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# Does corruption affect poverty in developing countries?

## Empirical evidence using dynamic panel data analysis

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**Abstract ;**

This study attempts to examine the impact of corruption on poverty in a sample of 42 developing countries for the period (2004-2019) using the dynamic panel data estimators. The resulting estimates using the two step system GMM estimator indicate a positive relationship between corruption and poverty and thus corruption plays a pivotal role in increasing poverty levels in developing countries.

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## 1.*Introduction*

Corruption is a complex phenomenon, it is a problem that humanity has known since ancient times and has become a pervasive global problem that affects more than two thirds of the countries worldwide[1].

In the past two decades, corruption has become one of the main concerns in the international development agenda. Although its costs are difficult to quantify and vary from country to country, there is a growing body of evidence pointing to its negative effects on economic development and social welfare, so it is the biggest obstacle to Social and economic development.

Since the Monterrey Summit of Development finance in 2002, there has been a global consensus that corruption increases poverty, or at least weakens the impact of its reduction measures[2]. Therefore, the relationship between corruption and poverty has received wide coverage in the academic literature, so that many researchers from several disciplines, in particular: economics, sociology, political science and development studies, have attempted to determine the impact of corruption on various aspects of development and human well-being.

Due to the positive impact of corruption on increasing poverty rates, the latter has been a source of concern in developing countries and has received great global attention, especially from Transparency International and other agencies, so that many efforts and resources have been directed to reduce it. However, many assessments indicate that a large part of anti-corruption efforts have not been effective in these countries.

Accordingly, this research aims to study the impact of corruption on poverty in developing countries, as it aims to answer the following question:

**Does corruption increase poverty rates in developing countries?**

## 2. *LITTERATURE REVIEW*

The literature that has dealt with the relationship between corruption and economic growth is abundant, but those that link poverty and corruption are very few, the most important of which can be summarized as follows:

✓ Mustafa Ildırar, Erhan İşcan, Corruption, Poverty and Economic Performance: Eastern Europe

and Central Asia (ECA) Countries[3]:

This article aims to study the relationship between poverty, corruption and economic performance for 16 Eastern Europe and Central Asian countries during the period from 2003 to 2014 using the first difference GMM estimator. The results showed that corruption affected directly economic performance and low economic performance leads to poverty.

✓ Carlota Campos Castro, How corruption impacts poverty in developing countries? The role of education[4]:

Through this research paper, the impact of corruption and education on poverty was tested in a sample of 81 low- and middle-income countries for the period from 1998 to 2017 using the fixed panel methodology. The results of the study showed that the Corruption Perceptions Index negatively affects the poverty index.

✓ Ina Purwantini Rahayu, Tri Widodo, The Causal Relationship between Corruption and Poverty in ASEAN: A General Method of Moments/Dynamic Panel Data Analysis[5]:

This research is based on the study of the relationship between corruption and poverty in 09 Asian countries during the period from 2005 to 2009 using Granger causality and the two step system GMM method, The major results show that There is unidirectional causality, from corruption to poverty.

✓ Vahideh Negin, Zakariah B Abd Rashid, Hesam Nikopour, The Causal Relationship between Corruption and Poverty: A panel data analysis[6]:

This research paper aimed to study the relationship between corruption and poverty in a sample that included 97 developing countries during the period from 1997 to 2006 using the two step system GMM estimator, the empirical findings reveal that corruption and poverty go together, with bidirectional causality.

✓ Azwar, Rahmaluddin Saragih, Does corruption affect poverty in Indonesia?[7]:

This study was set up to investigate and analyze the short and long run relationship between corruption and poverty in Indonesia during the period from 1995 to 2017 using Autoregressive Distributed Lag (ARDL) and dynamic Error Correction Model (ECM). The results of the study indicated that corruption has a positive and significant effect on the level of poverty ratio in the long run.

## *3. Theoretical framework for the relationship between corruption and poverty*

### *3.1 Corruption concept*

The World Bank (1997) defines corruption as “the misuse of public office for personal or private gain”.[8]

Corruption is also defined as a behavioral attitude that is contrary to the rules and agreed norms.[9]

On the other hand, corruption is a transaction between actors in public and private sector in which collective goods are illegally converted into private goods.[10]

Accordingly, corruption occurs when the office holder’s uses his position or rank to his own advantage. Practices considered corrupt by law include: bribery, extortion, mismanagement of public funds, theft by public servant, neglect of duty, causing financial loss to the government, making false allegations and embezzlement of public funds.[11]

Corruption can be classified into:

✓ Administrative and political corruption:

Administrative corruption refers to the actions of mid-level officials, which arises from receiving money, gifts, etc. from individuals and companies such as granting a license[12], As for political corruption, it occurs in the highest positions of the political system[13] i.e. in the executive, legislative and judicial authorities.

✓ Public and private corruption:

If a state official is a party to the act of corruption, this indicates public corruption, while if any employee of the private sector, from an ordinary employee to a manager who participates in the act of corruption, is called private corruption[14].

### *3.2 Poverty concept:*

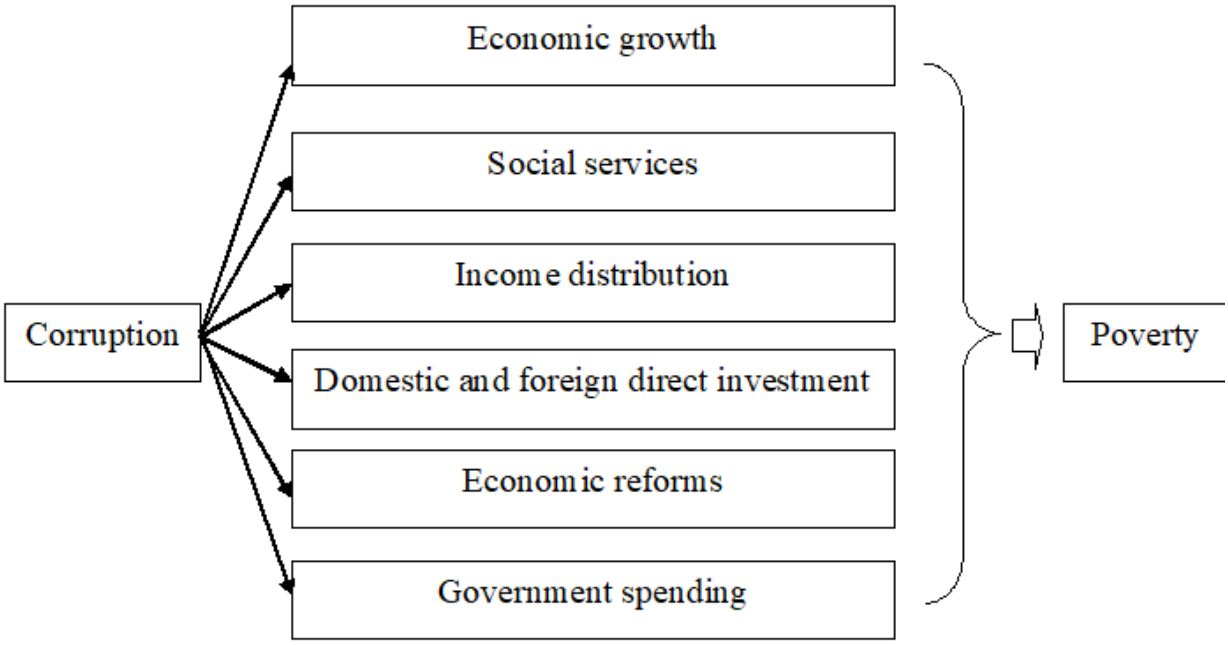
Poverty can be defined as the lack of resources to meet the basic needs of an individual or family[15].

According to Sen and Anand 1997, poverty is the deprivation of individuals of basic necessities and the lack of opportunities for human lives.[16]

### *3.3 Channels through which corruption affects poverty:*

According to the former World Bank President J.D.Wolfensohn "we need to deal with the cancer of corruption"[17] in order to achieve growth and to reduce poverty, and therefore at the macroeconomic level corruption affects poverty through the following channels:

**Fig.1. Channels through which corruption affects poverty**




**Source: Prepared by the researcher based on a set of previous studies.**

From the figure above, we conclude that corruption has a set of channels through which it affects poverty, namely:

✓ Economic growth:

Corruption impedes economic growth by deterring foreign and domestic investment, discouraging doing by business and reducing direct and indirect tax revenues. Also, the poor get a smaller share of economic growth because of corruption[18].

✓ social services:

Corruption weakens access to public services, increases the cost of basic public services to the poor, especially the education and health sector and decreases the quality of public services.[19]

✓ Income Distribution:

Under a corruption system, there is a tendency to concentrate wealth in the hands of a small minority of the population and thus the distribution of income becomes very unequal. In addition, the burden of corruption is more on the poor as they cannot pay the necessary bribes to send their children to a decent school, get proper health care,…[20]

✓ Foreign direct investment:

In light of corruption, it is difficult to obtain reliable economic information and data for planning and making sound business decisions. Therefore, long-term investment decisions cannot be taken under these circumstances, i.e. in an uncertain economic climate, and thus this negatively affects the quantity and quality of foreign capital inflows.[21]

✓ Economic reforms:

Unfortunately, corruption places significant constraints on the state's ability to carry out economic reforms, because reforms require a great deal of transparency, accountability, free competition, deregulation and reliance on market forces, as well as reducing price distortions and special privileges, and therefore the powerful rich will oppose reforms as this does not encourage a corrupt system.[22]

✓ Domestic investment:

Several empirical studies indicate that corruption reduces total investment, which includes public investment and private investment.

The burden of corruption falls largely on the shoulders of small businesses in the trade and service sectors because these small business owners do not usually enjoy political patronage. Corruption raises the initial costs of investment through bribes that are paid to obtain many services represented in: the purchase of land and lease contracts for buildings, access to water connections, ... , and also greatly increases the uncertainty of projects and thus all of this can lead to It reduces the incentive to invest[23].

✓ Government Budget:

Corruption can have undesirable effects on both the revenues and expenditures sides, its effects on the revenue side are known, so that paying bribes contributes to reducing taxes, fees and fees for public utilities, and bribes are also used to make illegal connections to

water, electricity and gaz to these facilities without paying for it, all this leads to huge losses on the side of government revenues.

As for the impact of corruption on government spending, corruption leads to a distortion of the allocation of public spending, so that under corrupt regimes a small part of public funds is allocated to education, health and other necessary needs, and the greater part is allocated for specific purposes such as military spending which has a greater ability to generate Illicit money[24], so that military spending includes large and expensive projects whose cost is difficult to determine and therefore vulnerable to bribery.

## 4. *Data, variables and research methodology:*

### *4.1 Data:*

In order to study the impact of corruption on poverty in developing countries, we selected a sample of 42 countries for this study: Algeria, Tunisia, Morocco, Jordan, Peru, Malawi, Brazil, Turkey, Senegal, Ghana, Bulgaria, Zambia, Mexico, Thailand, Mozambique, Russia, Kenya, Cameroon, Indonesia, Angola, Ukrain, Nigeria, Ethiopia, Colombia, Egypt, Kazakhstan, India, Cote d'Ivoire, Bolivia, Moldova, Ecuador, Vietnam, Tanzania, Armenia, Iran, Iraq, Chad, Niger, Mali, Uganda, Costarica and Nepal, and the study period from 2004 to 2019. The only criterion for selecting countries and study period it is the availability of data obtained from various sources, as shown in table N°01.

### *4.2 Model:*

To estimate the relationship between corruption and poverty, we relied on a set of explanatory variables, based on economic theory and a set of previous studies, including: (Azwar Iskandar, Rahmaluddin Saragih, 2018) and (Mustafa Ildırar, Erhan İşcan, 2015). The following is a detailed explanation of the variables used in the model:

**Table 1. Definitions and data sources of variables**

| Variable | Variable description | Unit of measurement | Data source |
|---|---|---|---|
| **HDI** | The Human development index: is a useful indicator to compare nations for poverty.<br>Is a composite index measuring average achievement in three basic | (0-10)<br>Where:<br>1= the most developed. | Knoema |

| | | | |
|---|---|---|---|
| | dimensions of human development: a long and healthy life, knowledge and a decent standard of living. | | |
| **COR** | the Corruption Perceptions Index: is the best known indicator of corruption, where countries with a higher Corruption Perception Index score are perceived as having less corruption | (0-100) | Transparency international |
| **GDP** | GDP per capita | constant 2010 US$ | World Bank database |
| **CPI** | Consumer Price Index: It is used as an indicator of macroeconomic stability. | Consumer price index (2010 = 100) | World Bank database |

**Source: Prepared by the researcher.**

Poverty in previous period is also a significant determinant of poverty in the following period, therefore, it is more appropriate to specify poverty regression in a dynamic panel framework as below:

$$HDI_{i,t} = \alpha\, HDI_{i,t-1} + \beta\, X_{it} + \mu_i + \varepsilon_{i,t} \dots (1)$$

$$i = 1,2, \dots, N \qquad , t = 1,2, \dots, T$$

Where:

$HDI_{it}$: The Human development index in a country i and the period t.

$HDI_{i,t-1}$: Lag of dependent variable(the human development index)in a country i and the period t-1.

$X_{it}$: The vector of poverty determinants.

**α** and **β**: estimated coefficients.

$\varepsilon_{it}$: the value of the error term in the country i and in the period t.

$\mu_i$: The country-specific fixed effect.

### *4.3 Research methodology:*

This research paper uses the generalized method of moment (GMM) estimators developed for dynamic panel models to examine the relationship between corruption and poverty in a sample of developing countries.

This approach is used in the following situations[25]:

- "large N and small T" – a large number of individuals and short periods of time;
- a linear functional relationship;
- one left-hand-side variable that is dynamic, depending on its own past realizations;
- independent variables that are not strictly exogenous, i.e., they are correlated with past and possibly current realizations of the error;
- fixed individual effects;
- heteroskedasticity and autocorrelation within individuals but not across them.

In panel estimation, neither the Generalized Least Squares (GLS) estimator nor the Fixed Effect (FE) estimator will produce consistent estimates in the presence of dynamics and endogenous regressors, Therefore and in order to improve the consistency of estimates, Arellano and Bond (1991) proposed a dynamic estimator as an extension of the Anderson and Hsiao (1982) estimator, such that the latter takes first differences and uses the lagged regressors as instruments, thus this estimator eliminates the correlation problem between the lagged dependent variable $HDI_{i,t-1}$ and the country-specific effect $\mu_i$.

This method (Arrelano and bond estimator) is defined as the Generalized method of moments (GMM) estimation of dynamic panel models and uses the following moment conditions[26]:

$$E\left[\left(HDI_{i,t-s}\right) * \left(\varepsilon_{i,t} - \varepsilon_{i,t-1}\right)\right] = 0 \text{ for } s \geq 2, t = 3, \dots, T \dots (2)$$

$$E\left[\left(X_{i,t-s}\right) * \left(\varepsilon_{i,t} - \varepsilon_{i,t-1}\right)\right] = 0 \text{ for } s \geq 2, t = 3, \dots, T \dots (3)$$

However, as shown by Blundell and Bond (1998) and Bond et al (2001), when the time series are persistent or close to random walk processes, the lagged values of the variables

are only weakly correlated with the endogenous variables and are weak instruments, the first-differences GMM estimation also suffers from a loss of valuable observations. Under these conditions, the first-differences GMM estimation is likely to perform poorly and has poor finite sample properties (bias and imprecision). Instead, the system GMM estimator suggested by Blundell and Bond (1998) is more plausible[27].

This estimator (The system GMM estimator) is designed within additional moment condition which is specified as follows[28]:

$$E\left[\left(HDI_{i,t-s} - HDI_{i,t-s-1}\right) * \left(\mu_i - \varepsilon_{i,t}\right)\right] = 0 \text{ for } s = 1 \ldots (4)$$

$$E\left[\left(X_{i,t-s} - X_{i,t-s-1}\right) * \left(\mu_i - \varepsilon_{i,t}\right)\right] = 0 \text{ for } s = 1 \ldots (5)$$

## 5. *Results and discussion:*

### *5.1 Results of dynamic panel data estimators estimates:*

The results are summarized in the following table:

**Table 2. Results of dynamic panel data estimators estimates**

| Dependent variable: LOGHDI N=42 T=16 | | | | | | |
|---|---|---|---|---|---|---|
| **Variables** | **Pooled OLS** | **Fixed effect** | **One step diff GMM** | **Two step diff GMM** | **One step Sys GMM** | **Two step sys GMM** |
| **L.LOG(HDI)** | 0.9767 (238.91)**** | 0.8369 (38.35)*** | 0.8926 (41.47)*** | 0.8952 (40.73)*** | 0.9199 (40.39)*** | 0.9070 (36.48)*** |
| **LOG(COR)** | 0.0019 (1.08) | 0.0081 (1.67) | 0.0138 (1.66) | 0.0144 (1.87)* | 0.0175 (1.92)* | 0.0142 (2.33)** |
| **LOG(GDP)** | 0.0008 (0.95) | 0.0177 (3.37)*** | 0.0105 (1.88)* | 0.0097 (1.72)* | 0.0119 (2.66)** | 0.0141 (2.99)*** |
| **LOG(CPI)** | -0.0026 (−1.10) | -0.0034 (−1.64) | -0.0050 (−2.22)** | -0.0050 (−2.36)** | -0.0016 (−0.64) | -0.0022 (−0.95) |
| **Constant** | -0.0045 (−0.24) | -0.2185 (−4.23)*** | / | / | -0.1772 (−2.74)*** | -0.1855 (−2.95)*** |
| **Years dummies** | Yes | Yes | Yes | Yes | Yes | Yes |
| **N of OBS** | 630 | 630 | 588 | 588 | 630 | 630 |
| **F statistic** | 13594.05 | 2017.33 | 2731.52 | 2650.23 | 5245.04 | 5013.66 |
| **Groups/instruments** | / | / | 42/21 | 42/21 | 42/24 | 42/24 |
| **AR(2)** | / | / | 0.123 | 0.127 | 0.115 | 0.119 |
| **Hansen statistic** | / | / | 0.467 | 0.467 | 0.444 | 0.444 |

**Source: Prepared by researcher based on STATA program 2014.**

**Note: Syntax used to obtain estimates of GMM is xtabond2 in STATA (Roodman, 2009a).**

*****: indicate significance at the level 1%.**

****: indicate significance at the level 5%.**

***: indicate significance at the level 10%.**

***5.2 How to choose between Diff GMM and sys GMM:***

To choose between Difference GMM and System GMM, the following steps should be followed according to Bond et al (2001)[29]:

- The autoregressive model should be initially estimated by pooled OLS and fixed effect approach.

- The pooled OLS estimate for φ (the coefficient of the lagged dependent variable)should be considered an upper-bond estimate, while the corresponding fixed effect estimate should be considered a lower bond estimate.

- If the difference GMM estimate obtained is close to or below the fixed effect estimate, this suggests that the former estimate is downward baised because of weak instrumentation and a system GMM estimator should be preferred instead.

Therefore, according to Table No.02, the value of the coefficient of the lagged dependent variable estimated using the diff GMM estimator (0.8952) is close to the value of the same coefficient estimated using the FE approach (0.8369), thus the System GMM estimator (the Tow step Sys GMM is more effective than one step sys GMM) is appropriate for our study.

***5.3. Diagnostic Test :***

Two types of diagnostic test are used for validity of the empirical models. First, the Arellano– Bond test (AR2) was adapted to test whether there is a second-order serial correlation in the first-differenced residuals, where The null hypothesis states that the residuals are serially uncorrelated. The output result shown in Table N.02 shows that AR2=0.119, therefore, this supports the absence of second order serial autocorrelation.

The second test is the Hansen test of over-identifying tests for joint validity of the instruments, where The null hypothesis states that the instruments are not correlated with

the residuals. The results of this test (Hansen statistic=0.444) clearly show that we cannot reject the null hypothesis. Therefore, this supports the validity of these instrument variables.

### *5.4. Long run effect of determinants of poverty and results interpretation:*

Long run coefficients can be calculated using the "nlcom" command in the STATA program, which can be summarized in the following table:

**Table 3. Long run effect of determinants of poverty**

| **Dependent variable: LOGHDI** | | |
|---|---|---|
| **Independent variables** | **Long-run coefficient value** | **The P- value of the Z-statistic** |
| **LOG(COR)** | **0.1534** | **0.017** |
| **LOG(GDP)** | **0.1517** | **0.000** |
| **LOG(CPI)** | **-0.0236** | **0.358** |

**Source: Prepared by researcher based on STATA program 2014.**

Through the empirical results of the short and long-term analysis shown in Tables No.02 and No.03, it becomes clear to us that:

We note that the coefficient of the Corruption Perceptions Index has appeared positive and significant at 5% level in the short and long term, that is, an increase in the Corruption Perceptions Index (or rather a decrease in levels of corruption) leads to an increase in the Human Development Index (i.e. a decrease in poverty levels), this result is consistent with economic theory and many empirical studies: (Azwar Iskandar, Rahmaluddin Saragih, 2018), (Carlota Campos Castro, 2019),…, which confirms that corruption has a pivotal role in increasing poverty levels in developing countries.

As for the coefficient of LOG(GDP), it also appeared positive and significant at 1% level and this result is consistent with economic theory and many empirical studies such as: (Azwar Iskandar, Rahmaluddin Saragih, 2018). Therefore, economic growth is the most powerful instrument for reducing poverty and improving the quality of life in developing countries. Economic growth generates job opportunities and thus increases the demand for employment, and higher income leads to a better quality of life, especially improving the education and health sectors.

The LOG(CPI) coefficient appeared negative but not significant in the short and long term, which means that the decrease in this index has no effect on poverty in the sample of developing countries selected in the study.

## 6. *CONCLUSION*

This research presented an econometric study with the aim of verifying the nature of the relationship between corruption and poverty in a sample of developing countries during the period 2004-2019, based on the estimates of the dynamic panel estimators. We first discussed the most important channels through which corruption affects poverty, then we presented the methodology used in the study by presenting Arellano and Bond Estimator (1991) and Bllundel and Bond (1998) estimators, Then we determined the variables used to estimate the model of this study based on both economic theory and a set of previous studies, and at the end of the research we concluded that corruption plays a pivotal role in increasing poverty levels in developing countries.

Based on the results obtained, a number of recommendations can be made as follows:

- Raising the wages of public sector employees and establishing penalties for public officials who engage in forms of corruption.
- Enact and clarify anti-corruption laws and impose severe penalties on violators.
- Putting the right person into the right position.

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