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The Concept of Threshold Inflation and How Threshold Inflation Relates to Economic Growth

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Abstract: The relationship between inflation rate and economic growth has resulted in their correlation becoming a subject in an extensive body of empirical and theoretical studies. Many studies have focused on how inflation relates to positive or negative growth. A gap exists in the threshold value beyond which this correlation works. The study fills this gap by using the threshold model to understand a threshold value beyond which inflation negatively impacts economic growth. The research examines the positive and negative associations between inflation and economic growth, the significant threshold value of the inflation rate beyond which it adversely affects growth, and the variation of threshold value and impact across different countries and economies in different developmental stages. The method involves analyzing secondary sources to establish a theoretical framework on the negative relationship between inflation and economic growth and an empirical framework on the relationship between high and low inflation rates on economic growth and threshold values and their impact on economic growth. The method also involves examining practical examples as a strategy to show that there is a variation in inflation threshold value. The concept of threshold inflation shows that there is a value beyond which an economy of a certain country, irrespective of developmental stage, negatively affects economic growth.

Keywords: inflation, threshold value, inflation threshold, economic growth, threshold model

1. Introduction

The Covid-19 pandemic forced many countries to close their economies as a strategy to adhere to public health guidelines that required people to social distance, and the ongoing war in Ukraine has resulted in downward economic swings that have led to many countries experiencing high inflation since late 2021. Many economists are concerned about the short-term and long-term implications of these high inflation rates on these countries' economic growth. This is because economists believe high inflation rates are associated with low or detrimental economic growth. Economists point out that in times of economic stress, countries should strive to maintain low, moderate, and stable inflation, as this can help sustain or promote economic growth and development [1]. A low or moderate inflation rate achieves this by enhancing investments, supplementing return on savings, and accelerating a country's economic growth. Hence, the link between the rate of inflation and economic growth has become the subject of an extensive body of theoretical and empirical studies. However, despite the importance of this correlation, many studies have mainly focused on the relationship

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between inflation and positive or negative economic growth. A gap exists in understanding a threshold level or value beyond which the effect of inflation becomes negative and a range within which it becomes positive. Therefore, the current study focuses on filling the gap by using a threshold model to understand a threshold value above which inflation hurts economic growth. This is because threshold value refers to the number or value beyond which the net costs begin to exceed the cost-benefit [2]. Overall, the study fills the gap by analyzing practical examples and empirical evidence and using the examples to examine and analyze the effect of threshold inflation on economic growth.

The study approaches these research topics by analyzing secondary sources that research how inflation rates correlate to economic growth.

The study contributes to the existing literature on how threshold inflation relates to economic growth and helps stimulate further research on the topic.

2. Theoretical Literature

The theoretical foundations of inflation and the rate of growth follow the models or theories of economic growth. The theories help economists establish how the rate or value of inflation correlates to economic growth [3]. The theories include;

2.1. Classical Growth Theory

The theory revolves around a supply-driven growth model linked to capital, land, and labor [3]. It links income distribution as an important factor in determining an economy's growth rate. Despite focusing on income distribution and its correlation to economic growth, the theory does not explicitly outline how economic growth connects to inflation. However, the theory implicitly shows that the variables have a negative correlation as it outlines that higher wage costs play a primary role in reducing a firm's profit margin [3].

2.2. Keynesian Theory

The theory outlines the relationship between inflation and economic growth by focusing on the aggregated demand and supply framework. It suggests that although in the short run, changes in output affect the level of inflation, the two variables do not correlate in the long run [3]. The theory recommends that countries must strive to hold output at a natural rate if they want to achieve a steady inflation rate because inflation will always fall when the output is below this rate [3]. Therefore, in the short run, there is a range within which output and inflation level influence each other.

2.3. Monetarist Theory of Inflation

The theory links inflation to economic growth by emphasizing the role of monetary growth in determining the inflation rate. It states that inflation happens when the output growth is lower than the growth in the money supply [3]. As a result, the theory establishes that in the short run, inflation level or rate affects growth by influencing money growth.

2.4. Neo-classical Theory

The theory establishes a correlation between inflation and economic growth by showing how inflation affects growth through investments and capital investments. It suggests that inflation has a negative, positive relationship or no effect on the output level [3]. However, despite these variations in how inflation affects the level of output, the theory helps establish that inflation correlates to economic growth.

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3. Empirical Literature

From an empirical perspective, the correlation between economic growth and inflation gives rise to different results based on factors like the country involved in the study, the method used, and the data period [3]. However, in the current study, the empirical studies help show that inflation correlates to economic growth and help establish a link between the threshold inflation value and its implication on economic growth.

3.1. The Relationship Between Inflation and Economic Growth

Many empirical studies have examined the relationship between inflation and economic growth. For instance, one such study is by Kormendi and Meguire [4]. The study used a sample size of 47 countries, a panel data period from 1950 to 1977, and a cross-country methodology. The study showed that inflation has a negative correlation with economic growth. It found that when inflation increased by 1%, it resulted in a 0.57% decrease in gross domestic product growth. The second empirical study that established this link was a study by Barros that revolved around a sample size of 100 countries, a panel data period between 1960 to 1990, and used the Instrumental Variable (IV) estimation methodology [5]. The study established a negative correlation between inflation and economic growth. It found that when inflation increased by 1%, there was a 0.02% decrease in economic growth. This finding was further affirmed by a study by Motley [6], who used a sample size of 100 countries, a panel data period between 1960 to 1990, and a cross-country methodology to find that when inflation decreased by 5%, there was a 0.1% to 0.5% increase in economic growth.

3.2. Threshold Inflation Value and Impact on Economic Growth

Different empirical studies have researched the threshold inflation value of different countries and economies and established their impact on economic growth. One such study is an empirical study by Sarel that revolved around a sample size of 87 countries, a panel data period between 1970 to 1990, and used a nonlinear [7]. It found that the threshold inflation value was 8% and that the impact of inflation on economic growth was inconsequential below this value. Bruno and Easterly carried out a similar empirical study examining the threshold inflation value and its impact on economic growth using a sample size of 26 countries, a panel data period between 1960 and 1992, and a cross-sectional data model [8]. The study found an average threshold inflation value of 40% for these countries, beyond which the economic growth deteriorated. However, the study stated that the inflation-growth relationship below this value is inconclusive.

Unlike earlier studies, recent studies have focused on examining a clearer picture of the relationship between the threshold value and economic growth using data from different countries' developmental stages. One such study is a Kremer, Nautz, and Bick that focused on a sample size of 76 developing and 48 developed countries, a panel data period between 1950 to 2004, and used a dynamic panel threshold model [9]. The study found that the threshold inflation value for developing countries was 17.2%, while that for developed countries was 2.5%. Other studies have focused on using more current data as a strategy to understand the current relationship between the threshold value and economic growth. For instance, a study by Mishchenko, Naumenkova, Mishchenko, and Ivanov [10], that involves a sample size of 158 countries, a panel data period between 2010 to 2017, and uses statistical and economic methods finds that in the global economy, the threshold inflation is 6.0%. The study states that most economies experience a decline or a slowdown in growth beyond this value.

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4. Overview of Literature

The theoretical and empirical literature plays an important role in setting up the practical examples section of the paper by establishing the correlation between economic growth and the threshold inflation value.

4.1. Overview of Theoretical Literature

The theoretical literature does not clearly outline how inflation relates to economic growth. For instance, the classical growth theory only outlines that inflation negatively correlates with economic growth because a rise in wages reduces the firm's profit margin [3]. Conversely, Keynesians state that although, in the short run, changes in output affect the level of inflation, the two variables do not correlate in the long run. Monetarists support this by stating that inflation is affected by money growth but has no long-run effect on economic growth. However, contrary to other theorists, neo-classical theorists state that economic growth and inflation can have a negative, positive, or no relationship at all. One thing that stands out from these economic theories is that despite their differences, the majority of them establish that inflation has a negative correlation to economic growth. This means that when inflation rises, it negatively influences economic growth.

4.2. Overview of the Empirical Literature

From the empirical literature review, despite differences in sample size, methodology, and panel data period between the studies, there seems to be a clear conclusion that specific countries or economies have threshold inflation value beyond which economic growth deteriorates.

5. Practical Examples

Various studies examining the relationship between threshold inflation and economic development have studied practical examples using panel or cross-sectional data methods as a strategy to understand and outline variations of threshold value and impact across different countries and economies in different developmental stages. Hence, the studies fall into two main categories: those that outline variation between developing and developed countries and those that outline variation between different economic regions or economies.

5.1. Developing Versus Developed Countries

Most studies in this category use practical examples to show that the threshold inflation value or range for developed countries is lower than that of developing countries. One of these studies is a study by Khan and Senhadji that examines a sample size of 140 developed and developing countries via a panel data period between 1960 to 1998 using the conditional least squares methods [11]. The study approaches the inflation threshold as nonlinear and nondifferentiable and finds that the threshold level for developed countries ranged between 1-3 percent and for developing countries, 11- 12 percent. Hence, the study concludes that the inflation threshold estimates for industrial countries are much lower than those of developing countries. A similar study by Azam and Khan uses a sample size of 11 developed economies and 16 developing countries, a panel data period between 1975 to 2018, and fixed effects and feasible generalized least squares (FGLS) method [12] to back these findings, shows that for developing countries, inflation impedes growth when it exceeds 12.23% while for developed countries it prevents economic growths when it moves beyond 5.36%. It outlines that these are values of inflation that countries in these developmental stages should strive to avoid as a strategy to mitigate the adverse implications of high inflation on the economy's growth. Therefore, these studies establish a variation between the inflation threshold value of developed and developing countries.

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The variations between developed and developing countries are also found in studies focusing on individual cases. For instance, a study by Rutayisire on Rwanda (a developing country) with a panel data period between 1968-2010 and using a quadratic regression model found that Rwanda has an inflation threshold value of 12.7% [13]. The value is close to the threshold value associated with developing countries in Khan and Senhadji's study [11] and Azam and Khan's study [12]. However, both developing and developed countries are at different developmental stages. Hence, developing countries have inflation threshold values higher than those of developed countries but lower than those of other developing countries. This becomes apparent in a study by Thanh Tung and Tien Thanh on Vietnam (a developing country) with a panel data period between 1986 to 2013 and using Generalized Method of Moments (GMM), Two-Stages Least Squares (2-SLS), and Ordinary Least Squares (OLS) [14]. The study finds that Vietnam has an inflation threshold value of 7%. Similarly, a study by Kusumatrisna, Sugema, and Pasaribu on Indonesia (a developing country) with a panel data period between 1994 to 2019 and using a linear model finds that Indonesia has an inflation threshold value of 9.59% [15]. The two studies establish that even in economies in the developing economic stage, countries have different inflation threshold values that reflect their economist state. Similarly, this finding also applies to developed countries. For instance, a study by Chu, Sek, and Ismail on 18 developed countries with a panel data period between 1980 to 2016 and using the dynamic panel threshold regression model found that the inflation threshold value of developed countries ranges between 2% and 4% [16]. Hence, those in the 4% range mainly strive to promote economic development by having their target inflation value as 2%. This is because the study finds that the decision of many central banks to reach an inflation rate of 2% is always wise as growth in such a lower inflation rate is always "positive and statistically significant at the 5% level" [16].

5.2. Different Economic Regions or Economies

Other studies use practical examples to show threshold inflation value varies between different economic regions or economies. For instance, a study by Thanh on ASEAN-5 countries that uses a panel data period between 1980–2011 and the Panel Smooth Transition Regression (PSTR) model found that countries in this economic group have an inflation threshold of 7.84% [17]. Similarly, a study by Vinayagathasan on Asian economies with a panel data period between 1980–2009 and using the dynamic panel threshold regression model finds that the inflation threshold value of this economic black is 5.43% [18]. Although the two studies use different methods, the variation in the threshold value of ASEAN-5 countries and Asian economies shows that other economies in Asia are doing better economically than ASEAN-5 countries. This outlines why the average threshold value of Asian countries is below that of ASEAN-5 countries. This variation is also explored in other studies. For instance, a study by Ndoricimpa on Africa as an economic zone that utilizes a panel data period between 1970 to 2013 and the dynamic panel threshold regression model finds that the inflation threshold level for these economies is 6.7% [19]. However, the study finds that the inflation threshold of the sub-sample of low-income countries is 9%, while that of middle-income countries is 6.5%.

Therefore, the practical examples in these studies show that although there is variation in the inflation threshold values between different developmental stages, economic regions, or economic blocks, the variations exist among countries or economies encompassed in these economic regions or blocks.

6. Discussion

Based on the findings from the theoretical literature, there is a negative correlation between inflation and economic growth. Hence, this means that when inflation rises, it negatively influences economic growth. This explains why many economists are concerned about rising inflation rates around the

world, despite countries experiencing downturns as a result of COVID-19 and the ongoing Ukraine War. Based on the findings of the empirical literature, it becomes evident that although inflation has a negative correlation to economic growth, there is a threshold value beyond which this impact becomes a reality. However, the practical examples further explore the correlation between economic growth and inflation by showing that although there is a threshold value beyond inflation that has a negative impact on the economy, there is a variation in the threshold value based on a country's developmental stage. The practical examples also show that the correlation between a country's inflation threshold value and economic performance or economic status acerbates the variations. For example, although developing countries have a higher inflation threshold value than developed countries, the variations also happen among developing countries. For instance, although, on average African countries have an inflation threshold value of 6.5% on average, when the inflation threshold value of low-income countries, when calculated individually, stands at 9%, while that of middle-income countries stands at 6.5% [19]. Overall, the variations show that lower inflation rates represent countries doing well economically. Hence, the practical examples recommend economies strive for stable and low inflation, as this can help promote economic growth.

7. Conclusion

The study shows that inflation and economic growth have a negative correlation. However, various empirical studies show that this relationship mainly occurs when the inflation rate exceeds a certain threshold value. The threshold value in developed countries is higher, while that of developing countries is lower. The threshold value also varies between countries with the same developmental levels. For instance, although developing countries have a higher inflation threshold value than developed countries, the value varies. The lower-income developing countries have a higher inflation threshold than middle-income developing countries. However, although the research outlines crucial information on how the inflation threshold value correlates to economic growth and how this differs between individual countries at different economic or developmental stages, more research is needed to understand this relationship. For instance, future studies can improve the paper by outlining some factors contributing to developing countries' higher inflation threshold values than developed countries. The researchers can also improve the paper by explaining how different methodologies influence the relationship and how this might influence the results.

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