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## **Linkages of Corruption with Income, Inflation and Income Inequality in Pakistan**

### **Abstract**

This study aims to investigate the causal linkages between corruption and three of its main determinants comprised of income level, inflation and income inequality in Pakistan over the years 1980-2013. The findings support that inter alia inflation causes more corruption while income rise goes the other way around. Overall the impact of extant rampant corruption implies for the higher economic growth as sin qua none of lowering inflation and therein improving income inequalities in Pakistan. On these bases, it is suggested that policy formulation to curb corruption level needed to be grounded in accord with the economic policies of the country. Moreover, there is indication of tradeoff between lowering corruption and inflation implying for the requisites of ingenuity in pragmatic approach by the extant government apparatuses, ceteris paribus.

Keywords: Corruption; Economic growth; Inequality; Inflation

### **I. Introduction:**

This study aims to uncover the linkages of the corruption and its economic determinants. Corruption is a curse and it has been defined differently by different authors allowing for contributing factors. World Bank has defined the corruption as “abuse of public office for private gains” whereas Transparency International has defined corruption as “exploitation of entrusted authority for personal gains” with dividing it into categories of “according to rule” and “against the rule” respectively. The former division of corruption with respect rule has been defined as the performing/demanding payment to obtain special treatment for something which the bribe beneficiary is obligatory to do by law whereas the latter known as against the rule corruption has been defined as the act of paying payment to obtain those services which the bribe beneficiary has been outlawed to offer. Corruption

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is one the most serious challenge to developing countries generally and to Pakistan particularly.

Corruption retards growth resulting in poverty, poor governance and hampers welfare (Sevenson, 2005; Seldadyo and De Hann, 2006). These factors cause inequality and inefficiency in resource allocation and thus give rise to social chaos, volatility and instability in the economy. There are numerous factors which are accelerating the corruption including income level, income inequality, inflation, Govt. Size and level of education etc. Sevenson (2005) documented that high amount of corruption in different countries are found to have very low level of human capital and skilled labor in those countries.

Inequality accelerates corruption as income disparity leads to illicit gains (O'Rourke, 1993; Lambsdorf, 1999). Braun and De Tella (2004) documented that inflation directs towards high intensity of corruption and degree of variation in inflation effects corruption positively. Ades and Di Tella (1999) documented that bribery is relatively far above the ground in densely populated countries which implies that size of population has significant impact on corruption.

Government regulations stimulates corruption but the relationship is quite complex as reducing the Government regulations do not reduce level of corruption automatically (Tanzi, 1998). Corruption has paramount impact on the economic, social and political fabric of any country. It has distributional implications for the economy as corruption creates inequality and inefficiency in resources allocation.

This study conducts an empirical analysis to examine the linkages between corruption and three of its main deterrents comprising of income level, inflation and income inequality in Pakistan. The empirical outcomes of the study will provide broader perspective of policy making to minimize the intensity of corruption in the country. The track for the remaining paper is as follow: section II contains the review of literature, section III portrays the methodology and data, section IV contains the estimation results and section V contains the conclusive remarks about the study.

## **II. Review of Literature:**

Corruption has been attributed to be outcome of many factors to fragile state administration, nature and performance of institution and individual as well as collective behavior. Alt and Lassen (2003) noted that plethora of empirical research have revealed the association between corruption and its key determinants. Nonetheless, consensus is once in a blue moon established amid researchers on the determinants of corruption.

Klitgaard (1998) documented that corruption is a consequence of fragile public management raised due to the monopolistic advantage at personal or organization level upon the goods or service, authority of making decisions, to be deficient in accountability, and reduced income levels. It has been noted that in one-time phase, corruption causes undesirable economic factors while on the other time phase it is those other undesirable factor which leads towards corruption and bribery.

There has been found a positive linkage between corruption and underground economy (Johnson et al., 1998; Bonaglia, et al., 2001). On the other hand, Treisman (2000, 2007) noted that there is linkage between corruption and

underground economy as authors found that state intervention curb underground economy that will further aggravate the issue of corruption. While, Lamsdorff (1999) acknowledged that administration rules neither lessen not intensify the level of corruption and it is somewhat credited to the limitation of institutions which fails to curb rampant corruption in the economies.

Many researchers have noted a negative correlation between corruption and income and these studies favored a high level economic activity to boost income growth and per capita incomes to curb the curse of corruption [Brown et al. (2005), Lederman et al. (2005), Chang and Golden (2004) among others]. While Braun and Di Tella (2004) documented that the reverse is true for their sample of studies. Paldam (2002) and Klesner (2010) found the positive linkage between corruption and income distribution.

Many researchers like Kunicova and RoseAckerman (2005), Brunetti and Weder (2003), Herzfeld and Weiss (2003) among other; noted that religion has a key determinant in the level of bribe and corruption in their selected sample of countries. On the other hand, there is some empirical evidence demonstrating a positive association between bribery and group of a specific religious affiliations among the entire level of population [Paldam (2002) and La Porta, et al. (1999)]

The upshot of the above discussion implies that there are enormous causes that have been linked to the rampant curse of bribery/corruption in different nations and regions. Nevertheless, all of these studies described earlier illustrate that corruption is effected with the main factors of income level, inflation and income inequality. These factors have found to have a very noteworthy impact on the intensity of corruption. On this basis, this analysis intends to evaluate the linkages of the level of corruption with these three main factors, *ceteris paribus*.

### **III. Methodology and Data:**

To find out the causal linkages between corruption and its three main determinants, the methodology of VAR (vector auto regression) has been used. For multivariate time series analysis, VAR is suitable approach. It is useful in analyzing time series data for dynamic analysis. To apply the VAR model order of integration of all the variables selected must be zero. As a first step, to check the order of integration of the time series, augmented Dickey Fuller test will be used. In the second step, Granger causality test will be used to identify the causal linkages between the variables of the model. This test is used because coefficients of the VAR model are not directly interpretable. This test uses lagged values of one variable help to determine the relationship of the other variable. The following equations show the Granger causality equation for this model.

$$\Delta C_t = \phi_{10} + \phi_{11} \sum_{t=1}^p \Delta C_{t-p} + \phi_{12} \sum_{t=1}^q \Delta O_{t-q} + \mu_{1t} \quad (1)$$

$$\Delta O_t = \phi_{20} + \phi_{21} \sum_{t=1}^p \Delta C_{t-p} + \phi_{22} \sum_{t=1}^q \Delta O_{t-q} + \mu_{2t} \quad (2)$$

In the above equations, the operator  $\Delta$  denotes the first differencing, C denotes corruption, O represents three main determinants of corruption while  $\mu_t$  denotes random error term with standard assumptions. The main determinants of corruption are comprised of income level, inflation and income inequality in this study. Significance of the coefficients of the lagged variables in equation (1) and

(2) are necessary to recognize the causality path between bribery and its determinants.

In specific, to identify the causality direction,  $H_0: \phi_{12q} = 0$  for all q in equation (1) and  $H_0: \phi_{21p} = 0$  for all p in equation (2) is tested. If the former hypothesis is rejected at standard levels of significance, then this shows that causality runs from determinant of corruption to corruption. This means that determinant of corruption is important in strengthening the causes of changes in corruption. In the same way if the latter hypothesis supposed to hold, then causality runs form corruption to determinant of corruption. This means that change in the corruption levels are important in explaining the movement in the determinant of corruption.

This analysis has employed the yearly time series data over the era 1980-2013 for Pakistan. Corruption perception index is used to measure the corruption level and it is obtained from International Country Risk Guide (ICRG, 2015). Data of the growth of consumer price index (CPI) is used to measure the inflation variable. The income inequality is measured by GINI coefficient while data of GDP per head is used to quantify the income level. The data of GDP per head, consumer price index and GINI index were obtained from World Bank (WDI, 2015).

**IV. Estimation Results:**

This segment elaborates the estimation outcome of the variables. The estimates were obtained by the methodology described in the previous section.

**A. Unit Root Test:**

Time series data mostly contains the problem of non-stationary while for testing the Granger causality by VAR model, all the variables of the model must be stationary. So to find out the order of integration of the time series, augmented Dickey Fuller (ADF) test was used. The outcomes of test statistics are presented with p-value of the ADF test (Table 1).

Results of unit root test given in table 1 show that corruption, income level and income inequality are non-stationary at levels while inflation is found to be stationary at levels. While the result of ADF test at first difference depicts that corruption, income level and income inequality are stationary at their first difference. So in order to apply the Granger causality test with VAR we have to use first difference of corruption, income level and Income inequality to obtain unbiased results.

**Table 1** **ADF Unit Root Test**

| Time Series       | Level            | First difference |
|-------------------|------------------|------------------|
| Corruption        | -2.51<br>(0.57)  | -4.57<br>(0)     |
| Income level      | -2.62<br>(-0.76) | -4.67<br>(0)     |
| Income inequality | -0.79<br>(-1)    | -4.15<br>(-0.02) |
| Inflation         | -4.14            | -----            |

|  |         |  |
|--|---------|--|
|  | (-0.01) |  |
|--|---------|--|

**Note:** p-values of test statistics are reported below the t-values

**B. Granger Causality Test:**

In the second step, Granger causality test was used to determine the direction of causality between the corruption and three of its main determinants comprising of income level, income inequality and inflation. The results are reported in table 2

The first column of (Table 2) shows Null hypothesis, second column shows the values of Chi-Square while third column contains the Probability values. The test results reveals there is unidirectional causality exist between income level and corruption. The direction of this causality runs from income to corruption. This implies that GDP per head/income per person has important bearings with respect to the explaining the movements in corruption levels over the time but not the other way round in the country. This finding has a resemblance with the finding of Brown et al. (2005) which documented that income and corruption are correlated.

In the case of causal association between inflation and level of corruption, the test revealed that there is unidirectional causal relationship holds. The direction of the causality runs form inflation to corruption. This implies that as inflation rises, this will aggravate the issue of corruption in the country. Thus rampant inflation has been found a key factor of the rising curse of the corruption in Pakistan. This finding confirms the finding of Braun and De Tella (2004) which documented that rise in inflation lead to aggravating the corruption in the nation state.

**Table 2**  
**Granger causality Test**

| Null hypothesis                                     | 1980 to 2013 |         |
|---|--------------|---------|
|   | Chi-square   | p-value |
| Income does not granger cause corruption            | 10.35        | 0       |
| corruption does not granger cause income            | 3.98         | 0.13    |
| Inflation does not granger cause corruption         | 4.67         | 0.09    |
| corruption does not granger cause inflation         | 3.02         | 0.21    |
| Income inequality does not granger cause corruption | 11.34        | 0.07    |
| corruption does not granger cause income inequality | 14.53        | 0.04    |

**Note:** optimal lag length of the test was selected at 2 based on Akaik information criterion.

Finally, the test of causal association between income inequality and corruption revealed that there is two ways causality holds for these two variables.

This implies that variations in income inequality are central to changing the level of corruption and vice versa in Pakistan. This also implies that higher level of unequal income distribution may create a social unrest and thereby aggravate the issue of bribery and due to rampant bribery, there will be further inequality among the classes of income holders. This finding supports the findings of O'Rourke (1993) and Lambsdorf (1999) which documented a significant connection between income inequality and corruption. Notwithstanding, the present study assumes that other related variables have relatively low impact on the contemporary analysis of corruption and therein its key determinants.

#### **V. Conclusion and Policy Implications:**

This paper has endeavored to explore the causal linkages between corruption and three of its main determinants comprised of income level, inflation and income inequality in Pakistan. To accomplish the task, yearly time series data over the era 1980-2013 were employed. The approach of Granger causality test was calculated after the confirmation of the stationary properties of the time series. The empirical outcome of the causality test revealed that there is unidirectional causality exist between income level and corruption. The direction of this causality runs from income to corruption. This indicated movement in GDP per head is central to the movements in the corruption but the reverse does not hold. This supports that to curb the corruption, economic production growth has a key determinant in the region. Therefore, an economic policy has a prominent value with crime suppressing policies with a transparent administration system to satisfy the low level corruption condition in the economy.

In the case of causal association between inflation and corruption, the test revealed that there is unidirectional causal relationship exists to hold amid them. The direction of the causality runs from inflation to corruption. This implies that as inflation rises, corruption also rises but not vice versa. This implies that a rampant inflation is also associated with the rampant corruption in the country. On the contrary, the test of causal association between income inequality and corruption revealed that there is two ways causality holds for these two variables. This implies that changes in income inequality are important in explaining variations in corruption and vice versa.

On the basis of these empirical findings it can be derived that corruption depends upon income level in Pakistan and as level of income rises, corruption falls. Similarly, persistent rise in inflation directs to augment the level of corruption in Pakistan. Policy makers should try to reduce inflation to curb the corruption in the country as rampant inflation incites corruption. Moreover, distributional effects that are causing inequality therein give rise to higher corruption and vice versa. Consequently, policy formulation to curb corruption level needed to be grounded with the economic policies of the country. Lastly, thorough and extensive research is further required with the incorporation of important factors like financial development with corruption to critically evaluate the relationship for better policy making and implementation.

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