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The Aid, Macroeconomic Policy Environment and Growth Nexus: Evidence from Selected Asian Countries

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Abstract

This study empirically investigates the aid effectiveness debate in light of the Burnside-Dollar (2000) hypothesis that the recipient country's policy environment is critical for aid effectiveness. Based on data from ten Asian countries for 1984–2015 and in line with Burnside and Dollar (2000), we construct a new composite policy index. Employing two-stage least squares to estimate the model, we find that aid had a negative impact on economic growth during the study period for these countries, thus refuting the Burnside-Dollar aid effectiveness hypothesis.

Keywords: foreign aid, macroeconomic policy, economic growth, Burnside-Dollar hypothesis, Asia.

JEL classification: 040, P45.

1. Introduction

The effectiveness of economic aid has been debated since the 1960s. Harrod and Domar suggested that foreign aid could fill the savings gap, resulting in greater physical capital accumulation and fostering growth. Later, Chenery and Strout (1966) suggested that recipients could use foreign aid to import capital goods and fill the foreign exchange gap. Several studies conducted in the 1990s observed that macroeconomic policies played a crucial role in assessing the impact of foreign aid on economic growth. Based on a cross-section panel, Burnside and Dollar (2000) found that foreign aid played a positive role in the economic growth of those developing countries that had sound macroeconomic policies. Easterly et al. (2003) have re-

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estimated Burnside and Dollar's study using expanded data for 1970–97, but found no empirical evidence to support the latter's results. Thus, there are no conclusive results to show that a sound policy environment is a prerequisite for the positive impact of foreign aid on growth.

Official economic aid has often been accused of not contributing to economic growth and poverty reduction. Net official development assistance (ODA) comprises concessional loans with some grant element (at least 25 percent) made by the members of the Development Assistance Committee (DAC) to non-DAC countries. The main purpose of such loans is to promote the recipient's economic development and welfare. This study considers the impact of ODA on selected countries in Asia, which accounts for a population of about 4.4 billion people. The region is subdivided into five sub-regions: East Asia, South Asia, Southeast Asia, Central Asia and Western Asia/the Middle East. The Asian region consists of 48 countries. East Asia and Southeast Asia have the strongest manufacturing sector, including countries such as China, Japan, South Korea and Taiwan. South Asia has enormous human and natural resources but accounts for nearly half the world's poorest population (see Figure 1).

Figure 1: Map of Asia (South Asia and Southeast Asia)

Over the last few decades, South Asia has been an important destination for foreign aid. India is the region's largest economy, followed by Pakistan. Most of the aid disbursed in this region has been for economic and infrastructure development purposes. According to Moreira (2005), the primary purpose of such aid has been to provide temporary financial assistance to the recipient countries to encourage long-term development projects, such as investment in human and physical capital. While the volume of aid has increased in recent years, its impact on growth is debatable. South Asia is still characterized by significant levels of poverty, with the incidence of poverty varying within the region. High population growth and unsuccessful macroeconomic policies have resulted in unemployment, inequality and poverty.

During 1870–1960, Southeast Asia's development prospects were not very promising. Countries such as Indonesia, Thailand and the Philippines showed hardly any improvement in terms of real GDP per capita (Myrdal, 1972). However, from 1961 to 1996, these three countries experienced rapid growth, with average annual growth rates of 7.7, 6.4 and 4 percent, respectively for Thailand, Indonesia and the Philippines. According to the World Development Indicators for 2002, Thailand and Indonesia were the world's fastest growing economies during this period. Their impressive growth helped improve living standards and reduced the incidence and severity of poverty. Per capita income in Thailand, Indonesia and the Philippines increased six-fold, four-fold and 1.6-fold, respectively, between 1960 and 2000. This increase in income was accompanied by improved life expectancy and education as well as lower infant mortality.

In late 1997, Thailand and Indonesia were affected by the Asian financial crisis, which resulted in a significant increase in their ODA inflows. During 1997–99, ODA inflows rose by 60 percent in Thailand and 160 percent in Indonesia. Between 1996 and 2000, Indonesia became the fourth largest recipient of ODA (after China, Egypt and India), while Thailand and the Philippines were the fourteenth and sixteenth largest recipients of ODA respectively. Most of the aid received by these three countries (Indonesia, the Philippines and Thailand) was bilateral, with Japan being the largest donor. About 11 percent of their net ODA inflows were from multilateral agencies during the same period (DAC, 2002).

Table 1 reports the ODA per capita received by selected countries. In the 1960s, Vietnam received the highest ODA per capita. Between the 1970s and 2000s, Sri Lanka received the largest volume of ODA, while India received the lowest per capita ODA during this period.

Table 1: Net ODA per capita received (Current US$)

Country	1960s	1970s	1980s	1990s	2000s
Bangladesh	-	7.6	14.6	12.7	9.3
India	2.0	1.8	2.7	2.0	1.6
Indonesia	1.5	4.7	6.3	8.1	6.0
Malaysia	2.3	5.4	12.41	4.8	5.1
Nepal	1.3	3.98	16.6	20.2	20.3
Pakistan	7.7	8.2	10.3	8.7	11.2
Philippines	1.8	4.1	10.1	15.3	5.9
Sri Lanka	2.2	10.4	30.6	31.3	31.2
Thailand	1.5	3.1	9.1	12.6	-1.5
Vietnam	8.3	9.3	3.2	10.3	24.9

Source: Organization for Economic Co-operation and Development.

Foreign aid is usually disbursed to recipients based on one or more of the following objectives: (i) infrastructure development and support to productive sectors such as agriculture, or to promote new technologies and ideas; (ii) to stabilize the effects of economic shocks; (iii) to strengthen health, education, the environment and political system; (iv) to provide subsistence goods as part of relief operations in humanitarian crises; (v) as part of counter-insurgency efforts (military aid); and (vi) as a means of pursuing foreign policy goals by donors. One of the primary objectives of this study is to establish the link between ODA and growth with reference to the recipients' economic policies. These findings are intended to highlight relevant policy issues and define alternative directions for future aid strategies for donors as well as recipients.

Our sample of Asian economies is significant for several reasons. First, the region is diverse in terms of political history, resource endowments, size and economic performance. This provides considerable scope for developing a case study. Second, the circumstances of the individual have changed over time: their ability to engage in commercial financial markets and to mobilize domestic resources has improved. This warrants a reassessment of the role of ODA. Third, the recipient community has a stake in maintaining the volume of aid it receives so that development is accelerated and countries can reach the take-off stage more rapidly. From donors' point of view, most future aid strategies are assessed and designed based on how aid has been utilized by the recipient (Alesina & Dollar, 2000). These findings may be useful to scholars and policymakers both in recipient as well as donor countries, allowing foreign aid to be used

more efficiently. We identify the structure of aid disbursed to the sample countries and explore the extent that it affects growth.

A large body of literature addresses the foreign aid and growth nexus and broadly falls into two categories: (i) unconditional growth effect studies and (ii) conditional growth effect studies. The first implies that growth will affect the recipient economy without any prerequisites (see Hansen & Tarp, 2001; Hermes & Lensink, 2001; Moreira, 2005). The second holds that the growth effect is conditional on a sound policy environment (see Collier & Dollar, 2002; Burnside & Dollar, 2000; Collier & Hoeffler, 2004). Our aim is to empirically test the validity of the second theory, which investigates the conditional growth effect. Thus, we assess the effect of aid on growth in the presence of good and bad policy environments with special reference to Asia.

The Harrod-Domar and Solow (1956) growth models identify physical capital formation as the driving force behind economic growth. In other words, output is dependent on new investment and its productivity. Lack of savings is regarded as a major constraint to economic growth in developing countries. A low per capita income is the chief factor limiting a country's capacity to generate the savings required for investment purposes. Subsequently, Chenery and Strout (1966) introduced the two-gap model by expanding the Harrod-Domar model. The two-gap model makes it possible to predict the amount of capital inflow required to maintain a specified rate of growth. According to this, low-income countries' investment is constrained either by a shortage of export income (trade gap) or a lack of domestic savings (the investment-savings gap). The inflow of foreign capital is required to fill this gap. The purpose of aid is to supplement internal sources of finance, improve the stock of capital and thus increase the amount of investment. However, if this aid is spent on government consumption expenditures rather than public investment, then this could have a negative effect on growth.

In this paper we investigate whether:

i. Aid is a significant determinant of GDP
ii. The policy variable and its interaction with foreign aid affects economic growth positively or negatively
iii. Government policies affect the level of economic growth positively or negatively (even in the absence of aid).

It is important to note that the third hypothesis is a prerequisite for the second hypothesis. If policy plays no role in the absence of aid, then it is theoretically incorrect to assume that it plays any role when interacting with the aid variable. The remainder of the paper is organized as follows. Following a concise review of the literature in Section 2, the study's data and estimation methods are discussed in Section 3. Section 4 presents the empirical model and our main findings. Section 5 presents concluding remarks and policy implications.

2. Literature Review

The aid effectiveness discussion has moved away from traditional foreign exchange and savings-investment gap theories to policy and institutional gaps in recent years. Burnside and Dollar (2000) represent the first significant work that generated debate on the aid-policy-growth relationship. They conduct panel growth regressions for 56 developing countries over six four-year periods (1970–93) and empirically test two important questions: (i) whether aid affects growth positively in the presence of sound policies, and (ii) whether donors allocate more aid to countries with good economic policies. Their results show that, in the presence of sound fiscal, monetary and trade policies, aid has a positive and substantial impact on economic growth. Another important finding is that multilateral aid was allocated in favor of good policy, but in the case of bilateral aid, no such evidence was found.

Subsequently, the World Bank considered Burnside and Dollar's (2000) findings when assessing aid and stated that donors should direct aid to those countries that had sound economic policies. Otherwise, aid would not be able to foster economic growth. However, many critics have criticized the methodology of the Burnside-Dollar study. Many studies have re-examined the robustness-of-policy view and assessed the relationship between aid and growth in this context. Dalgaard and Hansen (2001), Brumm (2003), Ram (2004), Feeny (2005), and Karras (2006) find no evidence that a good policy environment is a condition for boosting economic growth. This invalidates the Burnside-Dollar claims to a significant extent. However, Collier and Dollar (2002), Dalgaard et al. (2004), Denkabe (2004), and Salisu & Ogwumike (2010) show that a sound, stable macroeconomic policy environment is necessary for aid to contribute effectively to economic growth. Thus, Burnside and Dollar's (2000) findings remain controversial.

In summary, the results of these empirical studies are ambiguous and their applicability generally confined to the 1990s. Moreover, none of them focus primarily on countries in Asia. This study has tried to fill this gap and attempts to estimate the aid-growth link in the context of good/bad policy for ten selected Asian economies, using a more recent dataset (1984–2015). To the best of our knowledge, there is no other cross-country study focusing on Asian countries based on recent data. Most other studies in this area are either single-country studies or address developing countries overall. Our study is different from Burnside and Dollar (2000) in another way: the former use effective development aid to measure aid, whereas we use ODA as a measure of aid, following Minoiu and Reddy (2010).

The study is important, given that many developing countries in this region are still dependent on aid. Our findings may help policymakers and donors understand how aid has been utilized in the last three decades by recipients and how it has contributed to their economic growth. Using two-stage least squares (2SLS), we investigate this relationship by considering the endogeneity of some growth determinants, incorporating an aid-policy interaction term and its quadratic, in the model.

3. Data and Research Methodology

The empirical model is estimated by considering ten developing countries in Asia for the period 1984 to 2015. This study is an unbalanced panel study since some observations are missing for certain variables. However, the data is not heavily unbalanced. We have missing observations for certain variables in the case of Vietnam, Nepal and the Philippines. Political instability and lack of statistical capacity to maintain data is another reason for the missing observations.

The data is taken from the World Bank and OECD-DAC (see the Appendix for a complete list of countries and variables). Section 3.1 provides summary statistics for the variables used. Section 3.2 explains how the policy index is constructed. Section 3.3 addresses the issue of the endogeneity of aid, and Section 3.4 gives an overview of the estimation techniques used in this model.

3.1. Descriptive Statistics

Table 2 reports the sample mean, standard deviation, and minimum and maximum values of the variables used in our empirical analysis.

Table 2: Summary statistics

Variable	N	Mean	Min.	Max.	SD
Growth (per capita)*	319	3.41	-14.35	12.05	2.98
Aid	315	0.96	-0.65	5.93	1.06
Population growth (%)	320	1.73	-1.61	3.33	0.66
Openness (%)	318	70.90	12.01	220.41	46.93
Inflation (%)	308	7.21	-1.71	58.39	5.69
Budget surplus/deficit (%)	189	-2.97	-9.34	2.92	2.48
Domestic credit to private sector (%)	312	47.30	8.49	166.50	37.08
Infrastructure expenditure (%)	320	4.66	0.12	19.76	5.34

Note: * Growth of per capita income ($PPP).
Source: Authors' calculations.

Economic growth has always been used as a yardstick of the effectiveness of aid: more aid is expected to bring about faster growth. However, the relationship between growth and aid is not straightforward because some countries that have received large amounts of aid have shown slow growth. At the same time, other countries have witnessed impressive growth rates with small amounts of aid. Thus, the discussion on the conditions under which aid works effectively is an ongoing one.

Burnside and Dollar (2000) claim that aid spurs growth only in those countries that have a strong policy environment. To test this hypothesis, they introduce a policy index and use the interaction term between this policy index and aid to investigate the impact of policy in growth regressions. Following Burnside and Dollar, the following model is used to estimate the relationship between aid policy and economic growth:

$$\Delta Y_{i,t} = \beta_0 + \beta_1 Y_{i,0} + \beta_2 \left(\frac{aid}{GDP}\right)_{i,t} + \beta_3 (policy)_{i,t} + \beta_4 \left(\frac{aid}{GDP*policy}\right)_{i,t} + \beta_5 \left(\frac{aid}{GDP}\right)^2_{i,t} + \beta_6 \left\{\left(\frac{aid}{GDP}\right) * policy\right\}_{i,t} + \beta_z (Z)_{i,t} + \lambda_t + \mu_{i,t} \quad (1)$$

$i = 1, \ldots, 10; t = 1, \ldots, 32$

where i denotes a country and t a year. The dependent variable $\Delta Y_{i,t}$ is the average annual growth of real GDP per capita, $Y_{i,0}$ is the initial year real GDP per capita, $\left(\frac{aid}{GDP}\right)_{i,t}$ denotes foreign aid as a percentage of GDP, $P_{i,t}$ is a policy index affecting growth per capita, and $Z_{i,t}$ is a vector of all exogenous variables that affect growth and allocation of foreign aid. λ_t and

$\mu_{i,t}$ represent a constant that may change over time (or intercept dummy) and an error term, respectively.

The variables are averaged over four-year intervals (1984–87, 1988–91, … 2012–15). This is to help smooth out the yearly fluctuations that arise in the dependent and independent variables. Burnside and Dollar (2000) use panel data for 56 countries and six four-year periods from 1970–73 to 1990–93. Hansen and Tarp (2001) also use panel data for 56 countries and five four-year periods from 1974–77 to 1990–93. Collier and Dollar (2002) use panel data for 56 countries and six four-year periods from 1974–77 to 1994–97. For the poverty-efficient allocation of aid, they use data for 59 countries.

3.2. Construction of Policy Index

Estimating the model given in Equation 1 requires that we construct a suitable policy index that can represent fiscal, monetary and trade policies. We construct a composite policy index to capture the effect of these three policies. Subsequently, following Burnside and Dollar (2000), we assign weights to the coefficients of the variables obtained from the growth regression. The following equation expresses the policy index:

$$Policy\ index = \alpha_1(budget\ surplus) + \alpha_2(inflation\ rate) + \alpha_3(openness)$$

Here, the budget surplus/deficit is used to capture the effect of fiscal policy and the inflation rate is used to represent monetary policy. The openness variable captures the effect of trade policy. α_1, α_2 and α_3 are the weights assigned to the budget surplus, inflation rate and openness, respectively. It is important to note that Burnside and Dollar (2000) use a Sachs and Warner (1995) dummy variable to capture the effect of trade policy. In contrast, we use the trade openness index, which is constructed as follows:

$$Trade\ openness\ index = \frac{(exports + imports)}{GDP}$$

We avoid using a dummy variable to measure trade openness because it would be unable to classify the type of economy (whether closed or open) and thus give us a biased result (Rodríguez & Rodrik, 2000). The ratio of exports and imports is used to reflect the country's trade policy. Our sample represents a diverse group of countries, most of which are large countries with varying degrees of vulnerability to a common event. Empirical results suggest that open economies experience increased growth compared to closed economies with tariff barriers. Inflation is used to measure the monetary policy effect, based on Fischer (1993).

The main advantage of using the policy index is that it weighs policies according to their correlation with the growth regression. For this purpose, we first run an ordinary least squares (OLS) regression on the growth equation by excluding the aid variable. Equation 2 presents an estimated regression policy index equation that accounts for monetary, fiscal and trade policies:[1]

$$Policy = 4.42 + 0.1044\ (budget\ surplus/deficit) - 0.2138\ (inflation) - 0.104\ (trade\ openness) \quad (2)$$

The policy index weighs the three policy variables according to their GDP per capita growth impact. The constant 4.42 can be interpreted as the predicted growth rate of the country if it has the mean characteristic of all the variables that are included in the model (Burnside & Dollar, 2000).

The coefficient of the budget deficit/surplus is positive but insignificant. The coefficient of the inflation variable is negative and significant, with $p < 0.01$. This shows that a one-percentage point increase in inflation rate decreases per capita growth rate by around 0.2 percentage points. This could be because inflation depresses economic growth in two ways: it creates uncertainty about future profits, which results in conservative investment strategies; and it decreases the international competitiveness of the country by making exports expensive and worsening its balance of payments.

The trade openness term is used here as a proxy for trade liberalization/fewer trade restrictions. The coefficient of trade openness is negative and significant, with $p < 0.01$. The negative sign of the openness variable maybe the result of a larger share of imports than exports. As Abbas (2014) notes, many developing countries face higher trade barriers and restrictions on agricultural products and related sectors, which has a negative impact on their exports' performance, resulting in a higher trade deficit.

The coefficients obtained from the regression above are used to create the policy index series for each country in each year. Subsequently, this policy variable is used to estimate the main regression in model 1. The expected sign of each independent variable presented in model 1 is as follows: ODA is expected to have a positive impact on growth via increasing investment. The population growth rate is expected to have a negative impact on the growth rate of per capita income. Financial

[1] The Breusch–Godfrey test confirms the absence of autocorrelation in the model.

development is expected to be positively related to per capita growth by increasing the provision of services to people.

3.3. Endogeneity of Aid

In the empirical literature, especially that on aid effectiveness, the endogeneity of aid has remained a primary issue. When estimating the relationship between aid and growth, it is important to consider the problem of endogeneity, which has been investigated in studies such as Hansen and Tarp (2001), Easterly et al. (2003) and Clemens et al. (2012). Endogeneity arises when a regressor is correlated with the error term. This can happen in three cases: (i) if there is a measurement error, (ii) if a variable is omitted (which correlates with one of the regressors), or (iii) if there is simultaneity bias/reverse causality. If aid is endogenous, then we have the following equation:

$$cov\ (aid;\ \mu)\ \neq\ 0$$

The simultaneity of aid within the growth regression implies that foreign aid influences the economic growth of the recipient, but at the same time, economic growth also influences aid – donors may prefer to allocate aid to recipients with higher growth levels or to poor economies with lower growth levels. In the case of an endogeneity problem, OLS estimators will be biased. To correct this, other econometric approaches are used, such as instrumental variable regression and the generalized method of moments (GMM). Here, we employ the 2SLS technique.

3.4. Estimation of Model

The 2SLS method has been used to address the issue of endogeneity by several studies, including Burnside and Dollar (2000), Hansen and Tarp (2001), Dalgaard et al. (2004), and Angeles and Neanidis (2009). Other studies, such as Boone (1996) and Dalgaard et al. (2004), have used lagged aid as an instrumental variable. Rajan and Subramanian (2008) have reservations about this approach. They argue that using a lagged variable as an instrument could be problematic because, if the average growth rate depends on previous year aid flows (for instance, if the 1998–2001 average growth rate depends on aid flows in 1997), then this instrument would violate the endogeneity requirement, thus proving to be an unsuitable instrument.

Other studies have employed GMM to address the potential endogeneity of aid. Arellano and Bond (1991) use this technique to tackle

the issue of endogeneity by estimating dynamic panel models. GMM estimators are popular in the aid effectiveness literature (see Dalgaard et al., 2004; Rajan & Subramanian, 2008; Angeles & Neanidis, 2009). This technique is also known as the Arellano–Bond GMM.

If the results of first-stage 2SLS show that the instruments are weak, then the estimators of a fixed effects instrumental variable are likely to be biased. In this approach, the endogenous variable is converted to first differences and the lagged levels of the endogenous variable are used to instrument these differences. This estimator is also called the difference GMM estimator. Hansen (1982) notes that the Arellano–Bond estimation method initially transforms all the regressors into differenced form and then uses GMM for further estimation. However, the basic assumption of GMM is that the number of periods (T) is less than the number of individuals (N). In this analysis, we have fewer N and greater T, implying that GMM is not an appropriate technique for our purposes.

The OLS method assumes that the error term of the dependent variable is independent of all explanatory variables. When the above assumption is violated and the error term of the dependent variable is correlated with any of the independent variables, the OLS estimators yield biased results. If the error term of the dependent variable is correlated with any regressor of the model, then 2SLS can be used to resolve this issue. The 2SLS technique is, in fact, an extension of OLS. It operates in two stages: in the first stage, it replaces the problematic variable with the instrumental variable. In the second stage, the estimated values obtained in stage 1 are used (instead of the actual values of the problematic explanatory or endogenous variable) to estimate the model.

In this study, the foreign aid variable is assumed to be endogenous in the aid growth–policy nexus model. Since causality runs in both directions, from foreign aid to per capita growth and vice versa, the regressors could be correlated with the error term. To fix this problem, we apply 2SLS fixed effects. For this purpose, the lagged value of aid is used as an instrument. We add the lagged levels of the endogenous regressors, along with population as the control variable, given that aid money is disbursed based on the recipient's population or geographic size.

4. Empirical Results of Foreign Aid Model

To estimate the growth model, we use unbalanced data for ten South Asian and Southeast Asian countries for the period 1984–2015. Next,

the data is averaged over four-year periods (expect for initial per capita GDP). For initial per capita GDP, we take the first observation at the start of each decade. Our dependent variable is average real GDP per capita growth. The log of initial GDP per capita, population growth, domestic credit to the private sector (financial development), and infrastructure policy are taken as control variables.

Our results are presented in Table 3. The log of initial GDP is negative but insignificant. Aid, aid squared, policy and the aid–policy interaction term are the main variables of interest. The aid-squared variable describes whether there are diminishing returns to aid. A negative value of the coefficient of aid squared tests diminishing returns to aid, while a positive value would indicate increasing returns. Table 3 presents the results of the growth regressions carried out using 2SLS (fixed effects) and GMM.

Table 3: Panel growth regression outputs for 10 South Asian and Southeast Asian countries

Dependent variable: growth rate of per capita GDP.

Independent variable/estimation method	**2SLS FE (within) regression using BD policy index**
Intercept	5.1536
	(4.0257)
Log initial per capita GDP	-0.3054
	(0.5413)
Aid/GDP	-5.5520***
	(1.9197)
Policy index	0.4007***
	(0.1588)
(Aid/GDP)*policy	-0.2330
	(0.508)
Aid^2	2.2175**
	(1.0836)
(Aid^2/GDP)*policy	0.2628
	(0.1980)
Pop. growth	1.8925**
	(0.8999)
Domestic credit to private sector (financial dev.)	-0.3013**
	(0.0146)
Infrastructure policy (fixed telephone lines)	-0.2502***
	(0.1119)
Sigma	1.6594
P-value (F-test)	0.0049

Note: Robust standard errors given in parentheses. *** $p < 0.01$, ** $p < 0.05$ and * $p < 0.10$.
Source: Authors' calculations.

Since one of the explanatory variables (aid) is endogenous in this model, OLS or fixed effects could potentially lead to biased results. Thus, we use 2SLS to check the robustness of our results. The 2SLS results reported in Table 3 show that aid is significant but negatively related to real per capita GDP: one percentage point increase in aid depresses real per capita GDP by 5.5 percentage points. These results are similar to those of Brumm (2003). The aid variable in quadratic form is also significant and positive, which implies the impact of aid eventually becomes positive, once a threshold level of aid/GDP is reached. However, when the aid-squared term interacts with policy, it becomes insignificant.

Population growth is positive and significant, which indicates that it enlarges the labor force and increases growth. In the short run, population growth (following transitional theory) reduces per capita GDP, but in the long run, it improves living standards through an increase in labor force, human capital and consumer force (Crenshaw et al., 1997).

Financial development is measured in terms of domestic credit to the private sector. The coefficient of financial development is negative and significant. In other words, more finance is not necessarily good for economic growth, rather it is the optimal level that matters (Law & Singh, 2014).

Following Easterly et al. (2003) and Loayza and Fajnzylber (2005), telephone penetration (telephone lines per 1,000 persons) is used to represent infrastructure. Better information and communication technology reduces the cost of interaction and expands market boundaries (Roller & Waverman, 2001). The inefficiency of infrastructure investment has a negative impact on per capita growth. Poor governance and corruption could be a reason for these inefficiencies (Faridi et al., 2011). In developing countries, social infrastructure, which includes health and education, plays a crucial role in improving per capita GDP.

The coefficient of aid*policy is statistically insignificant, which negates the conditional effect hypothesis when aid interacts with policy. Policies have a significant and positive independent effect on per capita growth of GDP, but when they interact with aid, they become insignificant.

5. Conclusion and Policy Implications

The aim of this study was to provide an insight into the effectiveness of aid by testing Burnside and Dollar's (2000) claim that aid is effective only in a good policy environment. One of its major contributions is that it uses

more recent data on foreign aid to determine the relationship between aid, policies and growth in the context of the Asian region.

Using a panel growth regression model for ten major countries in Asia for the period 1984–2015, we have constructed an improved composite policy index to examine the determinants of policy. The index includes three major policies: fiscal, monetary and trade. This study differs from Burnside and Dollar (2000) in that we have used ODA rather than effective development aid as a measure of aid.

Our findings suggest that, in general, monetary, fiscal and trade policies are crucial for growth, the combined effect of these policies with aid has no impact on GDP per capita. This implies that robust and consistent public policies (fiscal, monetary, trade) are an essential, but not necessary condition for aid to be positively affecting growth. Thus, aid is not conditioned to a good policy environment. This result is inconsistent with Burnside and Dollar (2000) but highly consistent with Hansen and Tarp (2001), Easterly et al. (2003) and Yusuf (2012). Another significant finding is the negative relationship between aid and GDP per capita, which implies that aid has not effectively improved GDP per capita in this region, rather it has been used wastefully.

These findings are useful for the donor community and equally important for aid recipient countries. Though the principle objective of foreign aid has been to eradicate poverty in this region, but our results suggest that it has not necessarily improved per capita GDP. The policy implication is that donors should develop a robust accountability mechanism for recipients so that aid is not misused. On the other hand, it is also the responsibility of the recipient government to reconsider its internal policies and to control corruption and the wasteful use of financial resources.

Inconsistent government policies, political instability and weak institutional structures should also be addressed as a priority. Otherwise, the desired positive impact of foreign assistance cannot be achieved. Furthermore, since aid flows are highly unstable, a policy of self-reliance should be promoted. Recipients should rely on sustainable and stable sources of financing, such as exports and foreign direct investment.

One of the limitations of this study is the non-availability of data on variables such as political stability, political violence and institutional quality. This has meant that we could not include certain variables used by Burnside and Dollar (2000). While we have focused on the impact of aid in Asian economies, further research could expand this analysis to African economies.

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Appendix

Table A1: Sample of countries classified by region

South Asia	Southeast Asia
Bangladesh	Indonesia
India	Malaysia
Nepal	The Philippines
Pakistan	Thailand
Sri Lanka	Vietnam

Table A2: Sample of countries classified by income group

Income level	Country(s)
Low-income	Nepal
Lower middle-income	Bangladesh, India, Indonesia, Philippines Pakistan, Sri Lanka, Vietnam
Upper middle-income	Malaysia, Thailand

Table A3: Description of variables used in regression models

Variable	Description
GDP per capita growth (as an annual percentage)	Annual percentage growth rate of GDP per capita based on constant local currency. Aggregates are based on constant 2005 US dollars. GDP per capita is GDP divided by the midyear population. GDP at purchaser's prices is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for the depreciation of fabricated assets or the depletion and degradation of natural resources.
Log initial GDP per capita	Log per capita PPP real GDP for the first year of each period, constant.
Net ODA received (as a percentage of GNI)	Consists of the disbursements of loans made on concessional terms (net of repayments of principal) and grants by official agencies of the members of the Development Assistance Committee (DAC), by multilateral institutions, and by non-DAC countries to promote economic development and welfare in countries and territories on the DAC list of ODA recipients. It includes loans with a grant element of at least 25 percent (calculated at a rate of discount of 10 percent).

Variable	Description
Population growth (as an annual percentage)	The annual population growth rate for year *t* is the exponential rate of growth of the midyear population from year *t*–1 to *t*, expressed as a percentage. The population is based on the de facto definition of population, which counts all residents regardless of legal status or citizenship, except for refugees not permanently settled in the country of asylum, who are generally considered part of the population of the country of origin.
Policy index	Includes three policy variables: inflation, budget deficit/surplus, and openness to represent monetary, fiscal and trade policies respectively.
Inflation consumer prices (annual %)	Inflation as measured by the consumer price index reflects the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals, such as yearly. The Laspeyres formula is generally used.
Budget deficit/surplus	The government budget balance is the difference between government revenues and expenses. The budget is balanced when outlays equal receipts. The country reports a budget surplus when revenues are higher than expenses, and a deficit when expenses exceed revenues.
Openness index	An economic metric calculated as the ratio of the country's total trade, the sum of exports plus imports, to the country's GDP. Openness index = (exports + imports)/GDP.

Table A4: Correlation matrix

	Growth (per capita)	Aid	Population growth	Openness	inflation	Budget deficit	Domestic credit to private sector	Infrastructure
Growth (per capita)	1.0000							
Aid	-0.2767	1.0000						
Population growth	-0.2453	0.3686	1.0000					
Openness	-0.1002	-0.2950	-0.0736	1.0000				
Inflation	-0.3637	0.3367	0.0246	-0.3095	1.0000			
Budget surplus/deficit	0.1002	-0.1183	-0.0401	0.0435	-0.1392	1.0000		
Domestic credit to private sector	-0.0267	-0.4489	-0.1719	0.8447	-0.3644	0.2502	1.0000	
Infrastructure	0.0726	-0.4820	-0.1623	0.7123	-0.3358	-0.0632	0.6586	1.0000