

A Comparative Study on Inflation and Gross Domestic Product (GDP) Between India & China in the Recent Scenario

Dr.Y.Ebenezer¹, Dr.K.Sakthipria², Mr.M.Dhanasekar³, Dr.N.Periasami⁴

¹Assistant Professor of Economics, School of Law, Vel Tech, Rangarajan Dr.Sagunthala R&D Institute of Science and Technology (Deemed to be University), Chennai, Tamilnadu.

²Assistant Professor of Economics, School of Law, Vel Tech, RangarajanDr.Sagunthala R&D Institute of Science and Technology (Deemed to be University), Avadi, Chennai, Tamilnadu, India.

³Assistant Professor of Sociology, School of Law, Vel Tech, Rangarajan Dr.Sagunthala R& D Institute of Science and Technology (Deemed to be University), Chennai, Tamilnadu.

⁴Assistant Professor of agriculture Economics & Head of the department (school of social science), college of agriculture sciences, SRM Institute of Science and Technology (SRMIST) (Deemed to be University), Chengalpattu, near Chennai, Tamilnadu.

Received: 10.07.2024

Revised: 13.08.2024

Accepted: 08.09.2024

ABSTRACT

Economic growth is one of the attainments of any country and has the necessary potential to increase national income and enhance the living conditions of the people. The country's economic growth will be generated by macroeconomic policies like monetary, fiscal policy, and other economic measures undertaken by the policymakers of the country. Economic growth will be influenced by several factors, inflation will be one of the factors in the economy. Economic growth and the rate of inflation have a very complex relationship. There are empirical study results showed positive, negative, and neutral relationships between economic growth and the rate of inflation. Further, a high or very low rate of inflation will hurt sustainable robust economic growth and have a vital negative effect on the economy. This study has investigated the Inflation and Economic Growth relationship in India & China, countries that highlighted long-term moderate rates of inflation (less than 5%). Analyses like descriptive Statistics and the OLS model have been applied to India & China for the period between 2010 -and 2022 exhibiting that inflation and real GDP have a very weak positive relationship with India. On the other hand, china's economy has kept a moderate relationship between inflation and real GDP during that time. It has been established that India and China's economies have progressive and insignificant effects of inflation on real GDP in the study period. Finally, the study has concluded that the low rate of inflation alone is not a determined factor of a country's economic growth. It will be influenced by many other factors.

Keywords: inflation, economic growth, National income, economy.

1. INTRODUCTION

Economic growth is increasing a country's output over a while. It can be enhanced by a country's monetary, fiscal, and other economic policies. Economic growth will be affected by several factors, one of which is inflation. Inflation is a situation where the general price level increases over a while in the economy. From an economic point of view, it is a complex relationship between economic growth and price rises (inflation). This relationship has been investigated through empirical studies in industrially developed countries and found that there is a negative relationship between inflation and economic growth. Whereas, there is a positive relationship in developing countries. This above macroeconomic debated context has encouraged the researcher to study the inflation and economic growth (GDP) relationship in developing countries like India and China context.

2. Theoretical Framework On The Relationship Between The Rate Of Inflation And Economic Growth

In the recent economic history (Mervar, 1999), it is often highlighted that the economic system will be the endogenous result of economic growth. Based on the regression evaluation, GDP will be linked with some precondition economic factors like skilled labour force, technology gaps, and high levels of country saving and investment. The investigation of the GDP and inflation relationship has the central aim of country macroeconomic research and policy-making. It found that there is no clear-cut definition of the relationship between GDP and rate of inflation. The Mamo (2012) study controversial findings show that

the GDP and inflation relationship can be positive, negative, and neutral. However, Sidrauski's (1967) findings remarked that there was no relationship between both. Further, Fisher's (1993) study noted negative and Mallik & Chowdhury (2001) study noted both had a positive relationship over time in the economy.

The other discussion is that in which level of inflation can affect economic growth positively and negatively. Barro (1995) made a point that the high level of inflation will reduce the level of investment and GDP growth adversely in the economy. Outlined by Mamo(2012) is that the nature of inflation and GDP can be bidirectional causality, unidirectional causality, and no causality. Paul, Kearny, and Chowdhury's (1997) study result shows that there was no causality relationship in 40% of the countries, 20% of countries with bidirectional causality, and a unidirectional relationship in the rest of the countries. 145 countries inflation and GDP growth relationship have been studied by Ghosh and Philips (1998) and they found that as the rate of inflation was low, there was a positive relationship between inflation and economic growth yet this relation turned negative for high inflation.

Umaru I Zubariu's (2011) study result indicates that there is a different causal relationship between inflation and GDP in the short and long run. Finally, he argued that GDP can be the root cause of inflation. The same relationship has been studied by Datta (2011) in Malaysia and his findings reveal that in the short run was a causality relationship and the long-run economic growth was affected by inflation in the country. In another study, Fisher (1993) on 93 countries with the help of several macroeconomic variables found that inflation negatively affects economic growth by reducing investment and the rate of productivity. Barro (1997) made a study on the determinants of economic growth for 100 countries by using 30 years of data from 1960 to 1990. His study highlighted the reduction of growth of real GDP per capita by 0.2% -0.3% per year and also a decline in the ratio of investment to GDP by 0.4% -0.6% when the average inflation was more the 10% per year. Malik and Chowdhury (2001) used the from Bangladesh, India, Pakistan, and Srilanka and they confirmed that a moderate rate of inflation can be helpful to faster economic growth and has a positive relationship with both inflation and GDP. Anidiobu and G.A.Okolie (2018) studied in Nigeria. They found that inflation has a non-significant and positive effect on GDP. On the other hand, Bakare, Kareen, and Oyelekan (2015) in the same study area in Nigeria. Study results exposed that the inflation rate is related to an adverse and considerable effect on economic growth. Hussain, Shabir, and Kashif (2016) conducted a study on inflation and the GDP of Pakistan and has a significant negative impact on GDP. Dr. Sc. Mario Švigir and Josipa Miloš (2017) have examined the economic growth and inflation in Italy and Austria for the period between 1980 and 2016, it is revealed that a low rate of inflation is a significant but not appropriate influence on GDP.

Based on the previous studies, it seems the subsequent gap still exists in the literature in connection with problems under investigation. Firstly, there were empirical studies like Ghosh and Philips (1998) Mallik and Chowdhury (2001), Anidiobu and G.A.Okolie (2018), Bakare, Kareen and Oyelekan (2015), Hussain, Shabir and Kashif (2016), Dr. Sc. Mario Švigir, and Josipa Miloš (2017) specified deferent result that there is a positive and insignificant as well as negative effect relationship between inflation and real GDP in deferent country of deferent period in the world. Secondly, most of the studies are being done in other dominions, but very limited studies have been commenced in India. Thirdly, the data applied for the study is being extended up to 2022, while nobody of the studies appraised that standard.

3. Data and Methodology

The secondary sources of data that have been applied for this study are taken from the World Bank Report 2021 and www.statista.com covering the period from 2010 – 2022 for both countries like India and China. The selection of countries like India and China is connected to the fact that the two countries come under the Asian countries categories and characteristics like leading developing economies in the current scenario. Through comparative analysis between these countries, the study will explore whether long-term inflation does affect significantly the progress of a country. The regressive analysis is being conducted for both countries to prove this hypothesis. The acquired data deals with real GDP and the rate of inflation. Our dependent variable (grassland) is the real GDP, whereas the rate of inflation is our independent variable (regressor.). The method of Ordinary Least Square (OLS) has been applied to estimate the model. While the study makes use of time-series data and covers a long sample period, the study made sure that our data set was not compromised by unit root; so, the study has verified for stationarity of the series by adapting the ADF.

3.1 India and China model specification

The econometric model is being applied to this study which has been used by Chughtai, et al (2015) that examine the variables like the GDP nexus of Pakistan

The study appraised in the previous segment is indicated under two countries:

$$Y = \alpha + \beta_1 X_1 + e \dots\dots\dots (1)$$

$$\text{It is modified as } \text{GDP} = \alpha + \beta_1 \text{INFL} + e \dots\dots\dots (2)$$

Where macroeconomic variable GDP is Gross Domestic Product, α = Constant, β_1 is coefficients. INFR is the inflation rate and e' will be an error term.

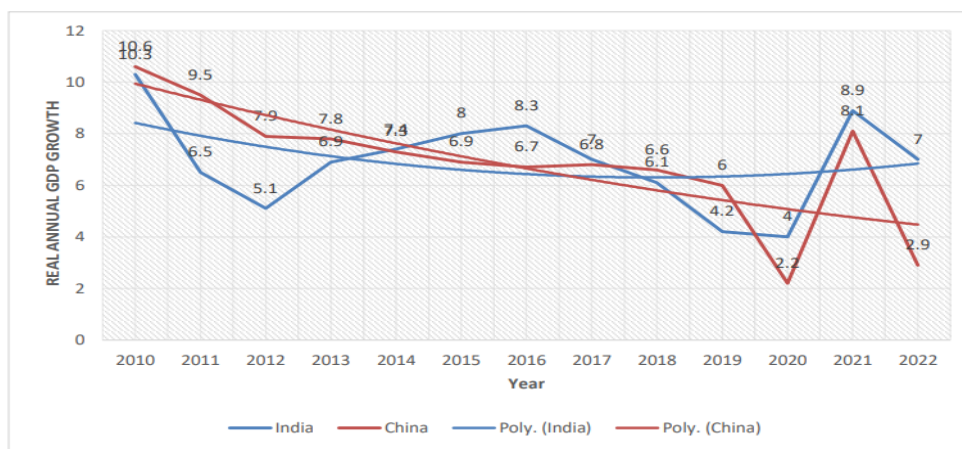
4. Results and Analyses

4. Comparative study on the inflation rate and GDP between India and China.

The study verified the relationship between the inflation rate and the GDP of India and China. Hence, the direction or nature of the relationship between the two countries could be determined. The relationship between the rate of inflation and GDP can be positive, negative, or neutral based on the literature and empirical studies that have investigated this phenomenon.

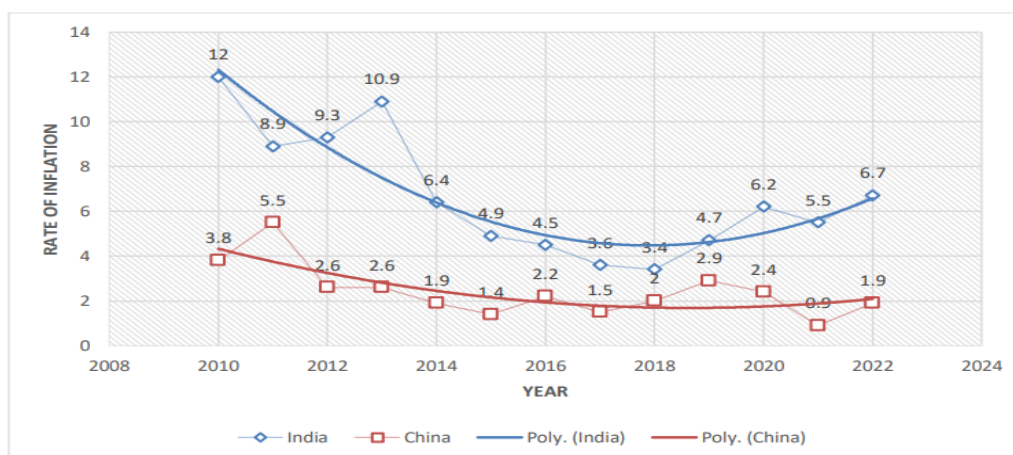
4.1 Movements of Economic Growth (GDP) and Rate of Inflation

The data used for the comparative analysis and identification of a longer trend and movements of inflation and GDP between India and China are historical data cover covering the 2010 -2022 period. Movements of GDP and inflation are presented in Graph 1 & Graph 2.



Graph 1: Economic Growth Rate Between India And China 2010-2022

The above Graph 1 shows the trend line of economic growth (GDP) of India and China in the period from 2010 to 2022. The Real Annual GDP Growth is highest in the year 2010 for both India i.e., 10.3%, and China 10.6%. From the year 2014 to 2017 and 2021 to 2022 India's Real Annual GDP Growth has highest than China. Further, China has the highest Real Annual GDP Growth in the year 2010 and least in the year 2020. Similarly, India has the highest Real Annual GDP Growth in the year 2010 and least in the year 2020. During the pandemic, both country GDP is being gradually declined from 6 % to 2 % between 2019 and 2020. However, two country's GDP has been increased from 2 % to 8.9 %. But, India's position seems a little better than China's during the post-pandemic period. Then, the GDP of both is being declined during the period of study.



Graph 2: Inflation Rate Between India And China 2010-2022

The above Graph 2 indicates the trend line of the rate of inflation in India and China in the period from 2010 to 2022. The Rate of Inflation is highest in the year 2010 in India is 12% while compared to China it is only 3.8%. In the year 2012 India's Rate of Inflation was 9.3% which is decreasing compared to the year 2010, while China's Rate of Inflation is also decreasing compared to the year 2010 i.e., 2.6%. There is a steady downfall in the Rate of Inflation in India in the year 2014 to 2019. The Rate of Inflation is increasing from the year 2020 onward. There is no steady increase or decrease in China's Rate of Inflation. Remarkably, china's rate of inflation has been maintained below 3 % even in the post and pre-pandemic during the period of study.

4.2 Descriptive Statistics Comparative Analysis Of India & China

The descriptive statistics about the variable should be summaries to explore the statistical properties of a model such that some explanation about the behavior of the serious will be offered at a glance before directly going to econometric estimation.

Table 1: Descriptive statistics Test Results

MEASUREMENT	INDIA (GDP)	CHINA (GDP)	INDIA (INFLATION)	CHINA (INFLATION)
Mean	6.900000	6.869231	6.692308	2.430769
Median	7.000000	6.900000	6.200000	2.200000
Maximum	10.300000	10.600000	12.000000	5.500000
Minimum	4.000000	2.200000	3.400000	0.900000
Std.Dev.	1.796756	2.289245	2.764194	1.177840
Skewness	0.015342	-0.658143	0.662071	1.364872
Kurtosis	2.510343	3.188289	2.222533	4.684621
Jarque-Bera	0.130382	0.957700	1.277146	5.573451
Probability	0.936888	0.619496	0.528045	0.061623
Sum	89.700000	89.300000	87.000000	31.600000
Sum Sq.Dev.	38.740000	62.88769	91.68923	16.64769
Observations	13	13	13	13

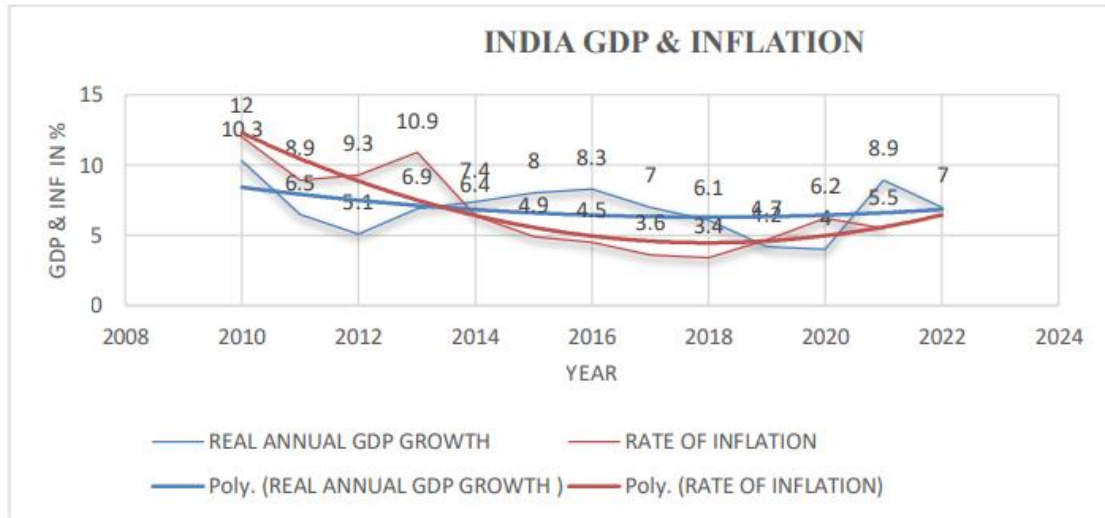
Source: Authors' computation aided by E-views, 2022

The above Table 1 reveals GDP and rate of inflation descriptive statistics between countries like India and China. The arithmetic mean for GDP is 6.9 for India and 6.8 for china. Similarly, the median value of GDP is 7.0 to India whereas China is 6.9 for the particular period. The Maximum GDP values are 10.3 and 10.7 for India and China. On the other hand, the Minimum value of GDP 4.0 is being with India and 2.2 is being with China from 2010 to 2022. In the case of Measures of Dispersion, the Standard Deviation value of 1.7 is kept by India and the 2.2 deviation is kept by China. In terms of Measures of Normality, Skewness values of 0.0 show the value of India is normally skewed. However, countries like china are negatively skewed as the value of Skewness is -0.6. In the case of the Kurtosis values 2.5 and 3.1 denote that India has a platykurtic curve nature and China has nature of leptokurtic curve. According to the Jarque Bera test results like 0.13 and 0.95, reveals that the distribution of all these variables is normally distributed.

Both countries rate of inflation arithmetic mean is 6.6 for India and 2.4 for China. Similarly, the median value of inflation in India is 6.2 while China is just 2.2 during the period. The Maximum and Minimum inflation values reveal that India and China have 12.0 and 5.5. In contrast, India is keeping 3.4, and 0.9 kept by China in the time from 2010 to 2022 of Minimum value. As per the Measures of Dispersion, the Standard Deviation value indicates that the deviation of India is 2.7 though the deviation of China is 1.1. The Measures of Normality, the Skewness value 0.6 express that India is normally skewed. Nevertheless, as the value of Skewness is 1.36, china has negatively skewed. In the case of the Kurtosis values 2.2 and 4.6 show the platykurtic curve nature is with India whereas the nature of the leptokurtic curve is China. As stated by the Jarque Bera test results like 1.2 and 5.5 expose that the distribution of all these variables is normally distributed.

4.3 India - Regressive Analysis

The below chart has been used to show the relationship between the inflation rate and the real GDP of India during the year from 2010 to 2022.



Graph 3: Relationship Between Inflation And Gdp Of India 2010-2022

The correlation value 0.23 indicates that the degree of correlation between inflation and GDP is positive but it has a very weak relationship nature during the period of the study from 2010 to 2022. Also, it specifies that if the rate of inflation is changing (increases or decreases) then there will be a positive move on the real GDP of India during the period of study. Then regressive analysis of the rate of inflation and GDP in India has been conducted.

Table 2: Regressive Analysis Of Inflation And Gdp; India 2010 – 2022

VARIABLE	COEFFICIENT	STD.ERROR	T-STATISTIC	PRO
c	5.875964	1.371441	4.284519	0.00013
Inflation	0.153017	0.190478	0.803332	0.4388
R-squared	0.0555416	Mean dependent variable		6.900000
Adjuste R-squared	-0.030455	S.D dependent variable		1.796756
S.E of regression	1.823911	Akaike information criterion		4.180482
Sum squared resid	36.59317	Schwarz criterion		4.267397
Log likelihood	-25.17313	Hannan-quinn criterion		4.162617
F-statistic	0.645342	Duebin-wwatson statistic		1.474436
Prob(F-statistic)	0.438797			

Source: Authors' computation aided by E-views, 2023

$$RGDP_t = 5.875964 + 0.153017 INFL_{T+e}$$

The study is related to the rate of inflation on GDP in India from 2010 to 2022. Table 3 exposes that inflation has a positive and non-significant effect on GDP in India during the period of study. On the base of the independent coefficient value, there is a positive impact on dependent variables like GDP. Further,

if the inflation is increased by one unit (1%), then GDP increases by 0.15 units (%). However, in terms of probability value, the values are more than 0.05% like 0.4. So, it is confirmed that there is no significant among the dependent variable GDP and the independent variable inflation. As per the R-squared value, the independent variable inflation is predicting 0.05% on the dependent variable GDP. The probability F-statistic is 0.43 which is more than 0.05%. So, the combined effect is insignificant.

4.4 China- Regressive Analysis

The below graph displays the association among the inflation rate and the real GDP of China during the year from 2010 to 2022.



Graph 4: Inflation And Gdp Of China 2010-2022

The correlation value 0.41 implies that the degree of association between inflation and the GDP of China is Moderate during the period of the study from 2010 to 2022. Since the cor- .value is positive, both variables have a positive relationship. It indicates that if the rate of inflation is changing (increases or decreases) then it will moderately affect the real GDP of China. The inflation and GDP in China for the period from 2010 to 2022 regressive analysis are presented in the below table.

Table 3: Regressive Analysis Of Inflation And Gdp; China 2010 – 2022

VARIABLE	COEFFICIENT	STD.ERROR	T-STATISTIC	PRO
C	4.907948	1.429477	3.433387	0.00056
Inflation	0.806857	0.533133	1.513424	0.1584
R-Squared	0.172338	Mean Dependent Variable		6.869231
Adjuste R-Squared	0.097096	S.D Dependent Variable		2.289245
S.E of Regression	2.175269	Akaike Information Criterion		4.532820
Sum Squared Resid	52.04974	Schwarz Criterion		4.619735
Log Likelihood	-27.46333	Hannan-Quinn Criterion		4.514955
F-Statistic	2.290453	Duebin-Wwastson Statistic		2.077351
Prob(F-Statistic)	0.158361			

Source: Authors' computation aided by E-views, 2023

$$RGDP_t = 4.907948 + 0.806857 INFL_{T+e}$$

The above table 3 shows the influence of inflation on economic growth in China during the time between 2010 and 2022. The result confirmed that inflation has a positive and nonsignificant effect on GDP in China. On the base of the independent coefficient value, there is a positive impact on dependent variables like GDP. On the other hand, if the inflation is increased by one unit (1%), then GDP increases by 0.08 units (%). However, in terms of probability value, the values are more than 0.05% like 0.15. So, it is established that there is no significant relationship between dependent variable GDP and independent variable inflation. Based on the R-squared value, the independent variable inflation is predicting 0.17% on the dependent variable GDP. In the case of the probability F- statistic is 0.1, it is more than 0.05% and the combined effect is insignificant.

4.5 India & China's Regression Results And Discussion

The study deals with inflation and real GDP in developing countries like India and China from the year 2010 to 2022. In terms of correlation value, inflation has having very weak relationship with real GDP in the Indian economy. However, inflation has a Moderate relationship with real GDP in China during that period. The regression result of this study postulates that inflation has positive and insignificant effects on real GDP in India and China's economies during the period of the study. Moreover, the result highlighted that with a unit change in inflation, the GDP increases by 0.15 % units. Also, in China's economy rate of inflation increased by one unit (1%) will lead to a real GDP increase of 0.08% units. In that regard, the study findings agreed with Ghosh and Philips (1998) have done the study for 145 countries, Mallik and Chowdhury (2001) made a study on Bangladesh, India, Pakistan, and Sirlanka. Also, Anidiobu and G.A.Okolie (2018) their study result from Nigeria agreed. On the other hand, this study contradicted the result from Nigeria by Bakare, Kareem, and Oyelekan (2015) and Hussain, Shabir, and Kashif (2016) their study from Pakistan as well as from Italy and Austria by Dr. Sc. Mario Švigir, and Josipa Miloš (2017).

5. CONCLUSION & SUGGESTIONS

One of the Macroeconomic policies of the country's aim is to increase real GDP along with price stability in the economy. Examining the two developing economies India and China's rate of inflation and real GDP, it is confirmed that low inflation is necessary however it is not a sufficient condition for the economic progress of the country. From the year 2010 to 2022, inflation and real GDP had a very weak positive relationship in India. On the other hand, china's economy kept a moderate relationship between inflation and real GDP during the period. The regressive analysis has confirmed that India and China's economies have positive and insignificant effects of inflation on real GDP in the study period. In the developing economy like India and China, the GDP of the country is not influenced only by the low rate of inflation. There are also many other factors in the economy. The fiscal, monetary, and other macroeconomic policies are cumulatively a way toward stable and maintainable economic progress in the non-inflationary environment. In addition, to attain optimum economic progress for India and China, as a welfare government should take appropriate stable steps to enhance the research and development expenditure exclusively for inclusive development manners such as the education system (skill development) and health care system (productivity enhancement), rational labour policy for the efficient labour market, and social as well as political stability mix in the economy.

REFERENCE

- [1] Mallik, G., & Chowdhury, A. (2001). Inflation and economic growth: evidence from four south Asian countries. *Asia-Pacific development journal*, 8(1), 123-135.
- [2] Adaramola, A. O., & Dada, O. (2020). Impact of inflation on economic growth: evidence from Nigeria. *Investment Management and Financial Innovations*, 17(2), 1- 13.
- [3] Bakare, H., Kareem, R., & Oyelekan, B. Effects of Inflation Rate on Economic Growth in Nigeria (1986)
- [4] Anidiobu, G. A., Okolie, P. I., & Oleka, D. C. (2018). Analysis of inflation and its effect on economic growth in Nigeria. *Journal of Economics and Finance*, 9(1), 28- 36.
- [5] Švigir, M., & Miloš, J. (2017). Relationship between inflation and economic growth; comparative experience of Italy and Austria. *FIP-Financije i pravo*, 5(2), 91-101.
- [6] Datta, K., & Mukhopadhyay, C. K. (2011). Relationship between inflation and economic growth in Malaysia-An econometric review. In *International Conference on Economics and Finance Research* (Vol. 4, No. 1, pp. 415-419).
- [7] Švigir, M., & Miloš, J. (2017). Relationship between inflation and economic growth; comparative experience of Italy and Austria. *FIP-Financije i pravo*, 5(2), 91-101.

- [8] Khan, M. A., & Khan, S. (2018). Inflation and the economic growth: evidence from Five Asian Countries. *Pakistan Journal of Applied Economics*, 28(2), 235-252.
- [9] Acet, H., Güvenek, B., & Baoua, M. M. A. (2016, September). The Relationship between Inflation and Economic Growth: Time Series Analysis for Niger (1971- 2014). In *GAI International Academic Conferences Proceedings* (p. 154).
- [10] Sattarov, K. (2011). Inflation and Economic Growth. Analyzing the Threshold Level of Inflation.: Case Study of Finland, 1980-2010.
- [11] Akter, F., & Smith, D. S. (2021). Impact of inflation on GDP growth in Malaysian economy. *International Journal of Innovative Science and Research Technology*, 34(2), 33-41.
- [12] Ozpence, A. I. (2016). Analysis of the relationship between inflation and economic growth in Turkey. *Journal of Economics Finance and Accounting*, 3(3), 180-191.
- [13] Barro, R. J., 1995. Inflation and economic growth. NBER Working Paper No.5326.
- [14] Barro, R. J., 1997. Determinants of economic growth: a cross-country empirical study. NBER Working Paper 5698.
- [15] Datta, K., 2011. Relationship between inflation and economic growth in Malaysia. *IPEDR Vol. 4. 9.*
- [16] 13. Fischer, S., 1993. The role of macroeconomic factors in growth. NBER Working Paper, No. 4565.
- [17] 14. Ghosh, A. and Phillips, S., 1998. Warning: Inflation may be harmful to your growth. *IMF Working Papers Vol. 45, No.4.*
- [18] Mallik, G. and Chowdhury, A., 2001. Inflation and economic growth: Evidence from South Asian Countries. *Asian Pacific Development Journal*, Vol. 8, No.1.
- [19] Mamo, F. T., 2012. Economic growth and inflation. Master's Thesis, Södertörns University.
- [20] Mervar, A., 1999. Pregled modela i metoda istraživanja gospodarskog rasta; Available at: <http://www.hrcak.srce.hr/indeks.php?show=clanak&id=clanak&jezik=30331> [Accessed 22 December 2016].
- [21] Mubarik, Y. A., 2005. Inflation and growth: An estimate of the threshold level of inflation in Pakistan. *SBP-Research Bulletin*, Volume 1, No. 1, pp .35-43.
- [22] Paul, S., Kearney, C. and Chowdhury, K., 1997. Inflation and economic growth: a multi-country empirical analysis. *Applied Economics*, vol. 29, pp. 1387-1301.