An Analysis of the relationship between Inflation and Trade Openness

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ABSTRACT

In this age of economic globalization, it is vital to have understanding of the relationship between inflation and openness. Romer (1993) hypothesizes that inflation is lower in the small open economies. This study validates the existence of significant relationship between inflation and openness in the case of Pakistan. This study is aimed to empirically determine the relationship between inflation and openness and check the correlation among the independent variables and run the regression. The result shows that the correlation between GDP and M2 is moderate relationship and the correlation between M2 and OT week relationship between variables. The correlation between OT and GDP is .007 which also shows the week relationship between variables. INF is dependent variable and OT (openness to Trade) M2 and GDP are the independent variables in the model.

Keywords: Analysis ; Relationship ; Inflation ; Trade Openness

1. INTRODUCTION

Economic globalization is a process of increasing the connectivity and interdependence of markets and business by removing restrictions and barriers on exchange of knowledge and products across the borders and regions. Economic globalization is an emerging issue in these days and thus supported by developed nations. Economic globalization also promotes mutual, cultural, financial and trade reliance. It is generally expected to reduce poverty and enhance economic development through faster growth in the most integrated economies. Burger and Krueger (2003) has shown that trade openness causes an increase in aggregate incomes and thereby growth rates.

No country in the world can survive in isolation. The world is quickly transforming into global village. In this transformation, trade has contributed more largely than any other factor. Benefits of the international trade and trade openness are widely discussed in the economic literature. Trade improves the level and distribution of income, enhances the availability of the choices, increases opportunities, boosts up technical capacities and finally stimulates people to bring economic changes and development in their countries. Economic
globalization and trade openness causes the international capital flow and full utilization of the under employed resources.

Trade openness is a tool of anti-monopoly as well as a medium for the long-windedness of the new technology, ideas and managerial skills among nations. It also harmonizes or even unifies the monetary and fiscal policies. General Agreement on Tariffs and Trade (GATT) was introduced and signed by twenty-three countries in 1947. The motive behind the GATT was to promote free trade among nations. Countries were agreed on lowering the trade barriers. They gained from trade and world output enhanced due to free trade and reduction in trade barriers.

The South Asian Association for Regional Cooperation (SAARC): An economic and political organization was founded on December 8, 1985, by Governments of Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka. Its motive was to speed up social development and economic growth in Member States. The North American Free Trade Agreement (NAFTA) is signed in 1994 by the governments of the United States, Canada, and Mexico to create a trilateral trade in North America. The agreement diminishes the trade obstruction and import-export duties between United States, Canada, and Mexico. It significantly eliminates the Mexican tariff by 65 percent on roughly half of all US industrial manufactured products. NAFTA has two components, the North American Agreement on Environmental Cooperation (NAEAC) and the North American Agreement on Labor Cooperation (NAALC). The Agreement on South Asian Free Trade Area (SAFTA) was signed at Islamabad during the Twelfth SAARC Summit on 6th January 2004. SAFTA was established on 1st January 2006. The objective of this agreement was to encourage and promote economic cooperation and mutual trade among contracting nations by removing barriers to trade, facilitating movement of goods across border and promoting fair competition in the free trade area.

To liberalize international trade and stimulate economic growth the World Trade Organization (WTO) was established in 1995 under the Marrakech Agreement, replacing GATT. The WTO deals with regulation of trade and provides a framework for economic negotiating and designing trade agreements. Pakistan has been a WTO member since 1st January 1995. One hundred and thirty-nine countries are now members of WTO. The GATT preface (1947) reports that “trade and economic endeavor should be conducted with a view to raising standards of living, ensuring full employment and a large and steadily growing volume of real income.” These basic goals were reinforced in the Marrakech Agreement, which established the WTO.

Economies specialize in the products of their comparative advantage and factor prices equalize among trading nations because of identical technology and production throughout the world. Trade is adversely affected by many factors such as demand and supply shocks, inflation, over population, and technological shocks etc. But among all these factors, high inflation more significantly and badly affects the economy as well as the society. Improper price regulation and imperfect information about aggregate price level causes inflationary situation in the economy.

A high rate of inflation causes many economic problems like poverty, unequal distribution of wealth, market imperfections, deficit in balance of payments and unemployment as well as non-economic problems like social evils such as smuggling and hoarding etc. Inflation also disturbs the very important role of smoothness of price mechanism. Moreover, high inflation rate has more volatility over time. The volatility of inflation rate is a hindrance for future economic planning and project evaluation and productive use of resources. Inflation slows down the economic growth and hurts the economy. Maintaining non-inflationary stable economic growth is inevitable not only to
uphold macroeconomic stability but also to save the poor from unfavorable effects of inflation (Ashra, 2002).

The overall price level may turn down because of direct and indirect price effects of cheaper imports of finished goods and intermediate inputs. Low cost availability of imports will turn down the domestic price level directly. This effect depends on the share of imports in the economy and this share of imports increases as the economy becomes more open. Cheaper imports force the domestic producers to reduce their prices. The availability of cheaper imports, cheaper inputs and foreign competition also reduce the cost of production and hence inflation. There are some direct and indirect, quantitative and qualitative methods of controlling inflation. Opening the economy is one of them.

Increased openness can also lead lower inflation indirectly. As the competition increases there will be faster domestic productivity growth and firms can pay high wages without passing their cost in the form of high prices. Grossman and Helpman (1991) identified four channels such as transfer of technical knowledge, competition among firms to innovate, greater reward for successful innovation and specialization in dynamics sectors through which increased openness leads to faster productivity growth. There are also many other ways such as central bank’s inflation objectives, imperfect competition and debt crises through which openness lower the price level. But most of them may be over time effects. They have transitory effects on the inflation rate but it may last for a long time (Wynne and Kersting, 2007). In a more integrated world, competition between currencies forces central bank to adopt best practices and keeps inflation low (Wagner, 2002; Tytell and Wei, 2004).

Rogoff (2003) pointed out if we closed up gap between natural rates of output and desired level of output then globalization would down size the inflation bias that were not restrained by rule. Causality ran from openness to lower inflation (Romer, 1993). Rogoff (2003) indicated some factors such as increased competition in labor and product market and better monetary policy resulted from increased globalization. These factors contributed in lowering inflation.

Monetary, fiscal and structural variables can influence the inflation. However when the economies become more open such fiscal, monetary and structural tools lose their control over inflation. Fluctuations in the exchange rate, foreign investment inflows and balance of payments also influence the price level. According to Milton Freidman (1963), “Inflation is always and everywhere a monetary phenomenon.” So when monetary authority lose their hold on inflation then trade openness act as a brake to the gains obtained by the inflationary surprise. As a result there exists inverse relationship between inflation and openness in the more open economies (Sachsida, Carneiro and Loureiro, 2003). Terra (1997) and Terra (1998) argued that negative relationship between inflation and openness existed in the economies those were heavily indebted. Macleod and Gurben (2004) supported the negative relationship between openness to trade and inflation and examined that this relationship is stronger in countries which experienced floating exchange rate. They also rejected Terra’s (1998) hypothesis and found that negative relationship between inflation and openness was more significant among less indebted economies.

Opening the economy not only improves the trade but it also helps to control the inflation. Romer (1993) hypothesized that inflation would be lower in the economies that are more open in trade. The negative relationship between inflation and openness was supported by Iyoha (1973), Lane (1997) and Sachsida (2003).

High inflation slows down the process of economic growth. It is believed that reasonable and stable inflation rate boosts up the economic growth and hence development process of a country. Moderate inflation increase return to savers, enhances investment, and therefore, speed up the economic growth of the country.
Mundell (1965) and Tobin (1965) explored a positive relationship between the rate of inflation and the rate of capital accumulation, which in turn, enhances the rate of economic growth. Mallik and Chowdhury (2001) found evidence of positive and long-run relationship between inflation and GDP growth rate for all four South Asian Developing Countries. On contrary, Fischer and Modigliani (1978) suggested an inverse and non-linear relationship between economic growth and rate of inflation. They pointed out that inflation hampered economic growth by reducing the efficiency of investment rather than its level.

Friedman (1977) suggested a negative effect of a highly volatile inflation rate on economic efficiency because of two reasons. Firstly, increased volatility in inflation causes long-term contracts more expensive because the future value of dollar payments is more uncertain. Secondly, increased volatility in inflation reduces the ability of markets to convey information to market participants about relative price movements. Greater inflation reduces economic efficiency which increases the rate of unemployment for the short term and reduces economic growth. Samimi and Shahryar (2009) also supported these results. Shelley and Wallacez (2004) showed that expected changes in inflation were inversely related to real output growth in Mexico.

Qayyum (2006) stated that inflation is negatively related to the economic growth in Pakistan. The money supply growth affects inflation and real GDP growth in Pakistan. Excess money supply growth had been an important factor to the rise in inflation in Pakistan. According to monetarists, inflation is a monetary phenomenon and this is also holds for Pakistan. This is because of loose monetary policy adopted by the State Bank of Pakistan. Inflation in Pakistan can be cured by a sufficiently tight monetary policy.

Since 1970s, Pakistan’s growth record underscores that high and persistent inflation is harmful to growth. Periods of high inflation have coincided with low growth spells, while high growth episodes tend to be associated with a low inflation environment (Khan and Schimmelpfennig, 2006).

No country can keep itself away from the world markets. Developing nations with restricted markets and insufficient resources had to make safe their goods and resources outside their boundaries. Due to removal of trade barriers and access to the advanced markets, developing economies earned relatively higher national income and hence economic development. Kemal et al. (2002) showed a positive linkage between export and economic growth in the South Asian countries including Pakistan.

In Pakistan, a number of decisions were taken such as 47% devaluation of Pakistani rupee in 1973, liberalization of import policy, delinking of Pak rupee from US dollar in 1982, the State Bank of Pakistan’s Export Refinance in 1973 to facilitate exporters to promote exports and hence trade. Pakistan adopted trade liberalization polices since late 1980s to bridge up socio-economic gaps and enhances the economic growth. Pakistan signed a Structural Adjustment Program (SAP) with IMF to address its problem of balance of payments and liberalize of both exports and imports in 1988. A case study on Pakistan by the Social Policy Development Center (SPDC 2006) showed that due to the trade liberalization and stable macroeconomic strategies, Pakistan’s trade has gone faster. Pakistan’s export increases, on average, by 14% per annum from 1980-81 to 2008-09. The export of primary, semi manufactured and manufactured goods, capital and consumer goods increases, on average by 16%, 15%, 20%, 9.2% and 19% per annum respectively. Although Pakistan’s overall trade to GDP ratio has risen 10.9% in 1970-71 to 30.65% in 1980-81 to 30.43% in 1990-91 to 27.69% in 2000-01 and 26% in 2008-09 but trade performance of Pakistan is still lacking behind than many other developing countries even in South Asia.

Pakistan’s economy is less developed and small open economy. Evidence from the economy of Pakistan shows that trade openness positively affects the economy through investment, foreign direct investment and manufactured exports (Yasmin, Jehan and
Chaudhary, 2006). Kemal et al. (2002) empirically examined the macroeconomic determinants of growth in Pakistan by taking into account the variables assuming to have the very important impact on the growth rate such as population growth, investment in physical capital, government consumption, trade liberalization and inflation.

This study examines the linkage between inflation and openness in Pakistan. Does increasing trade openness effect inflation in Pakistan? Does trade openness necessarily enhance for the economic growth of Pakistan. Will economic growth in Pakistan lower the inflation rate in Pakistan? All these questions are needed to resolve because it is necessary to analyze what is going on in the economy. It is also inevitable to examine up to what extent Government of Pakistan can restrict its trade and how does it influence the Inflation.

This study is planned to test Romer’s (1993) hypothesis about inflation and openness in case of Pakistan because both inflation and openness influence the economy of Pakistan.

OBJECTIVES

This study is planned keeping in view the following objectives:

- To empirically determine the relationship between inflation and openness.
- To check the correlation among the independent variables.
- To run the regression

SIGNIFICANCE OF THE STUDY

Inflation is undesirable for any social and economic system. On one side, it upsets the price mechanism and reduces the economic growth. On the other hand, openness to trade increases economic growth and development in the economy. Unrestricted trade causes free movement of resources, technology and managerial skills and thus enhances the productivity and growth. According to the new growth theory, output is a channel through which openness controls inflation. The present study is designed to investigate the inflation openness situation in the Pakistan’s economy.

ORGANIZATION OF THE STUDY

The rest of the study is designed as: Review of Literature of previous studies is discussed in Chapter 2. Chapter 3 includes the data source and model specification. The empirical findings and their analysis is presented in Chapter 4. Conclusions, recommendations and policy implications are given in Chapter 5.

DELIMITATIONS

This study is confined to just test the relationship inflation and openness. Histogram will be plotted to check the normality of the data and scatter plot are drawn to check the linear relationship among the variables.

2. REVIEW OF LITERATURE

In economics, the empirical literature on the relationship between inflation and trade openness is relatively scant. However, to be brief and precise, some empirical studies in the recent years are summarized as:

Romer (1993) postulated the hypothesis that average inflation rate is lower in relatively smaller, more open economies. He used cross country data for 114 countries. He categorized sample countries into 4 groups. He used the average annual change of log of GDP or GNP deflator to measure inflation for most of the countries. The countries for which series of GDP or GNP deflator was not available he used the change in the log of CPI as a measure of inflation. He used average share of imports in GDP or GNP as a measure of openness. This
study considered three types of control variables: (i) real income per capita: a general measure of development, (ii) a set of dummy variables for OECD membership and for various regions, (iii) dummy variables for the use of CPI rather than GDP deflator and for alternative measure of openness. The results of this study were significant for a wide range of countries except for a small group of developed economies in which inflation is lower and unrelated to openness. Romer (1993) argued that more open economies have steeper Philips curve representing lower inflation. The negative relationship between inflation and openness was stronger in countries that were politically less stable and had less independent central bank.

Lane (1997) and Campillo and Miron (1997) also supported the Romer’s (1993) findings about inverse relationship between inflation and openness. They demonstrated that inflation was negatively related to openness to trade even for the advanced and developed economies. Lane (1997) used 15-years averaged annual data from 1973-1988 and undertook cross sectional analysis through OLS technique. Lane reported that through price rigidity in the non-traded sector and through imperfect competition inflation and openness interrelated to each other. Furthermore, Lane (1997) documented that by using the variables such as per capita income, country size and central bank independency as control variables, inflation and openness are negatively related and statistically significant in the developed industrial economies. Campillo and Miron (1997) also investigated the inverse linkage between openness and inflation.

Mcleod and Gruben (2004) found an inverse relationship between inflation and trade openness. They found this relationship to be stronger in the countries with floating exchange rate. They also rejected the Terra’s (1998) hypothesis and favored that the negative relationship between openness and inflation was more significant among less indebted economies.

Bowdler and Nunziata (2006) extended the work of Boschen and Weise (2003) and found that increased openness reduced the probability of inflation start. They uses the variables such as high rates of real GDP growth, gap between inflation in US and domestic inflation and general elections take place in particular year caused the inflation start which had the negative relationship with trade openness.

Farvaque and Sarfaraz (2009) postulated that inflation and openness relationship varies in Asian developing countries and developed OECD countries. Their analysis is based on the annual data for the time period of 1980-2006. They studied thirty-seven countries in which there are twenty-one industrialized countries and sixteen developing countries of Asia. They showed that through the export prices the negative relationship between inflation and trade openness existed for the both developing countries as well as developed countries. The variables of their study were import prices, export prices real GDP, consumer price index (CPI) and trade as a percentage of GDP – a measure of trade openness. Globalization negatively effects the domestic inflation and increasing openness causes to decline the inflation sensitivity to output gap.

Nasser, Sachsida and Mendonca (2009) examined the relationship between inflation and trade openness for one hundred and fifty-two countries for the period 1950-1992. They found that the Terra’s (1998) criticism that the negative relationship between inflation and trade openness existed in the heavily indebted countries, did not held in the 1990’s. However, their results supported the Romer’s (1993) main result of the negative relationship between inflation and trade openness.

Alfaro (2004) investigated that, in short run, openness did not play a significant role in controlling inflation. He used panel data set for the period of 1973-1998 for the developing and developed countries. Furthermore, he demonstrated that exchange rate had a significant impact on inflation. These results hold after controlling for country and time fixed effects. Classical economists argued that exchange rate reflects the greater accountability,
observability and transparency of the exchange rate over openness. There is strong relationship between exchange rate and inflation in short run because inflation can be controlled through the economic cooperation and through the macroeconomic policies. Alfaro (2004) reported that fixed exchange rate restricted inflation in short run.

The impact of trade openness policy on tariff structure, export competitiveness, inflation and economic growth of the Latin American Countries was discussed by Rajagopal (2007). He explored that greater trade openness among the Latin American Countries improved the domestic institutions. In the analysis he focused on measuring the economic growth of Latin American Countries. Major variables, he used, were gross domestic investment, savings, reserves of foreign assets, growth rate of GNP, capital inflow, exports of goods and services, import of goods and services, consumption of goods and services and gross national product. This study also showed the negative relationship between inflation and trade openness among the Latin American Countries.

Kim and Beladi (2005) estimated the inflation and trade openness relationship for sixty-two countries. They investigated the direct relationship between inflation and trade openness for some developed economies such as Ireland, Belgium and US. They supported the Romer’s (1993) hypothesis of negative relationship between inflation and trade openness for the developing economies. They also documented that central bank dependency did not play an important role in explaining the relationship between inflation and openness.

Hanif and Batool (2006) tested the Romer’s (1993) hypothesis that small open economies experienced low inflation, for the country of Pakistan. They used time series data for the period 1973-2005. In their analysis they included real GDP growth, wheat support price, interest rate and monetary growth and trade to GDP ratio which is evidently negatively related to the domestic price growth in Pakistan. They reported that openness had a significant and negative impact on the price level in the economy of Pakistan.

Badinger (2008) postulated that globalization has played a key role in reducing the world wide inflation rate. This will be possible by directing the policy makers to make polices which are helpful in reducing the inflation. In this study he also analyzed the Taylor rule for eighty-three countries over the period for 1985-2004. He used variables such as short term interest rate, real GDP growth and actual Inflation, trade openness and financial openness. In the analysis, he considered GDP as a proxy for economic activity because of unavailability of data on potential output for most of the countries. He showed that output gap has negative relationship to the trade openness and financial openness. But this result does not hold for the OECD economies. He suggested to these economies that they should solve the time inconsistency problems.

Aaron and Muellbauer (2007) investigated in their study that to measure openness to trade is difficult although it is related to the exchange rate, growth model and inflation. But they measured trade openness through observable trade policy (tariff and surcharges) and unobservable trade polices (quotas and other non-tariff barriers) controlling for business cycle and exchange rate. They examined the variables such as manufactured imports to domestic demand for manufactures (IMP/D) and \( p^{imp} \) and \( p^{man} \) the price index for domestic output of manufactures, trade openness presenting low tariff barriers and NTBs. They found significant negative relationship between inflation and trade openness for South Africa.

Bowdler and Malik (2006) suggested two mechanisms through which inflation volatility can be declined. Trade openness reduces inflation volatility through minimizing more diversification in the pattern of consumption and through creating incentives for the policy makers to adopt stable macroeconomic policies. The trade to GDP ratio is used as a proxy for openness. For measuring the inflation volatility data for each country is divided into eight subsections, each consisting twenty quarters. This paper also demonstrated negative
relationship between inflation volatility and trade openness. This relationship is strongest among the developing economies and emerging economies.

Ashra (2002) demonstrated the empirical analysis of fifteen developing countries. He used panel data for the year 1980s and 1990s. He examined that the usual variables like agriculture output and growth of money, the variables such as import to GDP ratio and export to GDP ratio those are openness variables significantly influence the domestic rate of inflation. But these variables have an impact in a way just opposite to each other. Export to GDP ratio increases the inflationary pressure while the import to GDP ratio decreases this inflationary pressure.

Cooke (2004) developed a general equilibrium model which is based on the assumptions of the small open economies and analyzed the inflation bias. He examined the idea that more open economies experience the low rate of inflation. He showed that openness caused lower inflation because it changes the slope of Philips curve. Philips curve is steeper in more open economies. Furthermore, he said that openness caused optimal output level which helps to set down the position of the monetary authority’s utility function. He demonstrated the inverse relationship between inflation and openness and this inverse relationship holds when there was low foreign demand. But when the foreign demand increases inflation fell down and rose with the changes in openness.

Wynne and Kerstin (2007) provided evidence on the robust negative relationship between inflation and trade openness, across countries in the long run as the Romer (1993) stated. Furthermore, they stated that it was not only the openness to trade which reduced the inflation rate but openness to capital flows and openness to labor also reduced the inflation rate.

Wynne (2007) revealed that countries those were small but strongly linked with the international trade had better economic performance. Moreover, he said that more openness to trade caused reduction in the long run inflation rates. The reason behind this is that in more integrated economies there is less incentives for the monetary authorities to generate surprise inflation. In this study he used three quantity measures for openness those are foreign workers as a share of labor force, foreign assets and liabilities as a share of GDP and import and exports as a share of GDP.

Iyoha (1973) explained the negative relationship between inflation and trade openness in the less developed economies. She took the sample of thirty-three less developed countries and used OLS technique to estimate the results. She used both yearly and five year averaged data from 1960-61 through 1964-65 to analyze the relationship between inflation and openness. Her results showed the negative relationship between the inflation and openness. These results have implications for the optimal capital accumulation strategy and optimal trade policy (“inward looking” vs. “outward looking” polices). In her analysis, she used five independent variables those were import price, export price, income, money supply and terms of trade. She found the systemic variation in the rates of inflation of developing countries.

Bank of Japan (2007) showed the influence of economic globalization on inflation and examined the case of EMEAP economies. It demonstrated that inflation rate was reduced in these economies. The EMEAP economies had high degree of trade openness which causes reduction in the domestic rate of inflation. Besides these, inflation was also being affected in these economies through improvement in the monetary policy.

Berumentet al. (2007) expressed the role of openness to trade on inflation volatility for four MENA (Middle East and North Africa) countries. These four developing countries are Jordan, Turkey, Morocco and Algeria. In this study writer discussed the export openness and import openness for these MENA countries for the period of 1952-2006. The available data was from 1968-2006 for Turkey, from 1952-2006 for Morocco, from 1959-2004 for Jordon and from 1969-2006 for Algeria. They used annual data on imports, exports, GDP and CPI.
GDP is used as measure of income and CPI as a measure of prices. The empirical analysis of this study demonstrated that import openness that was import to GDP ratio, reduced the inflation volatility for Morocco and Jordan but it enhances the volatility for Turkey and Algeria. Export openness that was export to GDP ratio lowered the inflation volatility in these four developing countries.

Sibert (2007) suggested that over the past decade world-wide inflation has been low and stable because of the better monetary policy. He showed that inflation dropped out in mid 1990s in developing and emerging markets. It also fell down in early 1980s in the developed and industrialized Asian economies. Furthermore, he reported that growth of emerging market economies such as China had influence the inflation and causes low inflation because Chinese producers are more competent as compare to European and North American producers.

All the above discussed studies supported the Romer’s (1993) hypothesis about negative relationship between inflation and openness to trade. Economists showed that closed economies experienced high rate of inflation. So, the present study is designed to test whether or not Romer’s hypothesis exists in case of Pakistan.

3. METHODOLOGY

In the trade and growth theories, direct and positive relationship has been observed between openness to international trade and economic growth. Openness to trade can influence the economic growth through a number of ways such as increased efficiency and improved resource allocation, productivity gains through technology and greater access to world market (Ejaz and Omer, 2003). On the other hand, inflation adversely affects the economy. High inflation is a hindrance for the future economic planning and hence economic growth. New growth theories proposed that output is a channel through which openness might check the inflation. So, the countries those are more integrated to the world economies have better economic performance and lower inflation.

DATA SOURCES

This study utilizes time series data on real gross domestic product (Y), financial development (FD), inflation (Inf) and openness to trade (OT) for the span 1970-71 to 2008-09 to examine the relationship between inflation and openness to trade. Data were collected from various issues of Pakistan Economic Survey and WDI.

MODEL SPECIFICATION

Inflation is beneficial for the economy by its role in industrial take off and in capital accumulation. Furthermore, inflation causes to release the reserves for the development of the economy through the income distribution. In contrary, it also hurts the economy by inflationary finance and profit reduction (Thrillwall 1995). Openness to trade enhances the world economic growth. Trade openness eliminates the trade barriers and leads to a more integration among the nations. If the economies are liberalized and markets are deregulated then the international competition will enhance the productivity growth and increase the labor supply.
To determine the relationship among real gross domestic product (Y), financial development (FD), inflation and openness to trade (OT), various specifications have been tested and most appropriate one is presented below:

$$\text{Inf} = \alpha_0 + \alpha_1 Y + \alpha_2 FD + \alpha_3 OT + u$$

Where

- \(\ln\) = Natural logarithm
- \(Y\) = Real GDP – a proxy used to measures the economic growth of an economy; Current GDP at market prices which is deflated by GDP deflator. This proxy has been used by Ashra (2002), Bowdler and Nunziata (2006) and Hanif and Batool (2006).
- \(FD\) = Financial development which is the ratio of money supply to nominal GDP. M2/GDP ratio has been applied by Khan, Qayyum and Saeed (2005).
- \(Inf\) = GDP deflator: one of the most important indicators of inflation. This proxy is used by Al Nasser, Sachsida and de Mendonca (2009) and Kim and Beladi (2005).
- \(OT\) = Openness to trade – For the measurement of openness to trade, [(exports + imports / (GDP)]. This proxy has been used by (Jean-Louis, Patrick and Sandra, 2003).

### 4. EMPIRICAL RESULTS AND DATA ANALYSIS

#### Correlations

<table>
<thead>
<tr>
<th></th>
<th>GDP</th>
<th>M2</th>
<th>OT</th>
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</thead>
<tbody>
<tr>
<td>GDP</td>
<td>Pearson Correlation</td>
<td>1</td>
<td>-.108</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>.502</td>
<td>.007</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>41</td>
<td>41</td>
</tr>
<tr>
<td>M2</td>
<td>Pearson Correlation</td>
<td>-.108</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>.502</td>
<td>.281</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>41</td>
<td>41</td>
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<tr>
<td>OT</td>
<td>Pearson Correlation</td>
<td>-.415**</td>
<td>.172</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>.007</td>
<td>.281</td>
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<tr>
<td></td>
<td>N</td>
<td>41</td>
<td>41</td>
</tr>
</tbody>
</table>

**. Correlation is significant at the 0.01 level (2-tailed).

- The correlation between GDP and M2 is .50 which shows the moderate relationship between the variables.
- The correlation between M2 and OT is .28 which shows the week relationship between variables.
- The correlation between OT and GDP is .007 which also shows the weak relationship between variables.

Regression

Variables Entered/Removed

<table>
<thead>
<tr>
<th>Model</th>
<th>Variables Entered</th>
<th>Variables Removed</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>OT, M2, GDP</td>
<td></td>
<td>Enter</td>
</tr>
</tbody>
</table>

a. All requested variables entered.
b. Dependent Variable: inf

INTRODUCTORY TABLE GIVES THE INFORMATION ABOUT ALL THE VARIABLES:

This table gives information about all the variables telling that Inflation is my dependent variable and Openness to trade, GDP, Money Supply are the independent variables in the model.

Model Summary

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>.469a</td>
<td>.220</td>
<td>.156</td>
<td>57.00493</td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), OT, M2, GDP

Interpretation:

Adjusted R Square is .156 which shows that 15.6% changes in the dependent variable (inflation) due to independent variables (openness to trade, money supply and GDP.)

ANOVA

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>Df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
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<tbody>
<tr>
<td>Regression</td>
<td>33836.354</td>
<td>3</td>
<td>11278.785</td>
<td>3.471</td>
<td>.026a</td>
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<td>Residual</td>
<td>120233.780</td>
<td>37</td>
<td>3249.562</td>
<td></td>
<td></td>
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<tr>
<td>Total</td>
<td>154070.134</td>
<td>40</td>
<td>3813.705</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), OT, M2, GDP
b. Dependent Variable: inf
Model Summary

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
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<tr>
<td>1</td>
<td>.469&lt;sup&gt;a&lt;/sup&gt;</td>
<td>.220</td>
<td>.156</td>
<td>57.00493</td>
</tr>
</tbody>
</table>

Interpretation:

This is a model gives the information about the good fitness of the model:

Regression results show that Significance level 0.026 is less than 0.05, which tells us that model is a good fit.

Coefficients

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>t</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>(Constant)</td>
<td>151.121</td>
<td>29.935</td>
<td>5.048</td>
</tr>
<tr>
<td></td>
<td>M2</td>
<td>-4.082</td>
<td>1.752</td>
<td>-.344</td>
</tr>
<tr>
<td></td>
<td>GDP</td>
<td>-8.586</td>
<td>4.050</td>
<td>-.339</td>
</tr>
<tr>
<td></td>
<td>OT</td>
<td>-1.399</td>
<td>1.040</td>
<td>-.217</td>
</tr>
</tbody>
</table>

a. Dependent Variable: inf

This table tells that the relation of all independent variables with dependent variables:

This table tells us that which independent variables are more important and relevant to my study. Result shows that variables (M2, GDP) have significance level less than 0.05 thus they are more important and relevant than the variables (OT) whose significance value is greater than 0.05.
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