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Exploring the Link between Globalization and Inflation: Evidence from Pakistan

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Abstract

The world becomes a global village through the prompt exchange of products, human skills and knowledge, which are the main and wonderful aspects of globalization. A vast literature supports the contribution of globalization towards economic growth yet rising inflation in developing countries is also associated with increased globalization. Our study intends to explore whether this phenomenon is true in the case of Pakistan or not. This study employed different macroeconomic variables like globalization, exchange rate, government expenditures, and GDP as independent variables and inflation as dependent variables. Time series data from 1970 to 2020 has been used. We checked for the order of integration of the series and found mixed order of integration. Appropriate technique i.e., ARDL has been employed and the study reported empirical results for the short run and the long run. The findings of the study suggested that openness has an inflationary impact on Pakistan; an increase in globalization leads to high inflation in Pakistan. Pakistan needs to regulate fluctuations in the exchange rate. Besides, instead of current government expenditures, the public sector must promote development expenditures. Following the appropriate policy measures can bore the fruits of globalization well as reduce inflation in Pakistan like developed economies.

Keywords: Globalization, inflation, exchange rate, government expenditures

1. Introduction

Globalization becomes a manifold phenomenon prevailing in the world. It has different dimensions, like social, political and economic. The world becomes a global village through the prompt exchange of products, human skills and knowledge, which are the main and wonderful aspects of globalization. There are different economic aspects of globalization indicated by the international monetary fund (IMF), like trade, investment and capital and labor transfer also incorporating different challenges of environmental degradation like water and air pollution, etc. Globalization is a well-known phenomenon but its implications and practices are different in different countries, depending upon their directions, structures and the level of openness.

Integration of the economies is now increased through the economic part of globalization. It leads to the reduction in trade barriers and shrinking the boundaries to make economic activities more convenient than before. Due to the increasing pace of globalization, the tendency to invest abroad and import increased which is increasing trade with the globe.

With time, as globalization rose, the organization of inflation rates raised among advanced countries significantly (Auer et al. 2017; Audi et al. 2022). Some common factors explain the dynamics of inflation in European and different countries (Carriero et al. 2019; Ali, 2022). Cross-country correlation brings inflation through different food and energy prices. It affects consumer prices through cheaper imports, high labor supply, competition and the integration of supply chains. Globalization has different impacts on the economies, they can be negative and positive also. Improvement in trade and technological advancement, financial flows, and economic growth are some positive impacts but Pakistan is facing major challenges in the trade sector, policy design and infrastructure which is necessary for international opportunities (Hamdani, 2015; Ali, 2022). Other factors are influencing inflation in the country. For example, the exchange rate has a significant influence on inflation. The exchange rate and inflation nexus play an important role in economies (Dornbuch, 1976). According to him, the exchange rate between two economies significantly influences the rise in the price level. Domestic currency appreciates when the exchange rate falls and the general price level decreases. Fluctuations in the exchange rate affect the costs of production because prices of imported goods will also change. All this shows that there is a very close relationship between inflation and exchange rates. Another factor is government spending which has a substantial effect on inflation in any country. The need for spending occurs from time to time as per the situation. According to Keynes, to ensure economic stability, and boost productivity, the government needs direct public spending.

2. Globalization in Pakistan

In recent times, globalization a significant matter of discussion. The existing researchers used a lot of indicators as proxies of globalization such as trade and foreign direct investment. But this approach faces a lot of shortcomings

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because the concept of globalization was being limited. Globalization is a representation of exchanging of ideas and information between different countries. In 2000, various indicators were proposed named the KOF Globalization Index (KOFGI), which emerged as the most accepted and cited index.

The globalization index is a combination of different components i.e., economic, social and political aspects. These dimensions range from 1(least) to 100 (most globalized) for almost every country. In the world, most globalized countries are located in Western Europe and North America whereas Asia and Africa are categorized as least globalized countries. After the Second World War, powers moved from Europeans to the Americans. De-colonization and changed power dynamics around the globe create a bigger gulf between developed and developing countries. According to the KOF index of globalization, since the late 80s Pakistan gain momentum in the progression of globalization. Consequently, the implications of globalization are affecting Pakistan economically and socially, and inflation is among them. In light of all these effects, this study is motivated to find out the nexus between globalization and inflation in Pakistan. The pivotal work of Romer (1993) lead to an enormous volume of literature that postulated an inverse relationship between openness and inflation. The hypothesis of low inflation and globalization was supported by the argument of Rogoff (2003). According to Rogoff (2003), interaction and globalization have reduced the inflation in past few decades. Globalization reduces inflation in a double direction. Increased and greater market competition works directly and political instability pressurizes the central banks to create inflation. High completion around the globe boost efficiency which leads the low inflation.

3. Literature Review

Over the last decades, several studies are conducted to find out the relationship between globalization and inflation. Some of them showed that there is a negative relationship but some researches find out the counter findings. But these studies were conducted in different countries by using different periods and globalization measures. Ultimately, to promote deflation, globalization is playing an important role by providing, cheap human capital and through the sales of lost-cost products.

Romer (1993) stated that there is a negative relationship between openness and inflation in more open economies. Rogoff's model (1958) proposed a theory in which he explains why an open economy experience less inflation. The theory stated that developed countries tend to have less inflation because they have a stable and optimal monetary policy to overcome the instability and discrepancy due to unexpected monetary expansion. And on the other hand, countries with unstable monetary policies and less open to the world can face higher inflation.

A study was conducted by Kim and Beladi (2005) to check the impacts of globalization which points out the negative relationship between trade openness and inflation in developing countries but it depicts a positive relationship in advanced countries. Likewise, Hanif and Batool (2006) provided evidence for the hypothesis that small open economies have less inflation by using time-series data on Pakistan. They concluded that the "overall trade to GDP ratio" hurts local price growth in Pakistan. Samimi et al. (2011) researched to check the impact of openness and inflation by using Autoregressive distributed lag (ARDL) in Iran. They concluded that, in the short run, inflation is influenced by openness negatively but in the long run the effect is insignificant. Gruben and Mcleod (2004) conducted research and on OECD and developing countries and found a robust and negative relationship between inflation and openness. According to them, the countries which are more open to the world experienced low inflation during the 1990s, this relationship has fortified during the 90s. They found a reduction in inflation due to openness.

Alfaro (2005) tried to find out the nexus between trade openness and inflation on a panel of 148 countries. He couldn't find out the relationship in case of restricting inflation in the short run but the fixed exchange rate regime plays a vital role. (Afzal et al., 2013) captured the impact of globalization in Pakistan by using trade openness as a proxy. They applied ARDL and concluded that there is an inverse relationship between the openness of trade and inflation in the short and long run but the relationship in the short run is more robust and significant. Again, in the case of developing countries especially Pakistan, Zakaria (2010) checked the association between openness and inflation by applying the generalized method of Moments method. A positive relationship was concluded by research also he gave a point that both these variables are influenced by country and time-specific effects. Tee et al. (2018) provided an opposite analysis of Romer's theory after studying the impact of trade openness on inflation. They studied the effect by taking developing countries into account from the year of 1985 to 2014. Results showed that there is a positive and significant relationship between trade openness and inflation.

Yasmin et al. (2021) conducted a study to check the impact of fiscal policy on inflation in Pakistan from 1976-2019. They applied the Autoregressive distributed lag approach to check the long-run and short-run relationship and find out the positive impact of government expenditures on inflation. But contrary to this, Ogbole and Momodu (2015) tried to investigate the causal relationship between government expenditure and inflation during the period of 1970-2011 by using time-series data. They applied Johansen's co-integration test and Granger causality analysis and

found that there is a negative relationship between government expenditures and inflation in the case of Nigeria. Oyerinde, (2019) tried to assess the relationship between government expenditures and inflation in Nigeria from 1980 to 2017 by using the Johansen Co-integration analysis and vector error correction model. Results showed that government expenditures significantly affected inflation in the long run as well as the short run.

In a country, the stability of currency also affects the prices. A study was conducted by Chaudhry et al. (2011) to determine the impact of the impact of foreign exchange on inflation in Pakistan. They used time series data and applied the ARDL approach to find out the results. Empirical findings found that there is a negative relationship between the exchange rate and inflation in Pakistan. Bangura et al. (2022) conducted a study based on Romer's theory of having an inverse relationship between openness and inflation. They took Sierra Leone as the sampled country and applied the ARDL co-integration approach to check the relationship between these two variables for the period of 1980 to 2020. By applying the ARDL approach, results showed that Romer's preposition proved in Sierra Leone as an increase in openness leads to a decrease in inflation. In the same direction, Bošnjak et al. (2022) tried to add some insightful considerations to the outgoing debate on the impact of globalization on inflation by adding unemployment as mediating variable from the year 2000 to 2019 for the sample of six post-European countries Croatia, Czechia, Romania, Slovakia and Slovenia. They applied the dynamic panel data method with a generalized method of moments. Their findings advocated a negative relationship between openness and unemployment and then inflation but they couldn't find any direct relationship between openness and inflation.

The existing literature put a lot of discussions and insights as to how inflation is impacted by globalization and all the existing literature ignores developing countries like Pakistan, which is how inflation is influenced by globalization in these countries. As per our best knowledge, most of the literature is centered on advanced and industrialized economies. However, developing countries are also having the impact of globalization just like any other advanced country. And the fact is undeniable that trade openness has had a huge impact on developing countries more than developed countries. Therefore, this study tries to fill this gap in the available literature by investigating the impact of globalization on inflation in Pakistan by using the KOF index of globalization.

4. Data collection and methodology

This study inspects the impact of Globalization and macroeconomic variables on the inflation rate in Pakistan for the period of 1970 to 2020. This study uses an ARDL approach and conducts an augmented dickey fuller test to check the stationary of the data. For analysis, the most developed KOF globalization index is taken at an aggregated level to check its impact on inflation. The main methodological framework of the model is as follows:

It= f (Gt, GEt, EXt, GDPt,) ……..(1)

Equation (1) is the function of inflation with different driving factors such as globalization (G), Government expenditures (GE), Exchange rate (EX) and Gross domestic product (GDP).

It= β0+ β1Gt+ β2LGEt+β3EXt+ β4LGDPt +et ..……(2)

In this model, β is the intercept, It stands for inflation in the consumer price index, G is globalization in index form, GE is General government final consumption expenditure (constant 2015 US$), EX stands for the exchange rate in Official exchange rate (LCU per US$, period average) and GDP per capita (constant 2015 US$). Time is shown by t and et is an error term.

Different methodologies are used in the literature to check the determinants of inward FDI in Pakistan. Many scholars used the ordinary least square method to check the robustness. But in this to check the relationship among variables we use the ARDL approach. This method is an appropriate method to check the long-run co-integration between variables (Narayan 2005) and it's useful for small time-series data. This method is best to use than approaches used in the literature as it can measure the data when the data is integrated with different orders. If the time series is integrated at level 2, then the results will be confusing or spurious.

Short-run and long-run equations of the model

$$I_{2t} = \beta_0 + \beta_1 \sum_{t=0}^{p} \beta_2 \Delta I_{2t-r} + \sum_{t=0}^{p} \beta_2 \Delta G_{t-r} + \sum_{t=0}^{p} \beta_3 \Delta GE_{t-r} + \sum_{t=0}^{p} \beta_4 EX_{t-r} + \sum_{t=0}^{p} \beta_5 \Delta GDP_{t-r} + \beta_6 I_{2t-1} + \beta_7 G_{t-1} + \beta_8 GE_{t-1} + \beta_9 EX_{t-1} + \beta_{10} GDP_{t-1} + \varepsilon_t \ldots (3)$$

The short-run equation of ARDL is given as:

$$I_{2t} = \beta_0 + \beta_1 \sum_{t=0}^{p} \Delta I_{2t-i} + \sum_{t=0}^{p} \beta_2 \Delta G_{t-i} + \sum_{t=0}^{p} \beta_3 \Delta GE_{t-i} + \sum_{t=0}^{p} \beta_4 \Delta EX_{t-i} \sum_{t=0}^{p} \beta_5 \Delta GDP_{t-i} + + \varepsilon_t \ldots . (4)$$

Whereas the long-run equation is used as follows:

$$\Delta I_{2t} = \beta_0 + \beta_1 \sum_{t=0}^{p} \Delta LI_{2t-i} + \sum_{t=0}^{p} \beta_2 \Delta G_{t-i} + \sum_{t=0}^{p} \beta_3 \Delta GE_{t-i} + \sum_{t=0}^{p} \beta_5 \Delta EX_{t-i} + \varphi ect_{t-i} + \varepsilon_t \ldots . . (5)$$

To apply ARDL bound test, data must have some characteristics. For example, time-series data should be stationary at the level and 1st order. So we have to check the stationary of data by applying the ARDL method.

4.1. Data sources

The annual data adopted in this study cover the period 1970-2020. We use data on five variables: inflation, globalization, government expenditures, exchange rate and GDP. The data on globalization is taken from the Swiss Economic Institution and the remaining factors are taken from World Development Indicators (WDI).

5. Empirical results and discussion

There is a common problem of non-stationarity in the time-series data. If the mean and variance of data are not constant, it means the data has the problem of non-stationarity, and results will be spurious if we give empirical findings without addressing this problem. Therefore, we test our data by applying Augmented Dickey-Fuller (ADF) test. Table-1 shows the results of ADF test statistics.

Table-1 Unit root testing (ADF Test)

Variables	At level		At 1st Difference		Integration order
	ADF Stat	P-value	ADF Stat	P-value	
I	-3.483291	0.0125	-6.93480	0.0000	I(0)
G	-2.597905	0.787	-5.351220	0.000	I(1)
LnGE	-0.604432	0.8603	-8.835523	0.000	I(1)
EX	3.505891	1.000	-4.925392	0.0002*	I(1)
LnGDP	2.919952	0.4418	5.399948	0.0001*	I(1)

*, **, *** level of significance, 1%, 5% and 10% respectively

Table-1 shows the results of ADF tests. All the variables are stationary at the first difference or level. All variables are stationary at first difference except inflation. So, in this situation, the other approaches for co-integration cannot be used due to their limitations that all data should be stationary at a unique level. We have a mixture of stationarity in our data; that's why the Autoregressive distributive lag ARDL technique developed by Pesaran et al. (2001) is considered an appropriate technique for co-integration analysis.

Table-2 ARDL Approach results

	Critical bound values	
Significance	Lower bound	Upper bound
1%	3.29	4.37
2.50%	2.88	3.87
5%	2.56	3.49
10%	2.2	3.09
F-Statistics	4.841012	K=4

Table-2 indicates critical bound values results. In table F-statistics 4.84, this is bigger than the upper bound value i.e. 4.37 at a 1% significance level. This supports our hypothesis of the presence of a long-run relationship between inflation and globalization. Since, by using the Bound test co-integration is established. The next step is to attain long-run results which are presented in the table-3.

Table-3 Long Run Coefficients for the Dependent Variable I

Variables	Coefficient value	Standard error	Calculated values of t	probability
G	0.729842	0.256964	2.840245	0.0075
GE	12.76427	6.912432	1.846567	0.0733
EX	-0.037032	0.036004	-1.028534	0.3108
GDP	-22.52048	9.156989	-2.459376	0.0190
C	258.0404**	96.25076	2.680917	0.0111

The results shown in Table-3, prove the positive and significant association between economic globalization and inflation in Pakistan. Government expenditures (GE) also have a significant and positive impact on inflation in

Pakistan. Whereas, GDP and exchange rate show a negative impact on inflation, but the exchange rate is insignificant in this study.

Table-4 Assumptions Verifications Tests			
Diagnostic Test for	Test name	F-Stat	Probability
Normality Test	Jarque-Bera Statistics	1.366513	0.50497
Serial Correlation LM test	Breush-Godfrey test	0.876647	0.4256
Heteroskedasticity Test	ARCH test	0.989548	0.3252
Heteroskedasticity Test	Breush-Pagan-Godfrey test	0.567835	0.8525

Table-4 has reported the diagnostic tests for the short run. Our model is independent of the violations of OLS. It is free from autocorrelation and homoskedasticity. In addition, the error term is also normally distributed. Our next step is to testify for the short-run model.

Table-5 of short-run dynamics advocates that the exchange rate (EX) is negatively significant, whereas government expenditures (GE) have a positive and significant impact on inflation. GDP has a negative but significant impact on inflation. But our core variable which is globalization is significantly positive. However, in the short-run, significant and negative ECT term is our primary concern. This term shows the presence of a long-run relationship among concerned variables.

Table-5 Dynamics in the Short Run for the Dependent Variable (I)

Variables	Coefficient value	Standard error	Calculated values of t	probability
INF(-1)	0.624569	0.130063	4.802064	0.0000
INF(-2)	-0.031311	0.124939	-0.250607	0.8036
INF(-3)	-0.247643	0.96633	-2.562710	0.0148
EX	0.132684	0.082791	1.602629	0.1180
EX(-1)	-0.156917	0.088208	-1.778943	0.0839
LnGE	-8.468241	5.040022	-1.680199	0.1018
LnGE(-1)	13.76108	5.320814	2.586274	0.0140
LnGE(-2))	17.48883	5.812484	3.008838	0.0048
LnGE(-3)	-23.78371	6.121109	-3.88554	0.0004
LnGE(-4)	9.354772	5.400646	1.732216	0.0920
LnGDP	-14.73704	8.144371	-1.809475	0.0790
G	0.477597	0.230903	2.068386	0.0461
ECT(-1)	-0.654384	0.113578	-5.761555	0.0000

Further, the first lag of the ECT term is significant and negative. Based on experimental findings, we can conclude that globalization has a positive and significant impact on inflation in the developing country Pakistan in the long run and the short run. The results of diagnostic tests reported in table-4 also showed that our model is well and properly specified. There is no problem with heteroscedasticity and serial correlation and data is also normally distributed.

6. Conclusion and Policy Recommendations

Globalization becomes a manifold phenomenon prevailing in the world. It has different dimensions, like cultural, political and economic. The world becomes a global village through the prompt exchange of products, human skills and knowledge, which are the main and wonderful aspects of globalization. There are different economic aspects of globalization indicated by the international monetary fund (IMF), like trade, investment, and capital and labor transfer also incorporating different challenges of environmental degradation like water and air pollution, etc. Globalization is a well-known phenomenon but its implications and practices are different in different countries, depending upon their directions, structures and the level of openness. This research is mainly conducted to find out the international as well as domestic determinants of inflation in Pakistan. Recently, economic, social and political integration increased among countries. And this integration brings different macro-economic consequences including inflation. A lot of literature exists on its consequences, but the question raised in this study is the impact

of globalization has the same impact on developing countries like Pakistan as its consequences on the developed world.

To find out the questions, this study took different macroeconomic variables from 1970 to 2020 and applied ARDL. Findings suggested that openness has an inflationary impact on Pakistan. Simply, an increase in globalization leads to high inflation in Pakistan. These results are consistent with the findings of Zakria (2010) and Afzal et al (2013) but are opposite to the Romers' findings. According to Romer, openness leads to an inflationary decline in the country. In a developing country like Pakistan, we have to rely on other developed countries, and globalization is the name of integration among countries, so this incorporation also influences prices in the country. Pakistan needs to regulate fluctuations in the exchange rate. Besides, instead of current government expenditures, the public sector must promote development expenditures. Following the appropriate policy measures can bore the fruits of globalization as well as reduce inflation in Pakistan like developed economies.

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