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DETERMINANTS OF INFLATION IN INDONESIA: DYNAMICS OVER A DECADE

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Abstract

Inflation is a crucial topic that has been extensively researched by academics and government authorities, including central banks as monetary authorities. Maintaining inflation at a stable and low level is a fundamental basis for improving the well-being of the population and sustaining economic growth. This research aims to conduct a comprehensive literature review of Bank Indonesia's internal research and studies on inflation, with the objective of identifying research gaps to recommend future research directions. Through a literature survey method, 149 research outcomes/internal studies published by Bank Indonesia from 1965 to 2022 in the Bank Indonesia's internal repository were collected and reviewed. Findings from this literature study provide a complex overview of the factors influencing inflation and the policies required to achieve sustainable price stability in Indonesia. The review in this study encompasses inflation from basic theory, spatial aspects, inflation disaggregation, medium-run price formation, Phillips Curve theory, and various other empirical analyses. Differences in inflation literature findings between the pre-Inflation Targeting Framework (ITF) and post-ITF periods are also discussed. Several recommendations are proposed, including suggestions for research that support intensified multidisciplinary studies and a deeper understanding of inflation.

Keywords: Inflation, Monetary Policy, Inflation Targeting, Literature Study

JEL Classifications: E31, E52, E61

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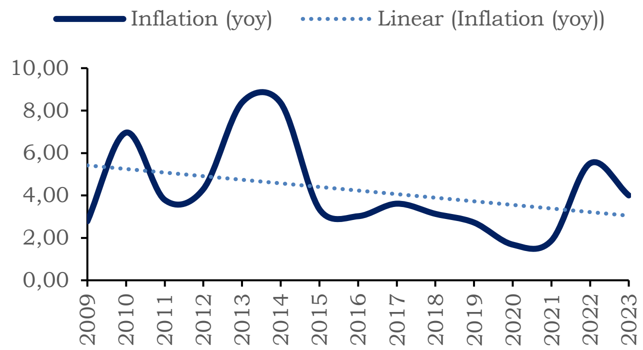
1. Introduction

Inflation is a topic that has been extensively examined by academics and government authorities, including central banks as monetary authorities. This stems from the significance of maintaining stable and low inflation as the primary foundation for improving the well-being of the population and fostering conducive economic growth. Empirically, inflation is closely related to other macroeconomic indicators, affecting short-term unemployment rates, as well as long-term poverty and economic growth. This underscores the importance of developing inflation policies that take into consideration potential impediments to the effectiveness of monetary policies (Yolanda, 2017; Wulandari et al., 2019; Rosnawintang et al., 2020).

The inflation trends in Indonesia have experienced a significant historical decline, particularly since the implementation of the Flexible Inflation Targeting Framework (FITF) following the global financial crisis of 2008. Data presented in Figure 1 reflects the inflation trends over the last decade, indicating that inflation rates have remained controlled at low levels, especially during the period 2017-2019, in line with the targets set out in PMK No. 93/PMK.011/2014. This achievement has been influenced by the stability of core and non-core inflation and policies supporting the purchasing power of the public.



Source: Central Bureau of Statistics.

Figure 1. Inflation rate, 2009-2023 (%)

Several literature surveys have been conducted by central banks in various countries to assess the development of their internal research on topics such as economic growth, communication strategies, policies affecting financial system stability, and inflation expectations. The findings from these studies have assisted central banks in formulating more precise policies and identifying the direction of future research (Blinder et al., 2008; Briguglio, 2022; Osorio-Barreto et al., 2022; Chapman et al., 2023). For example, the research conducted by Osorio-Barreto et al. (2022) has aided central banks in Latin America by providing an empirical research foundation on inflation expectations, including the variables and methods used, to support future research.

In Indonesia, there has yet to be a literature review that examines the various research findings and internal studies related to inflation, especially those conducted by Bank Indonesia. However, in its role of maintaining price stability, Bank Indonesia has undertaken a variety of research and studies related to inflation, both internally and externally. Discovering the common threads from these diverse research and studies is crucial to avoid redundant replication and to identify existing research gaps, thus providing a basis for policy-makers.

Therefore, this study has 2 (two) problem formulations as follows: (i) How is the development of research and studies on inflation conducted by Bank Indonesia throughout the years 1965-2022, and; (ii) What are the recommendations for future research directions based on existing research gaps? Thus, the objectives of this study can be stated as follows: (i) Presenting a comprehensive literature review of the results of research and internal studies by Bank Indonesia on inflation, and; (ii) Identifying research gaps at Bank Indonesia to recommend future research directions regarding inflation. The hope is that this study can provide relevant findings related to inflation in Indonesia, serving as a starting point for subsequent research, and avoiding duplication of research in the future.

To achieve these objectives, the literature survey method was chosen as the academic writing approach to discuss selected research issues or theories through the collection and analysis of various literature (Fink, 2014). Literature studies were employed to comprehend the heterogeneity of topics within this research, enabling a review based on relevant research questions and keywords. Figure 2 outlines the research steps in this literature study, consisting of literature selection, extraction, classification/categorization of literature, and tabulation/descriptive analysis based on the PRISMA 2020 method (Page et al., 2021). A total of 149 research findings/studies by Bank Indonesia on inflation published from 1965 to 2022 were successfully gathered.

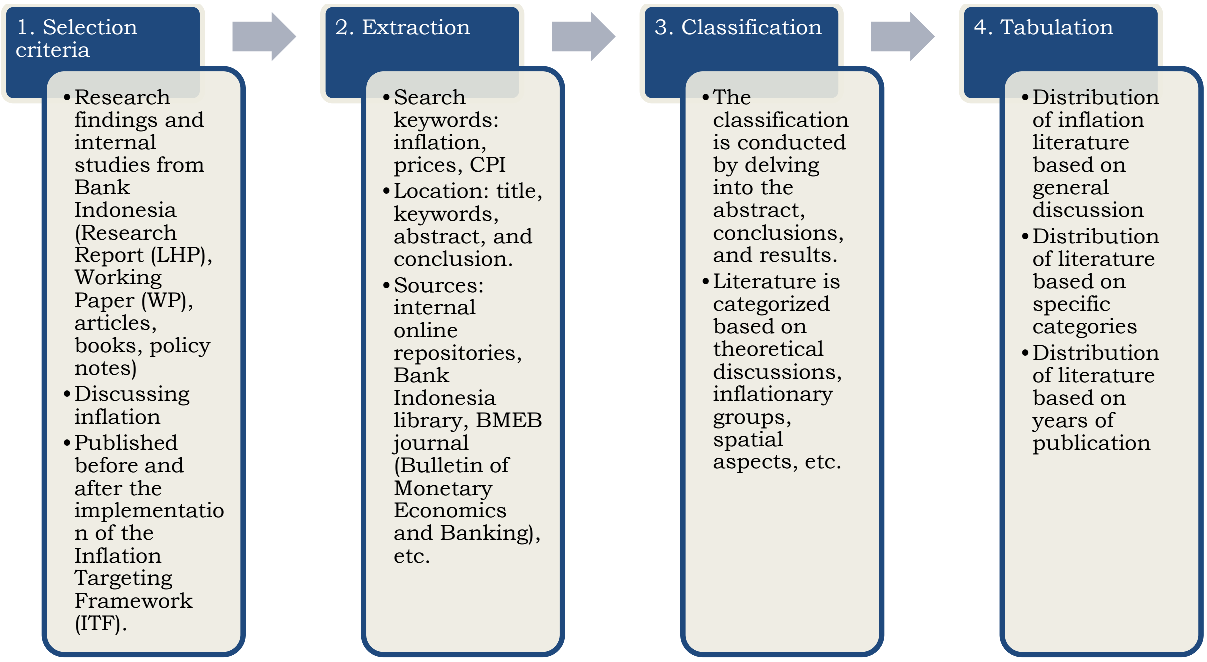


Figure 2. Research framework

The literature study consists of five chapters, as follows: Chapter one provides an introduction with the background and research objectives, chapters two and three elaborate on the theoretical concepts of inflation, chapter four presents various empirical results obtained from internal studies conducted by Bank Indonesia, and chapter five contains the conclusions and recommendations.

2. Theoretical Framework

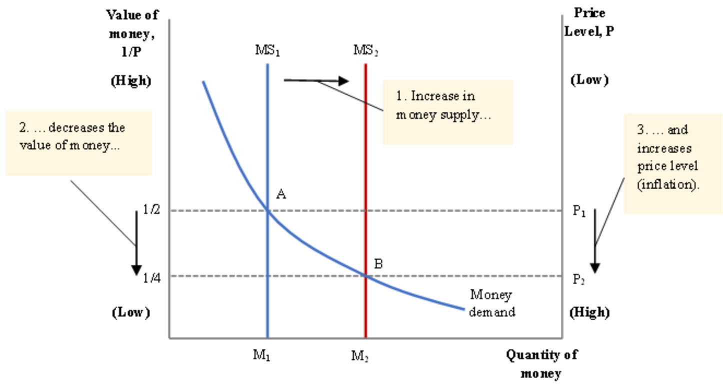
Inflation is a pervasive and continuous increase in the general price level of goods and services, resulting in a reduction of the purchasing power of a currency (Jevons, 1875). To facilitate a comprehensive discussion of various theories and categories of inflation, Chapter II of this study is divided into three sub-chapters: (i) Basic theories of inflation (monetary, Keynesian, and structural); (ii) Inflation and spatial aspects (regional and sectoral), and; (iii) Disaggregation of inflation in Indonesia. In-depth analysis of each sub-chapter is crucial to understanding how inflation affects the economy and the well-being of society comprehensively.

The monetary perspective on inflation explores the relationship between the money supply and the inflation rate, as presented in the Quantity Theory of Money (QTM). On the other hand, Keynesian theory highlights the role of aggregate demand in shaping inflation. Structuralist theory reveals the impact of structural changes in the labor market on inflation. Furthermore, inflation is also influenced by spatial and sectoral factors. Combining basic inflation theories with an understanding of spatial and sectoral aspects provides a comprehensive view of inflation. The variety of perspectives on inflation underscores the importance of categorizing inflation. In Indonesia, the measurement of the Consumer Price Index (CPI) divides inflation into core and non-core components to understand the influence of fundamental and non-fundamental factors.

2.1 The Fundamental Theories of Inflation

In this subsection, we will explore three fundamental theories of inflation. These theories are crucial in providing a comprehensive analysis of the impact of inflation on economic activities and overall welfare. The three theories to be discussed are as follows: (i) Inflation in the Monetary Theory, (ii) Inflation in the Keynesian Theory, and (iii) Inflation in the Structuralist Theory. A comprehensive understanding of these theories is expected to provide a vital foundation for the interpretative narrative within the scope of inflation literature in this study.

From a monetary perspective, one of the causes of inflation is the excessive supply of money. The theory aligned with this viewpoint is known as the Quantity Theory of Money (QTM). This theory was first formulated by the Polish mathematician Nicolaus Copernicus in 1517, and its contemporary version, which is widely recognized today, was developed by the American economist Irving Fisher in 1911. This establishes QTM as the oldest theory concerning inflation. Nevertheless, this theory remains useful in explaining the emergence of inflation, especially in developing countries (Moazzami and Gupta, 1996). According to the Quantity Theory of Money, the government should establish a precise inflation target to avoid economic shocks resulting from an excess of money in circulation. Therefore, as long as the government can control the money supply, inflation rates can be effectively managed.



Source: Mankiw (2012), *Macroeconomics*.

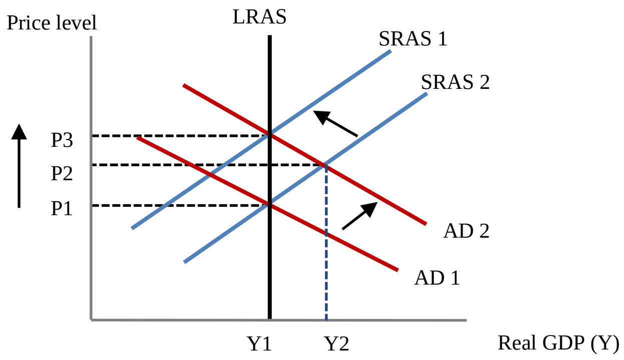
Figure 3. The mechanics of quantity theory of money

Figure 3 illustrates the mechanism of inflation using the Quantity Theory of Money framework. The formula for the Quantity Theory of Money can be expressed as follows:

$$MV = PT \tag{2.1.1}$$
$$MV = PY \tag{2.1.2}$$
$$\frac{\Delta MS}{MS} + \frac{\Delta V}{V} = \frac{\Delta P}{P} + \frac{\Delta Y}{Y} \tag{2.1.3}$$
$$\frac{\Delta P}{P} = \frac{\Delta MS}{MS} + \frac{\Delta V}{V} - \frac{\Delta Y}{Y} \tag{2.1.4}$$

Where, the quantity of money in an economy is proxied by Y, $\Delta P/P$ is the inflation rate, $\Delta MS/MS$ is money supply growth, $\Delta V/V$ is the velocity of money, and $\Delta Y/Y$ represents economic growth. The Quantity Theory of Money assumes that the velocity of money remains constant or stable. When an economy is assumed to operate at full capacity ($\Delta Y/Y$ = 0), inflation is primarily caused by an increase in the growth of the money supply ($\Delta P/P$ = $\Delta MS/MS$), as originally proposed by Fisher in 1911.

Fisher's perspective that inflation is driven by changes in the money supply was later supported by Milton Friedman in the 1970s, who asserted that inflation is fundamentally a monetary phenomenon. Furthermore, he advocated for the "*k*-percent rule," suggesting that the money supply should increase at a consistent rate of k percent annually. This rule is proposed to mitigate both inflation (resulting from an excessive growth in the money supply) and extreme deflation. The specific value of *k* in the *k*-percent rule is contingent upon institutional factors and is intended to be neutral (Friedman, 1970). To illustrate how monetary phenomena impact inflation in an economy, Figure 4 in this study depicts the emergence of inflation within the framework of the aggregate demand and aggregate supply model (AD-AS).



Source: Greenlaw et al. (2022), *Principles of Economics*.

Figure 4. Inflation in AD-AS model

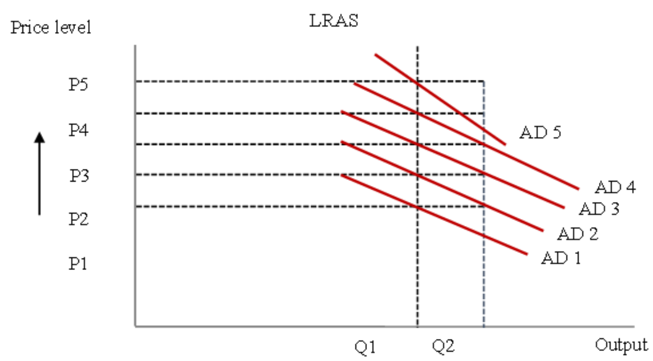
The increase in the money supply leads to a rise in aggregate demand for goods and services, thereby shifting the Aggregate Demand (AD) curve to the right. In the short term, production levels increase, which shifts the Short Run Aggregate Supply (SRAS) curve to the left. In the long term, total production (output) reaches an equilibrium level, resulting in an inflationary gap. This phenomenon can be attributed to the following factors: (i) as prices increase, fewer goods and services can be obtained (currency depreciation); (ii) an increase in nominal wages does not necessarily indicate an increase in real wages, leading to wage adjustment mechanisms to produce more goods and services. Ultimately, the economy returns to the initial output level (Y1), and the price level rises to P3 (Greenlaw, 2022).

Consequently, there are two critical factors influencing the inflation rate: (i) Money supply. If the money supply increases more rapidly than economic growth, inflation occurs. Conversely, if the increase in the money supply is too slow or even negative, the inflation rate decreases or becomes negative; (ii) Money demand, which refers to how much money people want to hold as a means of payment. An increase in money demand tends to lead to lower inflation, as people prefer holding money rather than spending it. However, a decrease in money demand tends to result in higher inflation (Friedman, 1970). Therefore, according to the monetarist view of inflation theory, the government plays a crucial role in tightly controlling the money supply to prevent inflation. Increasing interest rates, reducing government spending, and implementing strict monetary policies are some of the policy tools that can be employed to control money growth and inflation.

Meanwhile, the Keynesian perspective offers a critique of the monetarist views put forth by Fisher and Friedman, particularly regarding the assumption that short-term price fluctuations do not affect long-term potential output. Keynesians argue that the Long Run Aggregate Supply (LRAS) curve is not always perfectly inelastic. In other words, an economy can operate below its full capacity for an extended period. Moreover, according to Keynesian Theory, inflation arises when aggregate demand exceeds aggregate supply under conditions of full employment, rather than being solely attributed to the quantity of money in circulation (Keynes, 1936). This marks a fundamental difference between Keynesian and monetarist inflation theories.

Keynes (1936) posits that when individuals desire more goods and services than they can obtain, it tends to lead to inflation because demand increases without a corresponding increase in supply. In other words, the components that influence GDP (such as savings/investment, household expenditures, government spending, taxes, and trade balance or exports-imports) are the primary causes of inflation, also known as the genesis of the inflationary gap.

The inflationary gap emerges when there is strong purchasing power, creating effective demand for goods and services through consumption. This purchasing power includes government incentives to boost economic growth by running budget deficits, which are then financed by printing new money (Harrod, 1936). In addition to the government, businesses and labor unions also influence the emergence of the inflationary gap. Companies make new investments and secure funding through bank credit. Labor unions strive to secure wage increases for their members that exceed productivity gains (Kaldor, 1966). Figure 5 illustrates the inflation process, which ultimately ceases as the inflationary gap narrows and eventually disappears in the fifth period when prices stabilize at P5. Throughout this process, some segments of the population experience smaller income increases. In other words, inflation is always accompanied by income redistribution (Mankiw, 2007).



Source: Mankiw (2007), *Principles of Microeconomics.*

Figure 5. Inflationary gap

Since the implementation of Keynesian theory in several countries after World War II, criticisms and challenges through various empirical studies have arisen. Consequently, the term Neo/New-Keynesian has emerged. The theoretical exposition of New-Keynesian theory integrates the concepts of aggregate demand and aggregate supply to explain inflation phenomena. This theory combines Keynesian perspectives in the short term and classical views in the long term (Tobin, 1978).

Clarida et al. (1999) explain that, in the short term, New-Keynesian theory emphasizes the significance of aggregate demand in determining the inflation rate. Changes in public expenditure or the quantity of money in circulation can affect aggregate demand. For example, if public spending or the money supply increases significantly, aggregate demand will rise, but the price level tends not to change immediately because of the assumption of expected zero inflation. As a result, a significant increase in aggregate demand occurs, but the price level decreases.

In the long term, New-Keynesian theory recognizes the importance of aggregate supply or productivity in influencing inflation, particularly through a decrease in productivity or a widening gap between potential and actual output. For instance, if productivity declines, production costs tend to rise, which can prompt firms to raise prices and cause inflation. In New-Keynesian theory, it is assumed that the current inflation rate is influenced by the inflation rate in previous periods, and the output gap is depicted as follows:

$$\pi_t = \pi_{t-1} + \sigma((y_t - y^*)/y^*), \sigma > 0 \qquad (2.2)$$

In the given equation, σ represents a positive constant that can vary due to events beyond the scope of the theory and may differ across different economies. If the output gap, $((y_t - y^*)/y^*)$, is positive (indicating economic expansion), then the inflation rate (π_t) will increase compared to the inflation rate in the previous period (π_{t-1}). Conversely, if the output gap is negative (indicating economic contraction), then the inflation rate will decrease compared to the inflation rate in the previous period. If the output gap is zero, then the inflation rate will remain the same as the inflation rate in the previous period (Tobin, 1978).

In contrast to monetary and Keynesian inflation theories that primarily emphasize inflation arising from the supply or demand side, structural inflation theory posits that inflation occurs when there is tension between labor supply and demand within the economy due to structural changes in the labor market, such as shifts in the Phillips Curve. This theory, introduced by Taylor, underscores the crucial role of non-monetary factors in the inflationary process.

Taylor (1993) suggests that inflation can occur when labor supply becomes tighter than labor demand. This can be attributed to various factors, such as changes in market structure, alterations in labor regulations, or shifts in fiscal policies affecting the labor market. This tension can lead to increased wages and production costs for companies, subsequently passed on to consumers in the form of higher prices for goods and services, thus causing inflation. The Taylor Rule represents a mathematical formula connecting the ideal benchmark interest rate with the current economic conditions, expressed as follows:

$$R = R^* + (p\pi) + (yg) \qquad (2.3)$$

Where R represents the desired benchmark interest rate, R^* is the neutral benchmark interest rate (the interest rate that would be used as a reference when there is no inflation and output is at potential levels), p is a coefficient describing the central bank's response to changes in inflation (usually positive), π is the actual inflation rate, y is a coefficient depicting the central bank's response to changes in output (usually positive), and g is the difference between actual output and potential output (output gap), indicating how far actual output is above or below the potential economic level.

According to the Taylor Rule, the desired benchmark interest rate (R) will adjust based on actual inflation and output conditions relative to potential output. If inflation rises or output exceeds the potential level, the Taylor Rule will indicate raising the benchmark interest rate. Conversely, if inflation is low or output is below the potential level, the Taylor Rule will suggest lowering the benchmark interest rate. The Taylor Rule is considered an efficient method for estimating the reaction function of monetary policy, where policy changes in response to fluctuations in key variables, namely inflation and production levels (output), as the output gap is believed to be a cause of inflation.

Therefore, the structural view also posits that inflation occurs because food prices or export commodity prices react more rapidly than prices of other goods and services in the economy. This is driven by the process of industrialization (the shift of economic resources to the industrial sector), leaving the agricultural sector stagnant. The rapid increase in food prices compared to other prices leads to permanent price hikes if the money supply policy supports this condition.

Simultaneously, increased demand for export commodities will cause prices for those commodities to rise in the domestic market (due to reduced supply), leading to higher overall prices. This price increase is at least short-term, but it becomes permanent if the government increases the money supply. Hence, the structural theory also argues that a passive money supply policy is required to maintain long-term inflation stability (Fischer and Mayer, 1980).

2.2 Inflation and Spatial Aspect

In addition to the fundamental inflation theories, there are also theories and characteristics related to regional and sectoral economics that explain how spatial aspects influence inflation. Regional aspects are generally closely related to sectoral aspects and explain variations in inflation rates across different regions. Some spatial theories that can elucidate regional inflation in Indonesia include the Balassa-Samuelson effect and the wage-price spiral. The Balassa-Samuelson effect explains that high productivity growth in the export sector increases wages in the non-export sector, leading to higher production costs. These increased costs prompt producers to raise product prices, thereby triggering a wage-price spiral, contributing to higher inflation rates (Balassa, 1964; Samuelson, 1964; Renshaw, 1965).

Moreover, structural characteristics also have an impact on inflation in specific regions and sectors. Factors encompassed within str\uctural characteristics include infrastructure, regional progress/advantage, industrial composition, labor market dynamics, and productivity differences. For example, regions with concentrated industries or high labor market rigidity may exhibit different inflation dynamics compared to areas with diversified economies and more flexible labor markets (Solow, 1960).

Meanwhile, sectoral shocks in specific regions have varying durations of impact on inflation. Shocks such as changes in global commodity prices, natural disasters, or licensing changes can affect specific sectors for a considerable time. These sectoral shocks have different effects across regions, depending on their exposure to affected sectors or interconnections with other regions through supply chains. This leads to disparities in inflation and the potential for persistent inflation (Sullivan, 2003).

On the other hand, imported inflation and mark-up pricing play significant roles in shaping inflation in the global era. Global dynamics, such as currency fluctuations, international trade policies, or changes in global demand for specific commodities, can influence import prices and subsequently affect inflation in Indonesia. Imported inflation occurs when import prices rise, leading to increased domestic production costs and, ultimately, higher prices for products in sectors that heavily rely on imported raw materials. Mark-up pricing is a strategy employed by companies to set prices by adding a profit margin to production costs (Todaro and Smith, 2005).

2.3 Inflation Classification in Indonesia

Indonesia employs the calculation of the Consumer Price Index (CPI) to measure general inflation. The index is derived from a survey of prices for various goods and services considered representative of consumer spending. The results of this survey are used to calculate the inflation rate by comparing current prices with those of previous periods.

The CPI survey is conducted by the Central Statistics Agency (BPS). Based on the 2018 Classification of Individual Consumption by Purpose (COICOP), the CPI is grouped into 11 expenditure categories, namely: (i) Food, beverages, and tobacco; (ii) Clothing and footwear; (iii) Housing, water, electricity, and household fuel; (iv) Furnishings, equipment, and routine household maintenance; (v) Health; (vi) Transportation; (vii) Communication, information, financial, and other services; (viii) Recreation, sport, and culture; (ix) Education; (x) Food and beverage serving services/restaurants; and (xi) Personal care and other services.[1]

In addition to the COICOP-based classification, BPS also publishes inflation data based on a classification known as disaggregated inflation. Disaggregated inflation is performed to generate inflation indicators that depict the influence of both fundamental and non-fundamental factors. Therefore, disaggregation divides inflation into core inflation and non-core inflation. Core inflation represents components of inflation that tend to be stable or persistent in their movements and are influenced by fundamental factors. These factors include the relationship between supply and demand in the economy, external conditions such as exchange rates, international commodity prices, global economic developments, and expectations of future inflation.[2]

On the other hand, non-core inflation is composed of components that tend to exhibit high volatility because they are influenced by non-fundamental factors. Non-core inflation consists of Volatile Food Inflation (VF) and Administered Prices Inflation (AP). Volatile Food Inflation is dominantly influenced by shocks in the food category, such as harvests, natural disruptions, or factors affecting domestic and international food commodity prices. Administered Prices Inflation is dominantly influenced by government pricing policy shocks, such as subsidized fuel prices, electricity rates, transportation tariffs, and the like.

3. The Theory of Inflation and Economic Activity

The theoretical overview in Chapter III discusses inflation theory and economic activity, starting with the mechanism of price and wage formation in the medium term (price-setting) and progressing to the occurrence of inflation explained by the Phillips Curve theory. Furthermore, the relationship between unemployment and wages with respect to inflation is also explored through Okun's Theory. The multi-perspective explanation of inflation theory in Chapters II and III is intended to lay a strong foundation for interpreting narratives in the

[1] Central Bureau of Statistics. Indonesian Composite Price Index. https://www.bps.go.id/subject/3/inflasi.html#subjekViewTab2 (visited on 16/07/2023).
[2] Central Bank of Indonesia. Definition of Inflation. https://www.bi.go.id/id/fungsi-utama/moneter/inflasi/default.aspx (visited on 16/07/2023).

inflation literature.

Literature review of medium-run inflation theory, inflation according to the Phillips Curve, and its connection to Okun's Law, it is evident that inflation results from various factors, including inflation expectations, demand pressures, and changes in production costs. The Phillips Curve theory demonstrates a close relationship between the unemployment rate and inflation in the short term. Okun's Law, on the other hand, highlights the significance of changes in the unemployment rate in understanding economic output changes. Overall, understanding medium-run inflation theory, the Phillips Curve, and Okun's Law becomes a crucial element in analyzing and designing effective economic policies for inflation control.

3.1 Medium-run Inflation

Monetary, Keynesian, and structuralist theories are fundamental theories about inflation that demonstrate the processes of inflation occurring from both the demand and supply sides. However, these theories also rely on the assumption of an economy at full capacity. Therefore, understanding the dynamics of short-term inflation becomes essential to comprehend long-term price dynamics through interrelated variables. This understanding is obtained in part through wage-setting and price-setting theories.

Short-term wage adjustments occur when the unemployment rate is either higher or lower than its equilibrium or natural rate. When wages are lower, companies tend to increase wages due to labor market demand pressures. This can lead to the emergence of Wage-push Inflation, which is inflation caused by wage increases. In effect, this is a combination of demand-pull and cost-push inflation. Wage increases raise costs for companies, which are then passed on to consumers in the form of higher prices. On the other hand, wage increases also boost income, leading to increased consumption. Controlling inflation resulting from wage increases can be achieved through setting inflation expectations targets.

First, short-term wage adjustments can be illustrated as follows:

$$W = P^e F(u, z) \qquad (3.1.1)$$ [3]

Where the aggregate nominal wage (W) depends on three factors: inflation expectations (P^e), the unemployment rate (u), and other variables influencing wages in the short term (represented by z). Workers and producers have expectations about the price level because they care about the real wage they will receive. Additionally, a high unemployment rate forces workers to accept lower wages due to diminished bargaining power resulting from increased labor supply. The connection between wages and price levels is further explained in the Phillips Curve theory.

Second, the price adjustment theory states that companies determine the prices of their goods and services as follows:

$$P = (1 + \mu)\frac{W}{A} \qquad (3.1.2)$$

The symbol μ represents the price markup based on production costs, and A represents productivity. In a perfectly competitive market, $\mu = 0$, and $P = W$. Subsequently, wage

[3] Blanchard, Olivier. 2017. *Macroeconomics Global Edition, 7/e*. Pearson.

adjustments (3.1.1) and price adjustments (3.1.2) can be written as in equation 3.1.3. This shows how wage-setting and price-setting theories affect real wages.

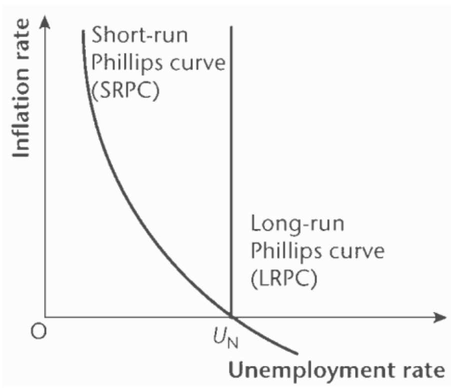
$$\frac{W}{P} = F(u, z) \text{ or } \frac{W}{P} = \frac{A}{(1+\mu)} \qquad (3.1.3)$$

Equation 3.1.3 is crucial to understand because real wages have a close relationship with inflation expectations in society (both from the workers' and producers' perspectives). Furthermore, the speed of wage and price adjustment processes depends on: (i) the duration of wage-setting agreements; (ii) the accuracy of information about the economic situation when determining wages; (iii) the synchronization between changes in wages and prices throughout the economy. Hence, inflation expectations are important as one of the policy instruments for inflation control. The difference between inflation expectations for the "next period" and the "previous period" is conceptually crucial, although in practice, they can merge due to various factors influencing the speed of wage and price adjustment.

3.2 Inflation and Phillips Curve

Wage-setting and price-setting theories explain the dynamics of short-term inflation through the formation of real wages. However, these theories do not yet explain the relationship between the unemployment rate and inflation. First, low inflation and the unemployment rate are two important aspects of the economy. However, there is often a trade-off between them. For example, if policymakers implement monetary policies to stimulate demand, the economy moves along the aggregate supply curve and stops at higher output and price levels. The trade-off between inflation and the unemployment rate is depicted in the Phillips Curve.

The Phillips Curve, created by economist A.W. Phillips based on wage and unemployment data in the UK from 1861-1957, demonstrates a stable and negative relationship between inflation and the unemployment rate. Presently, the Phillips Curve is also known as the Short-Run Phillips Curve (SRPC) and illustrates the short-term relationship between inflation and unemployment. In Figure 6, the Long-Run Phillips Curve (LRPC) is depicted as vertical and intersects with the SRPC at zero inflation. The unemployment rate at this point is referred to as the Natural Rate of Unemployment (NRU). In Phillips Curve theory, the NRU is also known as the Non-Accelerating Inflation Rate of Unemployment (NAIRU).



Source: Blanchard, 2009. *Macroeconomics, 5/e.*

Figure 6. Phillips curve

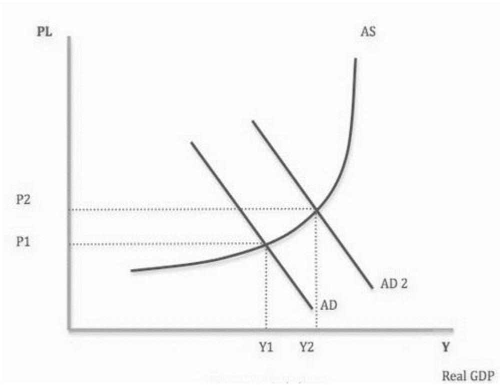
According to the Phillips theory (1958), firstly, inflation is implied to have inertia. This means that inflation will persist unless something stops it. More specifically, when the unemployment rate is at the NAIRU level, and there are no supply shocks, the rate of inflation will not accelerate or decelerate. This occurs because inflation in the previous period influences future inflation expectations, which, in turn, affect wages and prices. Secondly, low cyclical unemployment (unemployment deviating from its natural rate due to economic turbulence) exerts pressure on inflation through the mechanism of aggregate demand (more people working leads to higher purchasing power and consumption). Thirdly, significant supply-side shocks, such as an increase in world oil prices, can induce inflation by raising production costs.

Therefore, according to the Phillips Curve theory, it can be interpreted that there are three main causes of inflation: (i) past-year inflation (inflation expectations); (ii) demand-side inflation (cyclical unemployment), and; (iii) supply-side inflation (Phillips, 1958). Following this framework, the next subsection will elucidate the process of inflation emergence from both the demand and supply sides.

Inflation expectations are the perceptions and anticipations of the public, as well as economic agents, regarding the future inflation rate. This factor can influence consumers, investors, and other economic actors in their decision-making, thus impacting price stability and exchange rates. There are two types of inflation expectations: (i) Adaptive or backward-looking inflation expectations, which are based on past experiences or historical data, and; (ii) Forward-looking inflation expectations, which are based on the analysis and predictions of economic factors and policies that affect future inflation (Lucas, 1972).

Adaptive (backward-looking) inflation expectations and forward-looking inflation expectations reflect the evolution of economic thought and approaches in forecasting price movements in the economy. Therefore, understanding both types of expectations will broaden the literature's understanding of how inflation arises from past perceptions and future predictions, thus influencing economic policies, market dynamics, and overall economic stability.

In addition to inflation expectations, following the Phillips theory (1958), inflation is also influenced by the demand side. The occurrence of demand-pull inflation is due to the increase in aggregate demand for goods and services without a concurrent increase in sustainable output. This is consistent with the view of inflation according to Keynes (1936). Increasing demand, caused by rising household consumption, government expenditure, and trade balances, can exert pressure on prices in the economy, eventually leading to inflation. This phenomenon usually occurs when the economy experiences faster growth than the expected long-term growth rate. Figure 7 illustrates the process of demand-pull inflation.

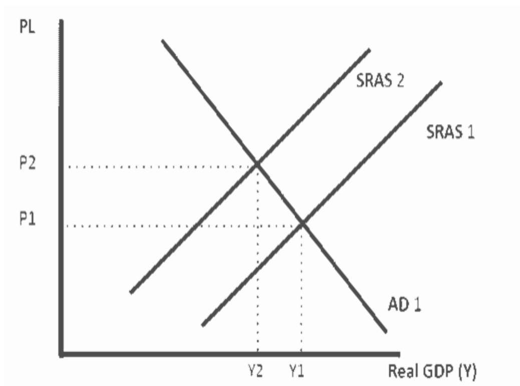


Source: Blanchard, 2009. *Macroeconomics, 5/e.*

Figure 7. Demand-pull inflation

When demand exceeds supply, companies respond by raising the prices of their products or services. This happens because companies will hire more workers and offer higher wages to meet this additional demand. In other words, companies increase the prices of their goods and services to cover the higher labor costs. The increase in the number of workers and wage levels implies an increase in household income and consumption, which, in turn, boosts aggregate demand. If this phenomenon occurs in most sectors of the economy, it will lead to inflation (Blanchard, 2009).

Meanwhile, cost-push inflation explains that inflation occurs when there are supply shocks that result in rising production costs. When this happens, companies need to raise prices to maintain their profit margins. The increased costs can include factors such as wages, taxes, rising costs of raw materials, or imported commodities (Solow et al., 1966). Figure 8 illustrates the process of cost-push inflation.



Source: Blanchard, 2009. *Macroeconomics, 5/e.*

Figure 8. Cost-push inflation

The rise in production costs for companies causes the aggregate supply (AS) to shift to the left or decrease. In other words, companies face higher cost pressures, and they respond by raising the prices of their products or services to maintain their profit margins. This price increase can subsequently lead to overall inflation in the economy as higher prices flow through to consumers (Blanchard, 2009).

3.3 Inflation Theory and Okun's Law

Medium-run inflation theory and inflation according to the Phillips Curve explain the relationship between inflation and other macroeconomic indicators. However, this relationship is not limited to price determination, expectations, supply, and demand factors; it is also influenced by real wages, the unemployment rate, and output (GDP). Okun's Law is an empirical relationship between changes in output (relative to its potential trend) and changes in the unemployment rate (relative to its natural state). In other words, this law, named after economist Arthur Melvin Okun, is intended to show how much a country's Gross Domestic Product (GDP) is lost when the unemployment rate is above its natural rate (Okun, 1962).

Many economists argue that Okun's Law is a useful guideline for monetary policy because it provides room for policymakers to increase aggregate output by reducing unemployment. Although its stability and usefulness are still debated, Okun's Law remains an undeniable consideration when examining unemployment dynamics, economic growth, and inflation in developing countries (Moosa, 1997). In terms of inflation, according to the Phillips Curve theory, it can be explained by Okun's Law through the substitution of output with unemployment in the downward shift of the Phillips Curve from the aggregate supply curve. This is because, according to Okun's Law, output that exceeds its potential level is reflected in a lower unemployment rate than its natural rate (NRU). The relationship between the Phillips Curve and Okun's Law can be illustrated as follows:

$$\pi = \pi_e + (1/\alpha)(Y - \bar{Y}) + v \qquad (3.3.1)[4]$$

$$(1/\alpha)(Y - \bar{Y}) = -\beta(u - u_n) \qquad (3.3.2)$$

expectations, $(1/\alpha)(Y - \bar{Y})$ represents output at its potential level, and v represents supply shocks (exogenous variables). In the formula (3.3.2), $-\beta(u - u_n)$ represents the lower NRU at the output level $(1/\alpha)(Y - \bar{Y})$. To obtain the Phillips Curve formula, substituting calculation (3.3.2) into calculation (3.3.1) becomes:

$$\pi = \pi_e - \beta(u - u_n) + v \qquad (3.3.3)$$

The stability and significance of Okun's Law depend on the long-term trends in GDP and unemployment. In other words, Okun's Law is only useful when the natural unemployment rate can be accurately measured because economic recovery following a crisis and its impact on the labor market vary depending on the type of shock experienced (Chen and Wen, 2012). For economic recovery resulting from financial sector shocks, Okun's Law exhibits the highest elasticity compared to recoveries from other shocks. This means that overall economic growth is not necessarily followed by improvements in the labor market or a decrease in the unemployment rate (Gelfer, 2020; Ziegenbein, 2021). These differences contribute to the debate over the stability of Okun's Law. Nonetheless, in essence, Okun's Law remains highly valuable for explaining the dynamics of inflation through the aggregate supply function.

[4] Prachowny, Martin F. J. (1993). Okun's Law: Theoretical Foundations and Revised Estimates. The Review of Economics and Statistics, 75(2), 331–336. https://doi.org/10.2307/2109440

4. The Dynamics of Inflation in Indonesia: An Internal Review of Bank Indonesia's Study

This literature review successfully gathered a total of 149 research results and studies from within Bank Indonesia, with publication years ranging from 1965 to 2022. In general, the research and studies conducted by Bank Indonesia on inflation are illustrated in Figure 9. Consistent with Bank Indonesia's role in maintaining price stability, the inflation-related topics compiled in this literature survey primarily focus on the impact of various variables on inflation, especially in the context of policy transmission, inflation targeting, and inflation determinants.

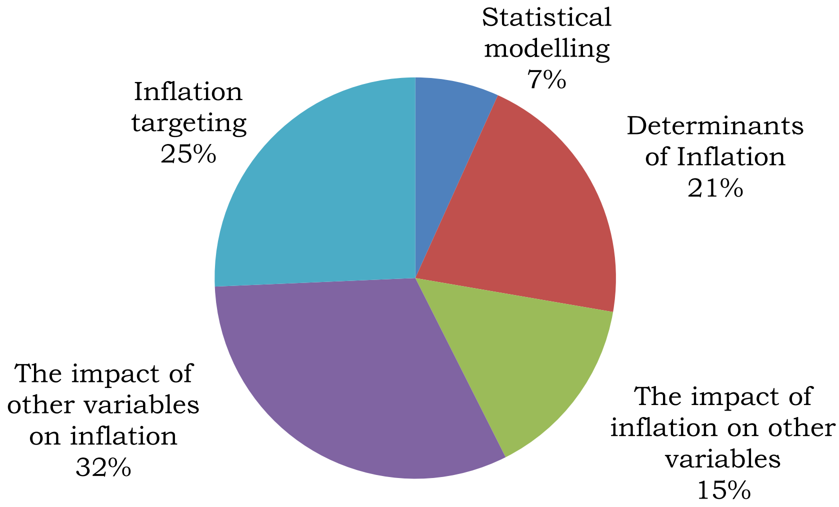


Figure 9. Topics of discussions on inflation literatures

A total of 48 literature sources (31%) discusses the impact of various variables on inflation. These variables include interest rates, commodity prices, exchange rates, economic growth, and money supply, ranked in order of their prevalence in the literature. Understanding the effects of various external variables on inflation is crucial for identifying relevant factors that significantly influence inflation. This is summarized in the literature survey matrix in the Appendix. Meanwhile, 38 literature sources (26%) are categorized as discussing inflation targeting with various policy instruments for controlling inflation, primarily interest rates, exchange rates, and money supply. Additionally, 31 literature sources (21%) address various factors that simultaneously affect inflation, such as economic growth/output gap, commodity prices, exchange rates, interest rates, and global dynamics or export-import.

On the other hand, inflation has an impact on other variables in the economy. This is observed in 22 literature sources (21%) that discuss the influence of inflation on the economy. The effects of inflation, whether general inflation, VF, or AP, are found in the movement of exchange rates, financial cycles, banking credit risk, sectoral economic growth, poverty, middle-income trap, and unemployment. Meanwhile, 10 other literature sources discuss modeling or statistics (7%). This includes reviews of inflation indicators, inflation calculations (commodities forming inflation, calculation biases, etc.), and inflation calculation models such as FAVAR and DSGE-VAR.

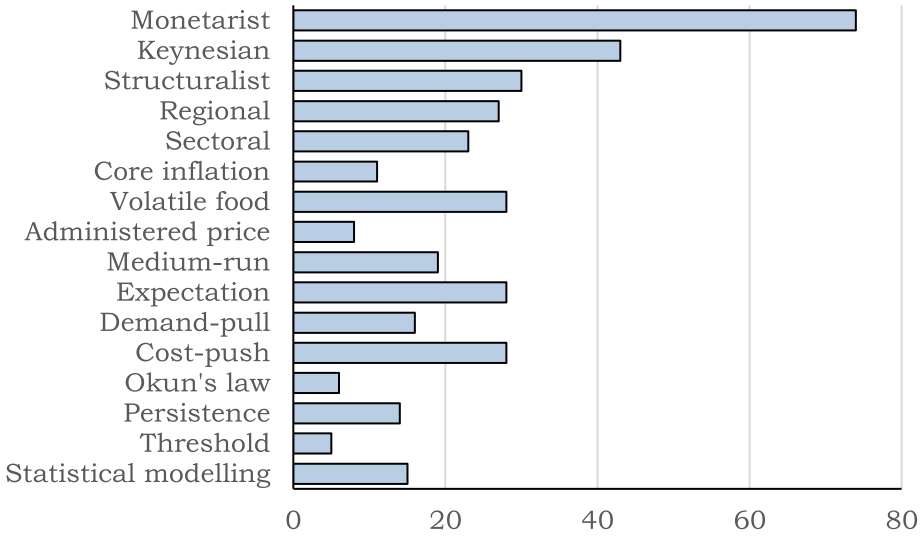


Figure 10. Categories of inflation literature

Next, the inflation literature is summarized and categorized based on the theories discussed in the previous two chapters, as illustrated in Figure 10. According to the graph, the most prominent themes in Bank Indonesia's literature survey on inflation are: (i) Inflation examined through Monetary Theory (with 74 literature pieces); (ii) Regional and Sectoral Inflation (with 50 literature pieces); (iii) Inflation analyzed from Keynesian Theory (43 literature pieces); (iv) Inflation explored from Structural Theory (30 literature pieces), and; (v) Volatile food inflation, inflation expectations, and cost-push inflation (each with 28 literature pieces). The publication years of these inflation literature pieces are indicated in Table 1.

Table 1. Categories of inflation literature based on year of publication.

No.	Categories	Frequency	Publication Year
1.	Monetary	74	1987 - 2022
2.	Keynesian	43	2000 - 2022
3.	Structural	30	1998 - 2022
4.	Regional	27	2002 - 2020
5.	Sectoral	23	1989 - 2021
6.	Core Inflation	11	1998 - 2021
7.	Volatile Food	28	1998 - 2021
8.	Administered Price	8	2006 - 2020
9.	Medium Run	19	2004 - 2020
10.	Expectation	28	1998 - 2021
11.	Demand-Pull	16	1987 - 2020
12.	Cost-Push	28	1987 - 2020
13.	Okun's Law	6	1965 - 2014
14.	Persistence	14	2005 - 2019
15.	Threshold	5	2006 - 2013
16.	Modelling/Statistics	15	2000 - 2022

Based on the distribution of the inflation literature, the literature review in Chapter IV is divided into seven main subsections: (i) Inflation in Indonesia from basic theories, namely Monetarist, Keynesian, and Structuralist theories; (ii) Inflation in Indonesia from a spatial perspective (regional and sectoral); (iii) Inflation in Indonesia categorized by its components (core and non-core); (iv) Inflation in Indonesia from a medium-term perspective (price and wage-setting); (v) Inflation in Indonesia from the Phillips Curve theories (inflation expectations, demand-pull, and cost-push); (vi) Inflation in Indonesia from the perspective of Okun's Law, and; (vii) Inflation in Indonesia based on various empirical studies, covering thresholds, persistence, and statistical models or inflation calculations. Subsection 4.1 is added to examine the differences in findings on inflation literature between the pre-Inflation Targeting Framework (ITF) and post-ITF periods.

4.1 Inflation in Indonesia: A Perspective Before and After ITF

The ITF period can broadly be divided into two phases, namely the pre-ITF period before the year 2000 and the post-ITF period after 1999. This distinction is based on the enactment of Law No. 23 of 1999 regarding the independence of the central bank, which paved the way for Bank Indonesia to focus more on controlling inflation. Therefore, reviewing the literature on inflation in the pre-ITF and post-ITF periods is essential to understand inflation control through various monetary policies. This subsection categorizes inflation literature based on publication years in the pre-ITF and post-ITF periods, showing that specific categories such as regional inflation, statistical models for measuring inflation, and inflation persistence began to be studied after 1999. Figure 11 illustrates that research and studies within Bank Indonesia on inflation have increased since the explicit implementation of the ITF by Bank Indonesia in July 2005.

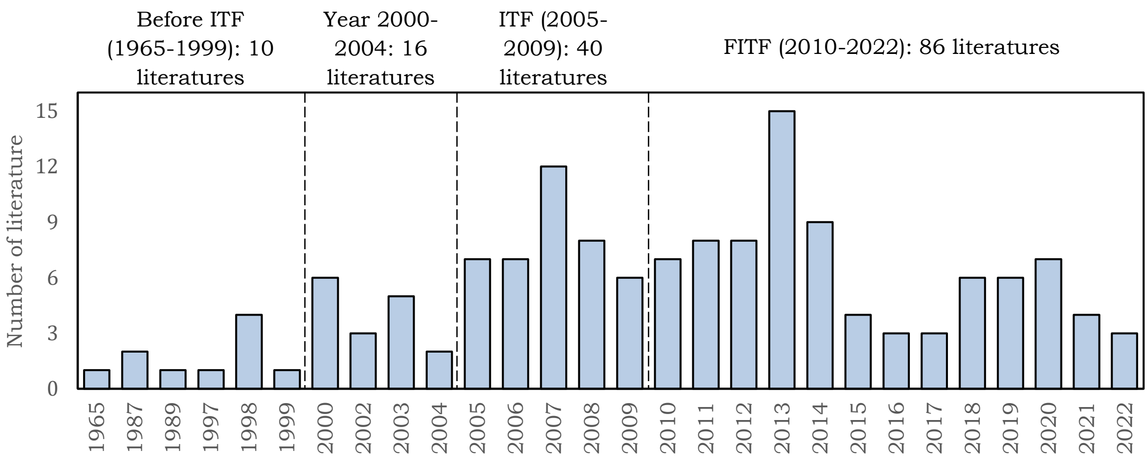


Figure 11. Central Bank of Indonesia's inflation literature by year

In 1998, inflation began to be extensively researched in response to the Asian financial crisis, which highlighted the urgency of policy instruments to control prices. Arifin's study (1998) indicated that research on monetary policy at that time was more focused on the demand side. This reflected the dominance of the demand-side economic paradigm to address the slowdown in growth and rising prices during the Asian financial crisis. In 2007, the number of studies on inflation increased with the emergence of the global financial crisis. Literature this year began to discuss the transmission of exchange rates to prices, regional inflation, and inflation persistence. In 2013, the inflation rate reached its highest level in the last decade (8.38% year-on-year), driven by the increase in fuel prices followed by the rise in food commodity prices.[5] This aligns with the abundance of literature discussing food commodity prices and regional policies affecting inflation at that time.

In 2013-2014, the effectiveness of monetary policy was questioned, considering the establishment of the Inflation Control Team (TPI) in 2005 and the Regional Inflation Control Team (TPID) in 2008. Literature findings highlighted the lack of effective coordination between the central bank and relevant government agencies, as well as a lack of clarity in policy strategy (Ridhwan et al., 2016b; Budiyono, 2017). This reflects the challenges in integrating monetary policy with other factors influencing inflation, thereby reducing the effectiveness of policy responses during that period. From 2018 to the present, factors such as rising energy prices, political instability, and the impact of the COVID-19 pandemic have played a crucial role in influencing inflation rates worldwide. Discussions regarding monetary policy and government measures have become the focus to address emerging inflation challenges.

Furthermore, Table 2 presents the evolution of monetary policy viewed through inflation literature categories over the period. Before the Inflation Targeting Framework (ITF) in 2000, 10 literature pieces were dominated by monetary discussions. After ITF, the number of literature pieces in some categories underwent a significant shift, with the monetary category remaining the focus and continually increasing. Similarly, literature with Keynesian and structural theory approaches. Literature on inflation discussing regional, sectoral, volatile food (VF), and inflation expectations also experienced a significant increase, while core inflation categories tended to remain stagnant. This illustrates the adaptation of monetary policy to the increasingly complex economic dynamics over time.

Table 2. Categories of Pre-ITF and Post-ITF Inflation Literature (Freq.)

Categories	Before ITF, 1965-1999 (n = 10)	After ITF			Freq. (N = 149)
		Inflation targeting lite, 2000-2004 (n = 16)	ITF, 2005-2009 (n = 40)	Flexible ITF, 2010-sekarang (n = 83)	
Monetary	8	12	22	35	74
Keynesian	0	4	7	32	43
Structural	1	1	7	22	30
Regional	0	1	4	22	27
Sectoral	1	2	5	16	23
Core Inflation	2	2	3	4	11
Volatile Food	1	0	6	21	28
Administered Price	0	0	5	3	8
Medium Run	0	1	7	11	19
Expectation	1	4	9	15	28
Demand-Pull	1	0	5	10	16

[5] https://katadata.co.id/timredaksikatadata/finansial/5e9a5754ee305/inflasi-sepanjang-2013-capai-839-persen?page=all (accessed 15 November 2023).

Cost-Push	1	3	10	14	28
Okun's Law	2	0	0	3	6
Persistence	0	0	6	9	14
Threshold	0	0	2	3	5
Modelling/Statistics	0	2	6	7	15

The internal studies conducted by Bank Indonesia on inflation during the pre-Inflation Targeting Framework (ITF) period (before the year 2000) revealed that Bank Indonesia primarily focused on controlling inflation by managing the money supply (Astradiningrat, 1965; Joyosumarto, 1987). Monetary policies tended to be tight during this period, and structural policies on the supply side were crucial to avoid shocks that could affect long-term inflation (Santoso and Anglingkusumo, 1998). Empirical findings also highlighted the roles of interest rates and exchange rates. As the transition to more modern monetary policies took place, these instruments became more relevant for inflation control (Lestari, 1987; Sitorus, 1989; Sarwono and Warjiyo, 1997; Wuryandani and Anglingkusumo, 1998). There was still a strong connection between inflation and monetary aggregates (Santoso and Simorangkir, 1999). The use of interest rates as an operational monetary tool began to receive significant attention in 1998, particularly in managing rupiah stability during a financial crisis (Wijoyo and Zulverdi, 1998; Arifin, 1998).

In the post-ITF period, particularly during the post-1998 crisis stabilization (from 1999 to 2003), Bank Indonesia began taking steps to implement inflation targeting. Literature during this time discussed inflation measurement, control, and the impact of monetary policies on the economy. Since the year 2000, monetary policy emphasized a more forward-looking approach, with a sole focus on inflation (Anglingkusumo et al., 2000; Haryono et al., 2000; Hutabarat et al., 2000). Consequently, modeling literature began to emerge, with some studies measuring the statistical characteristics of inflation and simulating models to determine the tightness of necessary monetary policies (Tjahjono et al., 2000; Joseph et al., 2010). The use of interest rates in the context of inflation targeting and their role as indicators of inflation expectations was also discussed (Laksmono et al., 2000; Zulverdi et al., 2000; Nugroho et al., 2003). Furthermore, monetary policies that aimed at controlling inflation were found to be influenced by the output gap and had implications for regional economies and post-crisis economic recovery (Suseno et al., 2002; Susianto, 2002; Agung et al., 2003).

In July 2005, Bank Indonesia explicitly began implementing the Inflation Targeting Framework (ITF) strategy, in line with the issuance of Law No. 3 of 2004. During the period from 2004 to 2008, the focus of monetary policy shifted towards achieving the inflation target as the primary objective. The policy response was expressed through the BI rate (the policy rate set at Bank Indonesia's Board of Governors Meeting). Alongside this, the role and mix of fiscal policies were deemed essential in supporting monetary policies (Mochtar, 2004; Anglingkusumo, 2005). On the other hand, the traded sector and financial sector played crucial roles in determining prices, necessitating trade liberalization and a conducive financial system to support monetary policy transmission (Astiyah et al., 2005; Zulverdi and Santoso, 2005). Concerning monetary transmission using the BI rate, a study by Nugroho and Mochtar (2006) demonstrated that monetary policy tended to be tight, and the natural interest rate (influenced by the BI rate) affected inflation.

After the 2008 financial crisis (from 2009 onwards), Bank Indonesia adopted the Flexible Inflation Targeting Framework (FITF) with the issuance of Law No. 6 of 2009. The FITF allowed Bank Indonesia to be more flexible in responding to economic changes and financial crises while maintaining the inflation target as the primary focus. The BI 7-day (Reverse) Repo Rate (BI7DRR) replaced the BI rate as the policy rate starting on August 19, 2016. Literature from 2009 to 2016 discussed inflation control and its measurement, particularly related to inflation thresholds, inflation targeting simulations using various statistical models, measuring inflation expectations, disaggregated inflation dynamics, and time inconsistency in monetary policy (Ariyanti et al., 2010; Harmanta et al., 2011; Tjahjono et al., 2012; Harahap et al., 2013a; Kusuma, 2013; Rahmahdian and Warjiyo, 2013). Interest rates became the most dominant operational tool during this period, with a focus on determining the short-term interest rate target (3-month) (Harahap et al., 2014; Wimanda et al., 2014).

Additionally, inflation persistence was continuously studied. A study by Yanuarti (2007) found that during 1990-2006, inflation persistence was high but decreased after the 1998-1999 crisis period due to low expectations. This highlighted the increased credibility of Bank Indonesia post-ITF. After the 2008 financial crisis, empirical results on inflation persistence emphasized its implications for regional inflation control policies (Arimurti and Trisnanto, 2010; Bank Indonesia, 2010a; Tirtosuharto and Adiwilaga, 2013).

After the establishment of FITF, literature on inflation from 2017 to 2022 addressed inflation control, focusing on strengthening strategies to address food inflation, the role of financial technology (fintech) in monetary policy transmission, and the importance of central bank communication in managing inflation expectations (Budiyono, 2017; Narayan and Sahminan, 2018; Harahap et al., 2017; Astrayuda et al., 2020). Other topics included the influence of global factors, such as commodity prices and global economic changes, as well as the impact of the COVID-19 pandemic on macro-financial policies and inflation (Agung, 2020; Puspitasari et al., 2020; Prabheesh et al., 2021). Furthermore, discussions on measuring inflation bias and assessments of Indonesia's economic and financial cycle in the context of inflation targeting policies were also addressed (Anugrah et al., 2019; Harun et al., 2021).

4.2 Inflation in Indonesia: A Review from Basic Theories

Empirical evidence on inflation in Indonesia, reviewed through the lens of monetary theories, indicates that inflation in Indonesia is influenced by the money supply (Joyosumarto, 1987; Anglingkusumo, 2005; Bathaluddin et al., 2012). Money supply itself is affected by changes in the monetary base and the money multiplier. The monetary base is linked to the behavior of monetary authorities, while the money multiplier relates to the portfolio decisions of the public and commercial banks (Joyosumarto, 1987). Anglingkusumo's study (2005) demonstrates that money supply affects inflation in the long term. In line with this, the volatility of money demand plays a significant role in determining excess liquidity, which can reduce the effectiveness of monetary policy in controlling inflation (Bathaluddin et al., 2012).

Furthermore, there is a preference for monetary policy in controlling inflation in Indonesia. Research by Joseph et al. (2010) shows that in practice, the "optimal" monetary policy rule does not always align with what is desired. A tight approach aims to achieve the inflation target as quickly as possible, while a more moderate approach adopts policies that are more "accommodative" to economic conditions. On the other hand, a study by Munandar et al. (2007) suggests that a cautious monetary policy can be an ideal option. This is because such a policy can not only reduce the poverty rate but also improve income distribution. This is supported by Simorangkir's (2011) study, which indicates that excessively tight monetary policy can exert pressure on future inflation and affect people's purchasing power.

Consistency in monetary policy is also essential for the effective implementation of inflation-focused policies (inflation targeting). Research by Harmanta et al. (2011) reveals that a high level of trust affects inflation expectations and the efficiency of monetary policy transmission in Indonesia. While central banks can consider gradually achieving the inflation target, high levels of trust enable faster target achievement. This trust is influenced by policy consistency. However, research by Rahmahdian and Warjiyo (2013) found inconsistencies in Bank Indonesia's monetary policies during the pre-independence period, where income inequality was often negatively weighed in policy formulation. After Bank Indonesia became independent, monetary policy considered not only price stability but also economic growth stability.

Literature on inflation targeting monetary policies also discusses lags and monetary policy transmission in Indonesia through interest rates (Simorangkir, 2002; Wimanda et al., 2014; Sahminan and Kusuma, 2019). Simorangkir's research (2002) reveals that monetary policy can potentially impact inflation and financial system stability, albeit with varying lags. Furthermore, Wimanda et al. (2014) identified lag times of approximately 18 months for inflation and 10 months for financial system stability concerning monetary policy. Interest rates were viewed as the most dominant monetary policy tool in controlling inflation. This is supported by Sahminan and Kusuma's study (2019), which showed increased responsiveness to inflation reduction through interest rate increases in Indonesia.

The use of interest rates as an operational target and key monetary policy tool was strengthened by earlier empirical evidence indicating that interest rates allow for faster responses to inflation, particularly post-ITF (Harahap et al., 2013a; Kusuma, 2013). During the global financial crisis in 2008, research by Harahap et al. (2013a) demonstrated that raising the BI Rate (the primary instrument in ITF) led to price level reductions during 2005-2013, as well as during the global financial crisis. Kusuma's study (2013) highlighted that interest rate shocks proved that the adoption of ITF had also weakened the "price puzzle."

Therefore, the appropriate adjustment of short-term interest rates serves as a guideline for monetary policy to achieve the inflation target (Haryono et al., 2000). Monetary policy rules adapted from the Taylor Rule with specific adjustments were considered ideal, not only for control but also for maintaining inflation at its target (Nugroho et al., 2003). Research by Harahap et al. (2014) found that short-term interest rates (three months) should be higher than the previous year. This underscores the importance of selecting the correct model to determine policy interest rates, especially during crises and in the short term.

In the determination of real interest rates, inflation targets and output targets should also be considered. This is because optimal monetary policy is influenced by output gap variability

(Wimanda and Hutabarat, 2005). Furthermore, there is a relationship between inflation and output. This is highlighted in studies such as Zulverdi et al. (2000), which found that asset prices and expectation variables together influence demand in the economy before impacting inflation. Concerning the determination of the right real interest rate, research by Ascarya (2012) revealed differences in the impact of conventional and Shariah interest rates on inflation and output. The mechanism of conventional interest rate transmission is closely related to inflation and output, while the mechanism of Shariah interest rate transmission is not linked to inflation and output.

Therefore, it is important to consider the aspect of output loss in determining the appropriate monetary transmission (Anglingkusumo et al., 2000; Tjahjono et al., 2007a). To minimize output loss, the inflation target announced in the near term should take into account the delayed effects of monetary policy over approximately one to two years, and in its achievement, a gradual strategy should be used (Anglingkusumo et al., 2000). In line with this, the study by Tjahjono et al. (2007a) shows that the disinflation process from the double-digit inflation rate at the beginning of the Inflation Targeting Framework (ITF) toward the steady-state inflation target progresses slowly with a significant output loss. This reflects imperfect credibility in monetary policy. Thus, monetary policies that minimize output loss also become key in determining an effective monetary transmission strategy.

Furthermore, innovation in the payment system is crucial in supporting economic growth and price stability (Santoso et al., 2013a; Harahap et al., 2017; Narayan and Sahminan, 2018; Adiwibowo et al., 2022). The study by Santoso et al. (2013a) shows that innovation in the payment system has a positive impact on the economy, reflected in economic growth, price reduction, and lower interest rates. This finding supports the study by Harahap et al. (2017), which indicates that the transmission of monetary policy through the interest rate channel appears to be more sensitive after the implementation of Central Bank Digital Currency (CBDC). The study by Narayan and Sahminan (2018) also highlights those continuous improvements in the payment system and the performance of the financial system, including fintech developments, help reduce inflation. Furthermore, the study by Adiwibowo et al. (2022) shows that a 10% reduction in the money velocity resulting from CBDC issuance will reduce inflation by 1%. As a result, nominal and real interest rates will also be permanently lower.

In addition to interest rates, the exchange rate also serves as a monetary policy transmission channel in the context of inflation control. The effectiveness of exchange rate policies depends on coordination with fiscal policies, as well as the sectoral aspect through enhancing export commodity competitiveness (Wimanda and Hutabarat, 2005). In line with this, the study by Indawan and Utari (2009) demonstrates that the impact of the exchange rate on inflation is smaller compared to the impact of monetary and fiscal policies. However, exchange rate depreciation shows a dominant influence from the demand side, particularly through improved competitiveness. Conversely, exchange rate appreciation can reduce inflation from the baseline scenario.

On the other hand, some literature also addresses the crucial relationship between banking credit, inflation, and monetary policy. The study by Prastowo and Depari (2008) analyzes monetary transmission through the banking credit channel and finds that an increase in the credit-to-GDP ratio will reduce the inflation rate and decrease the inflation target deviation. In line with this, the study by Budiman et al. (2019) demonstrates that the transmission of the exchange rate to inflation has improved, and an increase in policy interest rates through the banking credit channel will reduce inflation.

However, compared to banking credit, the exchange rate is considered to play a primary role in shaping inflation. Santoso and Simorangkir (1999) studied monetary control in a flexible exchange rate system and found a strong relationship between monetary aggregates and the inflation rate. This highlights the importance of monetary policy transmission influencing exchange rates through interest rates compared to transmission through the money supply. Furthermore, the study by Astiyah and Husman (2005) found that in a free-floating exchange rate regime, trade components account for more than 50% of the Consumer Price Index. If the proportion of imported raw materials is high, exchange rate fluctuations affect production costs, subsequently influencing inflation.

Moreover, some research also highlights the role of exchange rate appreciation and depreciation. The research by Husman (2006) shows that exchange rate depreciation pressure tends to originate from the widening yield spread of Government Securities (SUN). This provides a negative outlook on future inflation due to the possibility of increased import prices and production costs. Meanwhile, the study by Jacobs et al. (2011) indicates that the real exchange rate (REER) and debt service ratio (DSR) significantly affect the yield of government bonds, while significant factors for corporate bond yields include return on equity (ROE), inflation, current ratio (CR), and net profit margin (NPM).

Furthermore, there is a connection between devaluation, interest rate control, nominal exchange rate, real exchange rate, and economic growth (Lestari, 1987; Sitorus, 1989; Rasbin et al., 2021). The study by Lestari (1987) demonstrates a significant increase in inflation within one or two months after a devaluation action. In the context of controlling the nominal exchange rate, the study by Sitorus (1989) indicates that the monetary authorities are responsive to the domestic and foreign interest rate differential. This confirms that efforts to stabilize the nominal exchange rate have an impact on the real exchange rate. On the other hand, the study by Rasbin et al. (2021) shows that an undervalued Rupiah exchange rate can promote economic growth through exports.

In line with this, some literature emphasizes the importance of the exchange rate in export-import activities. In the context of an increasingly complex global economy, the mechanisms of policy transmission through interest rates and exchange rates are expected to provide faster signals for monetary authorities to stabilize prices (Sarwono and Warjiyo, 1997). Global economic conditions, such as economic slowdown and fluctuations in world commodity prices, directly affect exports and imports and can result in reduced demand (Hutabarat et al., 2000). The uncertainty of exchange rate shocks, demand, and supply will affect inflation variability, further emphasizing the need for more aggressive monetary policies to maintain price stability (Tjahjono et al., 2007b; Prasmuko and Anugrah, 2009). The study by Harahap et al. (2015) highlights that short-term inflation variations depend on the exchange rate, while in the medium term, they depend on GDP.

Understanding various monetary policy instruments and their impact on economic variables beyond inflation is essential for effective policy formulation. Research by Agung et al. (2003) identified the exchange rate variable as the best indicator with a quick effect. This research also shows that the quantity of money and interest rates provide significant information content for inflation, although the output gap has a faster impact than the quantity of money. On the other hand, research by Nugroho (2007) suggests that short-term increases in interest rates and exchange rate depreciation have the potential to reduce the state budget deficit (Anggaran Pendapatan dan Belanja Negara or APBN). This further underscores the importance of the exchange rate's role in price stability and economic growth.

Finally, the implementation of monetary policy cannot ignore that the COVID-19 pandemic has created a level of uncertainty that affects inflation control worldwide, especially in developing countries. This is explained in the study by Prabheesh et al. (2021). This study shows that in some countries that have managed to stabilize credit and output, the transmission of monetary policy has become more cautious, following a "wait-and-see" approach. In Indonesia, the policy mix has a greater impact on accelerating economic recovery, although it may not always address the inflation challenges (Budiman et al., 2022).

On the other hand, in Keynesian theory, the relationship between inflation and economic growth becomes a relevant topic, especially the link between inflation and GDP components. Empirical evidence suggests a nonlinear relationship between inflation and economic growth, emphasizing the importance of maintaining inflation rates within an optimal range (Anglingkusumo et al., 2009). Furthermore, the study by Surjaningsih et al. (2010) highlights that government spending, particularly on infrastructure investment, has a significant impact on reducing inflation due to its larger multiplier effect. Conversely, an increase in inflation due to tax hikes may result from expectations of rising production and selling costs. On the other hand, the current account deficit has been shown to significantly affect exchange rates and inflation (Widodo et al., 2013). Therefore, understanding inflation dynamics while considering economic shocks becomes crucial (Maryaningsih and Hermansyah, 2013).

Additionally, factors such as urban saving preferences and consumption-related to income must also be considered in maintaining price stability (Ariyanti et al., 2010; Lubis et al., 2020). In consumption patterns, the role of low-income households has significant implications for their impact on inflation (Ariyanti et al., 2010). The study by Lubis et al. (2020) emphasizes the importance of maintaining low-income household consumption. This is because the transition of labor to the informal sector (resulting from the increased low-income household population) can affect price volatility and growth in the non-food sector. This indicates the importance of paying attention to sectors and households vulnerable to price shocks.

The connection between inflation and economic growth is also found in other literature, with an emphasis on the importance of maintaining economic growth stability and income growth in inflation control (Anugrah and Chawwa, 2007; Santoso et al., 2013b; Utari et al., 2014a). The study by Anugrah and Chawwa (2007) shows a complex relationship between inflation, GDP, and other economic factors. Empirical evidence from Santoso et al. (2013b) demonstrates that inflation plays a significant role after the decentralization phase and correlates negatively with regional income growth. Meanwhile, the study by Utari et al. (2014a) indicates that rising inflation has a negative impact on a country's chances of escaping the middle-income trap (MIT). Moreover, addressing income inequality between provinces is also crucial.

On the other hand, structural inflation theory provides in-depth insights into the factors affecting inflation levels in Indonesia. Long-term structural models in Affandi's analysis (2007) show that the inflation rate becomes the primary focus of monetary policy, even during business-as-usual periods, emphasizing the importance of understanding inflation dynamics in the long term. One of the structural factors affecting long-term inflation is infrastructure. This aligns with the study by Prastowo et al. (2008), which suggests that changes in commodity prices and inflation are mainly caused by increased transportation costs and input costs due to long and inefficient distribution chains. In the context of trade, limited infrastructure provides incentives for producers to influence prices (Ridhwan et al., 2012a; Ridhwan et al., 2012b).

Structural theory also connects inflation with employment. In this regard, research by Tjahjono et al. (2006) discusses the influence of capacity utilization and unemployment on inflation pressure and persistence. The use of dual cost capacity utilization under the Non-Accelerating Inflation Rate of Capacity Utilization (NAICU) is considered ideal for reducing inflation pressure through wage stability and labor demand. Factors such as the slow accumulation of capital, wage rigidity, and various structural weaknesses were found to affect unemployment and have implications for monetary policy to address inflation. This can lead to unemployment persistence in Indonesia (Bank Indonesia, 2008a).[6]

4.3 Inflation in Indonesia from a Spatial Perspective

Regional inflation is a complex phenomenon, characterized by greater volatility compared to regional income (Suseno et al., 2002). Its multifaceted influence encompasses factors such as distribution, pricing, expectations, market structure, and competition (Bank Indonesia, 2007; Bank Indonesia, 2010a; Bank Indonesia, 2010b; Ridhwan et al., 2016a). In Central Java, the role of middlemen and commodity price distribution is found to impact market prices and net margins of commodity distribution players (Bank Indonesia, 2007).[7] In East Java and South Sulawesi, variations in inflation persistence are linked to economic agent behavior and limited information about economic conditions (Bank Indonesia, 2010a[8]; Bank Indonesia, 2010b[9]). Conversely, factors such as market structure, competition levels, and commodity price formation behavior can influence the persistence of food inflation in different regions (Ridhwan et al., 2016a).

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[6] Center for Education and Central Banking Studies (PPSK) of Bank Indonesia, International Center for Applied Finance and Economics (InterCAFE), and the Research and Community Empowerment Bogor Institute of Agriculture. (2008). Empirical Study of Unemployment Persistence in Indonesia and Its Mitigation Efforts Based on Microdata Analysis.

[7] Bank Indonesia Yogyakarta and the Center for Economic Development at Muhammadiyah University Yogyakarta. (2007). Survey of the Distribution Channels of Commodities Contributing the Largest Inflation in the City of Yogyakarta.

[8] Bank Indonesia Surabaya. (2010). Inflation Persistence in East Java and Its Implications for the Regional Economy.

[9] The Monetary Economic Team of Bank Indonesia Makassar. (2010). Inflation Persistence in South Sulawesi and Its Implications for the Regional Economy.

In line with this, a study by Ramadhan (2009) indicates that controlling regional inflation requires a deep understanding of the price movements of specific commodities, such as fast food, beverages, and tobacco. The movements of these commodity prices are influenced by various factors, including transportation, communication, and financial services. Another study by Tirtosuharto and Adiwilaga (2013) finds that decentralization can affect regional inflation volatility, where efficient interregional government expenditure and coordination play a key role. However, the study also identifies challenges in interregional coordination for inflation control in Indonesia, emphasizing the need for long-term policy formulation to address these issues.

In addition to commodity price movements, government expenditure, and interregional coordination, there are factors of convergence in regional inflation with varying determinants and sectors. According to a study by Wimanda (2006), the main determinants of regional inflation are backward-oriented inflation expectations and exchange rates. Sectorally, inflation in the transportation and property sectors is deemed dominant due to the significant impact of fuel price increases on spending in areas such as housing, food, and manufacturing. On the other hand, price increases in regions like Java, West Kalimantan, and Central Kalimantan can affect other regions. In line with this, a study by Ridhwan et al. (2015) demonstrates that food commodities such as rice, sugar, soybeans, red chili, shallots, and beef tend to have higher prices due to concentrated trade on Java Island. This results in higher production costs outside Java due to infrastructure disparities and market density.

Several studies recommend regional inflation control measures (Prakoso, 2017; Budiyono, 2017). These recommendations include steps such as strengthening the role of Bank Indonesia through training and empowering commodity-based SMEs, as well as optimizing the role of Regional Inflation Control Teams (TPID) to support interregional food commodity trade (Prakoso, 2017). Competition among startups for food security commodities also serves as an alternative approach to accelerate the digital transformation of SMEs. Effective national and local policy mixes, such as Interregional Cooperation (KAD), are emphasized to control food inflation (Budiyono, 2017).

In alignment with these recommendations, food security plays a crucial role in regional inflation control, particularly in food inflation. Findings by Santoso et al. (2014) highlight regions with the lowest scores in each pillar of food security. In terms of food availability, the lowest scores are found in Kalimantan, while in terms of food accessibility and stability, the lowest scores are in Eastern Indonesia. This underscores the importance of optimizing the role of TPID in controlling regional food inflation in these areas. Survey findings in the study by Ridhwan et al. (2016b) show that some TPID work programs are already effective in controlling prices and inflation. The most significant factors for TPID success include supply availability, followed by condition and work program factors, as well as exogenous factors.

Meanwhile, the complexity of regional inflation encompasses the impact of regional food inflation and its persistence. A study by Arimurti and Trisnanto (2011) finds that the relatively high persistence of Jakarta's inflation is due to high persistence in the inflation of most commodities that make up inflation. This is attributed to a combination of forward and backward-looking inflation expectations. In line with this, disparities in regional inflation indicate the need for government structural policies to focus on improving the productivity of sectors involved in trade (traded), such as manufacturing, agriculture, plantations, and mining. This is because commodities from these sectors have the most significant impact on inflation (Anglingkusumo et al., 2014a).

Furthermore, developments in the financial sector play a crucial role in maintaining inflation stability (Zulverdi and Santoso, 2005; Narayan and Sahminan, 2018; Safuan et al., 2022). A study by Zulverdi and Santoso (2005) demonstrates that changes in the financial system's structure can have a positive impact on the effectiveness of monetary policy transmission, particularly concerning the speed of transmission through banking. Supporting these findings, a study by Narayan and Sahminan (2018) shows that fintech as part of financial sector development significantly reduces inflation levels and triggers real appreciation of the domestic currency. Furthermore, a study by Safuan et al. (2022) reveals varying relationships between Indonesian real sector variables (household consumption and CPI), financial sector variables (interbank money market), and monetary policy variables (money supply) during periods of high and low financial stress. Based on these findings, it can be stated that the development of the financial sector is of special concern in maintaining price stability.

The development in the financial sector itself observes financial and business cycles in Indonesia. Research by Susianto (2002) finds that poor financial conditions can exacerbate inflation because the flow of funds into the banking sector, though inflation, interest rates, and exchange rates also affect sectoral risks. In addition, inflation also influences business cycle fluctuations in Indonesia, as well as exchange rates, bank lending, and oil prices (Tjahjono and Anugrah, 2006). The characteristics of business and financial cycles in Indonesia are similar, with short cycle durations and interconnections, where business cycles tend to lead financial cycles (Widodo and Tarsidin, 2007). Overall, this underscores the importance of understanding the relationship between financial conditions, inflation, macroeconomic variables, and business cycles in Indonesia.

In line with this, a study by Agung and Naiborhu (2020) explains that the rise in inflation due to financial sector conditions is partly attributed to global commodity shocks that prompt banks to reduce credit growth. Furthermore, a study by Harun et al. (2021) demonstrates that financing components, asset prices, banking indicators, corporate leverage, and foreign investor interest can depict financial dynamics effectively. This further strengthens the argument that the financial sector's role is crucial in maintaining price stability.

Moreover, there is a connection between the financial sector and inflation through the money circulation mechanism and the role of the financial sector as a shock absorber (Permata et al., 2011; Partono, 2013). A study by Permata et al. (2011) finds that although the marginal effect of financial sector development on output is smaller than other variables, financial sector development still plays a crucial role. The complexity of factors affecting the financial sector shows that the inflation rate significantly affects the circulation of money in the economy. On the other hand, a study by Partono (2013) identifies the positive role of financial sector development in mitigating the negative impact of economic shocks.

On the other hand, inflation also has a significant impact on the property sector, especially commercial and residential properties (Dewayany et al., 2014; Abubakar et al., 2016;

Karsono, 2018). Empirical evidence suggests that the growth of the Commercial Property Price Index is highly correlated with construction credit, indicating that demand plays a pivotal role in determining commercial property prices (Dewayany et al., 2014). On the other hand, the Residential Housing Price Index (IHPR) is closely related to the Consumer Price Index (CPI) in specific property cycles (Abubakar et al., 2016). Spatially, research by Karsono (2018) shows that property price fluctuations do not significantly impact Sumatra, Kalimantan, Sulawesi, and Sumatra. Therefore, policy focus is better directed toward improving regional economies through macroeconomic variables such as Regional Gross Domestic Product (PDRB).

The relationship between price levels and the property sector also discusses the role of demand, purchasing power, and rental price inflation that can affect other macroeconomic variables (Santoso et al., 2012a; Dewayany and Setyoningsih, 2015; Surjaningsih et al., 2018). A study by Santoso et al. (2012a) indicates that in the long run, house rental prices will affect exchange rates if property rental price inflation tends to be persistent. The study also highlights the high demand for house rentals in Indonesia, making homeowners dominant in price determination. In the context of the secondary property market, a study by Dewayany and Setyoningsih (2015) shows that the implementation of the Residential Property Price System (SHPR) observed a slowing increase in secondary home prices in 2015. Factors such as declining demand and purchasing power, as well as economic slowdown, were identified as the causes of this deceleration. In addition, inflation in rental prices also has an impact on Non-Performing Loans (NPL) in the manufacturing, trade, construction, and other sectors, thereby affecting sectoral inflation (Surjaningsih et al., 2018).

4.4 Core and Non-core Inflation in Indonesia

Core inflation is a crucial aspect of monetary policy analysis. This type of inflation is primarily influenced by demand factors and expectations, and policy transmission through interest rates (Arifin, 1998; Nugroho and Mochtar, 2006; Anugrah and Pratama, 2018). A study by Arifin (1998) highlights that raising interest rates to control inflation is more effective for core inflation than for volatile inflation. In line with this, research by Nugroho and Mochtar (2006) demonstrates that the natural interest rate (NRI) in Indonesia plays a significant role in controlling core inflation. Furthermore, other empirical evidence suggests that long-term core inflation in Indonesia is influenced by demand factors, while in the short term, backward expectations become the primary influence with varying lags. Other factors such as global commodity prices and seasonal factors like the start of the school year also have an impact (Anugrah and Pratama, 2018).

Other factors also affect core inflation. A study by Warjiyo and Zulverdi (1998) suggests that a flexible exchange rate is the primary choice in controlling core inflation. On the other hand, research by Santoso and Anglingkusumo (1998) indicates that underlying inflation, which affects core inflation, does not follow a random walk pattern, and it is more effectively controlled by tight monetary policies. Additionally, a study by Hamdani (2003) emphasizes the importance of the exchange rate of the rupiah, inflation rate, import, and service balance deficit as factors affecting core inflation. Based on these findings, core inflation control can be considered by considering the exchange rate, the service balance, and implementing tight monetary policies.

On the other hand, inflation in volatile food components requires special attention as it is closely related to structural factors in the economy and exhibits persistence (Santoso et al., 2013c; Ridhwan et al., 2016a). A study by Santoso et al. (2013c) identifies that most inflation is caused by commodities in the food and horticulture groups, as well as the livestock group. However, the development of clusters in this sector faces structural constraints such as limited capital, human resources, market access, and infrastructure. Additionally, the existing persistence of food inflation is due to limited supply and the dominance of suppliers/distributors and large traders in price determination. Therefore, a concentrated market structure tends to lead to persistent food inflation (Ridhwan et al., 2016a).

Understanding volatile food inflation in Indonesia also necessitates an examination of the empirical factors influencing commodity prices. A study by Santoso et al. (2011) identifies factors affecting the stabilization of rice prices in Indonesia. The most dominant factors include trader speculation, availability in the National Logistics Agency (Bulog), Government Purchase Price (HPP) policies, and festive season trends. In line with these findings, research by Ismaya and Anugrah (2018) indicates that the factors generally affecting food inflation in Indonesia are expectations, food production, agricultural sector income, food imports, agricultural sector credit, high demand, and seasonal factors such as holidays.

In the analysis of food inflation, it is also necessary to consider geographical aspects and more effective methods of measuring food inflation (Ridhwan et al., 2012c; Suselo et al., 2013; Irmasari et al., 2020). The presence of price clusters between neighboring districts or cities geographically indicates the influence of geographical distance on interregional trade intensity (Ridhwan et al., 2012c). Furthermore, using more specific commodity groups in analyzing food inflation is found to be more effective than the general approach using national commodity groups (Suselo et al., 2013; Irmasari et al., 2020).

On the other hand, empirical findings related to Administered Price (AP) inflation yield varied results. Generally, an increase in world oil prices has a significant impact on inflation (Syarifuddin, 2006; Adiwibowo and Waluyo, 2007). Research by Syarifuddin (2006) shows that a 10% increase in oil prices correlates with a 1.6% growth in Indonesia's GDP and results in a 3.6% increase in the Consumer Price Index (CPI). An increase in oil prices also affects the BI rate through output gaps and inflation pressure. Additionally, Adiwibowo and Waluyo (2007) demonstrate the existence of long-term equilibrium relationships through a dependency mechanism between exchange rates, oil prices, and consumer prices.

Furthermore, there is a connection between fuel prices, the monetary sector, and the financial sector. This affects the dynamics that occur in response to the BI rate increase and exchange rate changes. Research by Ridhwan et al. (2013) finds that with the increase in fuel prices, there is evidence of synchronization between the monetary sector and the financial sector in responding to the BI rate increase. Moreover, AP inflation also affects regional inflation heterogeneity through exchange rate transmission. In line with this, research by Narayan et al. (2019) shows that the long run cointegration relationship between oil prices and real exchange rates (RER) is also sensitive to various regimes in Indonesia. Under a floating exchange rate regime, there is a long-run cointegration relationship between oil prices and RER, but there is no evidence of a long-run relationship in a managed exchange rate regime.

4.5 Inflation in the Medium Term

In the medium term, inflation is influenced by price and wage formation. Price formation in Indonesia is generally affected by various factors, including inflation expectations, exchange rates, competitor prices, profit margins, and credit interest rates (Kurniati, 2007; Depari et al., 2009). A study by Kurniati (2007) also demonstrates that wage formation can be influenced by the transmission of exchange rates to prices. Low inflation expectations can minimize the transmission of exchange rates to prices, allowing market intervention in determining exchange rates. During crises, this impacts wage determination. In the determination of prices, producers tend to follow the highest market prices and pass cost increases to consumers as quickly as possible to maintain profits. Price changes at the producer level are influenced by credit interest rates, while price determination at the distributor level is influenced by exchange rates (Depari et al., 2009).

In line with this, the price formation process in the medium term is reflected in the manufacturing sector, one of the key sectors in Indonesia. Research by Nugroho et al. (2005) shows that the prices of manufactured products are influenced by wages, local and imported raw material prices, and energy prices. The monopolistic competitive market structure in the manufacturing industry also allows companies to influence price increases. This has the potential to lead to short and medium-term price increases when monetary policies are tight. Furthermore, research by Prastowo et al. (2010) highlights that the prices of manufactured products are also influenced by production cost efficiency and profit margins, while agricultural commodity prices are affected by planting/harvest cycles and weather conditions.

In the context of the causal relationship between wages, inflation, and price-setting strategies, several important factors need to be considered. A study by Cadrajat et al. (2008) shows a two-way causality between Unit Labor Cost (ULC) and inflation, especially in the period after the 1997 economic crisis. Research by Indawan et al. (2020) also indicates that labor and raw material costs affect price increases. Companies, as price setters, implement forward-looking pricing strategies, making prices 'sticky.' During the pandemic, ineffective policy coordination becomes the main cause of price stickiness, especially in the Micro Small and Medium Enterprises (MSME) sector. MSME entrepreneurs tend to set prices based on past costs, responding quickly to cost spikes.

Therefore, the credibility of medium-term inflation targets needs to be rapidly improved, given that price determination in certain sectors can influence inflation. A study by Astiyah et al. (2005) suggests that a significant reduction in profit margins in the medium term can potentially sustain inflation and affect social well-being. However, the central bank has limitations in controlling inflation caused by producer-side price determination (Dewati et al., 2014). Research by Dewati et al. (2014) reveals that to protect consumers from excessive rounding of prices, redenomination can be an alternative policy, although it requires an integrated strategy such as dual price tagging.

4.6 Inflation in Indonesia: A Review from Phillips Curve Theory

The Phillips Curve theory examines inflation from the perspective of expectations, demand, and supply. In terms of inflation expectations, empirical evidence highlights the importance of deposit interest rates, policy interest rates, forward-looking expectations, and expectation control through central bank communications (Laksmono et al., 2000; Arimurti and Trisnanto, 2010; Astrayuda et al., 2020). A study by Laksmono et al. (2000) demonstrates that the deposit interest rate and the Bank Indonesia Certificates (SBI) interest rate spreads influence inflation expectations, though they may not yet be suitable for forecasting. Furthermore, research by Arimurti and Trisnanto (2010) underscores the need for intensive efforts to shift inflation expectations toward a forward-looking perspective. Meanwhile, a study by Astrayuda et al. (2020) finds that in the short term, inflation expectations have been influenced by changes in communicated policy interest rates.

Hence, the effectiveness of policy communication through the media and monetary policy reports is crucial in achieving inflation targets and economic stability. Effective monetary policy communication in shaping inflation expectations among the public can reduce the gap between inflation expectations and actual inflation (Dewati et al., 2009). A study by Agustin et al. (2015) shows that inflation expectations are also influenced by current price changes, where the public tends to have more pessimistic inflation expectations. In the context of price formation, Bank Indonesia's communication strategy through monetary policy reports has a significant impact on inflation expectations. Based on these findings, inflation expectations are crucial for inflation control.

On the other hand, there is a role for Consensus Forecasts, monetary policy transparency, and surveys of inflation expectations in the money market in controlling inflation expectations (Utari et al., 2008; Anwar and Chawwa, 2008; Tjahjono et al., 2012). A study by Utari et al. (2008) finds that inflation expectations from Consensus Forecasts are considered more accurate and robust in predicting current and future inflation. Furthermore, Bank Indonesia's transparency has increased since 2002, although it remains lower compared to other central banks.[10] In this context, research by Anwar and Chawwa (2008) shows that high monetary policy transparency can reduce the degree of inflation persistence. Meanwhile, the results of surveys of inflation expectations in the goods market and money market provide different information, with estimates in the money market tending to be closer to the actual values (Tjahjono et al., 2012).

In addition to inflation expectations, from the perspective of the Phillips Curve theory, a comprehensive understanding of inflation also includes understanding demand-pull and cost-push inflation. In terms of demand-pull inflation, monetary and fiscal policies aimed at managing the impact of fuel and global commodity prices on aggregate demand play a key role (Dewati et al., 2007; Harahap et al., 2013b). Research by Dewati et al. (2007) demonstrates that supply shocks from fuel and exchange rate prices have a significant and positive impact on regional inflation and vary across regions. Moreover, research by Harahap et al. (2013b)

[10] Other central banks include the Bank of Thailand (BOT), the Bank of Korea (BOK), and the Bangko Sentral ng Pilipinas (BSP) (Utari et al., 2008).

shows that rising oil prices, energy prices, and global food prices can create inflationary pressures in several countries, including Indonesia.

In line with this, the findings of Rizvi and Sahminan (2020) indicate that responses to inflation influenced by food and global oil commodity prices vary. This depends on the policies and strategies adopted by the central bank and the government's role in controlling prices. Rizvi and Sahminan (2020) also note that monetary policy is increasingly responsive to output gap and inflation fluctuations, emphasizing the importance of balancing price stability and economic growth. Furthermore, a study by Puspitasari et al. (2020) shows that the relatively high persistence of inflation in Indonesia is mostly influenced by lags and the substantial contribution of money supply. This can affect demand due to the large money supply not being matched by increased production in the near term.

From the cost-push inflation perspective, factors such as production factors, agricultural infrastructure, fuel prices, adaptive inflation expectations, and exchange rates have significant implications for inflation pressure in Indonesia (Solikin and Sugema, 2004; Yanuarti and Hutabarat, 2006; Bank Indonesia, 2008b). In comparison, in China, Thailand, and the Philippines, cost-push inflation tends to be influenced by global food and oil commodity prices, with responses depending on central bank policies and the government's role in controlling prices (Yanuarti and Hutabarat, 2006). Furthermore, since Indonesian inflation is also influenced by agricultural infrastructure, addressing inflation should consider long-term factors such as food security and energy conservation to achieve sustainable price stability (Bank Indonesia, 2008b).[11]

Additionally, research by Yanuarti and Hutabarat (2006) reveals that excess money also has a significant influence on cost-push inflation in Indonesia. Excess money supply can trigger cost-push inflation by increasing demand for goods and services, which, when combined with supply constraints, leads to increased production costs and, ultimately, higher prices. A study by Anugrah and Ismaya (2018) shows that, in the context of price formation, factors related to company costs and supply-side have a greater influence than market conditions or demand-side factors. This is particularly applicable in situations where prices are considered relatively rigid.

4.7 Indonesian Inflation from the Perspective of Okun's Law

Inflation and its connection to Okun's Law represent a significant aspect of economic analysis. Literature indicates that in Indonesia, inflation is influenced by various factors, including inflation expectations and the output gap (Wuryandani and Anglingkusumo, 1998; Wimanda, 2010). In this context, Okun's Law links the output gap with the unemployment rate, while inflation expectations affect how the output gap impacts the inflation rate. Wimanda's study (2010) demonstrates that inflation projections with the output gap are considered efficient. This reveals the strong response of the central bank to inflation deviations from its target and a moderate reaction to the output gap when interest rates remain stable over 3-4

[11] Economic Research Bureau, International Relations and Studies Bureau, Representative Office of Bank Indonesia in Tokyo, and Representative Office of Bank Indonesia in Singapore. (2008). Characteristics of Inflation in China, Thailand, and the Philippines, and Policies Implemented in Controlling Inflation.

quarters. However, an earlier study by Wuryandani and Anglingkusumo (1998) revealed that the crisis period reflects indications of deviations in inflation expectations from actual inflation, indicating a high degree of uncertainty.

As discussed in Okun's theory, the impact of inflation on wages and workers' living standards also becomes a focus in the literature. Empirical results show that to mitigate the impact of inflation on workers' living standards, the use of the new Rupiah value (redenomination) can be a solution. Controlling prices of goods and services regarding the new Rupiah is a strategy that can potentially maintain the real income stability of workers and address wage-price spiral issues (Astradiningrat, 1965). Meanwhile, a study by Anglingkusumo et al. (2013) found that Provincial Minimum Wage (UMP), inflation, and GDP growth have a significant influence on actual wages. Additionally, UMP also affects the inflation rate. This highlights the need to consider both backward and forward-looking inflation expectations. However, a study by Utari et al. (2014b) found that UMP has a smaller influence on worker productivity. Greater influences were found in factors such as education level, training, and sector openness to trade.

4.8 Indonesian Inflation from Various Empirical Studies

In addition to the literature review based on the theories discussed in Chapters II and III, the literature review also considers other empirical studies. This empirical review addresses topics including inflation persistence, inflation thresholds, and inflation calculation models/statistics. These topics are crucial aspects of inflation analysis. Empirical evidence regarding inflation persistence in Indonesia indicates that inflation persistence tends to be high in the long term, with causes varying spatially (Yanuarti, 2007; Bank Indonesia, 2010b). Empirical research by Yanuarti (2007) shows that inflation persistence tends to be high in the long term. However, in the post-crisis period, inflation persistence is lower, possibly due to reduced inflation expectations. This indicates that post-crisis monetary policies may only require minor adjustments to achieve inflation targets. Spatially, research by Bank Indonesia (2010b) demonstrates that inflation persistence is found to be high in South Sulawesi, likely stemming from limited information on economic conditions. Furthermore, market structure, competition level, and price formation behavior also affect inflation persistence. These factors underscore the importance of statistical models capable of accurately projecting inflation and its persistence.

A study by Juhro and Iyke (2019) found that in addressing the three challenges faced by policymakers when predicting inflation, namely parameter uncertainty, predictor uncertainty, and model uncertainty, large-scale inflation prediction models have significant benefits. In this study, a dynamic model averaging approach is used, covering the sample period from January 1990 to June 2018, including the inflation targeting regime period and the earlier period. In-sample prediction results show that 60% of 15 exogenous predictors can significantly predict inflation, with an inclusion probability threshold of around 50%. This number increases to 87% when the threshold is lowered to around 40%. Out-of-sample predictions indicate that large-scale inflation prediction models have more substantial predictive power compared to simple models that consider long-term inflation persistence.

Regarding inflation thresholds, long-term dynamic analysis is required to determine whether inflation increases have exceeded the threshold (Tjahjono et al., 2000). In this regard, Tjahjono et al. (2000) research shows that the dynamic model averaging has a strong prediction capability for long-term inflation. However, Indonesia's inflation characteristics exhibit a non-normal pattern, making statistical methods recommended for sharper measurement. Additionally, there are also threshold values for exchange rates and money growth that influence inflation (Permata, 2008; Wimanda, 2011). Permata's study (2008) indicates that when exchange rate changes pass a certain threshold, the pass-through effect on inflation becomes large and significant. Meanwhile, Wimanda's study (2011) reveals a threshold effect of money growth on inflation, with high inflation occurring when money growth reaches 7.1%.

Finally, factors influencing inflation calculations are also crucial in inflation analysis. Anugrah and Chawwa's study (2007) found that, in reviewing inflation indicators and GDP components, projections using autoregressive models provided better results than forecasts using bivariate models or composites using Principal Component Analysis (PCA). Meanwhile, in calculating inflation in Indonesia, Santoso et al.'s study (2012b) emphasizes the need to consider the weight of gold jewelry. This is based on the fact that the majority of the population stores gold jewelry as a financial reserve. On the other hand, Anugrah et al.'s study (2019) found measurement bias in inflation, which can arise from components such as substitution bias, outlet bias, new item bias, and quality change bias, affecting the Consumer Price Index. These studies provide essential insights into the development of inflation projection models and stress the need to consider critical factors in calculating inflation in Indonesia.

5. Conclusions

This literature survey compiles and reviews 149 research findings and internal studies conducted by Bank Indonesia on inflation spanning the years 1965 to 2022. The review of these research findings and internal studies yields three main conclusions: (i) The most prominent themes in the field of inflation studied by Bank Indonesia encompass inflation examined from a monetarist perspective (74 literatures), inflation analyzed from a Keynesian standpoint (43 literatures), inflation scrutinized through structural theories (30 literatures), along with literature concerning volatile food (VF), inflation expectations, and cost-push inflation (each comprising 28 literatures); (ii) Research themes with the most recent publication year (2022) focus on inflation from monetary theory, Keynesian theory, and structural theory, exploring inflation during the pandemic, inflation and financial shocks, and inflation and digital currency; (iii) This study reviews empirical findings related to inflation from basic theories, spatial aspects, inflation disaggregation, medium-term price formation, Phillips Curve theory, and Okun's theory. Additionally, the review delves into other empirical examinations addressing inflation persistence, inflation thresholds, and inflation calculation methods. Lastly, the literature review also covers inflation discussions from both pre-Inflation Targeting Framework (ITF) and post-ITF periods. The various topics discussed in this literature survey culminate in a comprehensive analysis of Bank Indonesia's research findings and internal studies on inflation and provide several research recommendations for the future.

Several recommendations encompass research suggestions that support the intensification of multidisciplinary studies and a deeper understanding of inflation. These recommendations include:

1. Research theme on inflation that needs to be expanded includes: (i) Administered Prices Inflation (8 literature); (ii) Core Inflation (11 literature); (iii) Imported Inflation (12 literature); (iv) Inflation and its relationship with the current account deficit or exports-imports (8 literature), and; (v) Inflation influenced by fiscal policy (8 literature). This is because these themes involve critical aspects in the dynamics of inflation and economic policies in the global era.
2. Research themes on inflation that need to be updated, namely Inflation Thresholds (through various policy transmissions) and inflation influenced by wages (wage-push) or unemployment (in connection with Okun's Theory). This is considering that literature from these studies was last published in 2013 and 2014, while other literature was on average last published in 2020. Updating these themes will provide a deeper understanding of the relevance of inflation thresholds and the role of wages in shaping inflation pressures in an ever-evolving economic environment.
3. Research themes on inflation that are currently absent, including: (i) Research on inflation and its relationship with environmental factors (such as 'greenflation'); (ii) Inflation influenced by technological innovations in the financial/payment system (for example, blockchain), and; (iii) Inflation in short-term business cycles. These themes are becoming increasingly important as environmental factors have a growing impact on economic stability, while the role of technological innovation in the financial system fundamentally influences the dynamics of inflation. Controlling inflation during short-term business cycles is also vital for optimizing monetary policy, especially during an increasingly complex market volatility.

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Appendix

Appendix 1. Literature Matrix

No	Reference	Objectives	Method	Variables	Findings
1	Astrayuda, I., Saraswati., Martami, M. M., Lestari, A. L., Rasyid, A. (2020). Evaluasi Komunikasi Bank Sentral Dalam Mengelola Ekspektasi Inflasi. Bank Indonesia.	Evaluating the dynamics of inflation expectations and the effectiveness of Bank Indonesia's policy communication	Quantitative RCT (Randomized Controlled Trials)	Inflation expectations, policy interest rates	Inflation expectations based on surveys generally anchor around the inflation target and align well with realized inflation; changes in policy interest rates communicated through RDG press releases significantly influence changes in inflation expectations. Press releases as a policy communication tool also indicate a strengthening effect on interest rate transmission.
2	Sahminan., Kusuma, A. C. M. (2019). Transmisi Kebijakan Moneter Melalui Jalur Kredit Perbankan (Bank Lending Channel). Bank Indonesia.	Exploring the historical effectiveness of monetary policy transmission in Indonesia through the banking lending channel	Quantitative Vector Autoregression	Policy interest rates, credit, GDP	(Inflation expectations based on surveys generally anchor around the inflation target and align well with realized inflation; changes in policy interest rates communicated through RDG press releases significantly influence changes in inflation expectations. Press releases as a policy communication tool also indicate a strengthening effect on interest rate transmission.
3	Budiman, A. S., Mochtar, F., Sahminan, S. (2019). Overview Transmisi Kebijakan Moneter di Indonesia. Departemen Kebijakan Ekonomi dan Moneter Bank Indonesia.	Providing a comprehensive overview of the evolution and effectiveness of monetary policy in Indonesia since the 1990s	Literature review	Policy interest rates, credit, GDP, exchange rates	Policy interest rate increases impact a decrease in credit growth, GDP growth, and inflation; the transmission of the Rupiah exchange rate to inflation decreases, especially after the global financial crisis in 2008.

No	Reference	Objectives	Method	Variables	Findings
4	Bathaluddin, M. B., Dalawati, M., Mochtar, F. (2019). Transmisi Kebijakan Moneter Indonesia Melalui Jalur Suku Bunga. Departemen Kebijakan Ekonomi dan Moneter Bank Indonesia.	Comparing and contrasting the economic trajectories of four distinct periods in Indonesia from January 1991 to March 2019	Quantitative SVAR and TVC-VAR	Policy interest rates, deposit interest rates, loan interest rates	The policy implication for Bank Indonesia to effectively maintain price stability (inflation) is the existence of fiscal backing in the form of fiscal policy playing a role in keeping government spending proportional to the existing government debt conditions. These findings indicate the need to consider the attractiveness of domestic assets when deciding on monetary policy, in addition to the primary aspects of inflation and output.
5	Harahap, B. A., Bary, P., Idham., Kusuma, A. C. M., Rakhman, R. N. (2017). Perkembangan Financial Technology terkait Central Bank Digital Currency (CBDC) terhadap Transmisi Kebijakan Moneter dan Makroekonomi. Bank Indonesia.	Investigating the implications of Fintech, with a focus on Central Bank Digital Currency (CBDC), for monetary policy transmission and the broader macroeconomic landscape	Quantitative CGE	Central Bank Digital Currency (CBDC), deposit interest rates, policy interest rates	Implementation of CBDC with direct access mechanisms can increase deposit interest rates; monetary policy transmission through the interest rate channel appears to be more sensitive after CBDC implementation.
6	Wimanda, R. E., Maryaningsih, N., Nurliana, L., Satyanugroho, R. (2014). Evaluasi Transmisi Bauran Kebijakan Bank Indonesia. Bank Indonesia, 1–10.	Analyzing the mechanisms through which Bank Indonesia's policies are transmitted to the economy, with emphasis on achieving inflation targets	Quantitative Structural VAR and dynamic panel data	Policy interest rates	Monetary policy can influence inflation with an 18-month lag; the interest rate channel seems to be the most dominant in transmitting monetary policy to inflation. Macroprudential policy tightening does not appear effective in influencing inflation targets.
7	Santoso, W., Iskandar, D., Trenggana, R. A. (2013a). Dampak Inovasi Sistem Pembayaran Terhadap Transmisi Kebijakan Moneter di Indonesia. Bank Indonesia	Examining how payment system innovation influence the economy and contribute to changes in price levels	Quantitative Cointegrating Structural VAR	GDP, PUAB interest rates, payment system innovations	Payment system innovations have a positive impact on the economy, reflected in increased economic activity, reduced prices, and decreased short-term PUAB O/N interest rates.

No	Reference	Objectives	Method	Variables	Findings
8	Kusuma, I. W. (2013). The Dynamics of Indonesian Inflation: What can We Learn from Inflation Disaggregation? Buletin Ekonomi Moneter dan Perbankan, 16(1), 39–72. https://doi.org/10.21098/bemp.v16i1.437	Providing an indepth analysis of price behavior in the Indonesian context, highlighting factors influencing pricing dynamics	Quantitative Factor Augmented Vector Auto Regression (FAVAR)	Policy interest rates	Interest rate shocks have diverse effects on price behavior in Indonesia in terms of magnitude, direction, and speed; the adoption of ITF has weakened the "price puzzle."
9	Depari, Y., Prastowo, N. J., Nurmalia, I. (2009). Perilaku Pembentukan Harga Produk Manufaktur dari Sisi Produsen, Distributor dan Pengecer (Working Paper No. WP/18/2009). Bank Indonesia.	Understanding the behavior of price formation within the manufacturing sector	Descriptive and quantitative binary logit	Loan interest rates, exchange rates	Changes in producer-level prices are influenced by credit interest rates, while price determination at the distributor level is influenced by exchange rates.
10	Nugroho, W. A. (2007). Dampak Perubahan Kondisi Makro Ekonomi terhadap Anggaran Pendapatan dan Belanja Negara (Working Paper No. WP/20/2007). Bank Indonesia.	Outlining the construction of a straightforward static model for the national budget to provide foundational insights into budgetary dynamics	Quantitative OLS	Interest rates, exchange rates, fiscal budget (APBN), global oil prices	A $1 increase in oil prices per barrel reduces the state budget deficit by around Rp1.3 trillion; short-term inflation reduction, increased interest rates, and exchange rate depreciation can decrease the budget deficit. A Rp100 per USD exchange rate depreciation in the short term will increase the budget deficit by around Rp1.1 trillion.
11	Nugroho, W. A., Mochtar, F. (2006). Suku Bunga Natural di Indonesia: Temuan Awal dan Beberapa Analisis Lanjutan. Bank Indonesia.	Exploring methodologies for measuring the Natural Rate of Interest (NRI) and its alignment with the goal of maintaining stable inflation	Quantitative Structural VAR	Natural interest rates, policy interest rates, core inflation	Monetary policy tends to be tight, and the natural interest rate (influenced by the BI rate) affects inflation, playing a crucial role in controlling core inflation.

No	Reference	Objectives	Method	Variables	Findings
12	Hamdani, R. A. (2003). Pengaruh Aliran Modal Swasta Jangka Pendek Terhadap Perubahan Nilai Tukar Rupiah dan Laju Inflasi Di Indonesia Periode 1990.I – 2000.Iv. Buletin Ekonomi Moneter dan Perbankan, 6(1), 12–33. https://doi.org/10.21098/bemp.v6i1.321	Investigating the interconnectedness between shortterm private capital flows and factors influencing exchange rates and inflation rates	Quantitative Two Stage Least Squares (TSLS)	Exchange rates, private capital, policy interest rates, GDP	The Rupiah exchange rate is significantly influenced by inflation rate; inflation rate is significantly influenced by short-term private capital flows, changes in exchange rates, and Bank Indonesia certificate interest rates. Real GDP changes significantly affect inflation but have an opposite direction to existing theories, possibly related to public pessimism about future inflation.
13	Nugroho, P. B., Prakoso, R. D., Suryanto, H., Triswati, F. I. (2003). Prosedur Operasional Pengendalian Moneter Berbasis Suku Bunga Dalam Rejim Inflation Targeting. Direktorat Pengelolaan Moneter Bank Indonesia, November.	Discussing the operational aspects of monetary control, particularly in the context of implementing FullFledged Inflation Targeting (FFIT)	Technical paper	PUAB interest rates	Using PUAB O/N interest rates as the operational target can early respond to any information that can affect inflation pressure.
14	Laksmono, D., Suhaedi, S., Kusmiarso, B., I, A., Pramono, B., Hutapea, E. G., Pambudi, S. (2000). Suku Bunga Sebagai Salah Satu Indikator Ekspektasi Inflasi. Buletin Ekonomi Moneter dan Perbankan, 2(4), 123–150. https://doi.org/10.21098/bemp.v2i4.283	Identifying interest rate indicators that effectively explain movements in inflation expectations	Descriptive analysis and quantitative OLS	Deposit interest rates, policy interest rates, inflation expectations	Deposit interest rate spreads of 12 with 1 month, 12-month deposit spreads, and 1-month SBI spreads, as well as 12-month deposit interest rate spreads with 3 months, have the ability to explain inflation expectations, although the model is not yet usable for projecting inflation expectations.
15	Zulverdi, D., Haryono, E., Pratomo, W., Nugroho, W. A. (2000). Operasi Pengendalian Moneter Yang Berbasis Suku Bunga Dalam Mencapai Sasaran Inflasi. Buletin Ekonomi Moneter dan Perbankan, 3(3), 1–80.	Formulating an operational framework for monetary policy during crisis periods in preparation for full-fledged interest rate based monetary	Studi literatur	Policy interest rates	Increased interest rate volatility tends to raise the inflation rate. This strengthens the argument for implementing interest rate-based monetary policy in times of crisis.

No	Reference	Objectives	Method	Variables	Findings
	https://doi.org/10.21098/bemp.v3i3.299	policy implementation			
16	Arifin, S. (1998). Efektifitas Kebijakan Suku Bunga Dalam Rangka Stabilisasi Rupiah Di Masa Krisis. Buletin Ekonomi Moneter dan Perbankan, 1(3), 1–26. https://doi.org/10.21098/bemp.v1i3.174	Assessing the effectiveness of highinterest rates in achieving intended outcomes, specifically in strengthening exchange rates and mitigating inflation.	Analisis deskriptif	Interest rates, core inflation	In normal periods, the majority of inflation components come from the supply side (around 70%), while demand side components controllable by monetary authorities (core inflation) account for only about 30%; an effective increase in interest rates can control core inflation but is not effective in suppressing noise inflation.