Causality Between Stimulated Inflation and Real Economic Growth in Selected International Economies

Dr. Ihab Abbas Mohammed Al- Faisal

University of Basrah /Admin & Economics

Dr.Aqeel Abdul-Hussein Odeh

University of Thi-QarL /Admin & Economics

Dr. ZAHID. Q. BADAN

Admin & Economics AL-Qurna University of Basrah

Abstract :

We studied the three most prominent global economies (the United States of America, China and Japan) to find out the impact of the inflation rate on economic growth or vice versa during the period 1990-2023. The research used the descriptive data analysis method and then relied on the causality test after ensuring that the variables are stable and do not suffer from spurious regression using unit root tests. The experimental examination of the Cranger test in the American economy indicates the existence of a one-way causal relationship from the inflation rate to the economic growth rate, and the value was (5.3) for economic growth.

The Chinese economy was characterized by the existence of a two-way causal relationship from the inflation rate to economic growth, meaning that the inflation rate stimulates economic activity and increases the gross domestic product, and the calculated value of (F) was (4.18) and was called the competitive devaluation of the yuan in global markets through the exchange rate.

The existence of a relationship from the economic growth rate to the inflation rate, and the value of (F) was significant and its value was (5.79), which gives the Chinese economy an advantage. If the economic growth rate increases, the effect of inflation will rebound positively on economic activity.

The empirical outcome of this study can be useful in providing guidance to economic policy makers in developed and developing countries to benefit from the research findings.

Keywords: inflation, economic growth, causality, unit root

1- Introduction0

The inflation rate that causes economic growth is described as the critical path in which price levels are high and stimulate real economic growth, contributing to added value in the economy. This rate expresses the point that achieves balance and prevents economic problems, serving as a catalyst for aggregate demand and encouraging investment. The inflation rate that stimulates economic growth varies from one economy to another and over time, making it a critical and precise path that requires the interaction of fiscal and monetary policy tools toward a unified goal.

Target inflation is a characteristic of contemporary economies that has transformed the economic problem from a weakness into strength and from a threat into opportunity. It is a feature of most industrial economies, despite the different types and natures of inherent economic problems. Therefore, the economic and social objectives and stages of real economic growth processes have varied across the four countries studied and researched.

Therefore, some countries target inflation, as seen in China and the United States of America. In contrast, Japan has not been able to stimulate economic growth through inflation. The rise in the general price level is a problem that affects individuals and families; thus, addressing it must be done with the utmost accuracy and care. Determining the inflation rate that causes economic growth is very important and accurate in each economy in order to be in line with the reality and circumstances of each economy, whether it is developing or advanced, as it depends on the nature of the resources available in it and its ability to absorb the rise in the general level of prices.

It is necessary to reveal the inflation rate that causes economic growth in the selected economies to know the permissible limits in using the inflation rate to activate aggregate demand and stimulate commodity sectors to produce and create added value. The causality test was relied upon to reveal the variable affecting the other and the research results were approved

Hypothesis: The research was based on the following hypothesis:

1- Inflation stimulates economic growth by increasing supply in commodity sectors

2- Inflation causes a decline in economic growth due to a decline in the overall demand for goods and services.

Study Problem: The study problem is framed by the following questions:

1. Is there a significant relationship between inflation and economic growth?

2. Is the causality relationship between inflation and economic growth bidirectional, unidirectional, or no causality relation?

2- Literature Reviews

Several studies have been seen in different economies, some of which show the relationship between inflation and economic growth. which is consistent with classical economic theories in that there is a negative relationship between inflation and economic growth **(Ireland, 2014)**. There is also a positive correlation between inflation and short-run economic growth in the Keynesian model. Most European economies have

faced a new phenomenon of simultaneous inflation and unemployment, with some achieving economic growth **(Yelwa, David, & Awe, 2015)**. This research also showed that the inflation rate is higher than normal (4%) according to Friedman's vision, as it has negative effects on GDP over a period of time in the short and long run **(Fix, 2023)**.

This research is concerned with the relationship between economic growth and inflation for three Asian countries during the period 1980-2010. The methodology used in the study is cointegration and causality testing. Granger causality test was also conducted to explore the short-run dynamics of the relationship between the variables and determine the direction of causality **(Dinh, 2020).** The results reveal a negative and significant long-run relationship between economic growth and inflation in Sri Lanka. While no statistically significant relationships were found between the variables in China and India, the causality reveals a one-way causality from economic growth to inflation in China **(Datta & Mukhopadhyay, 2011).**

Many studies have attempted to explain the causal relationship between inflation and economic growth, and the results have been somewhat inconsistent. In East African countries, a causal study was conducted between inflation and economic growth, focusing on time series analysis. The study failed to explain the exact relationship between inflation and economic growth in the region. The study was based on the Solow growth model and used a correlation research design in conclusion, inflation negatively and significantly impacts economic growth **(Erbaykal & Okuyan, 2008; Nyenyia, Amlegab, & Scholasticac, 2017).**

Inflation can be a double-edged sword. At a certain level called the "Inflation Threshold", it is an incentive, but once it exceeds this threshold, it works inversely with a negative impact on economic activity. The problem of inflation according to the structural school arises in countries where aggregate demand is increasing and there is no productive apparatus that responds to the development of aggregate demand, because the main reason is due to real imbalances in the economic structure and how to distribute resources and how to exploit them **(Roncaglia de Carvalho, Ribeiro, & Marques, 2018).**

The research dealt with the impact of the exchange rate and inflation rate on development growth, considering oil prices as an independent variable affecting economic growth, based on the ARDL methodology, and trying to find the impact of oil shocks on economic activity.

3- Method

This study looks at a group of advanced economies to try to find out the nature of the relationship between the rate of inflation and economic growth, and to indicate the inflation rate that causes economic growth, if this exceeds a certain limit for each economy that is harmful to economic growth. The time period (1990-2023) was chosen because it witnessed sharp economic fluctuations and stifling political crises. This manuscript includes the study of causality between two variables (Rate of Inflation and Economic Growth represented by GDP) in three advanced economies with different economic systems, such as the United States of America, which represents a

market economy, China, which represents a centralized (Socialist) oriented system, and Japan, which represents a mixed economy between a market system and a centralized system. The study also uses the Granger Causality test, which begins with finding the unit root test for variables and then finding the causality test.

4- Relationship between Economic Growth and Inflation

Major global economies faced a range of challenges that affected their economic performance, including the high general level of prices, global financial crises, fluctuations in crude oil prices and the interruption of supply chains due to (COVID19), political crises, including the Russian-Ukrainian crisis, and the imposition of urbanization on Russian imports, which created supply-side difficulties to meet high consumer demand. There was also a state of uncertainty that was directly reflected in macroeconomic indicators, including fluctuations in the general level of prices and the decline in real economic growth in the countries under study **(Izzeldin, Muradoğlu, Pappas, Petropoulou, & Sivaprasad, 2023)**.

Researchers believe that the concept of the inflation rate that stimulates economic growth is a relative standard that cannot be determined by a specific rate, but rather varies from one economy to another and can be discovered by simply studying the causal relationship between the inflation rate and economic growth. Inflation occurs in advanced industrialized countries as a result of internal changes in the composition of aggregate demand, in addition to the existence of economic sectors in which wages and prices are flexible to rise and inflexible to fall. It also requires flexibility in the supply of these resources, which is a condition that is difficult to achieve in developing economies, which leads to prices remaining high even in the event of a decline in aggregate demand. If there is an increase in aggregate demand in a particular sector, this is reflected in the rest of the sectors, creating a spiral of inflation **(Yigit, 2010).**

4-1 United States of America

Major global economies have experienced varying degrees of economic recovery according to structural characteristics and their fiscal and monetary policy has differed in dealing with different inflation rates. In the United States, shown in Table (1) and Figure (1), it indicated a decline in the growth rate from (3.7) in (1990) to (4.3) in (1998). At the same level, the two variables began to decrease during the period (2008-2015), and then both increased for the remainder of the study period except for (2019, 2020), so the researchers note that low inflation is the problem of the times, as stated by the President of the US Federal Bank **(Hobijn & Lagakos, 2005).**

It is expected that inflation was targeted in advanced industrial countries to create a competitive advantage for the exporting country with the importing countries, but what worries the American economic policymaker is that inflation has leaked into the basic components of price indicators and reset the price expectations of the public and pushes them to demand higher wages. This dynamic is known as the wage and price spiral, which is linked to the flexibility of supply chains and their return to normal in the US **(Storm, 2024).**

What distinguishes the US economy from others is the ability to deal with financial and political crises. It also enjoys financial abundance and the use of the policy of Money Helicopter with the economic recession in order to stimulate aggregate demand with the presence of the inflation rate that stimulates economic growth (**Baumeister & Peersman, 2013**).

Table: 1

Inflation Rate and Real Economic Growth Rate in the United States of America

Year	1990	1992	1994	1996	1998	2000	2002	2004	2006
AGDP	3.7	3.9	4	3.6	4.3	3.7	2.2	3.1	2.7
AINF	6.1	2.3	2.6	2.9	1.6	3.4	1.6	2.5	3.2
Year	2007	2009	2011	2013	2015	2017	2019	2021	2023
AGDP	-0.4	2.5	2.3	2.4	1.6	2.9	-2.8	2.1	3.2
AINF	2.2	1.6	2.1	1.6	1.3	2.4	1.3	8	8.4

[https://www.amf.org.ae/ar/publications/altqryr-alaqtsady-alrby-almwhd/altqryr-alaqtsady-alrby-almwhd 1994](https://www.amf.org.ae/ar/publications/altqryr-alaqtsady-alrby-almwhd/altqryr-alaqtsady-alrby-almwhd)-1998- 2004-2010-2015-202——2023

Figure: 1

Inflation Rate and Real Economic Growth Rate in the United States of America
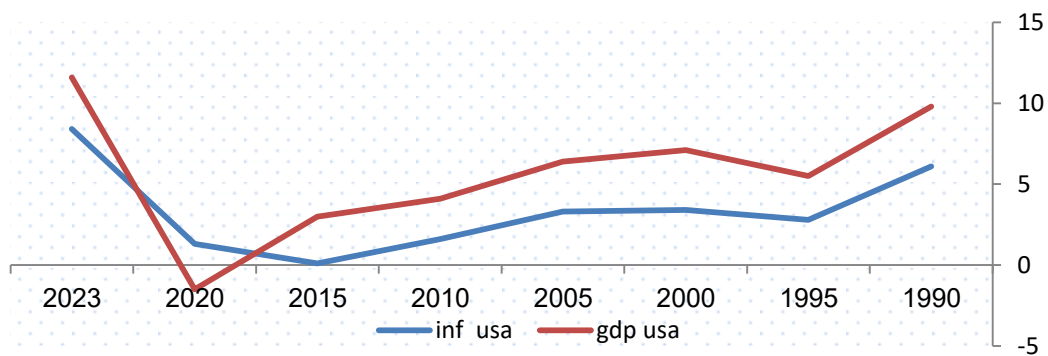
4-2 Japan

The Japanese economy has been characterized by a slow and fluctuating growth rate in rising and falling, due to a number of reasons, the most important of which is the rise in the value of the Japanese yen, which leads to a rise in import costs and a decline in surpluses in the Japanese trade balance (**Jorgenson & Motohashi, 2005**). The inflation rate in Japan is close to zero and some years have been negative, contrary to the nature of the inverse relationship between the two variables. This is due to the growth of household consumption, which increases when the inflation rate decreases and aggregate demand increases and thus positively affects GDP. Table (2) and Figure(2) show that the inflation rate is (1.4) in (1990), and the real

economic growth rate is (0.9). Then the inflation rate decreased to (0.9) in (2002), which led to a rise in the economic growth rate to (2.6). The inflation rate continued to decrease to (0.1) in (1996), accompanied by a significant increase in the real growth rate to (5). When the inflation rate rose to (1.7) in (1997), the real growth rate decreased to (1.6). Japan also achieved reversibly fluctuating growth with the inflation rate during the study period. It was found that Japan maintained stable inflation rates and real economic growth because its economy is characterized by stability and near full employment, and the presence of flexible productive commodity sectors that can respond to changes in the overall economy. However, the high fuel costs during the political crises in the Middle East and the political crisis between Russia and Ukraine **(Khoma & Nikolaieva, 2023)**, which negatively affected GDP. During the last years of the study, the growth rate was (-4.3) in 2020 due to Covid-19, followed by the war between Russia and Ukraine. The pressure on the Japanese economy also reduced the opening of doors to foreign tourists and raised the maximum number of arrivals. The result was positive, so the growth rate rose to (2.1) in 2021.

One of the substantive issues in international relations affecting economic growth is the nature of Japan-Russia bilateral relations and the factors affecting them, which is conditional on their rapid change under the influence of new global security challenges and the situation in trade partner countries**(Χιώτη, 2023).**

The negative effects on Japanese-Russian relations emerged after the Russian-Ukrainian crisis through investments in Japanese information technologies, which led to a change in foreign policy and security strategies, due to the actions of China and North Korea, which led to a change in Japanese foreign and security policy. Japanese-Russian relations have also deteriorated significantly. Many problems have arisen as a result of the different positions of Russia and Japan towards other countries, as well as the emergence of problems that go beyond narrow bilateral relations but affect them because of the global interdependence between modern countries, which made the effects of the crisis negative on real economic growth in Japan**(Al-Saadi, 2023)**.
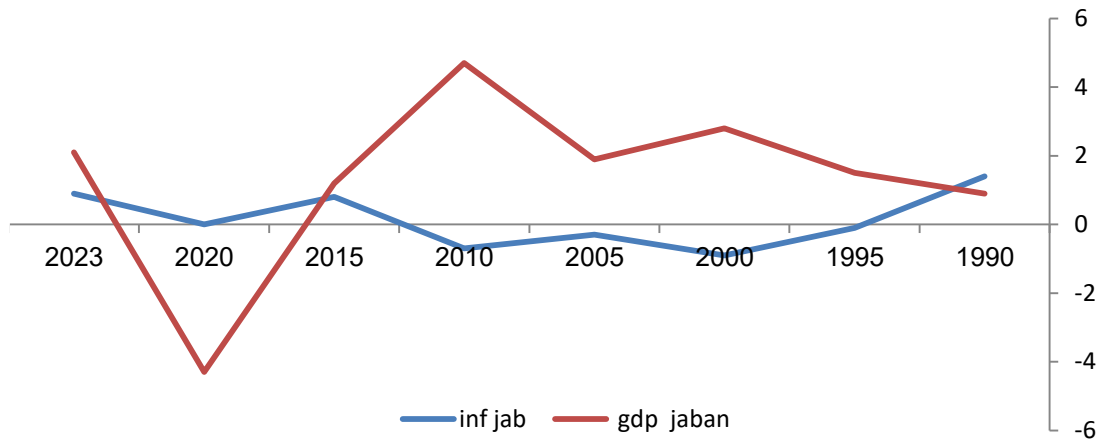
Table: 2

Japan's Inflation Rate and Economic Growth Rate

Year	1990	1992	1994	1996	1998	2000	2002	2004	2006
AGDP	0.9	2.6	0.6	5	-2.5	2.8	-0.3	2.5	2
AINF	1.4	0.9	0.7	0.1	0.6	-0.9	-0.9	-0.2	0.3
Year	2007	2009	2011	2013	2015	2017	2019	2021	2023
AGDP	-1.2	4.7	1.8	-0.1	0.5	0.6	-4.3	1.1	2.1
AINF	1.4	-0.7	0	2.7	-0.1	1	0	0.3	0.9

https://www.amf.org.ae/ar/publications/altqryr-alaqtsady-alrby-almwhd/altqryr-alaqtsady-alrby-almwhd 1994-1998- 2004-2010-2015-202——2023

Figure 2:Japan's Inflation Rate and Economic Growth Rate

4-3 China

This study aims to investigate the relationship between inflation and real economic growth in China from 1990 to 2023, where the data is an annual time series, as it is clear from the rates that the inflation rate in the future is positively related to real economic growth, and the competitive devaluation of the Chinese Yuan leads to inflation within the Chinese economy, at the same time it achieves the goal pursued by the Chinese government to increase the competitiveness of Chinese goods exported abroad, at the same time imported goods from abroad are more expensive than their manufactured counterparts within the Chinese economy, and the rapid increase in investment would lead to inflation in the future **(Xiao, 2009)**. China has used a special policy by using the exchange rate to influence domestic production by relying on its industrial sector **(Rifami, 2023)**.

Successive annual economic growth rates and China's large contribution to GDP have made China the second largest economy in the world **(Barboza, 2010)**. Therefore, it is necessary to study this economy and identify its nature and how to face the economic and political crises, through the data of Table (3). It was found that the inflation rate was (3.1) in (1990) and that the economic growth rate was (3.9) and then the inflation rate rose to (6.4) in (1992) and the economic growth rate doubled to (14.2) in the same year, and then the inflation rate rose to (24.3) in (1994) with a level of great pressure on monetary policy in China, which led to a slight decline in economic growth to (13). The inflation rate affected economic growth at a lower level than the change in the inflation rate through what the government earns from revenues to issue the Yuan at higher rates of money supply growth. This measure attracts more labor to the government and the banking sector, thus reducing profits for the private sector due to the effect of government displacement, when the government maintains a larger

363

percentage of revenues, the effect of government displacement and slowing inflation from growth **(He & Zou, 2016)**.

In (1996), the inflation rate decreased to (8.3) and the economic growth rate decreased to (9.9), and it continued to decrease in the inflation rate to (3.8) and the economic growth rate increased to (10.1), and the real economic growth rate continued to rise to (14.2) when the inflation rate was (4.8) in (2007), so the Chinese economy reached real economic growth rates with high inflation rates, and the economic growth rates continued at high levels without being affected by the inflation rate in the economy. This means that the economy has the ability to adapt to the rise in prices because there are sectors that have sufficient flexibility and competitiveness in entering global markets and almost complete control over the markets of trading partners. Foreign direct investment has an impact on GDP in (2010) was greater than that in (2005), and production in the Chinese sector contributes to a greater percentage than the rest of the sectors. This is due to the role of human capital and the interactive effects between foreign direct investment and human capital, because the average annual inflation rate of (3.8) in the study data, it explains an average economic growth rate of (8.7), if The estimated impact of inflation on economic growth has been significant in the Chinese economy in the past three and a half decades **(Zhang, 2014)**.
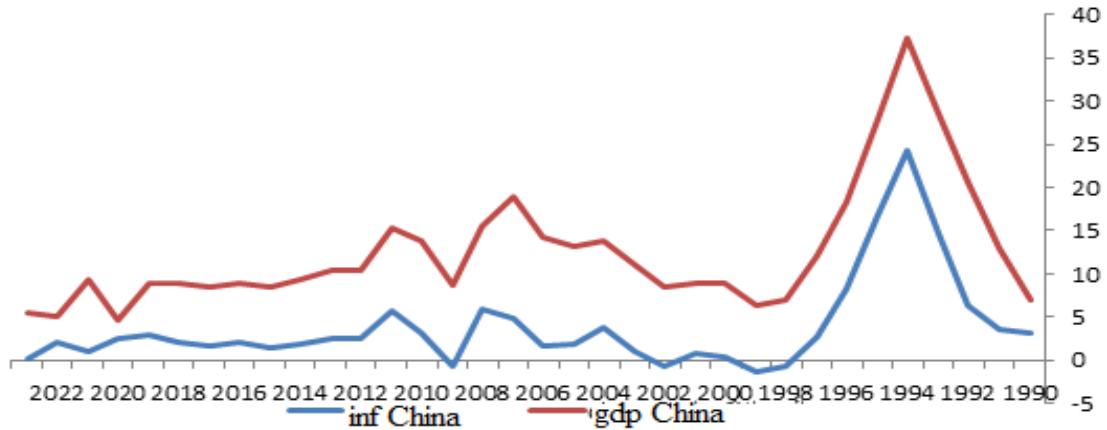
Table: 3

China's Inflation Rate and Real Economic Growth Rate

Year	1990	1992.	1994	1996	1998	2000	2002	2004	2006
AGDP	3.9	14.2	13	9.9	7.8	8.5	9.1	10.1	12.7
AINF	3.1	6.4	24.3	8.3	−0.8	0.3	-0.7	3.8	1.6
Year	2007	2009	2011	2013	2015	2017	2019	2021	2023
AGDP	9.7	10.6	9.7	7.4	6.8	6.7	2.2	3	5.2
AINF	5.9	3.2	2.6	1.9	2	2.1	2.4	2	0.2

https://www.amf.org.ae/ar/publications/altqryr-alaqtsady-alrby-almwhd/altqryr-alaqtsady-alrby-almwhd 1994-1998- 2004-2010-2015-202—2023

Figure: 3

China's Inflation Rate and Economic Growth

5- Estimating the causality between Inflation and Economic Growth

The estimation of causality is one of the important standard tests that provide a convincing answer to the question of cause, cause, cause and effect in the light of economic theory by relying on standard tests **(Hsiao, 1979)**.The Causality test shows an ancient philosophical question that is very accurate and requires great effort in order to decipher its symbols by descriptive analysis, as humans believe that everything is the cause of everything. Causality is a concept of the state of the known variable followed by another variable, between which there is a succession of occurrences within a specified period **(Lopez & Weber, 2017)**. The relationship between the two variables is known as the first cause and the second cause. The test is used to determine the type and nature of relations between economic variables (Inflation Rate and Real Economic Growth Rate). Economic variables move either in an agreeable or opposite direction to indicate the nature of the variables and the extent of their impact and impact on each other. One of the most important objectives of causality is to identify the causes of economic problems as a result of changes in the values of observations of the other economic variable over time.

5.1 Unit Root Testing

Table: 4

Unit Root Test Results

UNIT ROOT TEST RESULTS TABLE (ADF)							
Null Hypothesis: the variable has a unit root							
At Level							
		INFJ	GDPJ	INFUS	GDPUS	GDPCH	INFCH
With Constant	t-Statistic	-3.7024	-6.0055	-2.5849	-4.9999	-1.6993	-3.0880
	Prob.	0.0087	0.0000	0.1064	0.0003	0.4220	0.0383
		***	***	n0	***	n0	**
With Constant & Trend	t-Statistic	-3.6206	-6.1055	-2.1675	-5.4160	-3.2597	-3.3764
	Prob.	0.0433	0.0001	0.4906	0.0005	0.0913	0.0737
		**	***	n0	***	*	*
Without Constant & Trend	t-Statistic	-3.4336	-5.0403	0.4915	-1.4253	-0.7685	-2.7233
	Prob.	0.0012	0.0000	0.8158	0.1407	0.3754	0.0082
		***	***	n0	n0	n0	***
At First Difference							
		d(INFJ)	d(GDPJ)	d(INFUS)	d(GDPUS)	d(GDPCH)	d(INFCH)
With Constant	t-Statistic	-6.4705	-6.8236	-5.2651	-9.8963	-7.2614	-3.6730
	Prob.	0.0000	0.0000	0.0002	0.0000	0.0000	0.0099
		***	***	***	***	***	***
With Constant & Trend	t-Statistic	-6.4291	-6.7374	-5.7761	-9.7545	-7.1884	-3.6062
	Prob.	0.0000	0.0000	0.0002	0.0000	0.0000	0.0462
		***	***	***	***	***	**
Without Constant & Trend	t-Statistic	-6.5777	-6.9445	-5.2903	-10.0573	-7.3633	-4.6059
	Prob.	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
		***	***	***	***	***	***
Notes:							
a: (*)Significant at the 10%; (**)Significant at the 5%; (***) Significant at the 1% and (no) Not Significant							
b: Lag Length based on SIC							
c: Probability based on MacKinnon (1996) one-sided p-values.							

Table: Search results

5-2 Mathematical Model for Granger Model Test Causality

Causality test means that if a change in a variable such as (A) occurs before the change in variable (B), then variable (A) may be the cause of variable (B), so it is not expected that $_{variable}$ (B) causes the change in variable $_{(A)}$, meaning that changes and events in the past are likely to be the cause of the present events, while events that occur in the future cannot affect the above. The Granger test is used to reveal causality as a quantitative criterion to reveal the nature of causality, which is based on the dynamic (integrative) functional relationship between the two variables in time series. It is used to ensure that there is a feedback back relationship, or an implicit or apparent reciprocal relationship between two variables such as inflation and real economic growth **(Ammar, 2022).**

If the economic growth (GDP$_t$) and the inflation rate (INF$_t$) are similarto the growth and in the two variables over time (t), then the test includes the following two equations **(Christiano & Eichenbaum, 1986):**

$$GDP_t = \sum_{t=1}^{n} \alpha INF_{t-1} + \sum_{j=1}^{n} \beta GDP_{t-j} + U_{1t} \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots 4$$

$$INF_t = \sum_{t=1}^{n} \alpha GDP_{t-1} + \sum_{j=1}^{n} \beta INF_{t-j} + U_{2t} \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots 5$$

Random variables ($U_{1t}\, U_{2t}$) are not correlated with each other, so economic growth is attributed to itself, and inflation as shown in Equation (1), and inflation can be equated in terms of economic growth as in Equation (2). The decline in the rate of inflation is attributed to itself in addition to the rate of economic growth, and through the two equations we notice two cases of causality test (Causality) as in the table for each country separately:

5- 3 United States of America

Table (5) shows the Granger causality test for the model variables in two directions, as the Granger test indicates that there is a causal relationship in one direction, as the time series expressed the growth and in the various economic variables in the US economy during time (t), where the research represented both the rate of economic growth and the rate of inflation. Through the test, it was found that the inflation rate (INF$_t$) causes the change in GDP (GDP$_t$). It is noted in Table (5) that the value of (F) calculated is significant (5.306). In orderto test the null hypothesis ($H0: \sum_{i=1}^{P} \psi = 0$), it was found that the causality relationship was one way from the inflation rate (INFt) to the economic growth rate (GDPt), which means that the inflation rate caused a positive impact on GDP.

Table: 5

US Model Causality Test

Pairwise Granger Causality Tests			
Date: 08/22/24 Time: 20:49			
Sample: 1990 2023			
Lags: 2			
Null Hypothesis:	F-Statistic	Obs	Prob.
INFUSA does not Granger Cause GDPUSA	5. 306	32	0.0469
GDPUSA does not Granger Cause INFUSA	1.070		0.3570

 Table: Search results

4. Japan

Table (6) shows the Granger causality test for the model variables in two directions. The Granger test indicates that there is no causal relationship in both directions. During the test, it was found that the inflation rate (INF_t) does not cause and does not cause the change in GDP_t. In order to test the null hypothesis ($H0: \sum_{i=1}^{P} \psi = 0$), it was found that there was no causal relationship (Causality) in both directions, as it is noted from Table (6) that the value of (F) calculated is not significant (1.724, 2.878) for the two variables, respectively, and the probabilistic value is less than (0.05), where it was (0.197. 0.073) for the two variables respectively.

Table: 6

Causality test for Japan model

Pairwise Granger Causality Tests			
Date: 08/22/24 Time: 20:56			
Sample: 1990 2023			
Lags: 2			
Null Hypothesis:	F-Statistic	Obs	Prob.
INFJA does not Granger Cause GDPJA	1.72454	32	0.1973
GDPJA does not Granger Cause INFJA	2.87880		0.0736

Table Search results

5.5 China

Table (7) shows the Granger causality test for the model variables in two directions, where the Granger test indicates that there is a causal relationship in both directions. During the test, it was found that the inflation rate (INF_t) causes and causes the change in the real growth rate (GDP_t), for the purpose of testing the alternative hypothesis ($H1: \sum_{i=1}^{P} \psi \neq 0$), it was found that there is a causal relationship (Causality) that was in both directions, as it is noted from Table(7) that the value of (F) calculated is significant (4.182, 5.799) for the two variables, respectively, and the probabilistic value is less than (0.05), as it was (0.034 0.008) for the two variables, respectively.

Table: 7, China Model Causality Test

Pairwise Granger Causality Tests Date: 08/22/24 Time: 20:50 Sample: 1990 2023			
Lags: 2			
Null Hypothesis:	F-Statistic	Obs	Prob.
INFCH does not Granger Cause GDPCH	4.18216	32	0.0345
GDPCH does not Granger Cause INFCH	5.79944		0.0080

Table: Search results

6- Conclusions

The dominance of the market economy and the dominance of full competition in global markets have made some advanced economies competitive and achieve real economic growth through great flexibility and absorptive capacity in their economic sectors that have made them highly flexible.

- The American economy was characterized by the ability to achieve economic growth through the financial sustainability it enjoys, so the Granger test showed that there is a causal relationship with one direction from the rate of inflation to the rate of economic growth, as the value was (5.3) for economic growth, and the probabilistic values were (0.04), meaning that real economic growth creates a demand for factors of production that lead to higher prices of factors of production, so inflation comes from the implicit reducer and not from consumer prices. In the event that the United States faces an economic recession crisis, especially in times of crisis, it follows the policy of Helicopter Money in order to activate and activate aggregate demand.

- The Chinese economy was characterized by a causal relationship with two trends from the rate of inflation to economic growth, meaning that the inflation rate stimulates economic activity and increases GDP, as the calculated value of (F) was (4.18), and the probabilistic value (prob) was (0.03), this is called the competitive devaluation of the Yuan in global markets through the exchange rate.

- There is a causal relationship from economic growth represented by GDP to the rate of inflation in the Chinese economy. A significant value of (5.79) with a probabilistic value of (0.008). This gives preference to the Chinese economy in the event that the economic growth rate rises and the inflation rate coincides with it. The impact of inflation will rebound positively on economic activity, so it has the ability to absorb the rise in the general level of prices, contrary to Friedman's theory, which considers that the inflation rate, if it is more than (4%), represents an economic problem.

- We examined the existence of the causality relationship (Causality) between economic growth and inflation rate in Japan during the years (1990-2023), as the estimated results confirmed that the (F) test is not significant and its value is (1.7 and 2.8) respectively for the two variables, and the probabilistic value is more than (0.19 and 0.07) for the two variables, and the economic growth and the consumer price index are not related to each other causally, as the results of the study clearly showed that economic growth plays a role in the inflation rate by increasing the total supply that leads to a decrease in the general price level, meaning that the inverse relationship between the inflation rate and real economic growth.

References

1. Adaramola, A. O., & Dada, O. (2020). Impact of inflation on economic growth: evidence from Nigeria. *Investment Management & Financial Innovations, 17*(2), 1.

2. Al-Saadi, N. (2023). Russian-Ukrainian War's Effects on the World Economy. *Journal of Exploratory Studies in Law and Management, 10*(1), 8-21.

3. Ammar, A. (2022). Time series analysis of environmental quality in the state of Qatar.

4. Barboza, D. (2010). China passes Japan as second-largest economy. *The New York Times, 15*.

5. Barro, R. J. (1995). Inflation and economic growth: National bureau of economic research Cambridge, Mass., USA.

6. Baumeister, C., & Peersman, G. (2013). Time-varying effects of oil supply shocks on the US economy. *American Economic Journal: Macroeconomics, 5*(4), 1-28.

7. Breitung, J., & Das, S. (2005). Panel unit root tests under cross‐sectional dependence. *Statistica Neerlandica, 59*(4), 414-433.

8. Choi, I. (2001). Unit root tests for panel data. *Journal of International Money and Finance, 20*(2), 249-272.

9. Christiano, L., & Eichenbaum, M. S. (1986). Temporal aggregation and structural inference in macroeconomics: National Bureau of Economic Research Cambridge, Mass., USA.

10. Datta, K., & Mukhopadhyay, C. K. (2011). *Relationship between inflation and economic growth in Malaysia- An econometric review.* Paper presented at the International Conference on Economics and Finance Research.

11. Dinh, D. V. (2020). Impulse response of inflation to economic growth dynamics: VAR model analysis. *The Journal of Asian Finance, Economics and Business, 7*(9), 219-228.

12. Eggoh, J. C., & Khan, M. (2014). On the nonlinear relationship between inflation and economic growth. *Research in Economics, 68*(2), 133-143.

13. Erbaykal, E., & Okuyan, H. A. (2008). Does inflation depress economic growth? Evidence from Turkey. *International Journal of Finance End Economics, 13*(17).

14. Fix, B. (2023). The Cause of Stagflation.

15. He, Q., & Zou, H.-f. (2016). Does inflation cause growth in the reform-era China? Theory and evidence. *International Review of Economics & Finance, 45*, 470-484.

16. Hobijn, B., & Lagakos, D. (2005). Inflation inequality in the United States. *review of income and Wealth, 51*(4), 581-606.

17. Hsiao, C. (1979). Causality tests in econometrics. *Journal of Economic Dynamics and Control, 1*(4), 321-346.

18. Ireland, P. (2014). *The classical theory of inflation and its uses today.* Paper presented at the Shadow Open Market Committee Meeting. New York: Economic Policies for the 21st Century.

19. Izzeldin, M., Muradoğlu, Y. G., Pappas, V., Petropoulou, A., & Sivaprasad, S. (2023). The impact of the Russian-Ukrainian war on global financial markets. *International Review of Financial Analysis, 87*, 102598.

20. Jayathilake, P., & Rathnayake, R. M. K. T. (2013). Testing the link between inflation and economic growth: Evidence from Asia.

21. Jorgenson, D. W., & Motohashi, K. (2005). Information technology and the Japanese economy. *Journal of the Japanese and International Economies, 19*(4), 460-481.

22. Kasidi, F., & Mwakanemela, K. (2013). Impact of inflation on economic growth: A case study of Tanzania. *Asian Journal of empirical research, 3*(4), 363-380.

23. Khoma, N., & Nikolaieva, M. (2023). Japanese-Russian-Ukrainian geopolitical triangle: mutual influences of the parties. *Journal of Liberty and International Affairs, 9*(1), 374-385.

24. Lopez, L., & Weber, S. (2017). Testing for Granger causality in panel data. *The Stata Journal, 17*(4), 972-984.

25. Nyenyia, N. D., Amlegab, E. L., & Scholasticac, O. (2017). The relationship between inflation and economic growth in East African Community countries.

26. Pesaran, M. H. (2012). On the interpretation of panel unit root tests. *Economics Letters, 116*(3), 545-546.

27. Rifami, A. C., & Heriqbaldi, U. (2023). Exchange Rate and Indonesia-China Bilateral Industry Trade Flows: J-Curve and Asymmetric Effects. Iranian Economic Review, 27(4), 1382-1415.

28. Roncaglia de Carvalho, A., Ribeiro, R. S., & Marques, A. M. (2018). Economic development and inflation: a theoretical and empirical analysis. *International Review of Applied Economics, 32*(4), 546-565.

29. Storm, S. (2024). Tilting at Windmills: Bernanke and Blanchard's Obsession with the Wage-Price Spiral. *International Journal of Political Economy, 53*(2), 126-148.

30. Xiao, J. (2009). The relationship between inflation and economic growth of China: empirical study from 1978 to 2007.

31. Yelwa, M., David, O. O., & Awe, E. O. (2015). Analysis of the relationship between inflation, unemployment and economic growth in Nigeria: 1987-2012. *Applied economics and finance, 2*(3), 102-109.

32. Yigit, T. M. (2010). Inflation targeting: An indirect approach to assess the direct impact. *Journal of International Money and Finance, 29*(7), 1357-1368.

33. Zhang, K. H. (2014). How does foreign direct investment affect industrial competitiveness? Evidence from China. *China economic review, 30*, 530-539.

34. Χιώτη, E. (2023). The impact of the Russian-Ukrainian War on the food supply chain: a review of the effects on the global economy and malnutrition.