, the intensive use of raw material resources and energy, a decrease in air quality, and land subsidence (Oláh et al., 2020; Abdurrahman et al., 2022)

BPS states that the processing industry itself is defined as an industry that is active in converting basic goods, either through mechanical, chemical, or manual methods, into finished/semi-finished goods and/or goods that previously had less value into goods with more value and is closer to the end-user. Examples of processing industries are the textile industry, the paper industry, the processed food, and beverage industry, the pharmaceutical industry, and so on.

Industrial potential in Bandung Regency consists of small, medium, and large industries covering formal and non-formal settings. For Bandung Regency, the processing industry is dominated by the textile industry, with the largest and oldest textile industry center (since 1950) located in Majalaya Sub-district.

Table 3. The Non-Agro Industry Sector for Fiscal 2020

Type	Total Units	Total Investment	Total Labor
TPT & Aneka	3.576	5.820.158.282.303	165.317
IKE	1.251	164.518.682.783	7.273
ILMAT	119	1.083.521.303.967	3.149
Amount	4.946	7.068.198.269.053	175.739

Source: Bandung Regency Industry and Trade Office in LHP BPK, 2021

From the table above, we know that the number of businesses in the non-agricultural industry in 2020 were 4,946 business units with a total investment of IDR 7,068,198,269,053 and able to absorb 175,739 workers.

Table 4. Data for the Agro and Packaging Industry for Fiscal 2020

Type	Total Business Unit IKM	Total Investment	Total Labor
Food and Drinks	7.322	65.406.339.500	20.291
Pharmaceutical Chemistry & Traditional Medicine	135	298.400.000.000	264
Garden Forest Products and Building Materials	343	9.504.250.000	992
Amount	7.800	373.310.589.500	21.547

Data Source: Bandung Regency Industry and Trade Office in LHP BPK, 2021

As for the agricultural industry, the number of IKM businesses in the non-agricultural industry in 2020 were 7,322 business units, with a total investment of Rp. 373,310,589,500 and able to absorb 21,547 workers

Even though the manufacturing industry was the mainstay sector in terms of its contribution to the economy of Bandung Regency, the Development Direction of The RPJMN 2020-2024 does not mention the manufacturing industry as the mainstay sector of West Java Province as listed in The RPJMN 2020, even the mainstay sectors are in the agriculture, forestry, and fisheries sector which in fact these sectors are relatively lagging.

While the RPJMD of the Bandung Regency Government for 2016-2021 states that following the objectives of the spatial planning of the Bandung Regency RTRW, the development of a competitive area is based on natural and human resources that have insight into the environment, such as the development of small industries/home industries developed in urban and rural settlement areas by adjusting the potential for regional development in the form of clusters of thematic areas, such as jeans village, strawberry village, shoe village and so on.

In the RTRW of the West Java Provincial Government, the development of the mainstay sectors of the manufacturing industry can be carried out in (1) WP Sukabumi, (2) WP Purwasuka covering the Cikampek-Cikopo PKW area, Purwakarta Regency, Subang Regency, and Karawang Regency, and (3) East Priangan Regency-Pangandaran which include the City of Tasikmalaya, Tasikmalaya Regency, Garut Regency, Ciamis Regency, and Banjar City. Referring to the RTRW of West Java Province for 2009-2029, the direction of development for Bandung Regency is non-polluting industry, agro-industry, nature tourism, agriculture, and plantations.

While optimizing the development of industrial estates, the government placed more emphasis on existing industrial areas and indeed contributes significantly to the GRDP of West Java Province, namely: (1) MM2100 Industrial Estates, EJIP Industrial Estates (NEGAI), Bekasi International Industrial Estates, Industrial Estates Jababeka, Lippo Cikarang Industrial Estate, Patria Manunggal Jaya Industrial Estate,

Marunda International Standard Industrial and Warehousing Area Center in Bekasi Regency, and (2) Sentul Industrial Estate and Cibinong Industrial Estate Center in Bogor Regency.

From the explanation of the RTRW of the Provincial Government for 2009-2029, it appears that Bandung Regency is not a mainstay development area (WP) for the manufacturing industry; according to the author is a separate obstacle to the further development of the processing industry, and the Rancaekek Industrial Estate is also not a priority for the development of optimizing industrial estates. In the Sixth Part concerning the WP KK of the Bandung Basin, paragraph 3 regarding the regional infrastructure development plan in the WP KK of the Bandung Basin, point (f) only states that the development of the Rancaekek Industrial Estate is located in Sumedang Regency and Bandung Regency.

Based on the RTRW of the Bandung Regency Government (Regional Regulation or Perda No. 27 of 2016), industrial areas in Bandung Regency have been divided into three parts, namely: (1) Large Industrial Estates, which are spread over several sub-districts (Katapang, Banjaran, Pamengpeuk, Baleendah, Dayeuhkolot, Majalaya, Ciparay, Rancaekek, Cicalengka, Cikancung, and Solokanjeruk), (2) Medium Industrial Estates located in several sub-districts (Arjasari, Cimaung, Ibun, Pacet, and Margaasih) and (3) Small and Micro Industrial Estates, which spread throughout the regencies. In the development of the small and medium industrial center area, it is equipped with adequate waste management facilities, especially for the washing industry, in the form of Combined Wastewater Disposal Installation (IPAL) located in Kutawaringin and Rancaekek Sub-districts. In addition, for the industry in WP Baleendah and WP Majalaya, restrictions have been placed on the burden of water pollution. The Bandung Regency Government has also built and developed centralized .

Industrial wastewater treatment plants (WWTPs) are for groups of other industrial areas, while for industrial areas that are scattered, the construction of WWTPs is carried out individually.

Reviewing article 13 of Perda No. 27 of 2016 concerning the Bandung Regency RTRW, the system of activity centers (Local Activity Centers/PKL, Local Promotional Activity Centers/PKLP, Regional Service Centers/PPK, Environmental Service Centers/PPL) in each region is still plural, meaning it contains many activities/activity, but has no specificity yet. In a provincial region (article 15), it functions for many areas (for example, WP Cileunyi – Rancaekek is not only a service and trade area, but also functions as an industrial, housing, settlement, and conservation area. Functions as a service and trade area can still be in line with the industrial function, but contradictory to the function as a residential area, settlements, let alone conservation).

Until now, Bandung Regency has no integrated industrial area although the existence of industrial estates offers efficiency in production activities due to the availability of supporting facilities integrated with the area, such as factory equipment, research, and laboratories that serve as development facilities, office buildings, banks, social and public facilities (The Republik of Indonesia, 2015; Budiman, 2021).

The results of the review of project data in Bandung Regency from 2021 to 2022 collected by the One-Stop Integrated Investment and Licensing Office showed that the types of processing industries carried out in one sub-district were varied, such as textile industries, apparel, rubber industry, rubber and plastic goods, processed food and cuisine, chemicals and goods from chemicals, leather, leather goods and footwear, paper, paper goods and the like, and electrical appliances with various types of locations, and even some are close to the same, adjacent to not the same or far apart, indicating that clustering has not fully gone well

These industries need to be united in one or two adjacent areas to form a cluster so that they can support each other's emergence of comparative advantages for the region. Marshall (1920) in Sonobe and Otsuka (2014) states that

the existence of a cluster of industries brings three advantages, namely (1) obtaining much information, (2) giving rise to the classification and specialization of labor according to expertise among companies that produce spare- parts, components, and final products, and (3) creating development in the skilled labor market. Further research by Sonobe and Otsuka in 2006 found that in addition to the three advantages mentioned by Marshall in 1920, industrial clusters could reduce transaction costs because traders and manufacturing companies can meet and conduct market transactions directly. Clusters are also able to stimulate the growth of innovation (Sonobe and Otsuka, 2014).

In Bandung Regency, clustering for the processing industry can be done based on the volume of business and types of industrial products. For example, a textile industry as a sub-sector of the processing industry. It can be started from mapping the area according to the type of industry, whether large, medium, or small industries. Then, the government determines the location for clustering by taking into account the need for the land area to cluster the textile industry, by which if it is not possible to accommodate it in one sub-district, it is necessary to consider the location of the nearest sub-district and the number of old factories that already exist in the previous area. The government also needs to think about the need for the development of an integrated industrial area.

The development of the manufacturing sector can be done by collaborating with other sectors included in the criteria of relatively underdeveloped sectors. Bandung Regency is rich in agricultural products, but has not been well developed, so efforts are needed to improve the economic quality of processed agricultural products originating from agriculture, fisheries, and livestock. Raw materials from the agricultural sector are renewable and reproducible, so if developed, those will greatly support sustainable development.

Previous researches state that an agricultural processing industry is important because it can increase the effectiveness of the use of food technology, increase the nutritional value

of food, support efforts to improve food security, increase export opportunities, and expand the creation of employment opportunities in rural areas (Owoo and Lambon-Quayefio, 2018). In terms of exports, through the agricultural processing industry, we can reduce or stop exporting only raw goods into finished goods or finished goods that have a higher selling value. In addition, the development of the agricultural sector will also provide multiplier effects for the food and beverage sector due to the diversification of processed food products that have been packaged with qualified technology.

The next discussion is about the mining and quarrying sector. According to Perda No. 27 of 2016, mining is a part or all of the stages of activities in the context of research, management, and exploitation of minerals, coal, and geothermal which includes general investigation, exploration, feasibility studies, construction, mining, processing and refining, transportation and sales, as well as post-mining activities. Natural resources obtained from the mining and quarrying sector are from the natural wealth of Bandung Regency which surely can be used as capital for economic development in Bandung Regency. The potential of the mining and quarrying sector in Bandung Regency is obtained from geothermal mining, metal minerals, rocks, and oil and gas.

According to the Development Direction of the 2020-2024 RPJMN, the mainstay sectors of West Java Province are pepper, nutmeg, cloves, coffee, coconut, sugar cane, gold, salt, and capture fisheries and aquaculture. Hence, the type of mining listed is gold mining, and if carefully observed at the RTRW of Bandung Regency, it is known that the mining is located in Kutawaringin Sub-district in relatively small quantities. Meanwhile, in the 2016-2021 Bandung Regency Government RPJMD, it is known that the mining potential in Bandung Regency was geothermal and rock, with a focus on developing new, renewable energy that is environmentally friendly. According to Perda No. 22 of 2010, geothermal, water potential, solar, wind, and bioenergy are included in developing renewable energy.

In Article 50 paragraph 3 of the RTRW of Bandung Regency 2016-2036, it is stated that the development of geothermal potential in an area can be developed after a study and study of the feasibility of business activities carried out economically, environmentally, and are based on applicable laws and regulations. Whereas in article 4, it is stated that the exploitation of the potential for metal, rock and oil, and gas minerals can be done as long as it is carried out by good principles and under the provisions of the applicable legislation.

Other mining areas are (1) gold medal mining located in Kutawaringin Sub-district and (2) rock and sand mining (andesite, kaolin, backfill, tras, obsidian, sand, sandstone, and clay) spread in almost all sub-districts in Bandung Regency. For mining areas located in the North Bandung area, those must comply with the licensing regulations for the North Bandung area.

The geothermal resource potential of West Java Province in 2022 was recorded at 4,763 megawatts (MW), spread across 42 points and has an installed capacity of only 1193.8 megawatts (MW), with a development plan of 755 MW. Geothermal energy management areas are located in 11 Geothermal Working Areas (WKP) of West Java Province with 7 Working Areas with total resources of 1,268. MWs are located in Bandung Regency, as shown in table 4. The development of geothermal energy in Bandung Regency is managed by PT Star Energy Geothermal Wayang Windu LTD and PT Geo Dipa Energi, PT Pertamina Geothermal Energy, PT Star Energy Geothermal Darajat II Limited, PT Teknosatria Energi Geotherm, PT Indonesia Power, and PT Chevron Geothermal Indonesia Ltd.

Table 5. Geothermal Potential in Bandung Regency

No.	Area	Regency/ City	Resources (MWe)						Region status
			Spec	Hipo	Reserves			Total	
					Poss	Prob	Prov		
1	Kawah Cibuni	Bandung	-	-	140	-	-	140	WKP Cibuni
2	G. Patuha	Bandung	-	-	-	-	240	464	WKP Pangalengan
3	K. Ciwidey	Bandung	-	84	140	-	-		
4	Kamojang	Garut & Bandung	-	-	-	-	235	667	WKP Kamojang Darajat
5	Darajat	Garut & Bandung	-	-	64	8	291		
6	G. Wayang - Windu	Bandung	-	-	332	-	287	619	WKP Pangalengan
7	Malabar	Bandung	45	-	-	-	-	45	Open Area
	T O T A L		45	84	676	8	1935	1268	

Source: The Ministry of Energy and Mineral Resources, 2021

In line with the RTRW of West Java Province, the Bandung Regency Government, through Perda No. 27 of 2016 concerning the RTRW of Bandung Regency Article 28, has planned to build an energy or electricity infrastructure network system which the aim of increasing the power generation capacity through increasing the capacity of substations, security and arrangement of high voltage air lines and extra high voltage air lines in Java – Bali – Nusa Tenggara of 500 kV, developing new power plant infrastructure with alternative energy sources, including utilization of geothermal energy through the Cibuni Geothermal Power Plant, Wayang-Windu Geothermal Power Plant, Kamojang Geothermal Power Plant, Darajat Geothermal Power Plant (cross sub-districts), development of Hydroelectric Power Plants, utilization of waste as an energy source for Waste Power Plants, development of energy independent villages based on local potentials in the form of water, wind, solar, biogas, and others

in 11 sub-districts, namely Pasirjambu, Pangalengan, Cilengkrang, Cangkuang, Paperari, Pacet, Arjasari, Paseh, Cikancung Rajawali, and Ciwidey, and controlling potential geothermal waste with environmentally friendly management so as not to pollute the environment, especially rivers and improvement of electricity distribution network implemented to support industrial activities in the main activity centers in 17 sub-districts, namely Majalaya, Dayeuhkolot, Bojongsoang, Rancaekek, Cileunyi, Baleendah, Cicalengka, Margaasih, Katapang, Arjasari, Pamengpeuk, Paseh, Solokanjeruk, Cikancung, Banjaran, Kutawaringin, Ibun and other electrified areas.

Based on the Strategic Plan of the Ministry of Energy and Mineral Resources for 2020-2024 in Gunawan, Windarta & Harmoko (2021), it is known that the Central Government has a target to increase the energy mix and utilization of new and renewable energy (EBT) to 23 percent, including increasing the mix of Geothermal Power Plants. The government has prepared 20 new Geothermal Working Areas (WKP) with an energy power of 683 MW which have been ascertained through the Geoscience Survey - GGG and government exploration drilling on thin holes in 20 prospects by the Geological Agency. Two of the 20 WKPs are located in the Bandung Regency area, namely (1) the Tampomas WKP with 100 MW resources and a 45 MW development plan, and (2) the Papandayan WKP with 195 MW resources and a 40 MW development plan. According to ESDM data in 2017, there still found geothermal areas in Bandung Regency that have not received a WKP determination, namely (1) Ciarinem Potential with speculative potential of 25 MW with an area around Mount Papandayan and (2) Cilayu Potential with speculative potential of 100 MW covering areas located in the Wayang Windu area (Gunawan, Windarta and Harmoko, 2021)

The above description shows that spatial planning policies, development planning and policies of the Ministry of Energy and Mineral Resources have been aligned and showed support for the development of geothermal resources, but

their use of geothermal energy in Indonesia especially in Bandung Regency is still not optimal and only focused on electricity production with an installed capacity much smaller than its potential resources, but the used price tends to be higher when compared to fossil energy. This caused the minimum contribution of the mining and quarrying sector to the GRDP of Bandung Regency.

Based on the results of this research, processing industry became the most dominant sector in Bandung Regency, so if geothermal energy can be included in the processing industry activities, it will be able to improve the economics of geothermal energy itself. Previous researches on the use of geothermal energy conclude that geothermal energy can still be developed directly in the processing industry for activities that require medium to low-temperature fluids (below 150 degrees Celsius), such as textile washing and dyeing, chemical production, heating processing, space heating, industrial space cooling, paper and pulp processing, food processing, food and fish drying, pasteurizing milk and sterilizing produce and others (Jóhannesson and Chatenay, 2014; Lund and Boyd, 2016; Limberger et al., 2018; Think Geoenergy, 2021). The use of geothermal energy in food processing in the manufacturing industry will automatically have a multiplier effect on the food and beverage sector.

Geothermal energy also plays an important role in the sustainability of the agricultural sector. In the open-field and greenhouse agriculture, geothermal fluids in the temperature range of 40 to 75 degrees Celsius can be used to heat crops in winter (Nguyen et al., 2015). The use of geothermal energy in greenhouses can cut 35 percent of production costs (Jóhannesson and Chatenay, 2014). Geothermal energy can also be used in the irrigation process on dry land through underground piping systems (Nguyen et al., 2015).

To develop the utilization of the geothermal energy sub-sector, the government needs to improve the quality of geothermal data and information by obtaining geoscience data

and geothermal exploration drilling, optimizing data sources in WKP, improving the economy of heat projects to be more competitive, providing incentives such as tax incentive, price certainty, ease of licensing, and funding support to increase investor interest in investing their capital in the EBT sector, increasing collaboration efforts between development companies and surrounding communities facilitated by local governments, preparation of academic studies related to the prospects for the utilization and development of geothermal energy both in terms of electrical energy use in the processing industry and agriculture, and disseminating policies and programs to the public to create a climate that can support national development.

CONCLUSION

Research on Regional Development Strategies for Bandung Regency through an economic sector analysis approach was conducted to determine the possible mainstay sectors to develop in Bandung Regency to improve the economy and Gross Regional Domestic Income in Bandung Regency. An economic analysis approach was carried out through location analysis, Klassen typology, and shift-share. The findings showed the sectors that obtained the best LQ and Klassen Typology analysis results were the manufacturing sector and the mining and quarrying sector, while the highest shift share value was obtained by the mining and quarrying sector.

In developing the mainstay sector of the manufacturing industry, the strategy that can be carried out is to relocate and cluster according to the type and form of industry in the industrial area that the Bandung Regency government has provided. This industrial clustering will increase efficiency, innovation, and competitiveness, strengthen cooperation ties and reduce the industry's negative environmental impact, such as waste problems and reduced groundwater discharge. In addition, the development of the manufacturing sector can be done by collaborating with other sectors that fall under the criteria of relatively lagging sectors, e.g.

collaboration with the agriculture sectors by developing an agro-processing industry.

Furthermore, the development of the mainstay mining and quarrying sector is best carried out in the geothermal energy sub-sector to create and use environmentally friendly renewable energy. The strategy can be done by strengthening government performance through the improvement of the quality of geothermal data and information by obtaining geoscience data and geothermal exploration drilling, optimizing data sources in WKP that are already in production, improving the economy of heat projects to be more competitive, providing incentives such as tax incentive, price certainty, ease of licensing, and funding support to increase investor interest in investing their capital in the EBT sector, increasing collaboration efforts between development companies and surrounding communities facilitated by local governments, preparation of academic studies related to the prospects for the utilization and development of geothermal energy, both in terms of electrical energy, use in the processing industry and agriculture, and disseminating policies and programs to the public to create a climate that can support national development.

REFERENCES

Abdurrahman, D. *et al.* (2022) 'Application of Vertical Gravity Gradient to Delineate Groundwater Damage at Bandung Basin', *IOP Conference Series: Earth and Environmental Science*, 1031(1), pp. 1–8. doi: 10.1088/1755-1315/1031/1/012022.

Adeusi, S. O. and Aluko, O. A. (2015) 'Relevance of Financial Sector Development on Real Sector Productivity: 21st Century Evidence from Nigerian Industrial Sector', *International Journal of Academic Research in Business and Social Sciences*, 5(6), pp. 118–132. doi: 10.6007/ijarbss/v5-i6/1661.

Aditama, R. (2018) 'Development of Economic Potential and Determination of Leading Sectors in the Northern Region of East Java Province', *Media Ekonomi*, 26(2), pp. 127–136. doi: 10.25105/me.v26i2.5299.

The Central Statistics Agency of Bandung Regency (2021) *Bandung Regency Regional Statistics 2021*. Soreang: The Central Statistics Agency of Bandung Regency.

Budiman (2021) *Regional Development Management*. *FISIP UIN SGD PRESS*. first edition. Edited by N. Suparman. Bandung: FISIP UIN SGD PRESS.

Darma Putra, E. and Yuli Pratiwi, M. C. (2019) 'Identification of Leading Sector and Cluster Analysis of Regencies in Kalimantan', *Economics Development Analysis Journal*, 8(2), pp. 224–243. doi: 10.15294/edaj.v8i2.27237.

Gunawan, I., Windarta, J. and Harmoko, U. (2021) 'Overview of Geothermal Potential in West Java Province', *Jurnal Energi Baru dan Terbarukan*, 2(2), pp. 60–73. doi: 10.14710/jebt.2021.11072.

Hamad, Z. O., Rashid, P. T. and Ahmed, R. H. (2021) 'The Impact of Information and Communication Technology on Marketing Performance':, *Polytechnic Journal of Humanities and Social Sciences*, 2(2), pp. 31–38. doi: 10.25156/ptjhss.v2n2y2021.pp31-38.

Hutajulu, D. M., Nasir, M. and Arwansyah (2018) 'Analysis of the Leading Sector and the Effect of the Economic Growth: A Case Study in Pakpak Bharat Regency, Indonesia', *Studia Universitatis „Vasile Goldis" Arad – Economics Series*, 28(3), pp. 37–49. doi: 10.2478/sues-2018-0014.

Irawan, A. (2014) *Regional Income Disparities In Indonesia: Measurements, Convergence Process, and Decentralization*. University of Illinois.

Jóhannesson, T. and Chatenay, C. (2014) 'Industrial Applications Of Geothermal Resources', in *Short Course VI on Utilization of Low- and Medium-Enthalpy Geothermal Resources and Financial Aspects of Utilization*. Santa Tecla: United Nation University-Geothermal Training Programme, pp. 1–7.

Kharisma, B. *et al.* (2021) 'The Determination of Leading Sectors to Improve Bandung City's Competitiveness', *Economics Development Analysis Journal*, 10(3), pp. 270–285.

Khusaini, M. (2015) 'A Shift-share Analysis on Regional Competitiveness - A Case of Banyuwangi District, East Java, Indonesia', *Procedia - Social and Behavioral Sciences*, 211, pp. 738–744. doi: 10.1016/j.sbspro.2015.11.097.

Kilavuz, E. and Topcu, B. A. (2012) 'Export and Economic Growth in the Case of the Manufacturing Industry: Panel Data Analysis of Developing Countries', *International Journal of Economics and Financial Issues*, 2(2), pp. 201–215.

Knudsen, D. C. (2000) 'Shift-share analysis: Further examination of models for the description of economic change', *Socio-Economic Planning Sciences*, 34(3), pp. 177–198. doi: 10.1016/S0038-0121(99)00016-6.

Limberger, J. *et al.* (2018) 'Geothermal energy in deep aquifers: A global assessment of the resource base for direct heat utilization', *Renewable and Sustainable Energy Reviews*, 82(September 2017), pp. 961–975. doi: 10.1016/j.rser.2017.09.084.

Lund, J. W. and Boyd, T. L. (2016) 'Direct Utilization Of Geothermal Energy 2015 Worldwide Review', *Geothermics*, 60, pp. 66–93. doi: https://doi.org/10.1016/j.geothermics.2015.11.004.

Machsun, A. (2018) *Analysis of the Regional Spatial Plan (RTRW) on Land Suitability in Parung Panjang District 2008-2015*. Syarif Hidayatullah State Islamic University.

Mahi, A. K. (2016) *Regional Development: Theory and Applications*. Jakarta: Kencana.

Mamola, R., Marsega, C. and Yulianti, W. (2021) 'Regional Development Strategy through Analytical Hierarchy Process (AHP) with Sectoral Economic Analysis Approach in Banten Province', *Inspire Journal:Economics and Development Analysis*, 1(1), pp. 1–46.

Mangilaleng, E. J., Rotinsulu, D. and Rompas, W. (2015) 'Leading Sector Analysis of South Minahasa Regency', *Jurnal Berkala Ilmiah Efisiensi*, 15(04), pp. 193–205.

Mukhlis, I. *et al.* (2018) 'A Competitiveness Analysis of Economic Sector in Tuban Regency, East Java', 57(Piceeba), pp. 443–452. doi: 10.2991/piceeba-18.2018.27.

Napitupulu, M. Y., Hakim, A. and Noor, I. (2016) 'Implementation of Good Governance Principles and Their Effect on the Preparation of Regional Spatial Plans (RTRW) in Regional Spatial Planning Study on the Preparation of RTRW Serdang Bedagai Regency', *Wacana*, 19(4), pp. 196–205.

Nguyen, M. Van *et al.* (2015) *Uses of Geothermal Energy in Food and Agriculture*. Rome: Food And Agriculture Organization Of The United Nations.

Nwosa, P. I. (2018) 'Foreign Direct Investment in Nigeria : Its Role and Importance in Industrial Sector Growth', *Acta Universitatis Danubius. OEconomica*, 14(2), pp. 41–52.

Oláh, J. *et al.* (2020) 'Impact of industry 4.0 on environmental sustainability', *Sustainability (Switzerland)*, 12(11), pp. 1–21. doi: 10.3390/su12114674.

Owoo, N. S. and Lambon-Quayefio, M. P. (2018) 'The agro-processing industry and its potential for structural transformation of the ghanaian economy', *Industries Without Smokestacks: Industrialization in Africa Reconsidered*, pp. 191–212. doi: 10.1093/oso/9780198821885.003.0010.

The Republic of Indonesia (2015) 'Government Regulation No. 142/2015 on Industrial Estates'.

Rukmana, A. N. *et al.* (2020) 'Determination of the Leading Potential of Sub-districts in Bandung Regency', *Journal of Research and Technology*, 6(1), pp. 23–32.

Shikher, S. (2017) *How Does Industry Comparative Advantage Affect Establishment*. Washington DC.

Sonobe, T. and Otsuka, K. (2014) *Cluster-Based Industrial Development*. First. Newyork: Palgrave Macmillan.

Stimson, R., Stough, R. and Roberts, B. (2006) *Regional Economic Development*. Second Edi, *Gorontalo Development Review*. Second Edi. Heidelberg: Springer-Verlag Berlin Heidelberg.

Syapsan (2019) 'Analysis of Economic Leading Sector Determination and Development Strategy Formulation in Indragiri Hilir Regency', *Ekonomikawan: Jurnal Ilmu Ekonomi dan Studi Pembangunan*, 19(1), pp. 100–113. doi: 10.30596/ekonomikawan.v19i1.3244.

Think Geoenergy (2021) *Geothermal Energy Production &*

Utilisation, *www.thinkgeoenergy.com*. Available at: https://www.thinkgeoenergy.com/geothermal/ geothermal-energy-production-utilisation/#:~:text=Industrial Use of Geothermal Energy&text=Examples are processing heating%2C industrial,chemical production and many more. (Accessed: 3 October 2022).

Tri Basuki, A. and Gayatri, D. U. (2009) 'Determinants of Leading Sectors in Regional Development: A Case Study in Ogan Komering Ilir Regency', *Jurnal Ekonomi dan Studi Pembangunan*, 10(1), pp. 34–50.

Zahonogo, P. (2017) 'Trade and economic growth in developing countries: Evidence from sub-Saharan Africa', *Journal of African Trade*, 3(1–2), p. 41. doi: 10.1016/j.joat.2017.02.001.
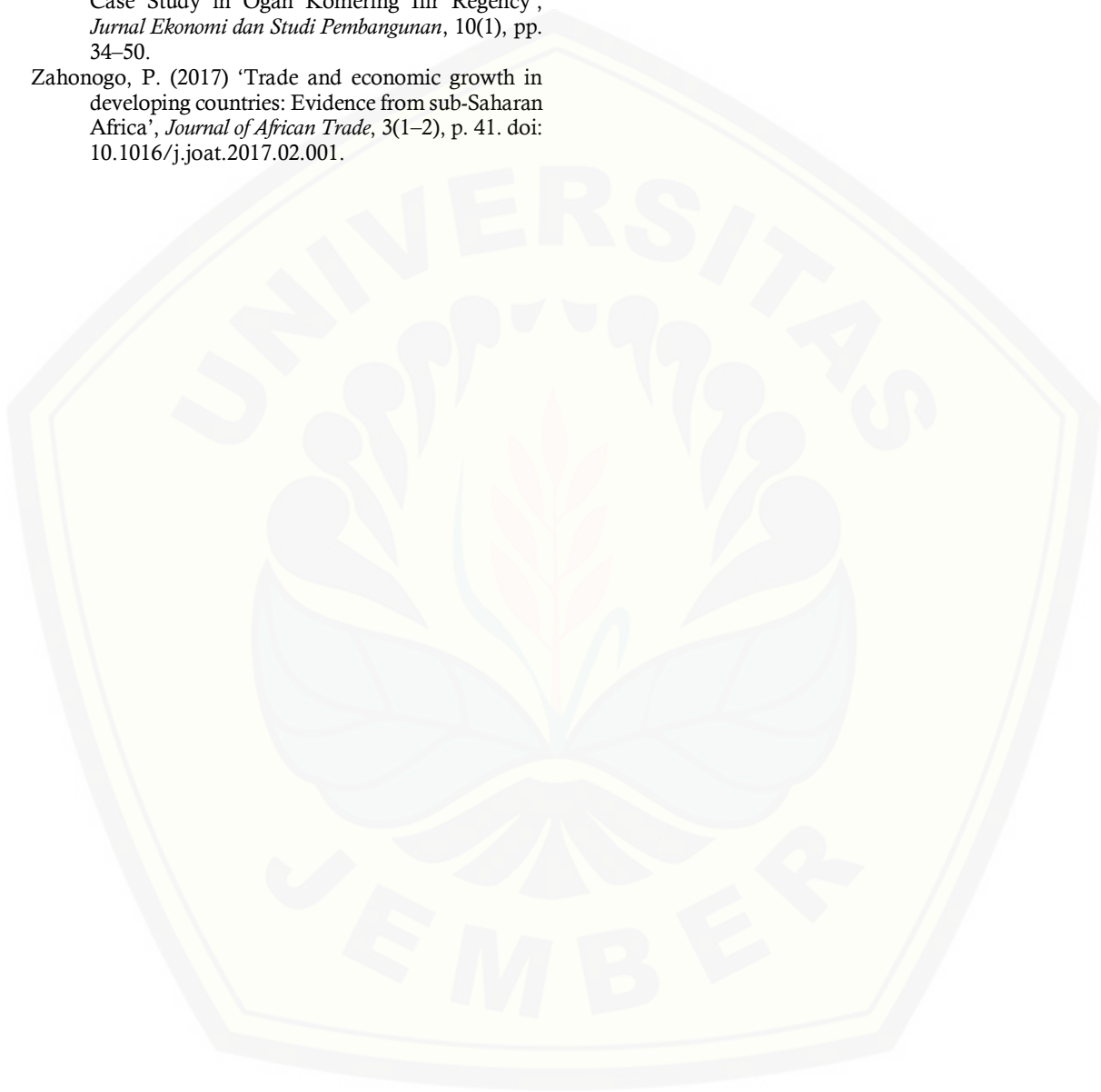
Financial Literacy and Inclusion on Consumption in Indonesian Rural Communities

Adhitya Wardhono[1] , [2]**M. Abd. Nasir,** [3]**Ciplis Gema Qori'ah,** [4]**Kiky Indah Sari**

[1,2,3,4]Department of Economics, Faculty of Economics and Business, University of Jember

Article Information	Abstract
	Financial inclusion and literacy are government efforts to increase economic growth for the welfare of its people. The level of community welfare can be seen through household consumption expenditures. Rural communities in Indonesia have a larger number than those in urban areas. Based on these problems, this study aimed to determine the impact of rural community financial literacy and inclusion on consumption levels. The data used were based on the results of IFLS 5 in 2014 with a total sample of 1,585 individuals. The method used in the analysis was the Tobit regression model. The results showed that the variables had a significant effect on the consumption level of rural communities were ownership of savings, financial literacy, market access, income, ownership of assets in the form of houses and buildings, and age. Meanwhile, the insignificant variables were ownership of loans, poverty, and ownership of assets in the form of land. From these results, it can be seen that the consumption pattern of rural communities in Indonesia does not depend on loans, but on financial literacy, income, and market access.

Corresponding author:
Address: Jalan Kalimantan No.37, Kampus Tegalboto, Jember, Jawa Timur, 68121, Indonesia
E-mail: adhitya.wardhono@unej.ac.id

INTRODUCTION

Economic development is a form of a country's efforts to reduce poverty through increasing economic growth. Roemer and Gugerty (1997) state that economic growth can reduce poverty and benefit society. This growth becomes the top priority in reducing poverty levels and efforts to improve people's quality of life, especially in developing countries (Son and Kakwani, 2004). Poverty and economic growth are the main factors in economic development in developing countries, including Indonesia. Economic growth and poverty reduction have varied values across all island groups, provinces and regencies in Indonesia (Asra, 2000; Tadjoeddin, Suharyo and Mishra, 2001). Indonesia economic condition is unstable because it has gone through two financial crises, namely 1998 due to the Asian financial crisis and 2008 due to the American financial crisis.

Problems related to poverty are no longer the main focus in urban environments or big cities and rural areas of Indonesia. The number of poor Indonesians in rural areas continues to increase as evidenced by the number of poor people in rural areas in 2020 semester 1 of 15.26 million people to 15.37 million in semester 1 of 2021. Development of the financial sector can be used as one of the steps to reduce poverty. This is in accordance with the theory presented by Schumpeter (1934) that the financial sector plays a role in accelerating economic growth through productive investment funds.

Several studies have showed that households living in rural areas in developing countries lack access to bank credit (Nuryartono, 2007; Mpuga, 2010). The cause of this condition can be seen from various sides. Hermes, Lensink and Meesters (2011) state that the provision of credit services to low-income communities has high transaction and information costs. This condition is also supported by a study conducted by Wardhono, Modjo and Utami (2019), namely business actors in rural areas have less opportunity to access credit from formal institutions compared to those of in urban areas. In addition, with

Indonesia wide geographical conditions, the process of economic development has become uneven, resulting many regions in Indonesia have no access to financial institutions. This is an important foundation for rural communities to increase financial literacy and inclusion in order to encourage economic growth and community welfare. Financial inclusion and literacy are the combination to achieve economic growth for the welfare of society. The development of financial inclusion can be done by strengthening the financial sector, regulations, and creating public awareness through financial literacy. By doing so, this program can encourage the financial system and economic growth to overcome poverty (Wardhono, Qori'ah and Indrawati, 2016; Wardhono, Indrawati and Qoriah, 2018).

Mwangi and Atieno (2018) and Addury (2019) explain that financial inclusion is significantly positive in explaining household welfare. However, this is different from the study conducted by Hidayatinnisa et al. (2021) which concludes financial inclusion and literacy have no significant effect on economic growth in Indonesia. This shows that financial inclusion and literacy still require various development efforts to prove that those two can play a role in improving the welfare of rural communities in Indonesia. The welfare indicator used in this study was the level of household consumption. UNICEF explains through the study of Moratti and Natali (2012) that consumption indicators are more relevant than income to measure welfare levels. The concept of measuring consumption is clearer than income. In addition, it is relatively difficult to collect income data, especially for self-employed households or working in the informal sector. Their level of consumption is more stable, especially the ones who work in an agricultural sector because this sector always refines throughout the seasons, so that it can reflect the true standard of living (Deaton and Zaidi, 2002). Deaton (1998) explains that the income variable is sensitive when compared to consumption. The amount of household consumption in Indonesia shows a positive

trend, except in 2020 due to the Covid-19 pandemic. However, an increase in consumption does not always indicate growth. This is illustrated in Figure 1 that the growth of household consumption in Indonesia has fluctuated movements.
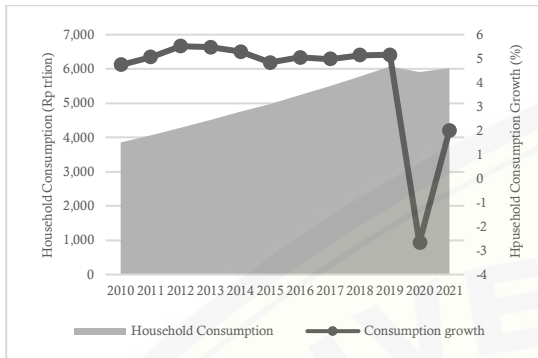

Figure 1. Household consumption in Indonesia
Source: World Bank, 2021

The existence of empirical and theoretical differences is supported by the phenomenon of household consumption in Indonesia. Regarding the previously mentioned discussion, this study aimed to determine the impact of financial inclusion and financial literacy on the level of consumption of rural communities in Indonesia. Several novelties are given here. First, the proxy used to represent household welfare is the level of consumption for both food and non-food consumption. This is different from previous studies that used human development index proxies (Ofori-Abebrese, Baidoo and Essiam, 2020), wealth index (Nanziri, 2016), poverty and income inequality (Zia and Prasetyo, 2018; Omar and Inaba, 2020; Zulfa Sari and Falianty, 2021). Second, this study added a market access variables in determining the level of household welfare. Stifel and Minten (2017) state that market access is one of the indicators in developing countries that can be developed to boost economic performance. Increasing market access can also be used as an effort to improve the welfare of rural communities in a country (World Bank, 2012).

Household consumption can be modeled with several frameworks. Based on the Fisherian, it is known that household representatives must make consumption and

saving decisions at time t. There are three individual and institutional behaviors that lead to the study of consumption, namely 1) control and guidance on economic activities, 2) choice problems in determining and evaluating, and 3) welfare. If the market is well informed, a shock will not affect individual consumption.

The concept of financial inclusion was developed after the concept of financial exclusion (Leyshon and Thrift, 1995; Adewale, 2014). Leyshon and Thrift (1995) explain that financial exclusion is the process of preventing individuals or social groups from accessing services from the formal financial system. In general, these community groups can be indicated by their low and uncertainty income levels, living in the periphery, and being unbanked. Meanwhile, financial inclusion is the process of formulating rules to assist the fulfillment of financial services at a fair price level, in an appropriate place, and without any form of discrimination for all members of society (Sarma and Pais, 2008; Aduda and Kalunda, 2012). Financial inclusion is closely related to the human development process because financial inclusion in its concept is directly related to efforts to equalize poverty and economic growth.

Financial inclusion can be measured through the Financial Inclusion Index (IFI) with three dimensions, namely access, use, and quality (Sarma and Pais, 2011). The access dimension is used to measure potential barriers to opening and using bank accounts. The usage dimension is used to measure the actual use of financial products and services related to the regularity, frequency, and duration of use. The dimension of quality or availability is used to determine the availability of financial products and services that are following customer needs. The above indicators can be seen through the availability of bank branches.

Mason (2000) defines financial literacy as a decision-making process by individuals using a combination of skills, resources, and contextual knowledge to process information and make decisions based on the financial risks of those decisions. Financial literacy plays an important

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role in life because it is a basic need for everyone to avoid financial problems (Dwiastanti, 2015).

Hung, Parker and Yoong (2009) explaine that financial literacy is the ability to use knowledge and skills to achieve financial well-being. Therefore, the concept of financial literacy presented by Hung, Parker and Yoong (2009) require indicators of financial knowledge, skills, and behavior where each indicator has a reciprocal relationship (Figure 2a). Meanwhile, the concept of financial literacy presented by Huston (2010) not only requires a knowledge dimension, but also an additional dimension, namely the application dimension which requires the ability and confidence in financial knowledge which will later be used in financial decision making (Figure 2b).

Studies related to financial inclusion on consumption levels have been carried out by several previous researchers, such as Seck, Naiya and Muhammad (2017), Mwangi and Atieno (2018), Addury (2019). Seck, Naiya and Muhammad (2017) conducted a study related to the effect of financial inclusion on household welfare through consumption in Indonesia. Their study found that access to finance has a positive impact on household consumption. Seck, Naiya and Muhammad (2017) mention that Islamic finance can be useful for increasing financial access by attracting segments of the population voluntarily. The same study was also conducted by Mwangi and Atieno (2018). However, the only difference is in the sites. Mwangi and Atieno (2018) conducted a case study in Kenya. The results are also in line with the study conducted by Seck, Naiya and Muhammad (2017) that financial inclusion is positive and significant in explaining household welfare. Recommendations that can be made are to reduce transaction costs through increasing formal financial products in order to increase competition in the financial market. The significant relationship between financial inclusion and household consumption is also illustrated by a study conducted by Addury (2019) in Indonesia. Financial inclusion is described by the amount of credit and savings/investment.
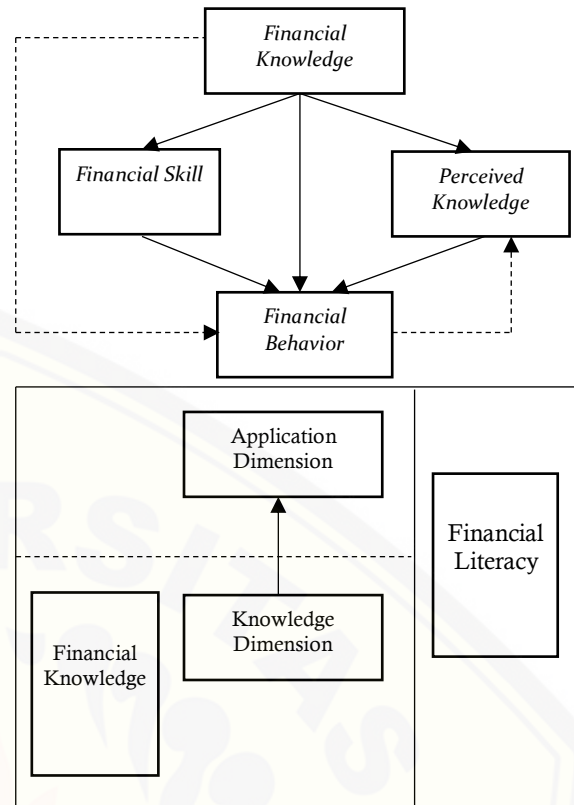
Figure 2. The concept of financial literacy according to a) Hung, Parker and Yoong (2009) and b) Huston (2010)
Source: Dwiastanti, 2015

Financial literacy variable also has an important role in the creation of community welfare. However, the study by Dinkova, Kalwij and Alessie (2021) found that there is no evidence to support the relationship between consumption growth and financial literacy. A positive relationship is still found between consumption of non-durable goods (especially food consumption) and financial literacy. Shahe Emran and Hou'study (2008) argues that household consumption can also be influenced by market access. Better access to domestic and international markets has a significant positive effect on the per capita consumption of rural households. Domestic and international markets also show complementary relationships in determining household consumption.

RESEARCH METHODS

The data used in this study were secondary data obtained from the Indonesia Family Life Survey (IFLS) 5 in 2014. The data used were the result of the last survey conducted by RAND and Survey Meter. The use of this survey was to obtain the latest released data. The IFLS sample has represented 83% of the population in Indonesia spread across 13 provinces, namely North Sumatra, West Sumatra, South Sumatra, Lampung, Jakarta, West Java, Central Java, East Java, Yogyakarta, Bali, West Nusa Tenggara, South Kalimantan and South Sulawesi. It used a sample of 15,000 households and 50,000 individuals. However, the samples used in this study were 1,585 individuals. This was because the focus of this study was only on rural communities. The data used in this study included household consumption, financial inclusion, financial literacy, market access, income, poverty, assets, and age. Financial inclusion indicators were represented by using data on ownership of loans and savings, while financial literacy used the data on knowledge related to loans. Then, market access was proxied using road conditions and electricity access in the village.

This study model referred to several research models, namely models from Bostic, Gabriel and Painter (2009) and Bhuiya et al. (2016). The models can be written as equations (1) and (2).

$$logNF = \alpha + \beta_1 m + \beta_2 x_i + \beta_3 log x_2 + \beta_4 log_y + \varepsilon \quad \text{............} (1)$$

$$logF = \alpha + \beta_1 m + \beta_2 x_i + \beta_3 log x_2 + \beta_4 log_y + \varepsilon \text{.....} (2)$$

In the above equations, $logNF$ is the log of non-food consumption, $logF$ is the log of food consumption, m is a microfinance dummy variable (1: members and 0: reverse), x is a vector of household characteristics, namely the number of family members and total assets, and y is income. α is a constant; β_1, β_2, β_3 are parameters and ε is an error term. This study model modified the model in equations (1) and (2) by adding aspects of financial inclusion and literacy, market access, poverty, and age. The equation written in

equation (3) was then transformed into an econometric model as in equation (4).

$$C = f (FI, FL, m, wage, p, x, age) \text{...................} (3)$$

$$Ci = \alpha_0 + \beta_1 FI_i + \beta_2 FL_i + \beta_3 m_i + \beta_4 wage_i + \beta_5 p_i + \beta_6 x_i + \beta_7 age_i + \varepsilon \text{.......................................} (4)$$

Furthermore, the operational definition of each variable used in equation (3) is described in Table 1.

Table 1. Operational Definition

Variable	Description
Consumption	It is the amount of food and non-food consumption obtained from book 1 section KS on questions KS07a and KS04b
Financial Inclusion	This variable explains the respondents' financial access to ownership of loans and savings. The data were obtained from Book 2 section BH on question BH07 by grouping the answers, namely: • Category (0) does not have a loan • Category (1) has a loan And the HR section on HR01 questions with Hrtype G. The data are grouped into two, namely: • Category (0) has no savings • Category (1) has savings
Financial Literacy	The financial literacy variable covered the respondent's understanding of financial products. The data were obtained from Book 2 section BH on question BH00 and grouped into two, namely: • Category (0) does not know about loans • Category (1) know about loans
Market Access	The market access variable describes the condition of roads and access to electricity in the village. The data obtained from the Minikamades Book Part A on question A8 and the data were then grouped into two, namely: • Category (0) unpaved roads • Category (1) asphalt road and part B on question B1 by grouping, namely: • Category (0) does not have access to electricity • Category (1) has access to electricity
Income	The income variable is approximately net income for the past month. The data were obtained from Book 3A of the TK section on questions TK25A1
Poverty	The poverty variable was explained through the ownership of the Social Protection Card (KPS). The data were obtained from Book 2 of the KS section on the KS27i question. The data were grouped into two, namely: • Category (0) does not have KPS • Category (1) has KPS
Asset Ownership	The asset ownership variable is the ownership of the type of house and land occupied, other houses/buildings (including

Variable	Description
	land), and land/land that is not used for farming/non-farming. The data were obtained from Book 2 of the HR section on HR01 questions with HRtypes A, B, C. The data were grouped into two, namely: • Category (0) has no assets • Category (1) has assets
Age	The age variable explains the age of the respondent obtained from book 3A, the COV section on the COV3 question

Soyrce: RAND Corporation, 2014

This study used a tobit regression model. The tobit model is a type of econometric technique considered a censored regression model (Wooldridge, 2002). Censored data in the economic field are often found in household consumption/expenditure surveys where some households do not consume certain types of commodities (Soediono, Virgantari and Rahmawati, 2005). This condition will affect the censored dependent variable which will then have an impact on the estimation method used to estimate the parameters in the model. Deaton (1998) states that the tobit model has differences with the OLS model, namely the tobit model tends to be biased upwards, while the OLS model tends to be biased downwards. The method used in estimating the regression coefficient of the research model was the maximum likelihood (ML) method.

Based on the research model, the hypotheses used in this study are: H_0 when the variables of financial literacy and financial inclusion have no significant effect on the consumption variables of rural communities and H_a when the variables of financial literacy and financial inclusion have a significant effect on the consumption variable of rural communities. To find out the results of hypothesis testing, the p-value approach was used. The null hypothesis is rejected if the p-value is less than the critical value ($p \leq \alpha$).

In addition to using ML in the tobit model, the study model also identified descriptive statistics to determine the central tendency in the model. Thompson (2009) explains that descriptive statistics can be useful for identifying sample characteristics that can later influence conclusions. To produce the Best Linear Unbiased Estimator (BLUE) model, the classical assumption stage was carried out, consisting of multicollinearity, heteroscedasticity, and normality tests. The method used in the multicollinearity test was the correlation value. If the correlation value is more than 0.8, it indicates a multicollinearity problem in the model (Gujarati and Porter, 2009). Following the test, heteroscedasticity test using the Breusch Pagan test method with the null hypothesis in the form of homoscedasticity data was carried out. The null hypothesis is accepted if the chi-square probability value is more than the critical value. Then, normality test was performed using the Jarque-Berra test method. The null hypothesis in the normality test, namely normally distributed data, can be accepted if the probability value of the Jarque-Berra is greater than the critical value. Here, statistical testing cannot be carried out if the assumption of normality cannot be met (Wardhono, 2004).

RESULTS AND DISCUSSION

Based on the results of descriptive statistical analysis (Table 2), it is known that the majority of the sample had a consumption amount of Rp37,969. The financial inclusion variable on the loan ownership indicator shows that the mean was 0.966562. Meanwhile, the average savings ownership was 0.324921. This illustrates that the level of financial inclusion of rural Indonesians was higher in terms of loan ownership. This condition is also linear with the loan literacy of rural communities in Indonesia which managed to reach an average of 0.965300. The majority of villages in Indonesia already have market access which can be seen by using indicators of road conditions and access to electricity in the village. Market access that is fulfilled in rural areas was supported by the mean of road conditions of 0.893375 and access to electricity of 0.997476. The mean income of rural communities in Indonesia was Rp1,313,112, and the mean of age of the population was 33 years.

Other control variables such as the poverty rate gained the mean of 0.100946 indicating that

the majority of rural communities in Indonesia were not at the poverty line. Ownership of Social Protection Cards (KPS) is used as a proxy for the poverty variable. Then for asset ownership, the majority of village communities had assets in the form of houses as evidenced by the mean value of 0.666877. Meanwhile, building and land assets were still not owned by the majority of the people in the village. This can be seen from the mean values which were 0.144479 and 0.141325 respectively.

Table 2. Summary of Descriptive Statistics

Variables	Obs.	Mean	Min	Max
Consumption	1585	37969.46	0	1000000
Loan ownership (1=yes)	1585	0.966562	0	1
Savings holdings (1=yes)	1585	0.324921	0	1
Loan understanding (1=yes)	1585	0.965300	0	1
Road conditions (1=asphalt)	1585	0.893375	0	1
Electricity access (1=yes)	1585	0.997476	0	1
Wage	1585	1313112.	0	9000000
Poverty (1=yes)	1585	0.100946	0	1
Home ownership (1=yes)	1585	0.666877	0	1
Building ownership (1=yes)	1585	0.144479	0	1
Land ownership (1=yes)	1585	0.141325	0	1
Age	1585	33.31735	15	85

Source: Data Processed, 2021

Based on the results of the regression analysis using the tobit model, it is known that there were three variables that had no significant effect on the consumption level of rural communities (Table 3). The three variables included ownership of loans, poverty, and assets in the form of land. Meanwhile, other variables such as ownership of savings, financial literacy, market access, income, ownership of assets in the form of houses and buildings, and age had significant effects on people's consumption in rural areas. The variable of ownership of savings had a significant positive effect on household consumption. These explain that when there is an increase in savings ownership, the level of

consumption will increase. The finding of this study is not in accordance with the consumption and savings functions presented by Keynes (1936) through the general theory of employment, interest, and money. When some of the income has been allocated to savings, consumption expenditure will decrease so that the relationship between consumption and saving is negative. Nayak et al. (2017) explain that rural communities have a Marginal Propensity to Consume (MPC) greater than the Marginal Propensity to Save (MPS). This condition is supported by the research results of Gonosa (2020) that households with low incomes save to meet their daily needs. It proves that when rural people save, consumption levels will also increase or these two variables have a positive relationship. This condition also illustrates that rural households in Indonesia have low MRS with relatively low-income levels. Therefore, the savings funds held will be allocated for consumption. Efforts to increase MRS can be done by increasing household income, so the savings owned are not used to meet daily needs, but for future needs.

Table 3. Tobit model regression results

Variables	Coefficient	Probability
FI1	-71619.21	0.0071
FI2	2738.668	0.8053*
FL1	-3606.826	0.8966*
Road	22356.24	0.1908*
Listrik	-80113.10	0.3640*
Wage	0.000865	0.4887*
P	-37001.99	0.0323
Home	10515.58	0.3484*
Building	8452.434	0.5696*
Tanah	35198.22	0.0151
Age	-381.3902	0.4170*

Note: *) significant at alpha 0.05

Sorce: Data Processed, 2021

Financial literacy related to loans had a significant negative effect on consumption levels, so that when there is an increase in financial literacy, people in rural areas will reduce their consumption. When people already have good financial literacy, people will use financial products correctly. The negative relationship between financial literacy and consumption of

rural communities found in this study showed that when rural communities have good financial literacy, the funds obtained from several financial products are allocated for productive activities or not used for consumption. This is not in accordance with a study conducted by Jappelli and Padula (2017) and Dinkova, Kalwij and Alessie (2021). Jappelli and Padula (2017) succeeded in finding a positive relationship between financial literacy and consumption growth. However, Dinkova, Kalwij and Alessie (2021) only found a positive relationship between financial literacy and consumption of non-durable goods (food consumption). These results describe the characteristics of households in Indonesia that are different from households in China, the Netherlands, and Italy. Indonesian households, especially in rural areas, are trying to increase their income by allocating credit to the productive sector. This is done to increase the MRS so that the savings will be used for future needs.

The welfare of rural households can be affected by market access. Market access is described through road conditions and electricity access. These variables had a significant effect on consumption. However, the two variables had different directions, better road conditions will encourage increased consumption or can be called positive. The better road conditions will make it easier for people to carry out economic activities including household consumption activities. This is in line with a study conducted by Gichohi (2015). In the short term, infrastructure development can affect consumption because its activities require labor. The costs given to labor will increase household income, which in the end the income is allocated for consumption. Meanwhile, in the long term, infrastructure can improve the business environment in the region. Market access as described by access to electricity showed a negative relationship to household consumption. This was because electricity is a durable material that is not a routine expense, so it does not affect household consumption in the majority. The results of this study are relevant to a study by Ikhsan and Amri (2022). Electrification does not

have a significant impact on income-generating activities because electricity is only able to encourage increased use of electronic devices (Wamukonya and Davis, 2001; Bensch, Kluve and Peters, 2011).

Apart from aspects of financial literacy and inclusion, income levels also positively affected the consumption level of rural communities. It has also been empirically proven by (Đikanović, 2018) (Tokoya et al., 2022). Income is one of the important factors in household consumption. Keynes (1936) through the Absolute Income Hypothesis (AIH) from The General Theory supports the statement that income and consumption have a linear and positive relationship. Moreover, asset ownership control variables, namely houses and buildings, had a positive direction on the level of consumption so that when people in rural areas have house and building assets, the level of consumption will increase. This can happen because rural communities who already have assets no longer use their income to save to buy assets so that the amount of household consumption can increase. A positive relationship between asset ownership and household consumption was also found in the Pan and Xing (2020) study of Chinese households. Then, the age variable had a significant negative effect on the level of public consumption. This is relevant to the Life Cycle Hypothesis (LCH) expressed by Ando and Modigliani (1963). People at a young age will tend to save to prepare for their retirement needs so that when they are older, they are more likely to consume, especially for health financing. Old people run their lives depending on the savings when they were young, while young people depend on loans.

Table 4. Classical Assumption Test

Steps	Type of test	Score	Description
Multicol-linearity	Correlation	<0.8	There was no multicollinearity
Heteroscedasticity	Breusch Pagan	0.1650	There was homoscedasticity
Normality	Jarque Bera	0.0000	Not normally distributed

Source: Data Processed, 2021

When tested for classical assumptions to meet the basic assumptions in the linear regression model, namely the Best Linear Unbiased Estimator (BLUE), it was known that all stages of tobit model have met (Table 4). In the multicollinearity stage, the value was less than 0.8 in each variable. With this value, the regression model did not have multicollinearity problem. Then, at the heteroscedasticity test stage, it was known that the chi-square probability value was 0.1650. Since the value was greater than the alpha value (0.05), so the regression model was homoscedastic. At the stage of normality test using Jarque-Berra, it was known that the probability value was 0.0000. This illustrated that the data were not normally distributed because the probability value was smaller than the alpha value.

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CONCLUSION

Financial inclusion and financial literacy of rural communities with the proxy of ownership of savings and knowledge related to loans provide significant results on the level of consumption. However, financial inclusion with loan ownership indicators still has an insignificant effect. These show that rural communities do not rely on loans/credits to meet their household needs so that the variable ownership of loans does not significantly affect the welfare level of rural communities. Then, market access shows a significant influence on the level of consumption because the condition of good facilities and infrastructure will facilitate people's economic activities to meet their needs.

In the control variables, it is known that there are three variables that have a significant effect on the consumption of rural communities, namely income, ownership of assets in the form of houses and buildings, and age of the population. However, the level of poverty and ownership of assets in the form of land do not have a significant effect.

REFERENCES

Addury, M. M. (2019) 'Impact of Financial Inclusion for Welfare : Analyze to Household Level', *Journal of Finance and Islamic Banking*, 1(2), p.

90. doi: 10.22515/jfib.v1i2.1450.

Adewale, A. A. (2014) 'Financial Exclusion and Livelihood Assets Acquisition Among Muslim Households in Ilorin, Nigeria: a Structural Invariance Analysis', *International Journal of Economics, Management and Accounting*, 22(2), pp. 69–94.

Aduda, J. and Kalunda, E. (2012) 'Financial Inclusion and Financial Sector Stability With Reference To Kenya: A Review of Literature', *Journal of Applied Finance & Banking*, 2(6), pp. 95–120.

Ando, A. and Modigliani, F. (1963) 'The "Life-Cycle" Hypothesis of Saving: Aggregate Implications and Tests', *American Economic Review*, 53, pp. 55–84.

Asra, A. (2000) 'Poverty and inequality in Indonesia: Estimates, decomposition and key issues', *Journal of the Asia Pacific Economy*, 5(1–2), pp. 91–111. doi: 10.1080/13547860008540785.

Bensch, G., Kluve, J. and Peters, J. (2011) *RUHR Economic Papers #284: Impacts of Rural Electrification in Rwanda*, *RUHR Economic Papers*.

Bhuiya, M. M. M. *et al.* (2016) 'Impact of microfinance on household income and consumption in Bangladesh: Empirical evidence from a quasi-experimental survey', *The Journal of Developing Areas*, 50(3), pp. 305–318. doi: 10.1353/jda.2016.0111.

Bostic, R., Gabriel, S. and Painter, G. (2009) 'Housing wealth, financial wealth, and consumption: New evidence from micro data', *Regional Science and Urban Economics*, 39(1), pp. 79–89. doi: 10.1016/j.regsciurbeco.2008.06.002.

Deaton, A. (1998) *The Analysis of Household Surveys: A Microeconometric Approach to Development Policy*. Baltimore and London: The Johns Hopkins University Press.

Deaton, A. and Zaidi, S. (2002) *Guideline for Constructing COnsumption Aggregates for Welfare Analysis*, *LSMS Working Paper*. Washington, DC.

Đikanović, D. (2018) 'Household budget: Impacts of incomes on consumption', *Journal of Economic Development, Environment and People*, 7(4), p. 43. doi: 10.26458/jedep.v7i4.601.

Dinkova, M., Kalwij, A. and Alessie, R. (2021) 'Know More, Spend More? The Impact of Financial Literacy on Household Consumption', *De Economist*, 169(4), pp. 469–498. doi: 10.1007/s10645-021-09391-4.

Dwiastanti, A. (2015) 'Financial literacy as the foundation for individual financial behavior', *Journal of Education and Practice.*, 6(33), pp. 99–105.

Gichohi, G. M. (2015) 'Effects of Government Expenditure on Household Consumption in Kenya', *International Journal of Science and Research (IJSR)*, 6(10), pp. 822–831. doi: 10.21275/ART20177335.

Gonosa, A. (2020) 'Factors' Affecting the Motives of Rural Households' Saving Behavior in North Bench District, Bench Maji Zone of Southern

Ethiopia', *Journal of Economics and Sustainable Development*, 11(17), pp. 31–41. doi: 10.7176/jesd/11-17-04.

Gujarati, D. N. and Porter, D. C. (2009) *Basic Econometrics, 5th Edition*.

Hermes, N., Lensink, R. and Meesters, A. (2011) 'Outreach and Efficiency of Microfinance Institutions', *World Development*, 39(6), pp. 938–948. doi: 10.1016/j.worlddev.2009.10.018.

Hidayatinnisa, N. *et al.* (2021) 'The Effect of Financial Literacy and Financial Inclusion on Economic Growth in Indonesia', *JBMP: Jurnal Bisnis, Manajemen dan Perbankan*, 7(2), pp. 339–359. doi: 10.30596/ijbe.v1i1.3442.

Hung, A. A., Parker, A. M. and Yoong, J. K. (2009) *Defining and Measuring Financial Literacy*, *WR-708*. doi: 10.2139/ssrn.1498674.

Huston, S. J. (2010) 'Measuring Financial Literacy', *Journal of Consumer Affairs*, 44(2), pp. 296–316. doi: 10.1111/j.1745-6606.2010.01170.x.

Ikhsan, I. and Amri, K. (2022) 'Does electrification affect rural poverty and households ' non-food spending ? Empirical evidence from western Indonesia Does electrification affect rural poverty and households ' non-food spending ? Empirical evidence from western Indonesia', *Cogent Economics & Finance*, 10(1). doi: 10.1080/23322039.2022.2095768.

Jappelli, T. and Padula, M. (2017) 'Consumption growth, the interest rate, and financial sophistication', *Journal of Pension Economics and Finance*, 16(3), pp. 348–370. doi: 10.1017/S147474721600010X.

Keynes, J. M. (1936) *The General Theory of Employment , Interest , and Money*, *International Relations and Security Network*.

Leyshon, A. and Thrift, N. (1995) 'Geographies of Financial Exclusion: Financial Abandonment in Britain and the United States', *The Royal Geographical Society (with the Institute of British Geographers*, 20(3), pp. 312–341. Available at: http://www.jstor.org/stable/622654 .

Mason, C. (2000) *Conceptualising Financial Literacy: An Ethnographic Study of School Governors*. Loughborough University.

Moratti, M. and Natali, L. (2012) 'Measuring Household Welfare', *Office of Research Working Paper*, (4).

Mpuga, P. (2010) 'Constraints in access to and demand for rural credit: Evidence from Uganda', *African Development Review*, 22(1), pp. 115–148. doi: 10.1111/j.1467-8268.2009.00230.x.

Mwangi, I. and Atieno, R. (2018) 'Impact of Financial Inclusion on Consumption Expenditure in Kenya', *International Journal of Economics and Finance*, 10(5), p. 114. doi: 10.5539/ijef.v10n5p114.

Nanziri, E. L. (2016) 'Financial inclusion and welfare in South Africa: Is there a gender gap?', *Journal of African Development*, 18(October 2016), p. 109. doi: 10.5325/jafrideve.18.2.0109.

Nayak, S. *et al.* (2017) 'Determinants and Pattern of Saving Behavior in Rural Households of Western Odisha: A Micro Level Analysis', *Journal of Economic Policy & Research*, 12(1), pp. 50–61.

Nuryartono, N. (2007) 'Credit Rationing of Farm Households and Agricultural Production: Empirical Evidence in the Rural Areas of Central Sulawesi, Indonesia', *Jurnal Manajemen & Agribisnis*, 4(1), pp. 15–21. Available at: http://journal.ipb.ac.id/index.php/jmagr/article/view/3329.

Ofori-Abebrese, G., Baidoo, S. T. and Essiam, E. (2020) 'Estimating the effects of financial inclusion on welfare in sub-Saharan Africa', *Cogent Business and Management*, 7(1). doi: 10.1080/23311975.2020.1839164.

Omar, M. A. and Inaba, K. (2020) 'Does financial inclusion reduce poverty and income inequality in developing countries? A panel data analysis', *Journal of Economic Structures*, 9(1), pp. 1–25. doi: 10.1186/s40008-020-00214-4.

Pan, Y. and Xing, H. (2020) 'Resident Assets , Wealth Effect and Consumption', *Conference on Social Science and Natural Science*, pp. 442–448. doi: 10.38007/Proceedings.0001284.

RAND Corporation (2014) 'The Indonesia Family Life Survey (IFLS)'. Available at: https://www.rand.org/well-being/social-and-behavioral-policy/data/FLS/IFLS.html.

Roemer, M. and Gugerty, M. K. (1997) *Does Economic Growth Reduce Poverty? Technical Paper*, *Discussion Paper*. doi: 10.1017/cbo9780511791376.004.

Sarma, M. and Pais, J. (2008) 'Financial Inclusion and Development: A Cross Country Analysis', *In Annual Conference of the Human Development and Capability Association, New Delhi*, 168(10–13), pp. 1–30. doi: 10.1002/jid.

Sarma, M. and Pais, J. (2011) 'Financial Inclusion and Development', *Journal of International Development*, 23, pp. 613–628. doi: 10.1002/jid.1698.

Schumpeter, J. A. (1934) *The Theory of Economic Development: An Inquiry into Profits, Capital, Credit, Interest, and the Business Cycle*. Harvard University Press.

Seck, O., Naiya, I. I. and Muhammad, A. D. (2017) 'Effect of Financial Inclusion on Household Consumption in Nigeria', *IRTI Working Paper Series*, (03), pp. 0–24.

Shahe Emran, M. and Hou, Z. (2008) 'Access to Markets and Household Consumption: Evidence from Rural China', *SSRN Electronic Journal*. doi: 10.2139/ssrn.1157912.

Soediono, J., Virgantari, F. and Rahmawati, H. (2005) 'Perbandingan Model Tobit Dan Model Kuadrat Terkecil Untuk Data Tersensor', *Forum Statistika Dan Komputasi*, 10(1), pp. 22–27.

Son, H. H. and Kakwani, N. (2004) *Economic Growth and Poverty Reduction: Initial Conditions Matter*,

International Poverty Centre.

Stifel, D. and Minten, B. (2017) 'Market Access, Well-being, and Nutrition: Evidence from Ethiopia', *World Development*, 90(September), pp. 229–241. doi: 10.1016/j.worlddev.2016.09.009.

Tadjoeddin, M. Z., Suharyo, W. I. and Mishra, S. (2001) 'Regional disparity and vertical conflict in Indonesia', *Journal of the Asia Pacific Economy*, 6(3), pp. 283–304. doi: 10.1080/13547860120097368.

Thompson, C. B. (2009) 'Descriptive data analysis', *Air Medical Journal*, 28(2), pp. 56–59. doi: 10.1016/j.amj.2008.12.001.

Tokoya, B. O. *et al.* (2022) 'Income and Household Consumption Expenditure in Nigeria (1986–2020)', *Journal of Economics, Management and Trade*, 28(3), pp. 30–41. doi: 10.9734/jemt/2022/v28i330399.

Wamukonya, N. and Davis, M. (2001) 'Socio-economic impacts of rural electrification in Namibia: comparisons between grid, solar and unelectrified households', *Energy for Sustainable Development*, 5(3), pp. 5–13. doi: 10.1016/S0973-0826(08)60272-0.

Wardhono, A. (2004) *Mengenal Ekonometrika Teori dan Aplikasi*. Jember: Fakultas Ekonomi dan Bisnis, Universitas Jember.

Wardhono, A., Indrawati, Y. and Qoriah, C. G. (2018) *Inklusi Keuangan dalam Persimpangan Kohesi Sosial dan Pembangunan Ekonomi Berkelanjutan*. Jember: Pustaka Abadi.

Wardhono, A., Modjo, M. I. and Utami, E. W. (2019) *Role of credit guarantee for financing MSMEs: Evidence from rural and urban areas in Indonesia*, *Unlocking SME Finance in Asia: Roles of Credit Rating and Credit Guarantee Schemes*. doi: 10.4324/9780429401060-9.

Wardhono, A., Qori'ah, C. G. and Indrawati, Y. (2016) 'The determinants of financial inclusion: Evidence from Indonesian districts', *International Journal of Economic Perspectives*, 10(4), pp. 472–483.

Wooldridge, J. M. (2002) *Econometric Analysis of Cross Section and Panel Data*. London: The MIT Press. doi: 10.1007/s12053-016-9491-2.

World Bank (2012) *Transformation through Infrastructure : World Bank Group Infrastructure Strategy Update FY2012-2015*. Washington, DC: World Bank.

World Bank (2021) *Households and NPISHs Final consumption expenditure (annual % growth)*. Available at: https://data.worldbank.org/indicator/NE.CON.PRVT.KD.ZG?locations=ID.

Zia, I. Z. and Prasetyo, P. E. (2018) 'Analysis of Financial Inclusion Toward Poverty and Income Inequality', *Jurnal Ekonomi Pembangunan: Kajian Masalah Ekonomi dan Pembangunan*, 19(1), p. 114. doi: 10.23917/jep.v19i1.5879.

Zulfa Sari, I. and Falianty, T. A. (2021) 'Financial Inclusion and Income Inequality: Does Financial Structure Matter?', *Jurnal Ekonomi Dan Kebijakan Pembangunan*, 10(1), pp. 72–100. doi: 10.29244/jekp.10.1.2021.72-100.

Partnership Impact on Production and Income of Indonesia Rubber Farmers

Yussy Faiz Aulia Priyadi[1]✉ , [2]Evita Soliha Hani, [3]Yoko Saito

[1,2,3]Faculty of Agriculture, Universitas Jember

Article Information	Abstract
	In Indonesia, many rubber farmers carry out partnership-based cooperation. Obviously, this activity gives benefits and impact for both parties. Regarding this idea, this research aimed to determine a partnership pattern found in rubber farmers, partnership impact on the production of rubber farmers in Indonesia, and partnership impact on rubber farmers' income in Indonesia. The study used descriptive and analytical methods. Meanwhile, to determine the problems related to the partnership impact on production and income, the researchers used an independent t-test. However, owing to abnormalities in the test, this study used the Wilcoxon signed-rank test. The result showed that the partnership pattern of rubber farmers in Indonesia was the KOA pattern. In terms of partnership impact on production, there was no significant difference between the production of non-partnered and partnered rubber farmers. Meanwhile, the income measure had a small difference between the two respondent farmers. Following this, rubber farmers should make partnerships due to high profits compared to non-partnership farmers. The bargaining power of farmers is better when they are in a cooperative system, so the price offered is better. This also makes the government's program successful related to the partnership recommendation by farmers.

✉ Corresponding author:
 Address: Faculty of Agriculture, Universitas Jember
 E-mail : yussyfaiz17@gmail.com

INTRODUCTION

The role of the agricultural sector makes Indonesia become the largest agrarian country in the world and holds the strategic position of national economic development. The plantation sector, which is one of several sectors in the agricultural sector, has contributed to the increase in the country's foreign exchange (Rompas et al., 2015)

Based on a research by Wulansari (2021), Indonesia has rubber plantations covering an area of more than 3 million hectares or ranked higher than Indonesia's main competitors,

namely Malaysia and Thailand. Rubber in Indonesia, including plantation commodities covers plantation products used by the community for daily needs. Rubber products are one of the export products that make Indonesia become the largest rubber producer in the world. Indonesia is the number two country after Thailand with the title as the largest rubber exporting country in the world. The following is a table of natural rubber production in major producing countries in 2000 – 2020 according to The World Rubber Industry, (2020):

Table 1. Natural Rubber Production of Major Producing Countries 2000 – 2020 (000 Tons)

Country	Year				
	2000	**2005**	**2010**	**2015**	**2020**
Thailand	2.347	2.937	3.192	3.472	3.722
Indonesia	1.501	2.271	2.930	3.486	4.160
Malaysia	928	1.126	1.177	1.071	1.020
India	629	771	897	908	957
China	445	510	619	699	769
Vietnamese	291	469	621	8664	1.067
Etc	594	800	1.355	784	1.321
World	6.734	8.884	10.791	11.274	13.016

Source: The World Rubber Industry, 2020

Based on a research by the International Rubber Study Group (IRSG) in 2020, the world's demand for rubber until 2035 will continue to increase, including the demand for natural rubber. High demand for natural rubber in the global market nowadays has triggered rubber-producing countries to perform the export,causing the market share of Indonesia in the global market decreases (Zuhdi and Anggraini, 2020). The decrease in Indonesia natural rubber products competitiveness level happened because in the global market Indonesia was dominantly influenced by the declined natural rubber export. In other words, the export of Indonesian natural rubber has been a declining trend and influenced by market distribution. Under those circumstances, the importer countries alter their importing activity from other countries due to the low quality of Indonesian natural rubber.

The above phenomenon is influenced by 2 factors, namely a stable world economy that

encourages increased consumption and increases human welfare accompanied by the demand for cars and other goods containing rubber components, and the scarcity of petroleum due to the higher the price of synthetic rubber causing the shift use of synthetic rubber to natural rubber. This will increase the demand for natural rubber in the world market. As a country that has the second-largest rubber production area in the world, Indonesia becomes one of the largest natural rubber producers (Wahyono, 2016).

The data used in this study were taken from the results of the 2013 Agricultural Census regarding the 2014 Plantation Business Household Survey. The agricultural census is an activity to record business in all agricultural sectors, starting from the food, livestock, plantation, horticulture, fisheries and forestry sectors. The benefits of the agricultural census are not directly felt by farmers, but the results are used for planning, policy implementation,

program evaluations and others. The data generated cover production costs for the past year, land area, socio-demographic characteristics and others.

Rubber plantations in Indonesia are managed by several types of business actors in groups who carry out agribusiness activities of an agricultural commodity, such as rubber. According to (Wahyono, 2016), rubber business actors are divided into 3, namely people's plantations, private plantations, and state plantations. Plantation is a profitable activity for farmers because it has high job prospects when carried out. Plantations spread across various regions have different average production in each region. There are several factors that cause differences in averages such as inadequate land area, erratic weather factors, inadequate labor and others. A research by Ricardo (2016) shows partnership relationships in rubber plantations can be reviewed with *Proyek Kemitraan Terpadu* (PKT) or integrated partnership project with the involvement of several mutually beneficial partnerships. This project is based on cooperation between large businesses (core) and small businesses (plasma), as well as banking participation aiming to provide small business loans more conveniently, safely, and effectively. Integrated partnership project activities can increase the success of the plantation business to be higher. The relationship between rubber plantations and the involvement of several parties in the partnership will show a pattern of rubber partnerships which takes part as the manager of the business garden with the help of the cooperative's intervention which helps the business as needed.

The challenge in the rubber industry is the increasingly fierce competition with rubber products from competing countries, namely India and China which sell tires at low prices. China affects rubber prices because it dominates world rubber consumption. Here, whatever happens to China's economic growth affect the demand for natural rubber, including the trade war with the United States (US) (Aisyah et al., 2021). By the same token, Indonesia's natural rubber export prices have a positive relationship

with domestic consumption and international rubber prices. Meanwhile, the export prices of Indonesia's natural rubber has a negative relationship with the exchange rate of the rupiah against the dollar (Daulika et al., 2020).

Domestic consumers do not love and believe in products made in their own country since SNI (Standar Nasional Indonesia) has not been enforced on rubber goods other than tires causing export countries concern about the quality problems for the rubber produced. The weakness of the rubber industry in terms of transportation facilities and infrastructure can be found in some aspects, such as the absence of special education in the rubber sector and the weak mastery of high technology. According to a research by Kurnia et al. (2020) the development of the manufacturing industry of latex-based downstream product in Indonesia continues to decline, and it is inversely proportional to the development of similar industries in Malaysia and Thailand. This also requires government policies in the form of facilities and infrastructure development, funds provision that will later be used for finance industrial development, and developing a partnership system between farmers and companies. A possible partnership pattern is the "PIR plus" in which farmers continue to own their plantations and rubber trees and at the same time hold shares in the partner companies. This partnership will provide benefits between farmers and partners (Wahyono, 2016).

According to Azmie et al. (2019), types of partnership patterns include: plasma nucleus, subcontracting, franchising, general trading, distribution and agency, profit sharing, operational cooperation, joint ventures, outsourcing, and other forms of partnership. Based on article 4 of the Decree of the Minister of Agriculture of the Republic of Indonesia Number: 940/KPTS/OT.210/10/97 concerning guidelines for agricultural business partnerships, agricultural business partnerships implement the following pattern: first, the plasma core pattern, a partnership relationship that exists between a company and a partner group, the company as the core while the partner group as the plasma.

A subcontracting partnership pattern is a group of partners whose job is to provide whatever components needed by the partner company for the benefit of its production. Second, an agency pattern, a pattern in which large companies provide products and give small companies the right to market these products for a fee. Third, the general trade partnership pattern, a pattern which requires partner companies market the products of partner groups or partner groups supply their products to partner companies (Zakaria, 2015).

A research by Saleh (2015) investigated PT Perkebunan Nusantara XIII which conducts partnerships by means of coaching and social responsibility. Based on the results of the 2013 Agricultural Census regarding the 2014 Plantation Business Household Survey, the total number of farmers who took part in the survey was 46,394. However, the participated ones were 276, whole the remaining 46,118 did not participate in the partnership. The main partnerships carried out by farmers are divided into 3, namely 63 farmers participated in BUMN partnerships, 19 rubber farmers participated in BUMD partnerships, and 194 rubber farmers chose to participate in PRIVATE partnerships. The survey results also state that around 26,134 rubber farmers experienced difficulties in marketing their agricultural products. A total of 625 farmers experienced difficulties during transportation, Khoiriah and Susdianto (2021) argue one of the causes of difficulties facing by farmers in marketing agricultural products and the low price of rubber is the farmers do not process their rubber products by themselves.

A research by Bakar et al., (2012) concludes farmers prefer having modern company partners to traditional institutions because they have difficulty processing their own rubber products. This has some impact that can distinguish the production results and income of rubber farmers who are partnered and not partnered. Production costs, fertilizer costs, average costs, marketing costs, rubber prices, net income and gross income are also different. As for the difference of opinion by Husin et al

(2017), the income gap between farmers with and without partnership is significant. The income of partner farmers is more than that of non-partnered farmers. The difference between farmers who do not partner is very clear, namely the number of farmers who do not partner is more than that of partnered farmers. This is what underlies the researchers to determine the effect of partnerships on the production and income of rubber farmers, where the partnership in question is the relationship between rubber farmers and BUMN, BUMD, and Private.

Bakar and Fauzi (2013) state that family income affects the choice between partnership and traditional institutions. In Soetriono and Suwandari (2016), farmers who carry out their own farming activities do not have the power to to maximize their farming due to the inability to technology, management, capital and marketing so that by partnering they can reduce the risk of failure during farming. There are many benefits that farmers get when doing partnerships, such as being able to improve the quality of partner groups, increasing the quality and quantity of production, increasing income, having a drive of success and others. Even, as the time develops partnerships will have greater impact between the two parties. Partnership is expected to be able to provide beneficial effects for partner farmers such as increased income which will have an impact on improving the welfare and standard of living of farmers (Cahyarubin, 2016). Several farmers in Indonesia have become active partners of partnership. However, there are still farmers who have not been interested in participating. This was presumably due to slight differences in production and income received by partner and non-partner farmers. Based on the problems above, the researcher wanted to know the existing partnerships of rubber farmers and the impact of partnerships on the production and income of rubber farmers in Indonesia.

Researches related to partnerships and their impact have previously been done, such as researcher conducted by Fitri et al. (2018), Puspitaningrum et al. (2019), Bakar et al. (2019), and Cahyarubin (2016). This paper

discusses the effect of partnerships on production and marketing of fruit, sugarcane, coffee, and rubber commodities. In addition, previous studies have discussed more about partnerships at the regional (regency and provincial) level. In addition, the novelty of this research contributes to partnerships and their impact on production and income with a national or Indonesian scope.

The purpose of this research was to find out the pattern of partnerships found in rubber farmers in Indonesia, to find out the impact of partnerships on the production of rubber farmers in Indonesia, and to find out the impact of partnerships on the income of rubber farmers in Indonesia. This research was different from previous research because the data in this study were obtained from secondary data from the 2013 Agricultural Census regarding the 2014 Plantation Business Household Survey. The agricultural census is conducted by the Statistics Indonesia (BPS) once in 10 years. The agricultural census has been carried out for 6 times in 1963, 1973, 1983, and 1993 with the latest data in 2013.

RESEARCH METHODS

This research used descriptive and analytical methods. Prabowo and Heriyanto (2013) state that descriptive qualitative approach method is a method of data processing by analyzing factors related to the object of research by presenting the data in more depth to the object of research. This method can be used to describe phenomena systematically, in detail, and accurately in the formulation regarding the partnership pattern of rubber farmers and the problem formulations regarding the impact of partnerships on the production and income of rubber farmers in Indonesia. Habib and Kuntadi (2020) argue analytical method is a problem solving procedure that uses analytical tools. Analytical methods can be used to examine the second and third problems, namely the impact of partnerships on rubber production and income in Indonesia. Problems related to the impact of partnerships on production and

income were analyzed using an independent t-test, but since there found some abnormalities in the data being tested, this research used the Wilcoxon signed-rank test.

In terms of data, this research compiled the data from the 2013 Agricultural Census regarding the 2014 Plantation Business Household Survey using respondents who worked in rubber farming. The population in this study was rubber farmers who were partnered and not partnered. Based on the census data, the total number of rubber farmers was 46,934 rubber farmers, with 276 partner farmers and 46,118 non-partnering rubber farmers. The number of samples in this study was determined usinh a disproportionate stratified random sampling (proportional stratified random sample). This technique is carried out when the sample obtained is not homogeneous in a population. Moreover, it is done by taking a sample and then dividing the population into strata, selecting a simple random sample from each stratum, and incorporate into the sample. The goal is to use to estimate population parameters and allow each member of the population to have an equal chance to be sampled (Siti et al., 2018).

According to Gay and Diehl (1992) the sample taken by researchers should be as large as possible. It is assumed that the more samples used, the more representative they will be and the results can be generalized. Sampling is carried out depending on the type of research used by the researcher. In causal comparison research, the sample used was 30 subjects per group. This is also not much different from the researches by Gay and Diehl (1992) and Roscoe (1975) which state thata sample size of more than 30 and less than 500 is appropriate for most studies, and if the sample is broken down into subsamples (male/female, junior /senior, etc.), the minimum sample size used is 30 per category. The population that was stratified or grouped in this study was divided into 2 groups, namely partner farmers and non-partner farmers. As for the selection of samples, a systematic random sampling technique was performed by taking the serial number of

respondents with an even number, which then resulted in a sample of 100 partner farmers and 100 non-partner farmers. Sampling was used in order to represent the characteristics of the existing population.

The method used to answer the first topic, the partnership pattern found in rubber farmers was a qualitative descriptive method. The partnership pattern can be seen from several aspects, namely the provision of land for farmers, namely self-owned, leased and rent-free. The next technical guidance was divided into PPL (Field Agricultural Extension)/related plantation service/the government and others. The kinds guidance obtained by rubber farmers were cultivation techniques, pest control, marketing, post-harvest, and others. The four technologies were divided into 4, namely self-owned, group-owned, leased, and rent-free. Next, the five sources of loans with interest were obtained from banks, rural banks, other financial institutions, cooperatives, plantation companies, and individuals.

The six grants/subsidy/free aids came from the government, BUMN/BUMD, individuals, and others. The production facilities received by farmers were divided into seeds, fertilizers, pesticides, and tools/machines. Seventh, the distribution of plantation products was aimed at self-consumption, KUD, markets, collectors, and plantation companies. Then, the causes of marketing difficulties were divided into 5, namely transportation problems, quality requirements, low prices, far enough marketing distances, and others. Finally, the difficulty of business barriers were divided into 5 difficulties in obtaining loans, the increase in production costs which was higher than the production price, the impact of severe pest attacks, difficulties in getting workers/ higher salary for workers, and the scarcity of production facilities.

RESULTS AND DISCUSSION

Partnership pattern is a form of cooperation in a business where there are two or more people whose goal is mutual benefit to one another. It is made based on an agreement where both parties adhere to mutually agreed principles. The principles held by both parties are mutual need, mutual benefit, and interdependence in order to achieve goals and increase business. The existing partnership patterns in Indonesia are divided into five, namely the nucleus-plasma pattern, subcontracting pattern, general trading pattern, agency pattern and KOA (Agribusiness Operational Cooperation) pattern.

When farmers join partnerships with their partners, it is hoped that they will be able to better manage their farms, increase farmers' businesses, encourage economic development, and ensure the marketing of agricultural products. Partners of rubber farmers in Indonesia are divided into three, namely: BUMN, BUMD, and private parties. The partnership that exists between rubber farmers and partners has gone through a long process and both have an agreement and agreed on the rights and obligations of each party. Rights and obligations occur because both need each other and provide mutual benefits to both rubber farmers and partners. The partnership will last long if both feel mutually beneficial.

The researchers used several indicators to determine the pattern of partnerships carried out by rubber farmers. Some of the indicators used included land provision, technical counseling/guidance obtained, capital loans, free grants or subsidies, production facilities assistance, and market guarantees. Technical guidance that can be obtained by rubber farmers includes cultivation techniques, pest control, marketing, post-harvest, and others. Assistance for production facilities can be in the form of seeds, fertilizers, pesticides, agricultural tools/machines, while distribution of plantation products can be consumed by themselves, KUD, markets, collectors, plantation companies, and can be made into stock by farmers. Each partnership pattern certainly has characteristics and differentiators between the five partnership patterns.

The difference in each pattern can be seen from the characteristics of each pattern, the rights and obligations that must be fulfilled by

both parties, the mechanism or implementation of the partnership, the advantages and disadvantages of each partnership pattern. Based on the results of the 2013 Agricultural Census data regarding the 2014 Plantation Business Household Survey, the data regarding the way partnership pattern was carried out by rubber farmers in Indonesia were obtained and presented in Table 2.

Table 2. The Relationship Pattern of Partnership with Form of Partner Company

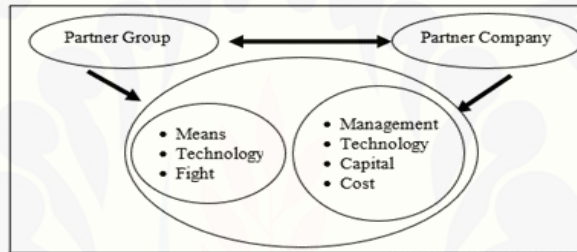| No	Partnership Pattern	Plasma Core Pattern	Sub Contract Pattern	General Trading Patterns	Agency Pattern	KOA Pattern
1.	Land Preparation	10%	0%	0%	0%	92%
2.	Counseling	15%	0%	0%	0%	15%
3.	Technical guidance	0%	0%	0%	0%	0%
4.	Technology	8%	8%	8%	0%	8%
5.	Grant Assistance	34%	0%	0%	0%	34%
6.	Production facilities Assistance	0%	0%	0%	0%	34%
7.	Distribution of results	0%	100%	100%	0%	100%

Source: Data Processed, 2022

Figure 1. Partnership Pattern of Rubber Farmers in Indonesia

The existing partnership pattern between rubber farmers and partners was the KOA (Agribusiness Operational Cooperation). In this partnership, farmers usually receive inputs (facilities and infrastructure), capital in the form of operational costs, and market guarantees. The KOA pattern is also often applied to plantation business actors. This pattern is also often applied in village communities.

Figure 1 is a picture of the partnership pattern of rubber farmers who have partnered in Indonesia. Here, the partner group provided land, labor and infrastructure. Meanwhile, the partner company gave counseling, capital, costs, assistance for production facilities and guarantees for the distribution of their farming results. In addition, each partnership has its own advantages and disadvantages.

Table 3. Rights and Obligations of Rubber Farmers and Partner Companies

No	Party	Right	Obligation
1.	Partner Farmers	- Get counseling - Get capital and financial assistance - Production facility assistance - Guaranteed distribution of results - Government involvement in cooperation between farmers and entrepreneurs - Joint risk management	- Provide Land - Provide manpower - Provide infrastructure
2.	Partner Company	Get benefits in accordance with the mutually agreed agreement	- Provide counseling - Capital assistance and costs - Production facility assistance - Guaranteed distribution of farm products

Source: Data Processed, 2021

KOA partnership pattern actually has the same advantages as the core-plasma system. KOA pattern is most commonly found in rural communities done by small businesses in the village and household businesses in the form of a profit-sharing system. For example, if the land owner provides land to be used, the farmer provides capital, labor, and other agricultural facilities whose profit sharing is 40: 50. This means 40% of the profit for the land owner and 50% for the farmer. The disadvantages of the KOA pattern are: profit taking by partner companies that handle aspects of marketing and product processing is too large so that small business groups feel it is unfair, partner companies tend to be monopsony, thereby they tend to reduce the profits for their partner small entrepreneurs, and there is no third party has played an effective role in solving the problem.

The results of the normality test for the impact of partnerships on production can be seen in Table 4 below:

Table 4. Normality Test of Partnership Impact Analysis on Production

Farmer	Kolomogrov-Smirnov [a]		
	Statistics	df	Sig.(2 *tails*)
Non-Partnership	0.285	100	0.000
Partnership	0.160	100	0.000

Source: Data Processed, 2021

Table 4 shows the normality test of the partnership impact on production whose significance value was <0.05, meaning that the value was not normally distributed. Based on this value, the researchers used the Wilcoxon signed-rank test to overcome normally distributed data. Further, the results are presented in the following table 5.

Table 5. Normality Test of Partnership Impact Analysis on Income.

Farmer	Kolomogrov-Smirnov [a]		
	Statistics	Df	Sig. (2 *tails*)
Non-Partnership	0.162	100	0.000
Partnership	0.363	100	0.000

Source: Data Processed, 2021

Similarly, the results in table 5 was not normally distributed with the value of <0.05. Again, the Wilcoxon signed-rank test was performed

In carrying out this test, the following formulas were used:

$$\mu W_R = \frac{n(n+1)}{4}$$

$$\sigma W_R = \sqrt{\frac{n(n+1)(2n+1)}{24} - \frac{\sum t^3 - \sum t}{48}}$$

$$Z_w = \frac{W_R - \mu W_R}{\sigma W_R} \quad \dots\dots\dots\dots\dots\dots\dots (1)$$

μW_R is Wilcoxon rank / mean; Sp is positive rank; Sn is negative rating; $\sum t$ is number of rankings from the mean value of the difference in the production measurement of partner rubber farmers with non partnership farmers (negative); and Z_w is table Z to test Z score.The basis for making decisions was the same as the Z test, namely if the probability (Asymp.Sig) < 0.05, H0 is accepted and Ha is rejected; and if the probability (Asymp.Sig) > 0.05, Ha is accepted and H0 is rejected.

The Wilcoxon signed-rank test determined the following hypotheses: H0: there is a difference between the production of partnership rubber farmers and non partnership farmers; and Ha: there is no difference between the production of partnership rubber farmers and non partnership farmers. H0 is rejected if the probability value < 0.05 indicating a significant difference between the production of partnership rubber farmers and non-partnership farmers. The last step was drawing conclusions based on the hypothesis testing.

The next step was revenue testing procedure by using Wilcoxon signed-rank test formulas for the impact of partnerships on revenue in Indonesia as follows:

$$W_R = \frac{n(n+1)}{4}$$

$$\sigma W_R = \sqrt{\frac{n(n+1)(2n+1)}{24} - \frac{\sum t^3 - \sum t}{48}}$$

$$Z_w = \frac{W_R - \mu W_R}{\sigma W_R} \quad \dots\dots\dots\dots\dots\dots\dots (2)$$

μW_R is Wilcoxon r / average; Sp is positive rank; Sn is negative rating; $\sum t$ is number of rankings from the average value of the difference in the income measurement of partnership rubber farmers with non partnership farmers (negative); and Z_w is Table Z to test Z score. The basis for making decisions was the same as the Z test, namely if the probability (Asymp.Sig) < 0.05 then H_0 is accepted and H_a

is rejected; and if the probability (Asymp.Sig) > 0.05, H_a is accepted and H_0 is rejected.

Furthermore, the next step was determining the hypothesis specified in the Wilcoxon signed-rank test as follows: H_0: there is a difference between the income of partnership rubber farmers and non partnership farmers; and Ha: there is no difference between the income of partnership rubber farmers and non partnership farmers. After that, the researchers determined the level of significance of 5% or 0.05. The next step was the defining the test criterion, namely H_0 is rejected if the probability value < 0.05 or there was a significant difference between the income of partnership rubber farmers and non partnership farmers. Finally, conclusion drawing was conducted.

Production is the end result of a process or economic activity that utilizes several inputs. Factors of production are influenced by land, labor, capital, fertilizers, pesticides, seeds and technology used by farmers. Production activities carried out in a company/when running a farming business can be said to be good the company can meet the production target. The problem that often occurs in rubber plants and affects rubber production was the weather during the rainy season. During the rainy season, latex production decreased and farmers could not reach the daily production target. High rainfall made make the latex into a lump and eventually farmers got a lower price. Based on the data that has been obtained, and tested for the level of normality, it was found that the data were not normally distributed, meaning that the analysis that could be used was non-parametric with the Wilcoxon-rank test.

The following are the results of the analysis using the Wilcoxon test on the data that have been obtained and the results of the study can be seen in Table 6:

Table 6. Differences in production between non-partnered and partnered rubber farmers

Farmer	Production Average (Kg/m2/year)	z-table	Sig. (2 tails)
Not Partnering	4.64 Kg/m2	-1.095b	0.273
Partner	5.10 Kg/m2		

Source: Data Processed, 2021

Based on Table 6 the average production per year of partnered farmers was greater than that of non-partnered farmers. Non-partnered farmers had an average production of 4.64 Kg/m2/year, whereas partnered rubber farmers gained an average production of 5.10 Kg/M2/year. Since the results showed probability of (Asymp.Sig), 0.05 < 0.273 then H0 was accepted and Ha was rejected. It can be concluded that there was no significant difference between the production of non-partnered and partnered rubber farmers. The difference in the average production of non-partnered and partnered farmers was not far enough, but the production of partnered farmers was far superior. One of the other factors that can be seen in terms of the use of appropriate inputs was the use of inputs that was combined with the aim of getting better results. This is in line with a research by (Kurniati and Darus, 2019) that the use of inputs in the right amount will have an impact on increasing production, on the contrary, excess or lack of input causes production to be not optimal.

According Kuswanto et al., (2019) possible efforts to increase rubber production are optimizing the use of labor both in the context of tapping, weeding, fertilizing, controlling pests and weeds and other businesses that support the success of rubber products, improving agricultural technology, such as using superior seeds, rejuvenating less productive crops through business partnerships with private companies and the state, and getting significant government support in providing fertilizers and encouraging farmers to increase their use.

This can be seen from the activities of partner companies that gave rights to partner farmers. These rights were in the form of providing land, capital, counseling, technological assistance, grant assistance, and distribution of marketing results.

Table 7. Production of non-partnered and partnered rubber farmers

No	Description	Plant Area(m2)	Production (Kg/m2)	Percentages (%)
1	**Not Partnering**			
	Amount	202.145	464.02	47.65%
	Average	2,021.45	4.64	
2	**Partner**			
	Amount	103,880	509.76	52.35%
	Average	1,038.8	5,10	
	Total	203,183.8	973.79	100%

Source: Data Processed, 2021

Rubber farming carried out by non-partnered and partnered rubber farmers produced different results. The average production received by non-partnered rubber farmers was 4.64 Kg/m2, while partnered rubber was 5.10 Kg/m2. In Table 4.3 it can also be explained that the total production of non-partnered farmers was 464.02 Kg/m2. The farmers who partnered had a total production of 509.76 Kg/m2. It can be concluded that the number of farmers who partnered with farmers achieved higher production than farmers who did not. One of the reasons for this was the area of plantations for rubber farmers. Rubber farmers who did not partner had a higher plant area than the planted area of farmers who were partnered. The planted area of non-partnering farmers was 202.145 m2, while the partnered farmers' area was 103,880 m2, but the resulting product was inversely proportional to the existing plant area. The results of this analysis contradicted to the research conducted by (Ayu et al., 2021) that on increasing farm income, land area is very influential to increase farmers' income. In addition, several other influencing factors such as land area, capital, and production can also affect the income earned by farmers.

Farmers who did not have partners in running their farming might have understood the problems that existed in the field, besides that they also had the same knowledge related to farming or at the upstream level. This can also be caused by several advantages of partnered farmers, including the provision of capital, infrastructure, and some other assistance. However, these do not guarantee a significant increase in production because technically farmers are the main subject. The guarantee of inputs received by farmers and downstream was a stimulus, meaning that if it is not balanced with increased technical implementation from farmers, it will also have an insignificant impact on increasing production. Therefore, this analysis showed that there was no real significance in the production because the difference between the production of farmers who were non-partnership and partnership was small.

In assessing the difference in income received by rubber farmers in running their farming business, wheter significantly different or not significantly, the Wilcoxon test analysis was carried out. This test was used to determine the difference in the average income of rubber farmers, when not in partnership and when doing partnership. Since the data in this research were not normally distributed, non-parametric with the Wilcoxon signed-rank test was conducted.

The following table 8 presents the results of the analysis using the Wilcoxon test on the data that have been obtained.

Table 8. Differences in income between non-partnered and partnered rubber farmers

Farmer	Income average/year	z-table	Sig. (2 tails)
Not Partnering	Rp. 902,000.33	-2,984b	.003
partner	Rp. 10,618,000.60		

Source: Data Processed, 2021

Based on table 8, the average annual income of partnered farmers was greater than that of non-partnered farmers. Farmers who did not partner earned an income of Rp. 902,000.33, while those who partnered had an income of Rp. 10.618.000.60. In addition, the test results showed the probability of (Asymp.Sig), 0.05 > 0.003, then H0 was rejected and Ha was accepted. It can be concluded that there was a significant difference between the income of non-partnered and partnered rubber farmers. Farmers who carried out their farming activities and participated in partnerships earned higher incomes than those who did not. Partner farmers will receive marketing guarantees/distribution results and have different price guarantees from non partnership farmers. This result is consistent with the research of Husin et al., (2017) which shows that partnership rubber farmers earn 68% of their income, much higher than 64% of non partnership farmers. This very significant difference is very beneficial for rubber farmers. Husin et al., (2017), also argue that farmer income is one of the easiest indicators to use to differentiate between two different systems.

Table 9. Revenue of Non-Partnered and Partnered Rubber Farmers

No	Description	Production (Kg/m/000)	Rubber Price (Rp/000)	Production Value (Rp/000)	Percentage (%)
1	Not Partnering	464.02	7	2,276,817	38.81
2	partner	509.76	7.74	3,590.070	61.19
	Total	973.79	14.74	5,866.887	100

Source: Data Processed, 2021

Table 9 statistically shows a significant difference between production, the price received by farmers, and the value of the production obtained. The greater the amount of production obtained by farmers, the greater the income received by farmers. Conversely, the smaller the amount of production, the smaller the income received by farmers. The production value in the survey data was the value of the rubber commodity produced by the production sector. It was the result of multiplying the quantity of production with the price per unit of the commodity. The unit price was stated at the producer price at the time the commodity was produced. In Table 9, it can be seen that the costs incurred by partnered farmers were greater than those of non-partnered farmers. The cost incurred by non-partnered farmers was Rp. 2,186,584,000 while partnered farmers cost was Rp. 2,528,210,000. The difference was not high, approximately Rp. 341,626,000. The high-cost difference can be seen in Table 9 which shows that there was a difference in costs between partnered and non-partnered farmers. The largest cost component incurred by non-partnering farmers was other expenses of Rp. 1,394,514. Other expenditure costs consisted of 1) land costs, both leased and free of rent, 2) business equipment/facilities, both leased and free of rent, 3) business credit/loans, 4) indirect taxes, 5) levies/levies/contributions, 6) depreciation of capital goods, 7) fuel, 8) costs of transportation/transportation of produce, 9) agricultural services and 10) others (containers, and others). Partnered farmers incurred the largest costs in the cost of wages given to existing work.

Table 10. Types of Costs Expended by Non-Partner and Partner Rubber Farmers

No	Fee Type	Not partner	Percentage (%)	partner	Percentage (%)
1	Seeds (Rp/000)	6.275	0.29%	11,499	0.45%
2	Protective Plants (Rp/000)	0	0%	0	0%
3	Fertilizer (Rp/000)	16.515	0.76%	160,845	6.36%
5	Liquid Pesticide (Rp/000)	14,688	0.67%	23,515	0.39%
6	Wages (Rp/000)	754.592	34.51%	1,712,303	67.73%
7	Other Expenses (Rp/000)	1,394,514	63.78%	620,048	24.53%
	Amount	2,186,584	100%	2,528,210	100%

Source: Data Processed, 2021

The total production value received by non-partnered rubber farmers was Rp. 2,276,817,000 compared to farmers who partnered, which was Rp. 3,590,070,000. The magnitude of the production value of partnered rubber farmers compared to non-partnered farmers was influenced by the guarantee of the distribution of results received by partnered farmers. This guarantee guaranteed that latex prices for rubber farmers were stable compared to rubber farmers who did not partner. To make it clearer, the income difference between partnered and non-partnered rubber farmers is showed in Table 11.

Table 11. Income of Non-Partnered and Partnered Rubber Farmers

No	Description	Production Value (Rp/000)	Total cost (Rp/000)	Income (Rp/000)	Percentage (%)
1	Not Partnering	227.6817	2,186,584	90,233	7.83%
2	partner	3,590.070	2,528,210	1,061,860	92.17%
	Total	5866887.00	47148	1,152.093.00	100%

Source: Data Processed, 2022

Income is the result of reducing the value of production with the total cost received by rubber farmers. The total income of non-partnered and partnered rubber farmers can be seen in table 11. The income of non-partnered farmers was much lower than that of partnered farmers, which was Rp. 90,233,000 for farmers who did not partner, while those who partnered earned Rp. 1.061.860.000. The amount of the income was also influenced by the total costs incurred by farmers and the production value received by rubber farmers who did not partner and partnered. Differences in income occurred due to differences in the participation of farmers in participating in partnerships. Farmers who are under contract with the company have the freedom to produce,(Fitri et al., 2018).

According to (Desvo et al., 2019) cooperation can increase the selling value of agricultural products. This is because partner companies have an obligation to market partner farmers' products. Stable income and clear market access are the main reasons for farmers to join the partnership. Cooperation in partnership will provide benefits for both farmers and companies. Farmers will gain market access and increase income. This result is in accordance with research conduct by (Puspitaningrum and Gayatri, 2019) which states that the partners (companies) also benefit from this partnership activity. Based on this, rubber farmers should make partnerships because it will provide higher profits compared to non-partnership farmers. The bargaining power of farmers will be better when farmers are in a cooperative system, so the price offered is better. This will also make the government's program a success, which is related to the recommendation of farmers to join the partnership.

CONCLUSION

Based on the results of research and discussion on the impact of partnerships on the production and income of rubber farmers in Indonesia, some conclusions are drawn as follows. First, the partnership pattern for rubber farmers in Indonesia is the KOA partnership pattern. This pattern can be marked by the availability of land by partner groups, while the partner companies provide counseling, capital, costs, assistance for production facilities and guarantees for the distribution of their farming business results. On the impact of partnerships on the production of rubber farmers in Indonesia, there is no significant difference between the production of non-partnered and partnered rubber farmers. On the impact of partnership on the income of rubber farmers in Indonesia, there is a significant difference between the income of non-partnered and partnered rubber farmers.

REFERENCES

Aisyah, S. M., M. Y. Yusa, N. A. Supli, Dan O. M. F. Ikhsan. 2021. The Implementation Of South Sumatera Industrial Downstreaming For Rubber Products Strategic Policy With The Establishment Of Tanjung Api-Api Special Economic Zone. *Jurnal Hubungan Internasional*. 10(1):1–18.

Ayu, I. G., B. Pradnyawati, Dan W. Cipta. 2021. [*Pengaruh Luas Lahan , Modal Dan Jumlah Produksi Terhadap Pendapatan Petani Sayur Di Kecamatan Baturiti]*. 9(1):93–100.

Azmie, U., R. K. Dewi, Dan I. D. G. R. Sarjana. 2019. [P*ola Kemitraan Agribisnis Tebu Di Kecamatan Jetis Kabupaten Mojokerto]*. *Agrisocionomics: Jurnal Sosial Ekonomi Pertanian*. 3(2):119–130.

Bakar, B. A., A. Azis, Dan E. Fauzi. 2020. [*Karakteristik Dan Kelembagaan Tata Niaga Petani Karet Di Aceh]*. 235–241.

Cahyarubin. (2016). Analisis Pendapatan Usahatani Tebu Petani Mitra Dan Non Mitra Pg Rejoagung Baru, Kabupaten Madiun. *Skripsi*

Daulika, P., K.-C. Peng, Dan N. Hanani. 2020. Analysis On Export Competitiveness And Factors Affecting Of Natural Rubber Export Price In Indonesia. *Agricultural Social Economic Journal*. 20(1):39–44.

Desvo Saputra, Maharani, M. S. 2019. The Effect Of Partnership On Efficiency Soybean Farming At Grobogan Vol, 3 No.02, (28 Desember 2019). *Jurnal Agri Sains*. 03(02):1–12.

Fitri, A., H. Harianto, Dan R. W. Asmarantaka. 2018. The Effects Of Partnerships On The Efficiency Of Mustard Farming At Megamendung District. *Jurnal Manajemen Dan Agribisnis*. 15(1):12–22.

Habib, E. A. Dan E. B. Kuntadi. 2020. [*Analisis Willingness To Pay Beras Organik Aromatik "Botanik" Gapoktan Al-Barokah Di Kabupaten Bondowoso]*. *Jsep (Journal Of Social And Agricultural Economics)*. 13(1):38.

Husin, L., Yulius, D. Adriani, Dan M. Antoni. 2017. Effect Of Different Rubber Market System On Farmer's Income In South Sumatra Province, Indonesia. *Russian Journal Of Agricultural And Socio-Economic Sciences*. 71(11):257–262.

Khoiriah, N. Q. Dan Siswahyudianto. 2021. [*Strategi Pemasaran Karet Sistem Lelang Dalam Upaya Meningkatkan Perekonomian Petani Karet*]. *Jurnal Ilmiah Ilmu Manajemen Dan Kewirausahaan*. 1(1):117–129.

Kurnia, D., Marimin, U. Haris, Dan Sudradjat. 2020. Critical Issue Mapping Of Indonesian Natural Rubber Industry Based On Innovation System Perspectives. *Iop Conference Series: Earth And Environmental Science*. 443(1)

Kuswanto, K., A. Zulkifli, A. Armandelis, Dan Z. Zulfanetty. 2019. The Impact Of The Efficiency Of Rubber Production On The Welfare Of Rubber Farmers In Jambi Province. *International Journal Of Economics And Financial Issues*. 9(2):80–86.

Kurniati, S. A. Dan D. Darus. 2019. [Optimalisasi Input Dan Pengaruhnya Terhadap Produksi Usahatani Bawang Merah Di Desa Sungai Geringging Kecamatan Kampar Kiri Kabupaten Kampar]. Unri Conference Series: Agriculture And Food Security. 1:34–39.

Puspitaningrum, D. A. Dan S. Gayatri. 2019. Farm Partnership Between Farmers And The Company In Production And Marketing Of Vegetables Commodity. *Journal Of Socioeconomics And Development*. 2(1):45.

Rompas, J., D. Engka, Dan K. Tolosang. 2015. [*Potensi Sektor Pertanian Dan Pengaruhnya Terhadap Penyerapan Tenaga Kerja Di Kabupaten Minahasa Selatan]*. *Jurnal Berkala Ilmiah Efisiensi*. 15(04):124–136.

Saleh, M. 2015. [*Studi Tentang Pola Kemitraan Pt. Perkebunan Nusantara Xiii Dalam Meningkatkan Perekonomian Masyarakat Di Desa Semuntai Kecamatan Long Ikis Kabupaten Paser]*. *Ilmu Pemerintahan*. 3(4):1527–1538.

Siti Faiqotul Ulya, Yl Sukestiyarno, P. H. 2018. [*Analisis Prediksi Quick Count Dengan Metode Stratified Random Sampling Dan Estimasi Confidence Interval Menggunakan Metode Maksimum Likelihood]*. *Unnes Journal Of Mathematics*. 7(1):108–119.

The World Rubber Industry. 2020. International Rubber Study Group. Rubber Industry Report. 16(9):24-29

Wahyono, N. D. 2016. [*Pemetaan Dan Rencana Aksi Pengembangan Industri Karet Di Propinsi Jawa Timur]*. *Jurnal Ilmiah Inovasi*. 14(1)

Zuhdi, F. Dan R. S. Anggraini. 2020. The Indonesian Natural Rubber Export Competitiveness In Global Market. *International Journal Of Agriculture System*. 8(2):130–139.

Zakaria, F. 2015. [*Pola Kemitraan Agribisnis]*. 2. *Jurnal Ekonomi Dan Bisnis Indonesia*.

Zunita Wulansari., M. T. C. 2021. Rubber Plant Disease Diagnosis System Using Depth First.