Does Corruption Invade the Effectiveness of Foreign Aid on Income Inequality in Developing Economies?

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ARTICLE INFO	ABSTRACT
	Foreign aid is critical for developing economies to meet their developmental objectives. Income disparity is a major problem that can be addressed with foreign resources; however unscrupulous behaviors such as misappropriation of funds for personal gain might diminish the effectiveness of foreign aid. This paper analyses the influence of foreign aid (ODA) on income inequality for a panel of 62 developing nations, including regional and income categories by using the Generalized Method of Moments (GMM) on model, with two specifications. The results have shown a negative impact of foreign aid on income inequality in developing economies overall and in regional and income groups of economies except Sub-Saharan Africa (SSA) particularly in the first specification where corruption has not been included in the model. In the second specification where corruption has been included in the model, the corruption has shown boosting impact on income inequality in developing economies as well as in all the regional and income groups of the economies. However, the effect of ODA on income inequality has become insignificant in developing economies but positive in all groups except SSA. It explains that corruption leads to foreign aid ineffectiveness in developing economies. In the control variables, FDI has a diminishing effect on income inequality in the panel of developing economies as well regional and income groups of the economies. It is proposed that to reap the benefits of foreign aid in developing economies, corruption is necessary to be eliminated.

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1.   Introduction

The Official Development Assistance (ODA) conventionally known as foreign aid comprises of transfer of resources, such as grants, subsidies and loans to developing nations from the developed economies at concessional economic terms. Foreign aid not only complements domestic resources but also complements domestic savings to meet the investment gap and provides extra funds to attain various development objectives in developing economies. The progress of development aid agenda can be analyzed by "Harrod-Domar model" as explained by (Harrod, 1939) and (Domar, 1946). (Rostow, 1960) looked at the effect of foreign assistance in the domestic growth and efficient resource utilization. (Chenery & Strout, 1968) introduced the "Two-Gap model," which was based on the Harrod-Domar model.

(Pesmazoglu, 1972) exploded the association of aid and growth and stated that economic growth is positively influenced by foreign capital inflows. The scholars have developed interest in the mixed outcomes of implications of foreign aid on economic growth.

Some studies have explored the aid-growth relationship (Armah & Nelson, 2008; Bobba & Powell, 2007; Bowen, 1995; Gomanee, Girma, & Morrissey, 2005). The expounders of foreign assistance are of the view that the inflow of external finance is essential to attain the development objectives of the underdeveloped countries. It is also claimed that foreign aid enhances domestic assets as well as domestic savings to fill the gap between saving and investment. Foreign aid supports the developing economies to proliferate from the take off stage to the sustainable growth by boosting the domestic investment and manufacturing investment (Rostow, 1960; Waterston, Martin, Schumacher, & Steuber, 1965).

Income inequality is a serious economic and social issue that is widely discussed by researchers, economists and policy makers from different perspectives. Inequality of income damages the socioeconomic development in under-developed economies. The strength of income inequality to retard economic growth becomes stronger in poor nations. Socioeconomic crises are also caused by income inequality. Income inequality directly results into decrease in satisfaction level among those who have reduced income level. As a consequence the impoverished individuals start committing crimes and taking part in other disruptive operations which in turn hurt the economy and diminish the quality of life (Wade, 2020). It is crucial to recognize the source of inequality in different nations around the globe due to harmful political and socioeconomic impacts of income inequality. One of the factors of income inequality may be corruption as literature has bulk of the evidences of damaging effects of corruption in the economies (Younsi, Khemili, & Bechtini, 2019).

Chase-Dunn (1975) carried out the initial analysis of foreign assistance and income inequality empirically. The study found positive effect of foreign aid on income inequality. Boone (1994); Collier and Dollar (2004) argued that foreign assistance improves the recipient government's quantity of funds. Sometimes the funds cannot reach the poor. In reality, these funds are misused and spent by authorities in alliance with ruling individuals or local elite (Drazen, 2014). The political system favors political elite with higher earnings (Boone, 1996) and foreign aid means more money available to ruling individuals and the local elite. It increases the chances of corruption which creates income inequality.

According to (Alesina & Dollar, 2000), the structure of foreign aid is influenced by political and social system of recipients. Foreign aid increases income inequality due to the behavior of donors and recipients. Commercial donors, for example are seemed more interested in physical facilities available in urban areas rather than distant regions where the poor individuals live. Similarly, using assistance by the recipients as a means of buying local political power means that it benefits the wealthy segment of the society rather than the impoverished. In this way corruption bridges the link among foreign assistance and income inequality.

Corruption is one of the major problems in aid effectiveness. Corruption makes involvement of other socioeconomic indicators like political instability, weak governance and weak institutional quality etc. which not only harm the economy as a whole but also increases income inequality. It has many faces like frauds, bribery, illegal favors to get high profile in politics etc. Corruption may badly affect aid effectiveness. The economies where corruption level is high, the aid is assumed to be less effective.

Rose-Ackerman and Palifka (2016) argued that a country becomes more impoverished due to high level of corruption. Corruption itself has significant and boosting effect on income inequality in developing economies. In developing economies, corruption is carried out by public officials, bureaucrats, political elites, feudalistic parties as they have authority to utilize the public resources. They use all the resources to get personal benefits and ignore the benefits of public especially of the poor. This situation creates a gap between rich and the poor. The gap becomes wider due to corrupt activities of authorities.

Foreign resources are exploited to meet specified objectives, yet prior research has found that the objectives were not met owing to unethical practices (Kabir, 2020; Letsoalo & Ncanywa, 2021; Mouneer & Khan, 2019; Younsi et al., 2019). The current study focuses on to see the role of corruption in foreign aid effectiveness in reduction of income inequality. It covers developing economies and attempts to further explore a varying role of corruption in the connection between foreign aid and income inequality in different economies based on region and income categories.

2.   Literature Review

According to economic literature, foreign capital inflows are important factors of economic growth of underdeveloped and developing economies. However, the impact of foreign aid to reduce income inequality has significant importance in the debate on the issue of foreign aid utilization and effectiveness. The relevant literature has shown mixed outcomes. Finally, the empirical literature is reviewed to recognize the association of foreign aid with income inequality.

Some studies argued that foreign aid reduces income inequality in developing economies (Bourguignon, Levin, & Rosenblatt, 2009; Layton & Nielson, 2008; Letsoalo & Ncanywa, 2021; Shafiullah, 2011). Layton and Nielson (2008) investigated the effect of foreign assistance on income inequality in numerous states from Eastern Europe, Asia, South America and Central America. The results evidenced that foreign aid in developing and transition countries improve income inequality. Bourguignon et al. (2009) found that foreign aid with sound trade and investment policies have a much greater and favorable impact on economic development and income inequality (Hussain, Nawaz, & Ibraheem, 2021).

However, Calderón and Chong (2006) found that, even in the presence of healthy organizations, foreign assistance has negligibly affected the distribution of income. They explained that assistance alone does not seem to affect significantly inequality and impoverishment. There is a need for excellent institutions to have the favorable impacts of foreign aid. Letsoalo and Ncanywa (2021) analyzed the impacts of external financial flows on income inequality in the Southern African Development Community and came to the conclusion that external financial flows can help reduce persistent income disparity in the region. However, Shafiullah (2011) also provided the theoretical outlook on the effect of foreign aid on income distribution for a panel of 94 nations. The study disclosed that foreign assistance reduces income inequality.

Most of the studies empirically found a boosting impact of foreign aid on income inequality. Bjørnskov (2010) argued that foreign aid leads to "Dutch disease", as the exchange rates rise due to aid inflows, the competitiveness of a country is suffered as a consequence of layoffs and it enhances unemployment. The resulting inflation also impacts the poor disproportionately "because the comparatively wealthy group invests in capital, land, and other resources," while salaried class tends to be unprotected from inflation in the informal sector. The gap between these income groups becomes widened by foreign aid.

Herzer and Nunnenkamp (2012) examined the long-term impact of foreign assistance on income inequality in 21 assistance recipient nations. They found that foreign assistance exerts a growing impact on income inequality. The findings invalidated the hopeful assumption that aid could help minimize impoverishment and economic inequality. They also argued that the beneficiaries of foreign aid are political elites and foreign aid contributes to corruption. With sample variation Kabir (2020) explored the efficacy of foreign aid in narrowing the income gap in underdeveloped nations and particularly for countries from Africa, South Asia, and South America, and found statistically significant but weak foreign aid effectiveness in addressing the income inequality in most underdeveloped nations. Furthermore, foreign aid effectiveness has fallen with ambiguous organizational quality.

However, Khuhro et al. (2012) evaluated the impact of foreign aid on income inequality for a panel of 43 lower income and middle-income nations. They found that ODA's role in reducing income inequality is not significant. Aid efficiency requires good governance and institutional quality. Sources of foreign aid also effects income inequality. Saidon, Yusop, Ismail, and Hoo (2013) explored the phenomenon of foreign aid to impact income inequality for a panel of 75 foreign aid recipient nations. Four major sectors for foreign aid (public sector, economic sector, multi sector and manufacturing sector) were included as dynamics of income inequality. They discovered that assistance to the economic sector plays a major role in decreasing income inequality, whereas multi-sector assistance appears to boost income inequality.

Ali and Ahmad (2013) examined the role of foreign assistance in income inequality reduction process in Pakistan. Johansen Co-integration Test and Vector Error Correction Models were used to see the long-term and short-term implications. The results verified the long-term harmful effect of foreign assistance on income inequality in Pakistan. It explains that economic resources obtained in the form of foreign assistance were utilized for unproductive operations rather than for growth promotion. As a result, assistance inflows could not contribute to decrease income inequality.

Few studies have argued that foreign aid leads to ineffective impacts on income inequality due to some unethical practices. According to Chong, Gradstein, and Calderon (2009), foreign assistance slightly affects inequality. In the presence of minimal corruption, however, foreign aid can help to reduce income inequality. Khan and Naeem (2020) have analyzed troika of corruption, income inequality and human resource development in 38 emerging economies. They found that corruption increase income inequality in emerging economies. Pham (2015) used a big dataset for twenty-seven Sub-Saharan African nations over the time period 1990-2011 to address the issue of foreign aid, either it plays a vital role in reducing income inequality or not. The study found that foreign aid has raised income inequality significantly. However, when interacting through the level of control of corruption, the rising effect of foreign aid reverses. Similarly, Younsi et al. (2019) evaluated the link between foreign aid and income inequality in 16 African nations and discovered that higher levels of corruption are linked to higher levels of income inequality in the recipient countries. This shows that corruption has a role in the ineffectiveness of foreign aid in reducing income inequality.

The present study is an extension to the literature departing from the existing literature by probing foreign aid effects on income inequality in developing economies, by incorporation of corruption in the model. Furthermore, the study also aims to explore whether the regional and income groups of the developing economies have varying effects of foreign assistance on income inequality in the perspective of role of corruption.

3. Data and Methodology
3.1 Data Sources
For empirical analysis of overall developing countries, sample consists of a panel dataset of 62 developing countries covering the time period from 2000 to 2015. The main sources of sample data are World Development Indicator (World Bank) and Transparency International (TI). GINI coefficient is obtained from WIID 3.4 data set.

3.2 Model
The dynamic panel data model is applied to evaluate the association of foreign aid with income inequality prevailed in developing economies. The Model is comprised of two specifications: primarily it specifies the foreign aid effectiveness in income inequality in developing economies and then extends to account for role of corruption in aid effectiveness. In this study, the income inequality is quantified using the GINI coefficient. The general model for estimation is given Equation 1.

$$\text{GINI}_{i,t} = \beta_{\text{GINI}}\text{GINI}_{i,t-1} + \beta_x X_{i,t} + \beta_z Z_{i,t} + \mu_t + \nu_{i,t} \ \ldots\ldots\ldots\ldots \ \ (1)$$

Subscripts i and t indicate countries and time, respectively. The variable GINI is GINI coefficient which is a standard measure of income inequality. $X_{i,t}$ is Official Development Assistance (ODA) as proportion of Gross National Income (GNI) and $Z_{i,t}$ is a vector of exogenous variables that could influence income inequality. μ_t are time-fixed effects to apprehend the influence of business cycles and $\nu_{i,t}$ is the residual term. The term $X_{i,t}$ is included to evaluate the foreign aid effects on income inequality and β_x is anticipated to be negative. The control variables included in $Z_{i,t}$ are selected on the basis of their potential for affecting the income inequality. The vector of the control variables includes some economic indicators which are foreign direct investment (FDI), unemployment rate (UNEMP), trade openness (TRADE) and growth rate of GDP per capita (GDP). By including all these control variables, Equation (1) is transformed into Equation (2).

$$\text{GINI}_{i,t} = \beta_0\text{GINI}_{i,t-1} + \beta_1\text{ODA}_{i,t} + \beta_2\text{GDP}_{i,t} + \beta_3\text{UNEMP}_{i,t} + \beta_4\text{FDI}_{i,t} + \beta_5\text{TRADE}_{i,t} + \mu_t + \nu_{i,t} \ \ (2)$$

The specification of the model is then expanded by including the corruption (CORRP) captured by corruption perception index (CPI) that may possibly impinge on the effectiveness of the foreign aid. The Equation (3) represents the second specification.

$$GINI_{i,t}=\beta_0 GINI_{i,t-1}+\beta_1 ODA_{i,t}+\beta_2 GDP_{i,t}+\beta_3 UNEMP_{i,t}+\beta_4 FDI_{i,t}+\beta_5 TRADE_{i,t}+\beta_6 CORRP_{i,t}+\mu_t+\nu_{i,t} \quad (3)$$

3.3 Description of Variables
3.3.1 Foreign Aid
Overall foreign aid is quantified in terms of ODA as percentage of GNI. The Official Development Assistance (ODA) is based on the OECD Development Assistance Committee's standard definition of aid. It includes grants and concessional loans net of previous aid loans being returned and considers prior borrowing redemption as recent aid. The income inequality is quantified by GINI coefficient and then it transformed into percentage.

3.3.2 Corruption
Corruption is incorporated in second specification of model to elaborate the role of corruption in foreign aid effectiveness for income inequality. Corruption is quantified by corruption perception index (CPI) constructed by Transparency International (TI). It is crucial to comprehend the expected relationship of independent variable with income inequality.

3.3.3 GDP per Capita
GDP per capita is an imperative factor that affects income inequality. The dominant theory of economic development and income inequality is the inverted U-shaped curve of (Kuznets, 1955). Income inequality increases by increase in GDP per capita at lower levels of development of nations. Income inequality declines due to increase in GDP per capital at comparatively higher level of development of the nations. Most of the countries in the sample of this study are at low level of development, so growth of GDP per capita is expected to enhance income inequality.

3.3.4 Foreign Direct Investment
Another important variable is foreign direct investment. Many researchers agree that foreign direct investment inflows have a disadvantageous effect on income inequality as this sort of investment comes to capital-intensive sectors that provide comparatively few employments. The fewer jobs are offered but at comparatively well paid which increases income inequality. In underdeveloped economies where labor is in abundance, FDI provides jobs which reduces rate of unemployment and ultimately reduces income inequality. Ambiguous effects of FDI on income inequality are based on different circumstances. So it would be positive or negative.

3.3.5 Unemployment Rate
The unemployment rate in a country is also an imperative determinant of income inequality, which theoretically increases income inequality. Trade openness is another determinant of income inequality. It is also anticipated to be negatively correlated with income inequality. Foreign aid, the main variable of interest, is anticipated to have either positive or negative effect on income inequality. Corruption is anticipated to be positively correlated with income inequality.

4. Methodology
A dynamic panel data (DPD) estimation technique is employed to analyze the foreign aid effectiveness in the presence of corruption in developing economies. Panel data is useful in this situation since it includes information from several dimensions, time periods, and cross sections. To begin, the stationarity is tested using the panel unit root test.

The Levin, Lin, and Chu (2002) (LLC) panel root unit test (based on the Dickey Fuller root unit test) is used to assess the stationarity in the data. This test accounts fixed effects for two ways, one is fixed unit-specific impacts and the other is unit-specific time trends. "The series has either unit root or non-stationary problem" is the null hypothesis for this test. The unit root test is used to determine either GMM or panel co-integration methodology should be applied. The DPD (Dynamic Panel Data) technique generally regarded the work of Arellano and Bond (1991) is a technique by which all feasible tools could be exploited. Using the

Generalized Moments Method (GMM) (Hansen, 1982), they acquired estimators using the moment conditions produced by the lagged levels of the regress and variable with Δv_{it}. These estimators are called difference GMM estimators. The GMM estimator initiated by Arellano and Bond (1991) is considered to be inaccurate when weak instruments are used because it uses only information contained differences.

In later work, Arellano and Bover (1995) and Blundell and Bond (1998) disclosed a prospective weakness in the Arellano and Bond DPD estimator. Blundell and Bond (1998) proposed using extra level information aside from the changes. The system GMM estimator combines moment conditions for differences and levels outcomes in a single estimate. According to Blundell and Bond (1998), when the series follow random walk, estimators that rely on lagged levels as instruments for present differences perform badly. The available instruments are slightly associated with the endogenous variables in this situation, and the GMM estimator is prone to suffer from severe limited sample bias and inaccuracies (Hoeffler, 2002). They discovered the lowest bias and variance in GMM estimators by using simulations. Generally, GMM estimation technique is used when regressors may correlate with the residual term. Time-invariant country aspects (fixed effects) may be associated with exogenous variables. The lagged dependent variable may cause autocorrelation. The dataset for the panel has a short period of time (*T=16*) and a sample of large number of countries (*N=62*). The dependent variable is dynamic, dependent on its own lag. Some specification tests are also employed to support the validity of model. Arellano and Bond (1991) suggested a test for detecting serial correlation in the disturbances. The Sargan test checks the validity of the subsets of instruments (Sargan, 1958).

5. Empirical Findings and Discussion

Table 1 shows the descriptive statistic for the variables, whereas Table 2 shows the outcomes of the unit root test. Unit root test is used to decide either methodology should be GMM or panel co-integration methodology.

Table 1: Summary Statistics of Variables for Developing Economies

Variable	Unit of measurement	Mean	St. dev	Min.	Max.
GINI	percentage	41.64	8.99	16.23	69.4
ODA	% of GNI	4.54	5.36	-0.65	43.51
GDP	Annual growth rate	3.71	7.64	-34.9	172.75
UNEMP	% of total labor force	9.33	7.19	0.1	37.6
FDI	% of GDP	3.86	4.35	-5.01	55.1
TRADE	% of GDP	78.86	35.33	21.12	220.41
CORRP	Index	3.2	0.99	0.4	6.5

Table 2: Results of LLC Test for Developing Economies

Variables	Without trend		With Trend	
	Statistic	P-value	Statistic	P- value
GINI	-9.44	0.000	-4.79	0.000
ODA	-4.68	0.000	-7.26	0.000
GDP	-9.31	0.000	-9.73	0.000
UNEMP	-7.93	0.000	-9.59	0.000
FDI	-8.98	0.000	-9.91	0.000
TRADE	-5.39	0.000	-9.41	0.000
CORRP	-5.37	0.000	-8.85	0.000

Empirical analysis is consisted of two specifications. The first step is to look into the direct association of foreign assistance with income inequality while the second is to empirically find the role of corruption in this link. The estimated coefficients for Equation 2 and 3 are obtained by system GMM estimator, a panel data estimation technique (Blundell & Bond, 1998). The GMM estimates for Equation 2 and 3 are presented in Table 3.

The estimated results showed that foreign aid has reduced income inequality significantly in the first specification. The value of estimated coefficient showed that 1 percent

rise in foreign aid causes 0.038 percent reduction in income inequality. But foreign aid's impact is observed to be insignificant when corruption is incorporated in the second specification. So, it is concluded that corruption is a main factor of foreign aid ineffectiveness. Some theories explain how money from foreign assistance leads to higher inequality. They describe that aid money flows to some communities and moves away from other communities.

Table 3: Results of System GMM for Developing Economies

Variables	Specification 1 Coefficient (t-statistic)	Specification 2 Coefficient (t-statistic)
ODA	-0.038** (-1.41)	-0.019 (-0.72)
GDP	-0.01 (0.93)	0.012 (1.04)
UNEMP	0.065** (1.66)	0.063** (1.65)
FDI	-0.166*** (-2.55)	-0.162*** (-2.63)
TRADE	-0.004 (-0.96)	-0.007* (-1.37)
CORRP		0.33** (1.72)
No of instruments	172	173
AR(1) test (p-value)	0.000	0.000
AR(2) test (p-value)	0.026	0.026
Sargan test (χ^2)	0.082	0.090
Hansen test (χ^2)	1.000	1.000

Note: *, ** and *** represent 10%, 5% and 1% level of significance and t-statistics are in the parenthesis.

The first framework to understand the inequality process is linked to politics. Politicians try to accommodate their supporters at all times. Generally, supporters of a politician belong to rich community of private citizens with specific motives. Boone (1996) reported that all democracies are in favor of an "elevated-income political establishment" when support distribution. In a research on the impact of foreign aid, Boone (1996) classified nations into three categories: nations with aristocratic governments, democratic governments, and laissez-faire governments. The study explains found that all types of governments support the elevated-income political establishment. The government institutions completely control and direct the utilization and distribution of foreign aid in a way that benefits certain elevated-income individuals who fund the politicians in power. It raises a small group of people's wages but ultimately impoverished remains in the same place prior to the government receive the aid money. This situation boosts up income inequality. Although the state makes a decision to provide the impoverished and their supporters with equal proportions of aid money, but income inequality increases as the money given is disbursed among specific groups (Awan, Ahmad, Hussain, & Marri, 2021). The Funds contributed to supporters are distributed to a significantly small number of groups, which allows these persons to receive a larger share.

The economic growth rate is the main determinant of income inequality. In this model, GDP per capita is used to observe its impact on income inequality. The inverted U-shaped curve (Kuznets, 1955) is the most widely accepted model of economic development and income inequality. By this model, income inequality rises as per capita income rises at lower stages of economic development, whereas income inequality reduces as per capita income rises at different stages of economic development. In this study, developing economies with low level of development, are included that receive foreign aid so the estimated results are consistent with theory, showing insignificant association between GDP/Capita and income inequality in both specifications.

The estimated coefficient of unemployment rate has shown boosting and significant effect on income inequality in both specifications. The corruption has no role to disturb the

effect of unemployment on inequality in developing economies. These results are theoretically consistent. When unemployment occurs, it leads to inequality and disparity. According to previous studies, unemployment is the leading cause of economic inequality in the world's emerging and less developed nations. Breen and Garcia-Peñalosa (1999) explored the influence of farm employment on income inequality including both advanced and emerging nations, concluding that a greater level of farm employment accounted for reduced income inequality. Nielsen and Alderson (1995) explained similar results that a larger rural population with more agricultural workers led to reduced income inequality. Deyshappriya (2017) also found that unemployment increase inequality in Asian countries.

The results in Table 3 demonstrate that FDI effects income inequality negatively in both specifications; even the magnitudes of the coefficients are almost equal. The results are consistent with existing literature. According to Herzer and Nunnenkamp (2012), in the long run that both outward and inward FDI diminish inequality. Im and McLaren (2015) argued that FDI appears to be ineffective for income inequality without instruments, but with the instruments, it significantly reduces inequality. Although Franco and Gerussi (2013) carried research for seventeen European transitional nations found that FDI has no significant effect on GINI coefficient.

It is theoretically assumed that trade openness has encouraging effects on economies. It decreases income inequality as well. The empirical literature however has mixed results, i.e. trade openness affects income inequality either positively or negatively. The results of current study have shown insignificant role of trade openness in both specifications for income inequality reduction. In the second specification the variable of corruption was included in the model. The estimated coefficient for corruption in second specification showed enhancing effect on income inequality. In the literature, there is significant evidence that corruption has strongly raised income inequality. According to S. Gupta, Davoodi, and Alonso-Terme (2002), disadvantaged socioeconomic development, prejudiced tax systems, relatively low levels and efficacy of social expenditure, and uneven opportunities for education and public services, all have strong contribution to income inequality.

Table 4: Results of System GMM Estimates for Regional Groups

Variables	SSA		MENA-SEA		LAC-ECA	
	Specification 1	Specification 2	Specification 1	Specification 2	Specification 1	Specification 2
	Coefficient (t-statistic)	Coefficient (t-statistic)	Coefficient (t-statistic)	Coefficient (t-statistic)	Coefficient (t-statistic)	Coefficient (t-statistic)
ODA	-0.001	0.012	-0.05**	0.05**	-0.095***	0.103***
	(-0.02)	(0.27)	(-2.16)	(2.24)	(-2.07)	(2.12)
GDP	0.01**	0.01**	0.054*	0.054**	-0.69*	-0.067
	(1.94)	(1.91)	(1.60)	(1.70)	(-1.30)	(-1.17)
UNEMP	0.168*	0.159*	0.032*	0.044*	0.047	0.063*
	(1.35)	(1.31)	(1.47)	(1.46)	(0.99)	(1.40)
FDI	-0.013*	-0.06*	-0.087**	-0.087**	-0.19***	-0.19***
	(-1.53)	(-1.56)	(-1.81)	(-1.84)	(-2.49)	(-2.58)
TRADE	-0.065*	-0.015	0.001	-0.002	-0.023*	-0.198*
	(-1.38)	(-1.21)	(0.35)	(-0.48)	(-1.53)	(-1.44)
CORRP		0.21*		0.34*		0.202*
		(1.34)		(1.29)		(1.58)
No of instruments	60	61	61	61	56	57
AR(1) test (p-value)	0.076	0.075	0.050	0.050	0.004	0.004
AR(2) test (p-value)	0.170	0.169	0.176	0.180	0.103	0.106
Sargan test (χ^2)	0.205	0.195	0.993	0.993	0.560	0.577
Hansen test (χ^2)	1.000	0.995	1.000	1.000	1.000	1.000

Note: *, ** and *** represent 10%, 5% and 1% level of significance and t-statistics are in the parenthesis.

Gyimah-Brempong (2002) explained that one-point rise in the corruption index is related with a seven point rise in the GINI coefficient in African countries. According to the

statistics from Transparency International's Global Corruption Barometer, the impoverished are disproportionately harmed by corruption. Corruption causes a distorted tax structure that has an impact on income distribution. Many researchers found that corruption raises income inequality in developing nations (Dincer & Gunalp, 2005; M. S. Gupta, 1998; Gyimah-Brempong, 2002; Khan & Naeem, 2020). Inefficient tax regimes and exemptions benefit the affluent and influential people as corruption promotes tax evasion. The statistics for the AR(1) and AR(2) tests Arellano and Bond (1991) for first and second order serial autocorrelation reveal no indication of autocorrelation for AR (2). For GMM estimates, the Sargan-statistic and Hansen-statistic (for over identifying restrictions) imply that a valid instrument set is employed.

Both specifications are further estimated to explore the link between foreign assistance and income inequality with the implications of corruption for disaggregated data. Sample is disaggregated on the basis of region and income of the economies. On the basis of regions it is divided into three sub-samples, i.e. Sub-Saharan Africa (SSA), Middle East and North Africa (MENA) and South East Asia (SEA) collectively, and Latin America and Caribbean (LAC) and Europe and Central Asia (ECA) collectively. On the basis of income it is divided into two sub-samples, first is comprised of lower income (LI) and lower-middle income (LMI) group while second is upper-middle income (UMI) group. Table 4 and Table 5 show the estimated coefficients for the region and income groups, respectively.

Table 5: Results of Difference GMM Estimates for Income Groups

Variables	LI-LMI		UMI	
	Specification 1	Specification 2	Specification 1	Specification 2
	Coefficient (t-statistic)	Coefficient (t-statistic)	Coefficient (t-statistic)	Coefficient (t-statistic)
ODA	-0.053*	0.046*	-0.195***	0.139**
	(-1.29)	(1.56)	(-2.87)	(1.97)
GDP	0.036	0.04	-0.003	-0.017
	(0.84)	(0.88)	(0.09)	(0.45)
UNEMP	0.028	0.17	0.113*	0.122**
	(0.42)	(0.25)	(1.52)	(1.77)
FDI	-0.065*	-0.057*	-0.236***	-0.215***
	(-1.52)	(-1.44)	(-3.73)	(-4.22)
TRADE	-0.01*	-0.1*	-0.01	-0.018*
	(1.34)	(-1.53)	(-0.70)	(-1.41)
CORRP		0.4*		0.9**
		(1.36)		(1.87)
No of instruments	55	55	59	60
AR(1) test (p-value)	0.025	0.025	0.003	0.002
AR(2) test (p-value)	0.262	0.266	0.006	0.061
Sargan test (χ 2)	0.990	0.992	0.005	0.005
Hansen test (χ 2)	0.987	0.985	1.000	1.000

Note: *, ** and *** represent 10%, 5% and 1% level of significance and t-statistics are in the parenthesis

The results in Table 4 show that in the first specification the coefficient of ODA is significant and negatively related to inequality for the regions of MENA-SEA, and LAC-ECA while it is insignificant in SSA. For SSA similar evidences exist in the literature (Pham 2015). In the second specification, the estimated corruption coefficient is found to be significant and positive for SSA, MENA-SEA, and LAC-ECA.

In the second specification it is also observed that foreign assistance affects income inequality significantly in the regions of MENA-SEA, and LAC-ECA, however foreign aid has insignificant effect in SSA. It explains that despite receiving huge quantity of foreign assistance from developed states, income inequality is found to be increased due to corruption in these developing economies. It would be logical to believe that that foreign aid significantly reduces inequality in developing economies, but this effect tends to be diverted in the presence of

corruption. The results are corroborated to the findings of panel of developing economies shown in Table 3.

The both specifications are also regressed for income groups of the economies, like lower income (LI) and lower-middle income (LMI) group collectively and upper-middle income (UMI) group. The results in Table 5 explains that in the first specification, the foreign assistance has negative influence on income distribution in all the income groups, i.e. LI-LMI group collectively and UMI group. The results are corroborating from the results for the panel of developing economies shown in Table 3. It explains that foreign aid decreases income inequality irrespective of income groups of the economies. In the second specification the estimated coefficient for corruption shown in Table 5 reveals positive and significant influence of corruption to raise income inequality in all income groups of the countries. The outcomes in second specification explain that coefficient of foreign aid becomes positive in all the income groups which demonstrate that in the presence of corruption the foreign aid increases income inequality instead of decreasing it. The results further explain that invasion of beneficial effect of foreign aid by corruption in irrespective of income groups of the economies. The results are corroborated with the results in Table 3 for panel of developing economies.

In the control variables, negative sign of estimated coefficient for FDI has shown beneficial influence to diminish income inequality in all regional groups as well as income groups. The results are corroborated by the results of panel of developing economies given in Table 3. The trade has also shown significant effect on income inequality in LI-LMI group, LAC-ECA group and SSA while insignificant for UMI group and MENA-SEA group (Table 4, and 5). Similarly, unemployment has destructive impact on income distribution in majority of the regional and income groups of the economies.

6.   Conclusions and policy Recommendations
To see how foreign aid effects on income inequality in underdeveloped economies and segregated economy groups based on region and income, the System GMM was utilized on 62 developing economies. This research reveals some important findings. Firstly, foreign aid reduces income inequality in developing economies as well as regional and income groups of the economies except SSA. Secondly, corruption increases income inequality in developing economies as well as all the regional and income groups of the developing economies.

Thirdly, impact of corruption on foreign aid effectiveness is exposed, i.e. corruption leads to reduction in foreign aid effectiveness as foreign aid becomes insignificant to diminish income inequality in presence of corruption in the panel of developing economies, however, it raises income inequality in all regional, and income groups of the developing economies. Fourthly, it may be inferred that SSA is a special case where foreign assistance has no influence on income inequality in both specifications while the region is receiving a substantial amount of foreign assistance.

Fifthly, the foreign direct investment has very encouraging effect on income inequality. It decreases income inequality in the developing nations collectively as well as irrespective of their regional or income group. In the light of the results and keeping in mind that development aid is important for recipients to get better and more sustainable results, it is proposed that corruption should be eliminated with iron hands to attain lower level of income inequality. Corruption control has the potential to alter the pattern of the association among foreign assistance and income inequality. It implies that in the presence of excellent control of corruption, foreign aid can promote equality of income. Corruption is a major problem in this matter that should be addressed by government, political agents and institutions to receive better outcomes in income distribution.

References
Alesina, A., & Dollar, D. (2000). Who gives foreign aid to whom and why? *Journal of economic growth, 5*(1), 33-63. doi:https://doi.org/10.1023/A:1009874203400

Ali, S., & Ahmad, N. (2013). A time series analysis of foreign aid and income inequality in Pakistan. *Ali, Sharafat & N. Ahmad (2013). A Time Series Analysis of Foreign Aid and Income Inequality in Pakistan. Global Journal of Management and Business Research, 13*(5), 11-20.

Arellano, M., & Bond, S. (1991). Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *The review of economic studies, 58*(2), 277-297. doi:https://doi.org/10.2307/2297968

Arellano, M., & Bover, O. (1995). Another look at the instrumental variable estimation of error-components models. *Journal of econometrics, 68*(1), 29-51. doi:https://doi.org/10.1016/0304-4076(94)01642-D

Armah, S. E., & Nelson, C. H. (2008). *Is foreign aid beneficial for Sub-Saharan Africa? A panel data analysis*. Paper presented at the Agricultural and Applied Economics Association (AAEA) Conferences.

Awan, A., Ahmad, H. K., Hussain, A., & Marri, M. Y. K. (2021). Prices, Money Supply and Output Nexus in Pakistan–A Macro Econometric Model. *iRASD Journal of Economics, 3*(2), 106-118. doi:https://doi.org/10.52131/joe.2021.0302.0029

Bjørnskov, C. (2010). Do elites benefit from democracy and foreign aid in developing countries? *Journal of Development Economics, 92*(2), 115-124. doi:https://doi.org/10.1016/j.jdeveco.2009.03.001

Blundell, R., & Bond, S. (1998). Initial conditions and moment restrictions in dynamic panel data models. *Journal of econometrics, 87*(1), 115-143. doi:https://doi.org/10.1016/S0304-4076(98)00009-8

Bobba, M., & Powell, A. (2007). *Aid effectiveness: politics matters*. Retrieved from

Boone, P. (1994). *The impact of foreign aid on savings and growth*. London: London School of Economics and Political Science, Centre for Economic ….

Boone, P. (1996). Politics and the effectiveness of foreign aid. *European economic review, 40*(2), 289-329. doi:https://doi.org/10.1016/0014-2921(95)00127-1

Bourguignon, F., Levin, V., & Rosenblatt, D. (2009). International redistribution of income. *World Development, 37*(1), 1-10. doi:https://doi.org/10.1016/j.worlddev.2008.06.008

Bowen, J. (1995). Foreign aid and economic growth: An empirical analysis. *Geographical Analysis, 27*(3), 249-261. doi:https://doi.org/10.1111/j.1538-4632.1995.tb00908.x

Breen, R., & Garcia-Peñalosa, C. (1999). Income inequality and macroeconomic volatility: an empirical investigation. European University Institute. In. US: Oxford.

Calderón, M., & Chong, A. (2006). *Foreign aid, income inequality, and Poverty*. Retrieved from

Chase-Dunn, C. (1975). The effects of international economic dependence on development and inequality: A cross-national study. *American Sociological Review, 40*(6), 720-738. doi:https://doi.org/10.2307/2094176

Chenery, H. B., & Strout, A. M. (1968). Foreign assistance and economic development: Reply. *The American Economic Review, 58*(4), 912-916.

Chong, A., Gradstein, M., & Calderon, C. (2009). Can foreign aid reduce income inequality and poverty? *Public choice, 140*(1), 59-84. doi:https://doi.org/10.1007/s11127-009-9412-4

Collier, P., & Dollar, D. (2004). Development effectiveness: what have we learnt? *The economic journal, 114*(496), F244-F271. doi:https://doi.org/10.1111/j.1468-0297.2004.00221.x

Deyshappriya, N. (2017). *Impact of macroeconomic factors on income inequality and income distribution in Asian countries*. UK: Springer.

Dincer, O. C., & Gunalp, B. (2005). *Corruption, income inequality and growth: evidence from US states*. New Zealand: Department of Commerce, Massey University at Albany.

Domar, E. D. (1946). Capital expansion, rate of growth, and employment. *Econometrica, Journal of the Econometric Society, 14*(2), 137-147. doi:https://doi.org/10.2307/1905364

Drazen, A. (2014). *Political economy in macroeconomics*. India: Orient Longman Private Limited.

Franco, C., & Gerussi, E. (2013). Trade, foreign direct investments (FDI) and income inequality: Empirical evidence from transition countries. *The Journal of International Trade & Economic Development, 22*(8), 1131-1160. doi:https://doi.org/10.1080/09638199.2011.647048

Gomanee, K., Girma, S., & Morrissey, O. (2005). Aid and growth in Sub-Saharan Africa: accounting for transmission mechanisms. *Journal of International Development, 17*(8), 1055-1075. doi:https://doi.org/10.1002/jid.1259

Gupta, M. S. (1998). *Does corruption affect income inequality and poverty?* US: International Monetary Fund.

Gupta, S., Davoodi, H., & Alonso-Terme, R. (2002). Does corruption affect income inequality and poverty? *Economics of governance, 3*(1), 23-45. doi:https://doi.org/10.1007/s101010100039

Gyimah-Brempong, K. (2002). Corruption, economic growth, and income inequality in Africa. *Economics of governance, 3*(3), 183-209. doi:https://doi.org/10.1007/s101010200045

Hansen, L. P. (1982). Large sample properties of generalized method of moments estimators. *Econometrica: Journal of the econometric society, 50*(4), 1029-1054.

Harrod, R. (1939). An Essay in Dynamic Theory. *The economic journal, 49*(193), 14.

Herzer, D., & Nunnenkamp, P. (2012). The effect of foreign aid on income inequality: Evidence from panel cointegration. *Structural Change and Economic Dynamics, 23*(3), 245-255. doi:https://doi.org/10.1016/j.strueco.2012.04.002

Hoeffler, A. (2002). The augmented Solow model and the African growth debate. *Oxford Bulletin of Economics and Statistics, 64*(2), 135-158.

Hussain, A., Nawaz, M. A., & Ibraheem, R. (2021). Governance, Real Output and Foreign Direct Investment in Asia: A Panel Data Analysis. *ANNALS OF SOCIAL SCIENCES AND PERSPECTIVE, 2*(2), 323-343. doi:https://doi.org/10.52700/assap.v2i2.120

Im, H., & McLaren, J. (2015). *Does foreign direct investment raise income inequality in developing countries? A new instrumental variables approach*. Yeungnam University: School of Economics and Finance.

Kabir, M. A. (2020). Foreign aid effectiveness: evidence from panel data analysis. *Global Journal of Emerging Market Economies, 12*(3), 283-302. doi:https://doi.org/10.1177/0974910120961570

Khan, R. E. A., & Naeem, H. M. (2020). Corruption, income inequality and human resource development in developing economies. *Asian Journal of Economic Modelling, 8*(4), 248-259. doi:https://doi.org/10.18488/journal.8.2020.84.248.259

Khuhro, T. N., Bhutto, N. A., Butt, F., Naz, M., Shah, W. A., & Zarqa, S. (2012). *Impact of foreign aid on income inequality.* Paper presented at the The 2nd International Conference on Business Management, Lahore, Pakistan.

Kuznets, S. (1955). Economic Growth and Income Inequality. *The American Economic Review, 45*(1), 1-28.

Layton, T., & Nielson, D. (2008). Aiding inequality: The effect of foreign aid on income inequality. In. Mimeo: Brigham Young University.

Letsoalo, T. E., & Ncanywa, T. (2021). Effects of external financial flows on income inequality in selected Southern African Development Community member states. *Africa's Public Service Delivery & Performance Review, 9*(1), 8. doi:https://doi.org/10.4102/apsdpr.v9i1.476

Levin, A., Lin, C.-F., & Chu, C.-S. J. (2002). Unit root tests in panel data: asymptotic and finite-sample properties. *Journal of econometrics, 108*(1), 1-24. doi:https://doi.org/10.1016/S0304-4076(01)00098-7

Mouneer, S., & Khan, R. E. A. (2019). How Does Corruption Disturb the Foreign Aid Effectiveness to Reduce Child Mortality Rate in Developing Economies? *Pakistan Journal of Social Sciences (PJSS), 39*(4), 1559-1569.

Nielsen, F., & Alderson, A. S. (1995). Income inequality, development, and dualism: Results from an unbalanced cross-national panel. *American Sociological Review, 60*(5), 674-701.

Pesmazoglu, J. (1972). Growth, investment and saving ratios: some long and medium term associations by groups of countries. *Bulletin of the Oxford University Institute of Economics & Statistics, 34*(4), 309-328. doi:https://doi.org/10.1111/j.1468-0084.1972.mp34004001.x

Pham, T. H. H. (2015). Income inequality and foreign aid.

Rose-Ackerman, S., & Palifka, B. J. (2016). *Corruption and government: Causes, consequences, and reform*. UK: Cambridge university press.

Rostow, W. W. (1960). *The stages of growth: A non-communist manifesto*. UK: Cambridge University Press.

Saidon, R., Yusop, Z., Ismail, N. W., & Hoo, L. S. (2013). Sectoral foreign aid and income inequality. *International Journal of Economics and Finance, 5*(9), 117-122.

Sargan, J. D. (1958). The estimation of economic relationships using instrumental variables. *Econometrica: Journal of the econometric society, 26*(3), 393-415. doi:https://doi.org/10.2307/1907619

Shafiullah, M. (2011). Foreign aid and its impact on income inequality. *International Review of Business Research Papers, 7*(2), 91-105.

Wade, R. H. (2020). Should we worry about income inequality? In *Neoliberalism, Globalization, and Inequalities* (pp. 95-118). New York: Routledge.

Waterston, A., Martin, C. J., Schumacher, A. T., & Steuber, F. A. (1965). *Development Planning: Lessons of Experience*. US: Johns Hopkins Press.

Younsi, M., Khemili, H., & Bechtini, M. (2019). Does foreign aid help alleviate income inequality? New evidence from African countries. *International Journal of Social Economics, 46*(4), 549-561. doi:https://doi.org/10.1108/IJSE-06-2018-0319