

The effect of inflation on income inequality: Evidence from a non-linear dynamic panel data analysis in indonesia

Betty Uspri^{a*}, Syafruddin Karimi^a, Indrawari^a and Endrizal Ridwan^a

^aDepartement of Economic, Universitas Andalas, Padang, Indonesia

CHRONICLE

Article history:

Received: November 21, 2022

Received in revised format:

December 28, 2022

Accepted: April 4, 2023

Available online:

April 4, 2023

Keywords:

Inequality

Inflation

Gini Index

Generalized Method of Moment

(GMM)

Indonesia

ABSTRACT

This research investigates the impact of inflation on income inequality in Indonesia. This study is part of a comprehensive examination investigating which monetary policy can be utilized to lessen inequality. As a central bank objective, inflation can influence the distribution of income, wealth, and endogenous consumption, hence defining inequality. This study employed dynamic panel data analysis for linear autoregressive data using the generalized method of moments (GMM) for both first differences GMM (FD-GMM or AB-GMM) and system GMM (Sys-GMM or BB-GMM) with regional data from 58 cities in 2010-2020. The Arellano-Bond estimator reveals a positive and statistically significant association between inflation and inequality. When inflation rises, the purchasing power of the poor will decline, while the wealthiest will benefit as their non-cash assets proliferate. This study finds, indirectly, that Indonesia's monetary policy can play a crucial role in lowering income distribution gaps. As one of the nations with an inflation-targeting framework, the Indonesian Central Bank can target the inflation rate by considering inequality. The ITF becomes the most effective monetary policy for stabilizing prices and promoting economic stability. The ITF reduces income inequality by reducing inflation rates. The study also finds that, similar to other emerging nations, economic growth in Indonesia exacerbates inequality. Poverty can be reduced by increased economic growth, but the positive impact of development on the wealthy is significantly more significant than on the poor. Therefore, economic expansion increases inequality.

© 2023 by the authors; licensee Growing Science, Canada.

1. Introduction

Price stability in Indonesia is primarily regulated by the inflation-targeting framework (ITF), which has become the country's primary monetary policy framework. According to the findings of a number of studies, this approach assists emerging countries, particularly Indonesia, in maintaining a stable level of inflation with only a reasonable trade-off in output growth (Duong, 2022; Tawadros, 2009). The performance of Indonesia's macroeconomic system has also shown indications of improvement after the ITF was implemented. As a result of the establishment of this framework, better inflation expectations have been established, and it should lead to a lower actual inflation rate (Hendar, 2016). Additionally, despite the global economy experiencing a severe downturn at the same time as the onset of the global financial crisis, Indonesia maintained its robust economic growth (World Bank, 2009; Monnin, 2014).

Inequality in economic circumstances is one of the knock-on effects of inflation and vice versa. This phenomenon is crucial because it determines what characterizes poverty while also having the capacity to influence economic growth. Generally, countries with high degrees of inequality, typically emerging countries, have high rates of inflation. Inequality would have a systemic impact on other variables, such as economic growth, ownership of assets, and even social issues, such as the rates of crime and violence (McKay, 2002). In the setting of elite bias in the political system, more income disparity produces

* Corresponding author.

E-mail address: bettyuspri@eb.unand.ac.id (B. Uspri)

inequality in the allocation of political power. This condition, in turn, leads to the development of favorable policies only for certain groups, specifically the upper-middle class. These policies pertain to the regulations governing taxes (Crowe, 2006). According to the survey's findings, personal taxes as well as the growth of technological advances, can contribute to Indonesia's increasing inequality (Ningsih, 2017). On the other hand, avoiding fluctuating inflation and continuing consistent economic growth are prerequisites for alleviating income disparity and poverty (Siringi & Oiro, 2011; Thalassinou, Uğurlu, & Muratoğlu, 2012; Bulir, 2001).

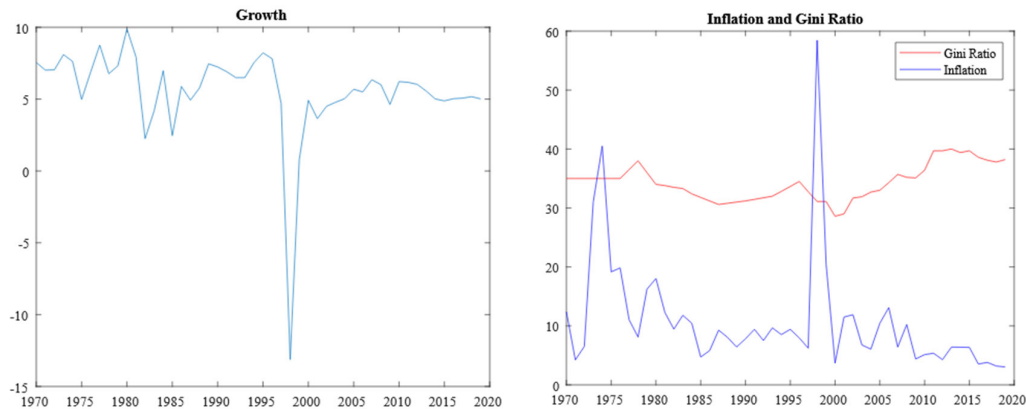


Fig. 1. Indonesia: Gini Index, Inflation and Growth 1970-2020.

In Indonesia, around the beginning of the 1930s, there was a substantial increase in the inequality of wealth distribution. That occurred during the worst part of the Great Depression as a direct consequence of a change in the economy's composition, specifically a shift from the domestic agricultural sector toward exports. The fall in export prices caused wealthy farmers to see a considerable loss in the amount of money they made from their crops. The disparity in expenditures between urban and rural areas widens, contributing to an increase in inequality (van Leeuwen & Földvári, 2016). In the 1950s, a rise in the proportion of workers employed in the industrial and service sectors signaled the beginning of an economic structure transition phase. In 1997, the real GDP grew by 7.1% annually due to stabilization and economic restoration initiatives. This sum is considerably more significant than the annual growth rate of the population, which is 2.1%. Until the early 1990s, changes in economic structure, followed by a rise in agriculture sector labor productivity, aided in reducing inequality. The 1930s-to-1990s trend of declining inequality is reflected in the reduced poverty rate. Due to an increase in GDP per capita, the percentage of those living below the poverty line and the disparity between the rich and the poor decreased (Van Der Eng, 2009).

Between 2000 and 2014, the real GDP per capita increased an average of 5.4 percent each year, coinciding with a rapid rise in economic inequality in Indonesia. The rate of poverty was reduced to 11% in 2011 as a direct result of the growth rate. On the other hand, the development process contributed to an increase in Indonesia's inequality (World Bank, 2015). More significant improvements have been seen in the incomes of the middle and upper classes than those in lower-income groups. After that, the income gap widens, leading to an increase in inequality. Over the course of the previous two decades, inequality in Indonesia has been significantly higher than in other ASEAN countries. The objectives of macroeconomic policy, including monetary policy, will be subject to a trade-off due to income disparity. Without considering the Gini Ratio, the development program, especially the poverty alleviation package, will not be effective. If the Gini Index were to decrease by 10 points, the number of people living in poverty in Indonesia would fall by up to 1.7 million. If the Gini ratio does not change much during the next five years, the number of people living in poverty will increase to 13 million (Seery et al., 2014).

The instability of Indonesia's economic inflation in 1997 and 1998 as a direct result of the Asian crisis is one of the critical sources of concern. The consumer price index had reached 219.54 at that point in time, representing an inflation rate of 77.6%. In 1999, the government of Indonesia attempted to break out of the monetary crisis by establishing independence for the central bank. The situation was expressed in the independence statute that Bank Indonesia passed. Since the passage of the law, the policy of the Bank of Indonesia has had only one objective: maintaining price stability. In addition, Bank Indonesia maintains complete autonomy in establishing monetary measures, including selecting the relevant variables and policy instruments.

The purpose of conducting research on economic policies is to ensure that the goals set forth by the government are both maximal and optimal. The optimization of the policy will bring a reduction in inequality and will enhance the economic system (Stiglitz, 2016). In spite of the fact that inequality is not a direct target of the central bank, monetary policy has a significant impact on it. Inequality can be used to determine whether or not the monetary policy significantly impacts actual economic variables, including determining how inequality reacts to changes in monetary policy within the ITF. The distribution of income, wealth, and endogenous consumption are all affected linearly by inflation when the economy is in a

state of static equilibrium. There is a correlation between income or wealth and household demographic characteristics, such as age, type of income, and portfolio composition. These variables interact with the various shifts in monetary policy (Amaral, 2017).

Indonesia is one country that serves as a model for the other ASEAN nations. Indonesia is the only nation in Southeast Asia to hold membership in the G20 and a commitment to promoting equitable and sustainable economic growth. Steady growth itself would not be enough to prevent an increase in poverty in several G20 countries, including Indonesia, despite inequality being on the rise. Inequality will make it impossible for the poor to benefit from economic growth, even if they indirectly pay financially to the G20's development programs. Consequently, it is essential that this paper be written to investigate the relationship between inflation and inequality in Indonesia and its influence. This study looks at 58 different cities across Indonesia to determine the levels of inflation and inequality there. Incorporating regional data enables more accurate research findings and produces more precise descriptions.

2. Literature Review

One of the fundamental goals of development is to strengthen economies that are advantageous to all communities, especially those that are economically disadvantaged. This phenomenon is one of the primary purposes of development. If those with lower incomes benefit more from economic growth than those with higher incomes, then development is advantageous for those with lower incomes. Even when the economy is expanding, poverty and inequality can be reduced with the support of a growth strategy that puts an emphasis on the requirements of the less privileged. When individuals who are already living in poverty receive a smaller benefit from socioeconomic development, the disparity that is produced as a result of development policies is proportionally more enormous (Ravallion, 2005).

The impact of the income disparity between lower-income households and the remaining population on economic growth is of utmost significance. The deleterious effects are observed among the lower 40% of the income distribution, encompassing not solely the lowest decile of earners. The results suggest that policy measures should not solely concentrate on alleviating poverty but also tackle the issue of reduced income levels overall (OECD, 2014).

Heterogeneity in the community can be traced back to its root cause, which is inequality. This disparity is responsible for the heterogeneous community's income, labor productivity, and marginal propensity to consume (MPC) (Kumhof, Rancière, & Winant, 2015). The availability of labor and access to the financial system are among the heterogeneity measures reflected in households. Households with low incomes are equivalent to unskilled labor that generates a low rate of return. The impoverished will spend all their money today because of their low incomes. This circumstance will continue to affect access to the financial system, ownership of assets, and even the capabilities of households in the face of economic shocks, including changes in monetary policy.

On the basis of the Kuznets hypothesis, a substantial amount of academic research explains the non-linear relationship between inflation and inequality, particularly income disparity. There is a positive link between inflation and inequality, particularly in developing countries. Because of how the economy is growing, inflation will be high, and the market gap will widen. Nevertheless, after that, inequality will go down as the rate of inflation goes down. Inflation may be a consequence of high disparity, and high inequality may be a consequence of high inflation. If inflation were to go down, there would be a corresponding reduction in income inequality and vice versa. When hyperinflation occurs, individuals will notice the effects of this phenomenon to the most significant degree.

On the other hand, a discernible rise in the Gini coefficient can be observed in the event of a sustained decrease in the inflation rate to its minimum or in the occurrence of disinflation. Consequently, whether inflation is low or high is not the objective; preserving price stability is the priority. When prices are stable, there is no possibility that deflation will cause middle- or long-term income inequality. This risk has been eradicated. If inflation persists and the labor supply is inelastic, inflation may result in a rise in average welfare. Influencing the impact of inflation includes variables such as the structure of the financial system, the persistence of shocks, and the elasticity of the labor supply. As a result of inflation, those receiving social security benefits will observe a decline in wealth disparity and an increase in consumption inequality. Nonetheless, when agents have social security in addition to financial and non-monetary assets, consumption difference decreases while wealth inequality rises (Camera & Chien, 2014).

The outcomes of this study provide evidence that supports the hypothesis that openness, GDP per capita, and political stability moderate the effect that inflation has on income inequality (Albanesi, (2007); Maurer & Yesin (2004); (Siami-Namini & Hudson, 2019); Nantob (2015). On the one hand, the relationship between debt and inflation can be impacted by factors such as public debt and exceptionally high foreign debt in emerging nations. In addition, these factors can influence inflation and income distribution. Based on these findings, policymakers in developing countries should address the impact of government policies on the income gap between different groups of people. The various impacts have been the subject of investigation in several studies. Inequality in income will, over time, work against the economy's growth, but there is no empirical evidence to explain the connection between inflation and income distribution (Yue, 2011). The relationship between inequality and inflation is contingent upon institutionally related parameters and preferences, such as the rate of

progressive taxation in the economy or the cost of the adoption of new technology (Lahiri & Jayne, 2007). Additionally, the transmission of monetary policy is more effective than other models in regulating three agents, namely households: the poor hand-to-mouth, the wealthy hand-to-mouth, and the non-hand-to-mouth, due to the fact that it results in higher output and a more significant response to inflation. These three agents are the poor, the wealthy, and the non-hand-to-mouth. The impact is felt more widely as a result of indirect routes of transmission for monetary policy. The macroprudential policy has the potential to mitigate the effects of inequalities in consumption and house ownership responses. According to the findings, modified loan-to-value (LTV) ratios have the ability to effectively control the responsiveness to shocks caused by monetary policy (Eskelinen, 2021).

In addition, the impact of monetary policy and inflation on inequality is proportionate to the initial rate of inflation in a country's economy. The adoption of monetary policy aimed at reducing the inflation rate would exacerbate inequality in a nation with low inflation, to begin with. In conjunction with initial inflation, which is relatively high, a restrictive monetary policy has the ability to reduce inequality (Galli & Hoeven, 2001). Varying relationships between inflation and patterns of inequality were also the result of inequalities in the initial distribution of wealth, which contributed to the current economic situation. Under some conditions, the pattern of inequality resembles a series of Kuznets curves, which implies that inequality initially increases and then begins to diminish over time. After that, it begins to decline gradually, and this trend is likely to continue. In other cases, seeing that patterns of inequality correlate with inflationary trends may come as a surprise. In a symmetrical framework, an unanticipated tightening of monetary policy would likewise contribute to an increase in inequality (Furceri, Loungani, & Zdzienicka, 2018).

3. Research Method

3.1 Data

The data supporting this study's findings are accessible at www.bps.go.id on the Statistics Indonesia website. Statistics Indonesia, sometimes known locally as BPS, is a non-departmental government institution in Indonesia that conducts statistical surveys and publishes the vast majority of statistical data available to the public.

3.2 Model specifications

Eq. (1) describes the non-linear relationship models between inflation and income inequality in Kuznets terms;

$$Gini_{it} = \delta_t + \eta_i + \gamma_1 \pi_{it} + \gamma_2 \pi_{it}^2 + \beta growth_{it} + v_{it} \quad (1)$$

Gini is income inequality, π is inflation, *growth* is economic growth - a control variable-, and v_{it} is an independent identically distributed (i.i.d) error term for the i ($i = 1, \dots, N$) at the time t . η_i is the individual effect of province i that may impact the inequality invariant with time. δ_t is the impact of time.

By considering the dynamic factor, the right side of the Eq. (1) changes to;

$$Gini_{it} = \delta_t + \eta_i + \xi Gini_{i,t-1} + \gamma_1 \pi_{it} + \gamma_2 \pi_{it}^2 + \beta growth_{it} + v_{it} \quad (2)$$

The regression Eq. (2) becomes a dynamic equation with first-order lag. The impact of inflation on inequality is $\gamma_1 + 2\gamma_2 \pi_{it}$. The focus of the analysis is γ_1 and γ_2 . Equation (2) describes quadratic function with maximum $\pi^* = -\gamma_1/2\gamma_2$. Gini ratio below the π^* level indicates inequality increases with decreasing inflation. However, the negative inflation effect becomes positive when the threshold π^* is passed.

Data panels emerge from inconsistency and efficiency issues related to the error term. Then, the analysis expands with a dynamic panel data model with the exogenous variable that is generally;

$$y_{it} = \delta y_{i,t-1} + x_{it} \beta + u_{it} \quad (3)$$

where the value of i and t is $1, 2, \dots, N$. $y_{i,t}$ is a unit of a cross-section of the period t . x_{it} is an observable independent variable vector measuring $1 \times K$, and β is a $K \times 1$ predictor vector. $u_{i,t}$ is a term error for unit cross-section to i in period t following one-way error component;

$$u_{it} = \mu_i + v_{it} \quad \mu_i \in iid(0, \sigma_u^2); v_{it} \in iid(0, \sigma_v^2) \quad (4)$$

Static panel data will bring up inconsistencies and efficiency in the Fixed Effect Model (FEM) and Random Effect Model (REM) related to the treatment, μ_i . Meanwhile, this condition is very different in dynamic panel data due to $y_{i,t}$, the function μ_i , which $y_{i,t-1}$ is also a function of μ_{it} . Since μ_{it} is a function of μ_i then $y_{i,t-1}$ correlates it μ_i . This fact makes the use of the least square estimator biased and inconsistent. This condition is also proper if it v_{it} is not serially correlated.

The autoregressive panel data model (AR(1)) without variables can explain the above conditions

$$y_{it} = \delta y_{i,t-1} + u_{it}, \quad |\delta| < 1 \quad ; \quad t = 1, \dots, T \quad (5)$$

The fixed effect estimator (1) is divided by;

$$\hat{\delta}_{FE} = \frac{\sum_{j=1}^N \sum_{i=1}^T (y_{it} - \bar{y}_i)(y_{i,t-1} - \bar{y}_{i,-1})}{\sum_{j=1}^N \sum_{i=1}^T (y_{i,t-1} - \bar{y}_{i,-1})^2} \quad (6)$$

$$\text{with } \bar{y}_i = \frac{1}{T} \sum_{i=1}^T y_{it} \quad \text{and} \quad \bar{y}_{i,-1} = \frac{1}{T} \sum_{i=1}^T y_{i,t-1}$$

Therefore, by substituting Eq. (6) into Eq. (5), the properties $\hat{\delta}_{FE}$ are;

$$\hat{\delta}_{FE} = \delta + \frac{\frac{1}{NT} \sum_{j=1}^N \sum_{i=1}^T (v_{it} - \bar{v}_i)(y_{i,t-1} - \bar{y}_{i,-1})}{\frac{1}{NT} \sum_{j=1}^N \sum_{i=1}^T (y_{i,t-1} - \bar{y}_{i,-1})^2} \quad (7)$$

3.3. First Difference GMM (Diff-GMM)

Estimating δ , which is consistent with $N \rightarrow \infty$ and a specific T , the first difference is carried out in Eq. (5) to eliminate individual effects (μ_i) as follows;

$$y_{it} - y_{i,t-1} = \delta(y_{i,t-1} - y_{i,t-2}) + (v_{it} - v_{i,t-1}); \quad t = 2, \dots, T \quad (8)$$

Using the least-squares estimator to estimate Eq. (8) will be inconsistent δ . For this reason, the first transformation is carried out the difference;

$$\delta_{IV} = \frac{\sum_{j=1}^N \sum_{i=2}^T y_{i,t-2}(y_{it} - y_{i,t-1})}{\sum_{j=1}^N \sum_{i=2}^T y_{i,t-2}(y_{i,t-1} - y_{i,t-2})} \quad (9)$$

where the necessary conditions for the estimator to be consistent are;

$$p \lim \frac{1}{N(T-1)} \sum_{i=1}^N \sum_{t=2}^T (v_{it} - v_{i,t-1})y_{i,t-2} = 0 \quad (10)$$

Estimating Eq. (3) can use GMM, which depends on the assumption x_{it} . If x_{it} is assumed strictly exogenous, it will be obtained;

$$E[x_{is}, \Delta v_{it}] = 0, \quad \text{for each } s \text{ and } t \quad (11)$$

This condition makes x_{it}, \dots, x_{iT} possible to add to the list of instruments for the first difference equation for each period t . If x_{it} is assumed not strictly exogenous but predetermined where x_{it} and lag x_{it} are not correlated with the current error, we get $E[x_{is}, \Delta v_{it}] = 0$ for $s \geq t$. In this case, only x_{it-1}, \dots, x_{i1} the instrument is valid for the first difference equation in the period t . So the moment conditions used are;

$$E[x_{it-j}, \Delta v_{it}] = 0; \quad j = 1, \dots, t-1, \forall t \quad (12)$$

3.4. System GMM (Sys-GMM)

The system-GMM method (Sys-GMM) estimates the first difference and system-level equations where the instrument is used on the first difference level of the series. Taking advantage of initial conditions is essential to produce efficient estimators on dynamic panel data when T is small. Consider the following dynamic panel data autoregressive model without exogenous regressors:

$$y_{it} = \delta(y_{i,t-1}) + \mu_i + v_{it} \quad (13)$$

where, $E(\mu_i) = 0$, $E(v_{it}) = 0$, and $E(\mu_i v_{it}) = 0$ for $i = 1, 2, \dots, N$; $t = 1, 2, \dots, T$.

Arellano & Bond (1991) assume $T = 3$ so that only one orthogonal condition is generated by $E(y_{it} \Delta v_{i3}) = 0$ were δ exactly identified. To comprehend this problem, regressing Δy_{i2} on y_{i1} yields the first step of instrument variable regression:

$$\Delta y_{iz} = (\delta - 1)y_{i1} + \mu_i + v_{iz} \quad (14)$$

Since $E(y_{i1}, \mu_i) > 0$ then $(\delta - 1)$ will be upwards biased with;

$$p \lim(\delta - 1) = (\delta - 1) \frac{c}{c + (\sigma_{it}^2 / \sigma_u^2)} \quad (15)$$

with $c = (\delta - 1)/1 + \delta$. The emergence of bias can cause the estimated coefficient of the instrument variable y_{i1} , to approach zero and the F statistic value of the first stage of instrument variable regression to converge to χ^2 with non-centrality parameters;

$$\tau = \frac{(\sigma_u^2 c)^2}{\sigma_u^2 + \sigma_u^2 c} \rightarrow 0 \text{ by } \delta \rightarrow 1 \quad (16)$$

As a result of $\tau \rightarrow 0$, the estimator variable becomes weak. This condition links the bias with the low precision of the initial difference-GMM estimator with the instrument's weakness, as shown by the concentration parameter, τ (Blundell, Bond, & Windmeijer, 2001).

4. Result and Discussion

Utilizing dynamic panel data can handle a time-dependent change in data. If there is no change over time in any city, GMM excludes a large proportion of the special effect and calculates the dependent variable as the instrument with a timeout (lag) of at least 1. The assumption is performed if there is no change in any city over time. The results of Table 1 indicate that estimation is reliable and effective since it minimizes the number of standard errors. This model does not exhibit the autocorrelation problem indicated by the AR test. Furthermore, the correlation between the variables of the instrument is not explained by the Sargan-Hansen Test. In addition, the sheet clarifies that an estimate of Diff-GMM and Sys-GMM has decreased the standard error of an exogenous variable and has no autocorrelation issues at the 5% level.

Table 1
Inflation and Inequality: Estimation Result

Variable	Dependent Variable: Gini Ratio	
	Diff-GMM	Sys-GMM
Inflation	0.4314229*** (957.83)	0.4514975*** (3635.93)
Inflation-Sq	-0.0555102*** (-1022.47)	-0.0573269*** (-3913.20)
Growth	0.2159769*** (1119.79)	0.2137182*** (3269.25)
Constant	-0.5571404*** (1119.79)	-0.5733804*** (-1756.36)
Sargan Test	0.0850	0.2982
AR(1)	0.3168	0.3168
AR(2)	0.0208	0.0991
Observation	522	530
Cities	58	58

Notes: *** p < .01. The numbers in parentheses are standard errors.

The findings of both the Diff-GMM and Sys-GMM estimations demonstrate that the direction of the inflation coefficient remains consistent in its influence on inequality in Indonesia. In general, the rate of inflation in Indonesia has contributed to the country's growing inequality. At 1% alpha, inflation substantially affects the level of inequality. This conclusion is similar to the findings of Davtyan (2016), Nantob (2015), Correia (2009), and (Albanesi, 2007). However, the findings of this study contradict Siami-Namini & Hudson's (2019a) estimations of inflation and inequality, according to which the link between inflation and inequality forms an inverted U-shape for emerging countries.

The level of economic activity will increase due to inflation, which in turn will lead to an increase in real wages and household spending. Expansion of economic activity, in particular increased employment, will positively affect the living situation of low-income families. The increase in inflation will also affect the movement of household wages. Of note is the frequency of shifts in wages between low and high-income households. This study clarifies the fact that the increase in real wages for high-income households is much higher than that for low-income households. Meanwhile, inflation will increase both the value of assets and the income of rich households, causing an increase in the gap between the rich and the poor. On the other hand, the purchasing power of cash-only poor people will decrease as inflation increases. As inflation rises, non-cash assets, such as property, gold, and foreign exchange, will appreciate in value for the relatively wealthy community.

This circumstance will worsen the income gap between the poor and the wealthy.

According to the statistics, the effect of inflation on inequality is non-linear and becomes significant at 1%. Based on the non-linear model utilized in this study, a decrease in inflation causes an increase in inequality below certain thresholds of the inflation rate. However, once the inflation threshold is exceeded, the negative impact of inflation will begin to have a positive impact. This statement indicates that the link between inflation and inequality has a structural breaking point. In the paradigm of non-linear relationships, the direction of the relationship between inequality and inflation might vary based on the inflation rate. The critical rate of inflation will appear differently depending on the position of every country. Inflation caused a significant slowdown in actual economic variables, which was projected to be between 1-3 percent in industrialized countries and 7-11 percent in developing countries (Khan & Senhadji, 2001). Meanwhile, the inflation threshold for Indonesia is approximately 4.64 percent (Aziz & Nasrudin, 2016). In other words, inflation rates below 4.64 percent continue to positively impact economic growth, affecting other macroeconomic variables, including inequality.

The results of this study show that Indonesia's growing inequality is also linked to its growing economic growth. The results were validated with a 1% margin of error. This situation arises due to the fact that growth in Indonesia has not stimulated the creation of new jobs, nor has it enhanced the productivity of unskilled or low-skilled labor. If the only people who benefit from increased productivity from economic expansion are highly skilled individuals, then inequality will worsen. Several economic policies, including macroprudential policies, were found to cause a positive association between development and inequality (Zungu, Greyling, & Mbatha, 2022). Before implementing policies, policymakers must devise policies targeted at attracting investment, which will create jobs and a rise in living standards, as well as monitor the level of economic development.

One issue pertaining to developing countries is their failure to fully optimize economic expansion as a fundamental driver for achieving equitable distribution of wealth. The issue persists as economic expansion plays a crucial role in facilitating the equitable distribution of wealth. The enhancement of human capital can be achieved through various means, including job training and the development of improved skills. The consideration of equality of opportunity is deemed crucial. The concept of "inequality of opportunity" refers to the capacity of individuals to create financial resources, affluence, worth, or contentment in a manner that is both accessible and impartial. The presence of disparities in geography, governmental quality, and other influential factors can impede specific individuals from accessing opportunities. Inequality is observed to be more widespread in developing nations as compared to developed nations. (IMF, 2017). The issue of unequal opportunities extends to the lower middle class who are vulnerable and may not be able to reap the benefits of and make contributions towards future recovery and growth. Merely implementing anti-poverty programs may not suffice. The implementation of cash transfers and the enhancement of accessibility to public services, such as education, training, and healthcare, can be regarded as a social investment with long-term benefits, aimed at fostering greater equality of opportunity.

This article clearly illustrates that one strategy for reducing inequality is to execute a contractionary monetary policy with the objective of reducing inflation as substantially as possible. If the objective of the ITF, which the central bank is managing, is to maintain low inflation, then this will have an effect on lowering inequality. The extent to which monetary policy can influence the socioeconomic community in any way, even indirectly, is an important question that needs to be answered. When discussing monetary policy, it goes without saying that the financial market will be immediately impacted. When more people participate in financial markets, there will be a larger community that can be influenced by monetary policy through the existing financial institutions. This opinion will allow for more economic investigation. Unquestionably, additional research is necessary to improve the efficacy of the finding.

5. Conclusions

A significant amount of research has been conducted on inflation and its effect because of its significant influence on other macroeconomic factors. One of these is the effect that inflation has on inequality, as well as the reverse. Over the period of the past twenty years, Indonesia has had significantly greater levels of inequality than other ASEAN countries. Because of this circumstance, it can be demonstrated that the income growth of the middle and upper classes has been more significant than that of the income growth of the lower classes. The end outcome is a widening of economic gaps and an increase in inequality.

Using the data from 2010 to 2020 from 58 cities in Indonesia, this study assessed the impact inflation has had on the income disparity in Indonesia. The research found that inflation has a positive impact on inequality in Indonesia. The robustness checks that find the consistency of the relationship between inflation and inequality make this analysis robust. In conclusion, maintaining a low inflation rate is absolutely necessary in order to bring about a reduction in the economic gaps that exist in society. The use of monetary policy has the potential to play an important role in narrowing the income gap that exists in Indonesia.

People with low incomes will benefit from an increase in economic activity, notably the development of new jobs. As inflation rises, tangible assets such as land, gold, and currency from other countries increase, which works to the advantage of wealthy populations. This scenario will widen the already significant income gap between the wealthy and the poor. The

performance of the macroeconomy will improve once inflation is under control, and there is less inequality in the economy. In addition, it is anticipated that the consequences of inflation will improve economic activities such as increased output and real wages, which help the poor by raising their income and reducing inequalities.

The estimation made it clear, if in an indirect way, that monetary policy might be an essential factor in bringing about a more equitable distribution of wealth in Indonesia. The ITF emerges as an efficient monetary policy instrument, helping maintain price stability and contributing to economic stability. When inflation remains stable, the range of possible income distributions between different groups of individuals will be narrowed. The Inflation Targeting Framework (ITF) leads to reduce inflation rates, which in turn leads to lower levels of income inequality.

As a result, monetary policy can be utilized to lower inflation and hence reduce inequality. Along the same lines as the ITF, inequality may be considered when setting inflation targets. This policy is not being implemented for no reason. The efficiency of monetary policy is impacted when there is inequality. The widespread presumption is that those who are poor are non-bankable. The higher the financially excluded society will undoubtedly affect the effectiveness of monetary policy because the policy affects the minors in the community. It is conceivable to make inequality an issue that must be considered when establishing monetary policy, and this would make it easier to meet the inflation target that has been set. It is also possible that the Bank of Indonesia aims to increase inequality as one of its primary objectives. Undoubtedly, there is a need for an additional investigation.

Inequality reduction continues to be a challenging task, particularly in the post-crisis environment, but it is essential to achieving economic growth. The global economic crisis and the problem produced by the COVID-19 epidemic have both had a detrimental impact on economic growth in practically all countries throughout the world, which has undoubtedly contributed to an increase in inequality. There is no doubt that the growth of employment opportunities is an important governmental objective. Increasing worker productivity, which naturally contributes to economic expansion, is incorrect if all it does is boost productivity for labor skills. This condition will lead to a rise in the already existing income gap. The drive to boost productivity must permeate every level of the labor force. As a direct consequence, the government requires a thorough policy framework to guarantee that the advantages of the development process are dispersed fairly among the entire population.

Acknowledgment

We would like to express our gratitude to the members of the reviewing team as well as to all of the attendees of the 2nd International conference on business and social science (ICOBUSS) 2022, who submitted their thoughts and ideas to help improve the analysis. This essay was written as a requirement for Universitas Andalas's Ph.D. program as part of the research process. The initial author was assisted financially by Domestic Postgraduate Education Scholarships (BPPDN). Awards known as BPPDN are presented to lecturers who have permanent positions at universities that are overseen by the Indonesian Ministry of Research, Technology, and Higher Education.

References

- Albanesi, S. (2007). Inflation and inequality. *Journal of monetary Economics*, 54(4), 1088-1114.
- Amaral, P. S. (2017). Monetary policy and inequality. *Economic Commentary*, (2017-01).
- Arellano, M., & Bond, S. (1991). Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *The review of economic studies*, 58(2), 277-297.
- Aziz, E. B., & Nasrudin. (2016). Estimation Threshold Inflation in Indonesia. *Journal of Applied Economic Sciences*, XI(7(45)), 1376-1383.
- Blundell, R., Bond, S., & Windmeijer, F. (2001). *Estimation in dynamic panel data models: improving on the performance of the standard GMM estimator*. (Vol. 15, pp. 53-91). Emerald Group Publishing Limited.
- Bulíř, A. (2001). Income inequality: does inflation matter? *IMF Staff papers*, 48(1), 139-159.
- Camera, G., & Chien, Y. (2014). Understanding the distributional impact of long-run inflation. *Journal of Money, Credit and Banking*, 46(6), 1137-1170.
- Correia, I. H. (2009). Inflation and Inequality. *Economic Bulletin and Financial Stability Report Articles and Banco de Portugal Economic Studies*.
- Crowe, C. (2006). Inflation, Inequality, and Social Conflict. *IMF Working Paper No. 06/158*.
- Davtyan, K. (2016). Income inequality and monetary policy: An analysis on the long run relation. *AQR-Working Papers*, 2016, AQR16/04.
- Duong, T. H. (2022). Inflation targeting and economic performance over the crisis: evidence from emerging market economies. *Asian Journal of Economics and Banking*, 6(3), 337-352.
- Eskelinen, M. (2021). Monetary policy, agent heterogeneity and inequality: Insights from a three-agent New Keynesian model. *ECB Working Paper No. 2590*
- Furceri, D., Loungani, P., & Zdzienicka, A. (2018). The effects of monetary policy shocks on inequality. *Journal of International Money and Finance*, 85, 168-186.

- Galli, R., & Hoeven, R. van der. (2001). Is inflation bad for income inequality : The importance of the initial rate of inflation. *Employment Paper 2001/29*.
- Hendar. (2016). Inflation mechanisms, expectations and monetary policy in Indonesia. *BIS Papers*, 89, 193–203.
- International Monetary Fund (IMF). 2017. *Fiscal Monitor: Tackling Inequality*. World economic and financial surveys. Washington, October.
- Khan, M. S., & Senhadji, A. S. (2001). Threshold effects in the relationship between inflation and growth. *IMF Staff papers*, 48(1), 1-21.
- Kumhof, M., Rancière, R., & Winant, P. (2015). Inequality, leverage, and crises. *American Economic Review*, 105(3), 1217-1245.
- Lahiri, R., & Dillon, J. (2007). Concerning Kuznets curves, persistent inequality, inflation, and redistribution. *International Advances in Economic Research*, 13(4), 520-521.
- Muarer, M. R., & Yesin, P. A. (2004). Income inequality and inflation. *Swiss National Bank Working Papers*.
- McKay, A. (2002). Inequality briefing. *Briefing Paper*, 1, 1-6.
- Monnin, P. (2014). Inflation and income inequality in developed economies. *CEP Working Paper Series*.
- Nantob, N. (2015). Income inequality and inflation in developing countries: An empirical investigation. *Economics Bulletin*, 35(4), 2888-2902.
- Ningsih, C. (2017). Causes of Income Inequality in Indonesia: A Panel Data Approach for Indonesia among Asian Countries. *International Journal of Management and Applied Science (IJMAS)*, 3(6), 25-28.
- OECD. (2014). *Focus on Inequality and Growth. Focus on Inequality and Growth*. Directorate for Employment, Labour and Social Affairs (December).
- Ravallion, M. (2005). Inequality is Bad for the Poor. *World Bank Policy Research Working Paper*, (3677).
- Seery, E., & Caistor Arendar, A. (2014). *Even it up: Time to end extreme inequality*. Oxfam International.
- Siami-Namini, S., & Hudson, D. (2019). Inflation and income inequality in developed and developing countries. *Journal of Economic Studies*, 30(3–4), 195.
- Siringi, E. M., & Oiro, M. O. (2011). Impact of inflation on income inequality: Lessons from Kenyan economy. *Journal of Economic Policy & Research*, 11(2), 56–69.
- Stiglitz, J. E. (2016). *Inequality and economic growth*. The Political Quarterly. The Political Quarterly Publishing.
- Tawadros, G. B. (2009). Testing the impact of inflation targeting on inflation. *Journal of Economic Studies* 36(4), 326–342.
- Thalassinos, E., Uğurlu, E., & Muratoğlu, Y. (2012). Income Inequality and Inflation in the EU. *European Research Studies*, 15(1) 127–140.
- Van der Eng, P. (2009). *Growth and Inequality: The Case of Indonesia, 1960-1997*. University Library of Munich (No. 12725), Germany.
- Van Leeuwen, B., & Földvári, P. (2016). The development of inequality and poverty in Indonesia, 1932–2008. *Bulletin of Indonesian economic studies*, 52(3), 379-402.
- The World Bank. (2009). *Indonesia Economic Quarterly. Weathering the storm*. June.
- The World Bank. (2015). *Indonesia rising divide. Executif Summary*. AKU. *Akhiri Ketimpangan Untuk Indonesia*. November.
- Yue, H. Y. (2011). Income inequality, economic growth and inflation: a study on Korea. *International Journal of Economics and Research*, 2(5), 14-21.
- Zungu, L. T., Greyling, L., & Mbatha, N. (2022). Nonlinear dynamics of the development-inequality nexus in emerging countries: The case of a prudential policy regime. *Economies*, 10(5), 120.



© 2023 by the authors; licensee Growing Science, Canada. This is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC-BY) license (<http://creativecommons.org/licenses/by/4.0/>).