Impact of Psychological, mental, and Socioeconomic Factors on Corruption in South Asia

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Abstract: The study empirically examines the effects of socio-economic factor (per capita GDP, level of education and Inflation) on crime (corruption) in South Asia. For empirical analysis panel Co-integration technique is used by using data for four South Asian countries for the period 1997 to 2017. First, it is found that the variables have unit roots at levels but are stationary at first differences, which indicates the possibility of co-integration. Co-integration test results show that long-run co-integrating relationship holds among variables. Fully Modified OLS (FMOLS) and Dynamic OLS (DOLS) methods are applied to find the parameter estimates. The results of long run estimates show that level of education, per capita income reduces the corruption, while inflation increases the corruption in the region. It is also found that growth also increase the corruption. Corruption enhances economic growth by allowing investors to escape bureaucratic interval by the use of "speed money".

Keywords: Socioeconomic factor; Crime; South Asia
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1. Introduction

Over the past three decades, the economics research area is capturing the phenomena of crime economics, especially the increase in criminal activity during the same period, as evidenced by some critical studies (Fajnzylber, Lederman, & Loayza). Becker published a paper in 1968 that the way of thinking regarding criminal behavior fundamentally changes. Since the early 1980s, Becker's theory has opened up a new empirical ground of research whose main objective is to validate and study economic variables to identify agents' criminal behaviors and choices. This is possible because many systematic and rigorous research studies has been conducted over the past two decades, particular a more authentic specific and systematic methodology of data collection has been developed, which is useful for analyzing this problem (Becker & Todd, 2017). In reality, many heterogeneous and different fields like sociology, criminology, psychiatry and geography have interacted by the economics. It is nearly linked to the income inequality and wage, backgrounds of family and cultural, social exclusion, levels of education, poverty and many other social and economic factors that may affect individuals' criminal tendencies.

Corruption is one of the economic crimes that directly related to above mentioned social factors. In economics, the study of the reasons and effects of corruption has a long history, at least dating back to the pioneering contributions of Bagwati (1982), Krueger (1974) and others to rent-seeking literature (K. A. Jones, 2015; Lorme, Kamerschen, & Mbaku, 1986). Although, empirically exploration this area has been limited because the competence of government institution cannot be measured. In recent years, corruption around the world has led to concentration of economists and the public interest (Isaksson & Kotsadam, 2018; Kolokoltsov & Malafeyev, 2017; Zalanga, 2018).

There are different forms of corruption like embezzlement, extortion, favoritism, bribery and others. Literature explained different views on this phenomenon. When a person could not fulfill his maximum needs with his earning and he becomes greedier then he involves in some other illegal activities such as social crime i.e. corruption (Butalia, 2013; E. Jones, 1994; Wright, Sanchezazofeifa, Portilloquintero, & Davies, 2007). According to a literature less income societies become more corrupted than the rich societies (Li, Xu, & Zou, 2000). This phenomenon is seen either as a political or economic structural issue or as a personal moral and cultural issue (Rong, Xin-lan, Yu-guang, Economics, & University, 2013). Corruption is a dangerously complex common act. There are many ways to analyze corruption.

The relationship between social factors (level of income, level of education, growth and level of prices) and corruption is not new. Similarly, the extensive empirical studies on the association between corruption and socio-economic factors have not clearly delivered the answer of the question that whether the corruption has positively or negatively affected by economic factors (Aidt, 2009; Arnell & Onate; Mauro; Meon & Weill). In addition, with some exemptions, the researchers were tried to take attention on exploring the effects of social causes of corruption. However, it still exists uncertain that whether the rise in income and education will continue reduce/increase the corruption in various countries, depending on the level of corruption. Although, the literature points out the linear negative relationship between corruption and economic growth, the intensity of growth and corruption is not identical and direct. The long-term tendency of the whole procedure may be similar to the downturn shape described by the linear function, although the nonlinear function can be distinguish between the experiences of less corrupt/moderately corrupt nations with the experience of countries with high levels of corruption.

The aim of the study is to explore the impact of level of income, education and inflation on corruption in South Asia. The study contribute in the literature in the following ways, first this study used the social factor and its impact on corruption. Previous studies mostly focus on cause and consequences of corruption. Second the study is important because it shows the anti-corruption measures to reduce corruption.

This study is divided in six sections. Section 1 is consisted on brief introduction. Section 2 is consisted on review of previous literature. Section 3 is consisted on material and methods Section 4 is consisted on results and discussion. Section 5 is consisted on conclusion and policy recommendation. Section 6 is consisted on references.

2. Literature Review

On the basis of previous literature, the association between the corruption and per capita income is gradually diminishing. There are two contradictory views on the idea of association, the point of view of clarity and the decrease of ability (Rehman & Naveed, 2007). Positive views of income to corruption convey the potential results of income that income gives positive impact on corruption. People having more money always try resolving their problems at all means. In this way they utilize financial resources (Calderón, Duncan, & Schmidt-Hebbel, 2016; Campos, Dimova, & Saleh, 2010; Dreher & Schneider, 2010; Rotimi, Obasaju, Lawal, & IseOlorunkanmi, 2013).

The relationship between income and corruption is unclear on the bases of theoretical background. The debate in the literature about the direction and nature of this relationship has been ongoing. Seldadyo and Haan (2006) investigated that per capita income is very important determining factors of corruption (Seldadyo & Haan, 2006). The main reason behind this is that corruption differs due to the variation from income level. In the literature there are several research studies to confirm this outcome (Damania, (2004); Persson, Tabellini, & Trebbi, 2011; Wade). Although, Hall and Jones (1998), Kaufman et al (1999) and Kaufman and Kraay. (2004) were unconvinced concerning the relationship between income and corruption (Hall & Jones, 1998; Kaufmann & Kraay, 2004; Kaufmann, Kraay, & Zoido, 1999). Many research works have shown that there is a positive impact of level of income on corruption, such as Braun and Tella, and Frechette (Braun & tella; Braun. & Tella., 2004; Frechette, 2001). Lindner (2013) explored that many of economies used the strategy of increase in income to reduce corruption, however increase in income does not always reduces corruption because good management and control on system much need to reduce corruption (Lindner, 2013).

However, there are many other studies such as Lederman et al. (2005), Braun and Di Tella (2004), Kunikova and Ackerman (2005), Chang and Golden (2004), and Damania (2004) that show there is a negative impact of level of income on corruption (Braun & Di Tella, 2004; Chang & Golden, 2007; Kunicová & Rose-Ackerman, 2005; Lederman, Loayza, & Soares, 2007). Cole (2007) explored the association among income, environment and the corruption. In his research, he constructed the two-way relationship between income and corruption. Thus, theoretical and reviews it has confirmed by the empirical and theoretical reviewers that the income corruption discussion has not yet been finalized (Cole, 2007).

The discussion about the impact of education on corruption is at best a mixture of theoretical and empirical studies. Some studies are in the favor that there is negative impact of education on corruption through legal behaviour channels, social cohesion and social responsibility (Beets, (2005); Heyneman, 2002, 2008; Oreopoulos & Salvanes, 2009) .

This position also is supported by some studies based on cross countries (Cheung & Chan; Lederman et al., 2007). But on the other side the many studies showed that the education has positive impact on corruption (Kaffenberger., 2012; Mocan, 2008; Truex, 2011). Kaffenberger (2012) explored that there is positive relationship between corruption and education, as mentioned by Mocan (2008) empirical evidence (Kaffenberger., 2012; Mocan, 2008). This has broadly mentioned by Truex (2011), who previously identified that education is one of the most determining factors of corruption (Truex, 2011). In general, many empirical studies based on the high economic costs of corruption are consistent (Heyneman, 2008; Heyneman., 2004; Stephen., Kathryn., & Nazym., 2007)

Asongu and Nwachuwu (2014) explored that education played a powerful role in corruption reduction. They further explored that the transition from secondary to tertiary education also very impact for reduction in corruption (Asongu. & Nwachukwu., 2014). Eicher et al (2009) explored that education played a key role in corruption reduction. They showed that education not only enhanced economy but increase in income distribution reduced the level of corruption (Theo., Cecilia., & Tanguy., 2009).

From the scientific research findings, there is a positive and significant relationship between corruption and inflation. In other words, significant variations in prices have a rising impact on corruption (Braun. & Tella., 2004) . The corruption was seen very high in those countries that have high inflation rate (Al-Marhubi, 2000). Same is the case, Smith-Hillman (2007), Abed and Davoodi (2002), Rohozyny & Sinitsina (2004), Bahmani-Oskooee and

Nasir (2002), Al-Marhubi, 2000, and Gupta & Chaudhuri (1997), in their studies, concluded that increase in overall prices lead to increase the level of corruption (Abed. G. & Davoodi., 2002; Al-Marhubi & Fahim., 2000; Bahmani-Oskooee & Nasir, 2002; Dabrovski, Rohozynsky, & Sinitsina, 2004; Gupta & Chaudhuri, 1997; V. Smith-Hillman, 2007) .

Empirical literature does not show the clear picture of impact of socio-economics factor on corruption. Either there is positive or negative, short run or long run impact of income, inflation and education on corruption. Researchers explore all the variables separately but no clear evidence among their relationship. There is no study that they explore the impact of all the socio-economic factors with crime (corruption), specifically in South Asian countries. Therefore, this research paper constitutes a step forward to have a better understanding of this debatable issue in the field of economics.

3. Methodology

3.1. The Model

To examine the effect of macroeconomic variables on corruption through balanced panel data method. The panel data method which has lots of advantages is preferred more and more in both macro and micro level econometric studies (Davidson and MacKinnon, 1999: 296). , we will estimate the following equation.

Having both cross sectional and time dimensions in panel data set provides some advantages such as controlling the heterogeneity of the predictions, increasing the degree of freedom level and reaching more reliable parameters (Baltagi, 2005; Hsiao, 2006). Panel data regression model is shown below in the simplest way (Greene, 2003):

$$Cor_{it} = \beta_0 + \beta_1 PCGDP_{it} + \beta_2 ED_{it} + \beta_3 INF_{it} + \mu_{it}$$

Where, i stands for cross sections of countries, whereas 't' denotes the time period (1997 – 2017)

The variables included in the analysis are,

$\mathrm{Cor_{it}} = \mathrm{Corruption}$
$\mathrm{PCGDP_{it}} = \mathrm{Per\ Capita\ GDP\ (Income\ Level)}$
$\mathrm{INF_{it}} = \mathrm{Inflation}$
$\mathrm{ED_{it}} = \mathrm{Level\ of\ Education}$
$\mu_{it} = \mathrm{Error\ Term}$

Theoretical explanation and expected signs above independent variables are as follow:

Per capita DGP: Neoclassical economists argue that developing countries have a better potential of growing faster than their developed counterparts because the diminishing returns to capital in developed countries is stronger than in developing countries resulting in convergence (all other factors held constant) as the developing countries catch up with developed countries at similar levels of per capita GDP over time. This catch-up theory has proven to be necessary because several empirical studies on economic growth found it crucial to control for per capita GDP against corruption. Similar to Mauro (1995); Mauro (1996); Tanzi and Davoodi (1998); Ehrlich and Lui (1999), this research sees per capita GDP as a critical variable which ought to be included in the empirical model.

High levels of national income may bring greater willingness to combat corruption. Blackburn, Bose, & Haque, 2005). Paldam, 2001 and Treisman, 2000 claim that corruption is a poverty driven disease that vanishes when countries develop, so that causality is mainly from the level of GDP to corruption. Brown and Shackman (2007). Aidt (2009) confirm a strong negative relationship between per capita GDP and corruption.

Inflation: The stability of prices plays a major role in achieving macroeconomic stability and hence economic growth in any country. Inflation has been discovered as a hindrance to economic wellbeing in several empirical studies. Inflation creates distortions, creates economic instability, resulting in less productive economic activity, low economic growth and hence the need to control for inflation. Despite the lack of consensus as to whether inflation promotes or reduce the corruption, this research includes the inflation in the main econometric model because inflation remains a classic variable in corruption models and has been used as a variable in several empirical studies on corruption. There is a significant and positive relationship between the change in the inflation rate and

corruption. That is, a significant change in prices has an increasing impact on corruption (Braun and Di Tella, 2004) inflation could influence corruptions implicitly. The increase of inflation can lower the investments and economic growth and it can make the level of corruption higher due to these indirect effects (Braun and Di Tella, 2004). Invariably, inflation pushes disparity of income distribution in society up and this might result in the enlargement of corruptions (Paldam, 2002).

Level of Education: The negative effect of education on corruption is traceable to the cognitive and non-cognitive benefits of the former (Oreopoulos and Salvanes, 2009; Heyneman, 2002). According to the narrative, education induces patience and the ability to sacrifice the present for better gains in the future, essentially because students have to work hard to obtain pass grades (Kaffenberger, 2012). While the results are not consistent with the strand of the literature suggesting that education increases participation in corrupt activities (Kaffenberger, 2012; Mocan, 2008; Truex, 2011), this stream of the literature nonetheless indirectly recognizes the role of education in fighting corruption if proper policies are put in place (Truex, 2011).

Table 3.1 provides the summary of the expected effect of macro variables on corruption

Table 3.1 Relationship between macro variable and corruption

Dependent	Independent	Expected Effect
Corruption	Per capita GDP	-
	Inflation	+
	Level of Education	+/-

3.2. Estimation Technique

There are a number of methods available to examine the existence of relationship or the co-integration among the time series variables. The most common techniques are Ordinary least square, fixed and random effect, GMM, co-integration, granger causality test, VAR estimation, all of these estimation techniques were used in existing literature to observe the relationship between corruption and dynamic variables specifically (See example, (Akça, Ata, & Karaca, 2012; Asongu. & Nwachukwu., 2015)

However, there are several major disadvantages associated with these methods. For instance, Enders (2004) proved that variables must be integrated in the same order by definition for co-integration in Engle-Granger procedure. These two methods for finding the co-integration are not that much reliable for studies with small sample size. This research work adopts relatively a new technique for testing the existence of a co-integration which developed in a series of studies by Westerlund (2007). This study have applied bootstrap panel cointegration test to check the co-integration among variables (Westerlund & Edgerton, 2007). After confirming the cointegration we have applied fully modify ordinary least square (FMOLS) and dynamic ordinary least square (DOLS) for justify the relationship and variables significance among the variables. The detail of Westerlund cointegration, FMOSL and DOLS are given below.

4. Results and Discussion

4.1 Data Overview

For estimation, the data is collected from 1997 to 2017 for four South Asian countries including Pakistan, India, Bangladesh and Sri Lanka. However, Worldwide Governance Indicators (WGI); World Development Indicators (WDI); Corruption Perception Index (CPI) and International Country Risk Guide (ICRG) are the mainly data sources. Here is the nature of the variables:

Corruption: We used the "Perceived as less corrupt if close to 100 and Perceived more corrupt if close to 0. Same is the case, this proxy is used in many studies (Attila, 2011; Bao-yu, Xiao-xiao, Yu, & Frank).

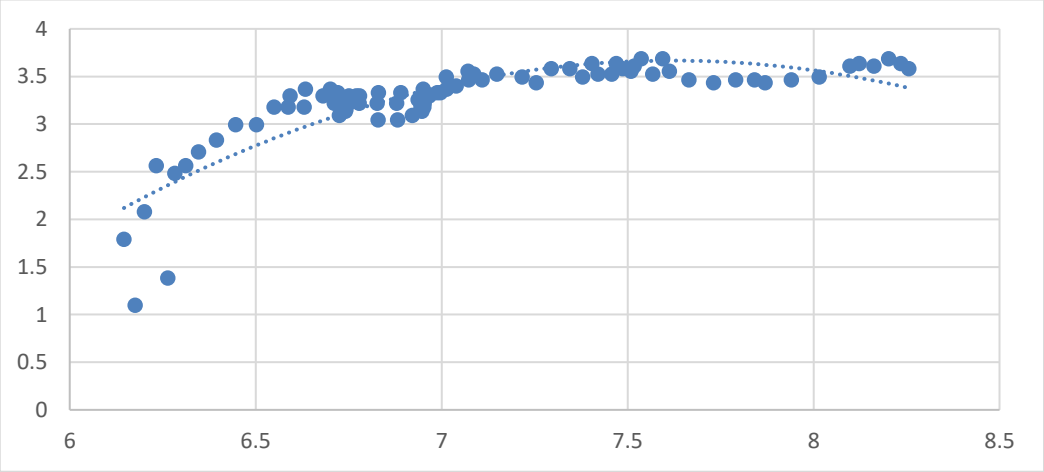
Per-capita GDP: GDP per Capita in US$ is used in our current study, which is also used by many other researchers, (Nolan, Roser, & Thewissen, 2016).

Inflation: Annual inflation based on consumer price index is used in our study (Akça et al., 2012; Kinda, 2011).

Level of Education: Percentage of total population that attain the education at least lower secondary. Same variable used by (Beets, (2005); Heyneman, 2002, 2008; Jensen & Rasmussen, 2011; Oreopoulos & Salvanes, 2009)

The core fitting line of the scatter plot in Figure 4.1 illustrates the relationship between per capita income and corruption. The curve indicates the presence of nonlinear relationships. The curve has increased significantly in the central corruption range and then decreased at the point where corruption is at least and the most. In simple arguments, this can be notice from the outset that, when per capita income increases slightly then corruption increases, again as per capita growth increases then corruption increases, further and in the future, when the level of corruption exceeds 6.5-7, the rate of per capita growth will decline significantly. The nonlinear fitting line shows that the "hypothesis" of "wheel" exists at the end of corruption line, while the role of "wheel" exists in the middle section of corruption. This shows the relationship between income levels and corruption in South Asia is as inverted U-shaped.

Figure 4.1. This is the figure for Corruption and Level of Income of South Asia



Notes: X-axis= corruption and Y-axis = Per capita income

Source: Developed by authors using data from World Development indicators for per capita Income and ICRG for corruption

4.1 Cross-sectional dependence (CD) test

First, the cross-section dependence test on variables has been done as it is present in the panel data. The literature has highlighted different tests for cross-sectional dependence such as Pesaran (2004) scale LM test, Baltagi et al (2012) bias-corrected scaled LM test, Breusch-Pagan (1980) Lagrange Multiplier (LM) test and Pesaran (2004) CD test (Baltagi, Feng, & Kao, 2012; Breusch & Pagan, 1980; Pesaran, 2004).

Consider the traditional panel data model:

$$y_{it} = \alpha_i + \beta_{it} x_{it} + \varepsilon_{it}$$

For $i = 1, \ldots, N$ and $t = 1, \ldots, T$ where β is a $K \times 1$ vector of parameters, x_{it} is a $K \times 1$ vector regressors and αi is time-invariant individual nuisance parameters. The null hypothesis of no cross-section dependence may be expressed as:

H_0: $\rho_{ij} = Corr\ (\mu_{it}, \mu_{ij}) = 0$ for $i \neq j$

Where ρ_{it} is correlation coefficient between the disturbances in cross-section units *i* and *j*. Table 4.1 shows the various results of cross-sectional dependence tests. H_0 is rejected at 5% significance level, which shows the presence of cross-sectional dependence.

Table 4.1. Cross-section dependence (CD) test

Test	Statistic	P-Value
Breusch-Pagan LM	36.9072***	0.0000
Pesaran scaled LM	7.76744***	0.0000
Pesaran CD	0.627993	0.5300

***statistically significant at 1% significance level; LM – Lagrange. Multiplier test

4.2 Panel unit root test

To check the stationarity of the variables, we couldn't applied first generation panel unit root tests due to the presence of cross-sectional dependence. Therefore, we have applied the second generation panel unit root test of Pesaran (2007) to check the stationarity (Pesaran, 2007). Results of Pesaran suggest the following Cross-sectional Augmented Dickey-Fuller (CADF) test to test the null hypothesis of panel unit root:

$$\Delta y_{it} = \alpha_t + \rho_i y_{i,t-i} + c_i \bar{y}_{t-1} + d_i \Delta \bar{y}_t + \nu_{it}$$

Where $\bar{y}_{t-1} = (\frac{1}{N}) \sum_{i-1}^{N} y_{i,t-1}, \Delta \bar{y}_t = (\frac{1}{N}) \sum_{i-1}^{N} \Delta y_{i,t}$ and

$v_{it}$is the regression error, which is not assumed to be serially correlated. This test is *t*-ratio of the ordinary least squares (OLS) estimate ρ_i based. Pesaran (2007) suggests the following cross-section IPS-test (CIPS) (Pesaran, 2007):

$$CIPS = \frac{1}{N} \sum_{i=1}^{N} CADF_i$$

Where $CADF_i$ is the statistics of the *i*th cross-section unit provided by the *t*-ratio of ρ_i in the above regression. If the residuals are serially correlated, more lags of Δy_{it} and $\bar{y}_t$need to be incorporated in the regression. For an *AR* (*p*) process, the following CADF regression will be estimated:

$$\Delta y_{i,t} = \alpha_i + \rho y_{i,t-1} + c_i \bar{y}_{t-1} + \sum_{j=0}^{p} d_{i,} \Delta \bar{y}_{t-1} + \sum_{j=0}^{p} \beta_{i,j} \Delta y_{i,t-j} + \upsilon_{i,t}$$

Table 4.2 provides the panel unit root results of Pesaran (2007). The results reveal that all variables are not stationary at levels, but they are stationary at their first differences (Pesaran, 2007). This finding shows the possibility of variables is co-integrated.

Table 4.2. Pesaran panel unit root test results (Pesaran 2007)

Variables	Level	First Difference
COR	-1.599	-5.037***
PCGDP	-2.308	-5.086***
INF	-1.717	-3.188***
YD	-1.251	-4.465***
ED	-0.411	-5.056***

***null hypothesis is rejected at 1% significance level; for level and first difference series, critical values for 1% are –2.57, respectively; (Source: calculated by authors)

4.3 Panel cointegration test

We have applied Westerlund (2007) bootstrap panel cointegration test to check the co-integration among variables (Westerlund & Edgerton, 2007). The following data-generating process has assumed by the error correction test:

$$\Delta y_{i,t} = \delta_i' d_t + \alpha_i(y_{i,t-1} - \beta_i' x_{i,t-1}) + \sum_{j=1}^{p_i} \alpha_{i,j}\, \Delta y_{i,t-j} + \sum_{j=-q_i}^{p_i} \gamma_{i,j}\, \Delta x_{i,t-j} + \nu_{i,t}$$

Where $y_{i,t}$ represents dependent variable and $x_{i,t}$ states for vector of independent variables. d_t contains the deterministic components. When d_t= 0 there is no deterministic term, when d_t= 1, Δy_{it} has a constant, and finally when d_t =(1,t), Δy_{it} has both constant and trend term.

The parameter α_i shows the speed of adjustment to the equilibrium $y_{i,t-1}$ - $\beta_i x_{i,t-1}$ after a shock. In case α_i< 0 it implies error correction in the model which indicates that cointegration exists between $y_{i,t}$ and $x_{i,t}$. In case α_i= 0, it indicates the absence of cointegration. Thus, the null hypothesis is no cointegration, i.e. H_0: α = 0 for all *i*. However, the alternative hypothesis depends on the assumption of the homogeneity of αi. The first pair of tests, called group-means tests ($G\tau$and $G\alpha$) do not assume α_i's to be equal, thus alternative hypothesis is H_1^G: α_i< 0 for at least one *i*. The second pair of tests, called panel tests ($P\tau$and $P\alpha$), require that $\alpha_i$is equal for all *i*. In this case, the alternative hypothesis is H_1^P: α_i = α < 0 for all *i*.

Table 4.3 provides the Westerlund co-integration test results (Westerlund & Edgerton, 2007). The two test statistics ($G\alpha$and $G\tau$) among four tests rejects the null hypothesis. It indicates that long run co-integration exists among variables.

Table 4.3. Westerlund (2007) panel cointegration test

Test Name	Value of test	z-value	Robust *P*-value
Group mean test (Ga)	-0.127	3.833	1.000
Group mean test (Gt)	-3.664	-2.205	0.014***
Panel test (Pt)	-9.42	-4.774	0.000***
Panel test (Pa)	-0.12	3.164	0.999

***statistically significant at 1% level (Source: calculated by authors)

To verify our co-integration results we have also applied the Fisher/Johansen test as proposed by Maddala and Wu (1999) (Maddala & Wu, 1999). If the probability value (*p*-value) from an individual cointegration test for cross-section *i* is πi then for the panel null hypothesis:

$$-2\sum_{i=1}^{N} \log(\pi_i) \rightarrow X_{2N}^2$$

The results of the Fisher/Johansen test are given in Table 4.4, where both trace and max-eigen tests indicate co-integration among variables as null hypothesis is rejected. Trace statistics indicate two co-integration vectors while max-eigen test indicates one co-integration vector at 1% significance level.

Table 4.4. Fisher/Johansen panel cointegration test

Hypothesized No. of CE(s)	Fisher Stat.* (from trace test)	P-value	Fisher Stat.* (from max-eigen test)	p-value
None	63.13	0.000	41.74	0.000
At most 1	29.43	0.0003	22.72	0.0037
At most 2	13.74	0.0887	12.48	0.131
At most 3	10.05	0.2612	10.05	0.2612

* Probabilities are computed using asymptotic Chi-square distribution.(Source: calculated by authors)

4.4 Estimation of the model

We have applied fully modified OLS (FMOLS) and dynamic OLS (DOLS) methods for model estimation. Estimated outcomes are given in Table 4.5. The results reveal that level of education has a negative and statistically significant effect on corruption in both FMOLS and DOLS estimations. This implies that corruption and education have inverse relationship. When education increases the level of corruption decreases from the economy literature also explained the same findings (see example; Babatunde et al, 2012; Kim and Lee, 2009; WaGithinji and Adesida, 2011; Lee, 2013; Fosu, 2013a;andAsongu, (2016); Asongu, 2016; Fosu, 2013; Kim, 2009; Lee, 2013; Lee & Kim, 2009; Olusola Babatunde, Opawole, & Emmanuel Akinsiku, 2012; Wa Githinji & Adesida, 2011). Government should encourage education at least tertiary and lower secondary level which enhances the fight against corruption. Second, there are "corruption mitigating" benefits that drive a knowledge economy through lifelong learning.

When people are educated then ratio of corruption is decreases. The numerical value of the coefficient shows that when education increases by 1%, corruption decreases by 2.74% (2.55%) in FMOLS (DOLS) estimations. Like level of education, inflation also has a statistically significant but positive impact on corruption in South Asia. When inflation increases then corruption also increases. 1 % increase in inflation corruption will increased 2.04% (1.649%) in FMOSL (DOSL). Braun and Di Tella (2004) Akca et. al., 2012 reported similar result (Akça et al., 2012; Braun & Di Tella, 2004). In other words, high inflation was observed in economies in which corruption was seen intensively (Al-Marhubi and Fahim, 2000). Similarly, Abed and Davoodi (2002), Bahmani-Oskooee and Nasir (2002), Ekpo Agiobenebo (1985), Oweye and Ibrahim (1996), Piplica (2011), Samimi et al. (2012), Smith-Hillman (2007), investigated the effect of corruption on general level of prices in their studies and concluded that corruption increased the prices (Abed & Davoodi, 2000; Al-Marhubi & Fahim., 2000; M. Bahmani-Oskooee & A. Nasir, 2002; Ekpo & Agiobenebo, 1985; Oweye & Ibrahim, 1996; Piplica, 2011; Samimi, Abedini, & Abdollahi, 2012; A. V. Smith-Hillman, 2007).

The most important variable in the estimation is per-capita income. The coefficient of per-capita is negative, which implies that per-capita increases corruption will decreased in the region. The numerical value of the coefficient indicates that 1% increase in per-capita income decrease corruption by 2.24% (2.02%) in FMOLS (DOLS) estimation. Our current study's results are justified because similar results showed in previous studies, (Dreher & Gassebner, 2013; Dreher & Schneider, 2010; Goel & Nelson, 2010; Okada & Samreth, 2012; Swaleheen, 2011), that increase in per capita income leads to decrease the level of corruption.

Table 4.5. Fully modified OLS (FMOLS) and dynamic OLS, (DOLS) estimations (period 1997–2017)

Variable	FMOLS	DOLS
Level of Education	0.0078** (-2.741721)	0.0126** (-2.5585)
Inflation	0.0445** (2.04629)	0.1097* (1.6493)
Per-capita GDP	0.028** (-2.24516)	0.0464** (-2.0265)
R-squared	0.841942	0.862405

Adjusted R-squared	0.819035	0.843556
S.E. of regression	0.186241	0.180827

***, **, * significant at 1%, 5% and 10% respectively;

values in parentheses are t-values (Source: calculated by authors)

4.5 Robustness analysis

For the robustness analysis, we have included another variable in our model, the growth of GDP. By allowing investors to supplement their income with "fast money" and encouraging low-income government employees to pay bribes, corruption makes it easier for investors to avoid delays in administration management. (Leff, 1970; Lui, 1985; Lui., 1985). On the other hand, previous studies have claimed that corruption reduces investment in financial and human capital and has a negative impact on economic growth (P. Mauro., 1995; Reinikka & Svensson, 2005), resulting in insufficient distribution of public spending from areas of growth promotion (e.g. education and health) to areas with low productivity gains but high levels of corruption, such as large and costly infrastructure projects (Paolo. Mauro., 1997; Tanzi & Davoodi, 1997).

The negative or positive impact of corruption on economic growth seems to depend heavily on national and regional circles (Virta, 2010). In addition, with a few exceptions, the researchers focused on identifying the linear effects of corruption on economic growth. However, according to the classification of the level of corruption, it remains unclear whether the increase in economic growth has systematically reduced/increased corruption in several countries.

Table 4.6 provides the estimated results. All previous variables have not only maintained their signs, but their significance levels have also increased. Level of education has become statistically significant in both FMOLS and DOLS estimations. Moreover, inflation has also become statistically positively insignificant. Per-capita gdp has a negative impact on corruption. GDP growth has statistically positively significant in both FMOLS and DOLS estimations. The value of the coefficient implies that 1% increase in growth increases corruption by 3.17% (2.71%) in FMOLS (DOLS) estimations. Positive sign of growth indicate that corruption increases due to increased growth.

Table 4.6. Fully Modified OLS (FMOLS) and Dynamic OLS (DOLS) Estimations For Robustness Analysis

Variable	**FMOLS**	**DOLS**
Level of Education	0.0243** (-2.30336)	0.0164** (-245866)
Inflation	0.839 (0.204015)	0.9931 (0.00869)
Percapita GDP	0.0008** (-3.51954)	0.0031** (-3.06266)
GDP Growth	0.0022** (3.179761)	0.0084** (2.71087)
R-squared	0.860677	0.874678
Adjusted R-squared	0.833235	0.851404
S.E. of regression	0.178784	0.176233

***, **,* significant at 1%, 5% and 10% respectively; values in parentheses are t-values (Source: calculated by authors)

5. Conclusion

Four South Asian countries were discussed in our study. ADF test shows that variables are co-integrated. Our null hypothesis are rejected which were there is positive impact of level of education and income on corruption and there is negative impact of inflation on corruption because FMOLS as well as DOLS both show that level of education and per capita income have negative impact on corruption. If level of education and per capita income

increase then corruption will decrease. This is happened because people always try to fulfil their needs. 95% people never involve in illegal activity if their need can be fulfil by their income. Police is considered one of the most corrupt departments in India, Bangladesh, Sri Lanka and Pakistan. Duty timing is almost 24 hours but in these countries the average income of a policeman is round about US$220 which is insufficient to fulfil for a family (Ahmed, Rameez, Fatima, & Usmani, 2016; Gutierrezgarcia & Rodríguez, 2016; Hope, 2017; Miller, 2016; Schreinemachers, Wu, Uddin, Ahmad, & Hanson, 2016; Tankebe & Asif, 2016). It is very difficult to bear the whole family expenses with lower income such as income of a policeman. When a person cannot fulfil his family's needs then he involves in other activities such as gambling, speculation, robbery, target killing and corruption. On the other hand inflation has positive impact on corruption. If the inflation increases the corruption will also promote. This is happened because when income level remains constant and income is not fairly distribute in the people, but inflation increase then purchasing power of income goes down. People can't fulfil their needs with existing income. Result is that people involve in corruption and other illegal activity to fulfil their wants.

This research study further suggests that government should not only take some solid actions against corruption but also there is need to create wealth, maintain equal distribution of income and good opportunities of employment and increase the level of income which should be as good as they can fulfil the needs to their families.

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