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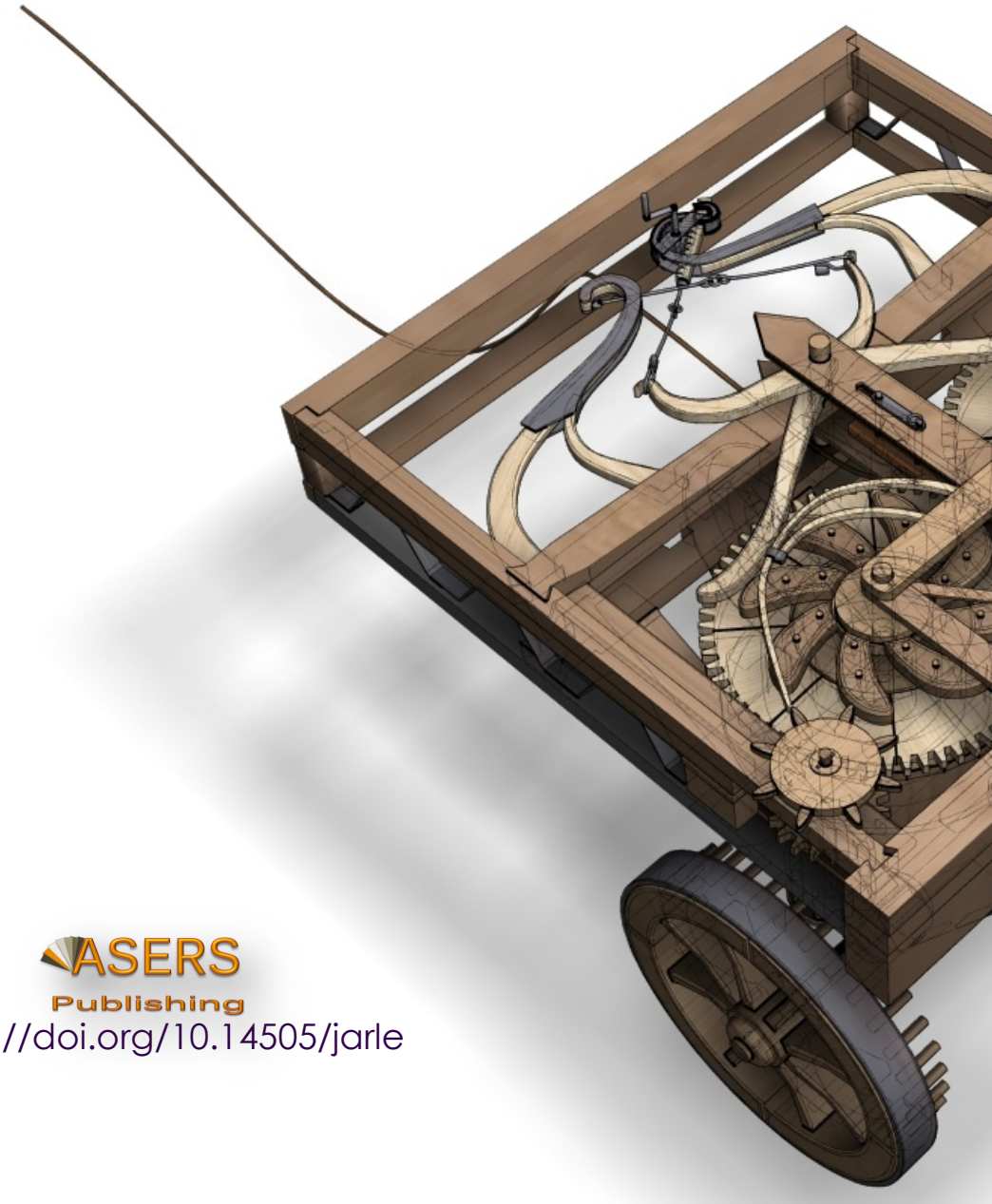

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Revisiting the Aid – Growth Nexus: New Evidence on 56 Least Developed Countries

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Abstract:

Many scholars have observed the aid – growth nexus with no consensus regarding the results. This study tries to investigate the potential non-linearities relationship between aid and growth as well as to explore whether aid is more effective in countries with good policies. In the panel specifications, we use six time periods in 56 Least Developed countries, namely: 1985-1989; 1990-1994; 1995-1999; 2000-2004; 2005-2009; 2010-2014. By using the panel Generalized Method of Moments (GMM) estimation, we find that a more positive impact of aid on growth in good policy environments is not a robust result in all models. However, our study confirms a non-linear relationship between aid and growth.

Keywords: aid; growth; policy

JEL Classification: C33; F35; O40; O50.

Introduction

Many low income countries have received substantial amount of aid over the last 30 years. However, the hope that aid will increase investment and will boost economic growth in the low income countries through improvement on domestic saving and or foreign exchange constraints have not been met. There has been a debate that despite some countries takes advantage of aid to achieve high and persistent growth; they all have become more dependent on aid. This will reject the notion that the need for further assistance will reduce as the economy grows.

In terms of the origin of funds, aid flows can be categorized by the private and official flows (Mercieca 2010). The former is dominated by direct investment, export credits and commercial debt. While the latter constitutes bilateral transfers (e.g. from one government to other governments) and multilateral transfers (e.g. from the international agencies to government). Such transfers normally include an element of 'concession' which is known as official development assistance (ODA). This will involve any type of grants (including technical assistance), concessionary loans, contributions in kind, suppliers' credit, and reparations payments. It can be elaborated that not all types of ODA take the form of chariTable donations.

Early empirical studies of the macroeconomic impact of foreign aid focused on the association between aid, domestic savings, and growth. The conceptual foundation can be traced back to John Maynard Keynes's idea where governments can fill the gap of development by attracting foreign direct investment (Meier, and Stiglitz 2001). Accordingly, investments are determined by savings, which are affected by per capita income. As poor countries have low incomes, which lead to low savings, thus there is a phenomenon so-called vicious cycle of poverty. With this condition, foreign aid can assist the development of this country through a productive investment, which will enhance economic growth. Here,

the donor can facilitate a target of country's economic growth by calculating the financing gap that is the difference between domestic savings and level of investment to achieve this growth target.

This formulation of the gap theory was then reassessed by the Harrod-Domar model (Harrod 1948; Domar 1947). Here, they assumed that the availability and productivity of capital will limit economic growth and there is an excess supply of labor. As developing countries have low savings and thus have low investments, foreign aid is intended to tackle the savings constraint. Such saving gap model will increase investment, leading to a rise in economic growth. The development of gap theory never had a breakthrough until Chenery, and Strout (1966) proposed a foreign exchange gap to complement a saving gap model. They argued that export earnings which are prerequisite for importing raw materials and capital goods for investment are so minimal in developing countries. Here, foreign aid is needed when commodity prices decline, and or when new trade barriers are imposed, and or when constraints on trade are not removed rapidly as they should be. In addition to a foreign exchange gap, Bacha (1990), and Taylor (1994) identified the fiscal gap. They recognized that the revenue raising capacity of governments in developing countries is so limited to cover a desired level of investment. Thus, foreign aid could potentially relieve this gap as long as it was used for productive investment.

Despite the existence of these gaps which aid can potentially fill, the majority of aid studies focused on the financing and the saving gap. Also, since the level of growth is likely to affect aid, this study requires a strategy to disentangle reverse causation issue. Most of them tended to rely on instrumental variables but the instruments that have been used are debaTable in terms of their validity and strength. Concerning with knowledge gap, this paper tries to investigate the potential non-linearities in the aid – growth relationship as well as to explore whether aid is more effective in countries with good policies. For our novelty panel specifications, we use six time periods in 56 Least Developed countries, namely: 1985-1989; 1990-1994; 1995-1999; 2000-2004; 2005-2009; 2010-2014. The following parts of this paper are organized as follows: Chapter two, based on literature review, discusses the relationship between aid and growth. Chapter three describes the data and methodology used in this study. Chapter four explores and analyzes the result. Finally, chapter five provides the conclusion and limitation of study.

1. Literature Review

Many scholars have begun to investigate the relationship between aid and growth since 1950s but the results in aid effectiveness studies are relatively ambiguous. Mosley (1980) made a breakthrough contribution to the aid – growth nexus. He used lagged aid variables and took account for the potential endogeneity of aid. He found that there was a negative and insignificant association between aid and growth. However, when the sample was restricted to the poorest 30 countries in the sample and aid was lagged for 5 years, he found a positive and statistically significant impact of foreign aid. Later, Mosley *et al.* (1987) investigated the effect of aid on growth in 63 countries over the period 1970 – 1980. They basically found no statistically significant relationship between aid and growth. Boone (1996) investigated the impact of foreign aid on investment, consumption and measures of well-being by constructing panel dataset for 91 countries in the period 1971 – 1990. He then examined whether aid effectiveness is determined by the political regime. The results showed that foreign aid led to an increase in government consumption. This will reject the notion that aid will increase investment or will give benefit to the poor. To sum up, there was no conclusive evidence that foreign aid was effective to promote economic growth in recipient countries up to the late 1990s. Such ambiguous result can be explained by different scope of countries and variety in estimation method.

During 2000 up to 2008, the result is pretty much similar to what happened in 1990s. Burnside, and Dollar (2000) found that aid gave a positive effect on growth for developing countries with good policies, but had little impact for those with poor policies. This could provide an explanation of why aid had a weak effect on growth in previous empirical work. Concerned with this result, Addison *et al.* (2005) proved that aid will reduce poverty through growth when it is used to invest in the livelihoods of the poor, which raised the poverty-elasticity of growth. Such intervention will improve the productivity of the poor and their human development indicators.

Hansen, and Tarp (2001) examined the relationship between foreign aid and growth in real GDP per capita. They showed that aid in all likelihood increased the growth rate. The interesting argument is that this result is not conditional on whether countries adopted 'good' policy. There are decreasing returns to aid, and the estimated coefficient of aid effectiveness is highly sensitive to the choice of control variables and estimation technique. When they controlled for investment and human capital, there was no positive effect of aid on growth in all models. However, aid continues to impact on growth through investment.

Despite the optimism of the result, Easterly *et al.* (2004) reduced the confidence of some conclusions that aid promotes growth in countries with good policies. By adding additional data of Burnside, and Dollar (2000), the simple robustness check raised new doubts about the effectiveness of aid. They suggested that economist and policy makers should be less sanguine to conclude that foreign aid will boost economic growth through good policies. Similar results are also provided by Rajan, and Subramanian (2008) in which they investigated the effects of aid on growth in cross-sectional and panel data, after correcting for the possible bias that poorer and stronger growth may draw aid contributions to recipient

countries. Even after this correction, they found little robust evidence in the relationship between aid inflows into a country and its economic growth. They also found no evidence that aid worked better in better policy or geographical environments.

After decades of little or no clarity over its effectiveness, Guillaumont (2008) argued that aid effectiveness depends on two features of recipient countries. First, it is related to the policy and the quality of institutions. The basic idea is that aid is more effective when the policy and institutional quality are 'good' because aid is used more rationally. The second category is related to the exogenous shocks and the post-conflict situation. While vulnerability to exogenous shocks gave a negative effect on growth, aid can reverse this effect by lowering the shortfall of resources. Also, aid can facilitate recovery and can lower the risk of new conflict.

2. Data, Methodology, and Empirical Framework

To investigate the relationship between aid and growth, we use several data compiled by various authors (see Figure 1). The average growth rate of real GDP per capita, natural logarithm of initial level of real GDP per capita, gross and foreign domestic investment as a share of GDP, natural logarithm of population, and initial level of mortality are taken from the World Development Indicator (WDI). These are used by several authors such as Easterly *et al.* (2004), Burnside, and Dollar (2000, 2004) as well as Rajan, and Subramanian (2008) in their essay to capture the relationship between aid and growth. Our study relies on data of 56 countries over six time periods, namely: 1985-1989; 1990-1994; 1995-1999; 2000-2004; 2005-2009; 2010-2014. Here, the choice of countries is based on Burnside and Dollar' study.

Meanwhile, official development assistance (ODA) as a share of GNI, index of ethno-linguistic fractionalization, number of assassinations per 100,000 population proxy of institutional quality, and proxy of human capital are taken from the OECD-DAC database on Aid which is summarized in WDI, World Health Organization (WHO) mortality database, the quality of government basic dataset (QoG version January 2016), Penn World Table dataset (PWT version 9.0), and WDI respectively. Moreover, we include dummy variable such as trade openness and regional to control heterogeneity in aid. In addition, we also used one period lag of M2 as a share of GDP, government consumption and budget surplus as a share of GDP, natural logarithm of CPI differences, one period lag of arm imports. Such data are available in WDI and Stockholm International Peace Research Institute (SIPRI) trend indicator values which is summarized in WDI, respectively. We also calculate the policy index based on Burnside, and Dollar' (2000) framework, which is constructed from a constant, budget surplus, inflation and openness.

Figure 1 indicates that some data are available for all countries in all time periods. The variables take on values that are within the expected ranges, and there are no missing values on variable of country as we already put label on the World Bank country code. Also, since we used regional dummies, the mean of sub-saharan and Latin America countries are only 38 % and 29 % of the sample, respectively. With regards to our main variables of interest, the average growth rate and ODA as a share of GNI in our observation are about 4 % and 5 %, respectively.

Overall, the dependent variables and regressors can potentially vary over both time and individuals. Variation over time or a given individual is called within variation, and variation across individuals is called between variations. Time – invariant regressors have zero within variation, so the country, ethnf, icrge, and regional dummy variables are all time-invariant. Meanwhile, individual – invariant regressors have zero between variation, so variable of period are individual – invariant. All variables except period, growth, assassin, fiscal, infl, and fdi have more variation across individuals (between variation) than over time (within variation), and thus within estimation may lead to efficiency loss.

Figure 1. Summary of Statistic

Variable	Obs	Mean	Std. Dev	Min	Max
country	336	138.5	16.18734	111	166
period	336	3.5	1.710372	1	6
growth	333	3.88985	5.239866	-31.0159	35.58995
lgdppc	333	7.033106	1.103636	4.171462	9.776379
oda	333	5.159791	7.523130	-6446748	72.06033
ethnf	336	47.39286	30.15582	0	93
assassin	336	.390625	1.148384	0	11.5
icrge	336	4.598353	1.216624	2.270833	7
m2lag	329	28.77624	13.48182	7.235307	98.38651

Variable	Obs	Mean	Std. Dev	Min	Max
fiscal	299	-0465399	064444	-4750511	1785741
infl	325	.2333987	.3927076	-.036822	3.24832
open	336	.2254464	.3958174	0	1
policy	290	1.23874	1.164591	-4.063581	4.2318
govcon	329	.1325942	.0525632	.039	.3230322
gdi	333	.2178594	.0760687	.055273	.6149999
fdi	331	.0085465	.0141999	-.0343512	.1156461
mytotl	270	3.942589	1.966817	.16	8.558117
ssa	336	.375	.484845	0	1
easia	336	.0892857	.285581	0	1
lac	336	.2857143	.4524277	0	1
cac	336	.0892857	.285581	0	1
francz	336	.125	.3312122	0	1
egypt	336	.0178571	.1326296	0	1
armslag	335	5.737048	13.81908	0	116.35
lpop	336	16.17452	1.413785	13.09825	20.58554
imrt	336	88.08502	43.79279	14.6	204.2

Moving to the methodology approach, clearly identifying the causal effect of foreign aid on economic growth is relatively difficult. First, aid relative to GNI is likely measured with error. The problem of measurement error is exacerbated as the estimated model is often demeaned to compensate the country fixed effects (Griliches, and Hausman 1986). Even if aid/GNI did not display measurement error, GNI itself could not be strictly exogenous in a growth equation. Second, identification might be confounded by unobserved factors that determine both economic growth and aid. Third, growth itself could also affect aid.

In response to these potential problems, previous studies have introduced different instrumental variables to identify the causal effect of aid on growth. Boone (1996) used three different instruments to investigate the effectiveness of foreign aid programs to gain insights into political regimes in aid recipient countries. The first instrument is the logarithm of population, followed by the political determinants of aid flows where he used three variables such as Friends of US, Friends of OPEC, and Friends of France. The third instrument is twice-lagged aid of five-year averages of data.

In different approach, Burnside and Dollar (2000) used 2SLS model to explain aid and growth relationship which treats share of aid on GDP (aid/GDP), the interaction term between (aid/GDP) and policy as well as the squared (aid/GDP) on policy as endogenous variable. They basically relied on natural logarithm of population and lagged one period of arm import as instrument. Also, several regional dummy variables such as Egypt, France zone, and Central America are used as instruments in growth equation. In addition, several interaction variables such as logarithm of initial income x policy, logarithm of population x policy, lagged of arm import x policy, the squared logarithm of initial income x policy, and the squared logarithm of population x policy are all treated as excluded exogenous variables in growth equation.

Other studies relying on panel data used either first differencing the data or by conditioning on country fixed effects. These studies put more emphasize on the short term effect of aid on growth. Here, a dynamic panel model with either difference GMM or system GMM estimators is employed. Many scholars instrument for current aid with lagged values of income and aid, as well as with other standard cross-country regressors (for example, Hansen, and Tarp 2001; Rajan, and Subramanian 2008; and Clemens *et al.* 2012).

Following Burnside, and Dollar' (2000) equation, a very general linear model for panel data permits the intercept and slope coefficients to vary over both individual and time.

$$y_{it} = \alpha_{it} + x'_{it}\beta_{it} + \varepsilon_{it},\ i = 1,...,N,\ t = 1,...,T \qquad (1)$$

where y_{it} is a scalar dependent variable, x_{it} is a K ×1 vector of independent variables, ε_{it} is a scalar disturbance term, i indexes individual (country) in a cross section, and t indexes time. In this case, the dependent variable is the average annual growth rate of per capita GDP of a country over the relevant period while the explanatory variable of interest is the average ratio of ODA to GNI over that period to the selected countries.

The control variable is relatively varied within the aid – growth literature. This comprises initial level of per capita income, institutional quality, financial depth measured as the ratio of M2 to GDP, assassinations, ethnic fractionalization, trade policy, inflation, regional dummy variable of Sub-Saharan Africa, East Asia, and Latin America, as well as the ratio of budget surplus to GDP. We then add three measures that are likely correlated with growth equation as a part of capital accumulation, which include gross domestic investment, foreign direct investment, and a measure of human capital. In the regressions, we use the logarithm of gross domestic investment relative to GDP (gdi), while foreign direct investment (fdi) as shares of GDP was transformed as ln (1+ x). We also add government consumption since it contributes to growth through capital expenditure spending. Finally, to avoid collinearity problems, we use policy index from Burnside and Dollar' formula. As seen, the construction of the index is such that good policy, in terms of a budget surplus, low inflation and an open economy, leads to a high value of the index. Hence, the effect on growth is expected to be positive.

Since one variable of interest x_{it} (the average ratio of ODA to GNI) is treated by Boone (1996) and Burnside and Dollar (2000) to be endogenous, with $E [x_{it}(\alpha_i + \varepsilon_{it})] \neq 0$, so that the OLS estimator of β is inconsistent. Thus, we need instruments such that z_{it} exists satisfying $E (\varepsilon_{it}| z_{it}) = 0$. Put it simply, they must not be correlated with unobserved variables / error term that potentially determine growth variable. In addition, Cov (z_{itss} , x_{it}) ≠ 0 such that our valid instrument must be correlated with the troublesome/endogenous explanatory variable, in this case share of aid on GDP. And lastly, they do not appear anywhere else in the model.

All of these prerequisites are expected to provide consistent estimation is possible by 2SLS regression of y_{it} on x_{it} with instrument z_{it}. However, individual effect models have two error components, α_i and ε_{it} in the first equation. Thus, endogenous regressors of a model to be random effects model if instruments z_i exist that satisfy $E [z'_i(\alpha_i + \varepsilon_{it})] = 0$. Then this method will permit consistent estimation of all regression parameters. If instead it is possible only to find instruments such that $E [z'_i\varepsilon_{it}] = 0$, but $E [z'_i\alpha_i] = 0$, the model to be a fixed effects model. Then α_i must be eliminated by differencing, in which case only the coefficients of time-varying regressors will be identified.

To solve endogeneity problem, we relied on several instruments that already been used in Burnside, and Dollar (2000). For example, natural logarithm of population lagged one period of arm import, and several regional dummy variables such as Egypt, France zone, and Central America. We also adopt instruments from Hansen, and Tarp (2000) such as natural logarithm of infant mortality. Unlike Burnside, and Dollar who relied on several interactive variables such as logarithm of initial income x policy, logarithm of population x policy, lagged of arm import x policy, the squared logarithm of initial income x policy, and the squared logarithm of population x policy, we choose Dalgaard, and Hansen' (2001) instruments such as the lagged of aid over GNI, lagged of $(aid/GNI)^2$, and one lagged interactive variables between policy and aid/GNI.

3. Results

Previously, we conducted various tests to determine whether aid is an endogeneous regressor in growth equation and whether fixed effect is more appropriate model than random effect (available from the authors). The Hausman test showed that aid has contemporaneously correlated with growth and that fixed effect model is resoundingly accepted. With the Instrumental variable (IV) fixed-effect estimators are likely to be biased unless the number of time periods, T, is large, we decided to use panel Generalized Method of Moments (GMM) estimator since it can remove heterogeneity and is suitable for dataset with small T and large observation of groups in N. Here, we modified equation 1 such that our dependent variable, average growth rate, has lagged value and this will create autocorrelation.

For our preliminary result, we want to investigate whether aid has a non linear relationship with growth. Here our instrument variables are natural logarithm of population, lagged one period of arm import, several regional dummy variables, the lagged of aid over GNI, and lagged of $(aid/GNI)^2$, and natural logarithm of infant mortality. Model 2 and 4 use more strictly exogenous variables than model 1 and 3 such as government consumption, gross and foreign direct investment, as well as total average years of schooling. In addition, we use the fourth lag of the endogenous variable as GMM-style instrument.

In Table 1, clearly aid has non linear relationship in model 1 and 4. The former forms U-Shaped, while the latter form inverted U-shaped. Also, there is evidence of conditional convergence in model 1, however conditional divergence appears in model 3 and 4. As expected, in model 2 and 4, the estimated coefficient of government consumption is negative and significant, while GDI and FDI remain positive and significant.

Table 1. Non Linearities Aid-Growth with GMM

Variable	IV-GMM (1)	IV-GMM (2)	IV-GMM (3)	IV-GMM (4)
Oda	-1.282888* (.5223828)	-.4490203 (.2774051)	.2596501** (.1330425)	.1921765** (.0863111)
Oda_squared	2.389942** (1.040037)	.4567865 (.5874506)	-.6238247 (.3896956)	-.4965278*** (.2765445)
llgdppc	-.6944695* (.1779298)	-.6719432* (.1687965)	.0122955** (.0054623)	.0320805* (.010452)
Open	.0281541* (.0114189)	.0065325 (.0081712)	.0199996* (.006599)	.01964* (.00515)
Infl	-.0113315 (.0110879)	-.0103331 (.0088575)	-.0116464*** (.0062931)	-.0038613 (.0053738)
Fiscal	.0847383 (.0663498)	-.0194616 (.0633202)	.067933*** (.0410505)	-.0108511 (.0470228)
M2Lag	-.000108 (.0004784)	-.0001456 (.0004043)	-.000228 (.0001918)	-.0000804 (.0001793)
Ethn	-	-	-.0000817 (.0000959)	-.0001447** (.0000723)
Assassin	-.0034786 (.0058823)	-.0002601 (.0033991)	-.0074708** (.0036793)	-.0038426 (.0025019)
Ethn x Assassin	.0000818 (.0001112)	.0000151 (.0000654)	.0001158 (.0000766)	.0000493 (.0000521)
SSA	-	-	-.0208656* (.0084322)	-.0098944 (.0066763)
EASIA	-	-	.0129555 (.0096318)	.0207134* (.0070869)
LAC	-	-	-.0113793*** (.0068034)	-.0030282 (.0057491)
Lgovcon		-.031743** (.0139277)		-.025793* (.0061083)
Lgdi		.0738499* (.0125339)		.0494107* (.0079666)
Lfdi		.6923647** (.293041)		.6058201* (.1987472)
Mytotl		.0079059 (.0059352)		-.0060206* (.0013514)
Observation	243	198	322	264
Group	48	45	54	51
Sargan test	0.013	0.038	0.098	0.061
AR (1)	No	No	No	No
AR (2)	Yes	Yes	Yes	Yes
GMM estimation	Difference	Difference	System	System

Note : Number of parentheses are robust standard error; *** = significant at 10 percent level; ** = significant at 5 percent level; * = significant at 1 percent level

In this section, we incorporate policy variable to capture non-linearities relationship between aid and growth (see Table 2). Following Burnside, and Dollar (2000), Hansen, and Tarp (2000, 2001) as well as Dalgaard, and Hansen (2001), we add one endogoneus regressor in growth equation which is the interactive term between aid and policy. Consequently, number of instrument will increase by adding the lagged of their interaction variable. The econometric model is following the step in Table 1. In principle, there is no significant evidence that aid is working in better policy environments in all models. In addition, aid and growth forms non linear U-shaped relationship in model 1. Also, conditional convergence appears in model 1, 2, and 4. Moreover, the estimated coefficient of government consumption remains negative and significant in model 2 and 4, while GDI and FDI maintain positive and significant level in the same model.

Table 2. Non Linearities Aid-Growth-Policy with GMM

Variable	IV-GMM (1)	IV-GMM (2)	IV-GMM (3)	IV-GMM (4)
Oda	-1.576509** (.6457734)	-.3046928 (.3295065)	.1587227 (.1617588)	-.1316381 (.1487259)
Oda_squared	2.739344** (1.175597)	.2919102 (.5818692)	-.3811608 (.3899695)	-.0913532 (.2997837)
Oda_policy	.1657557 (.1255147)	-.0312772 (.1634157)	-.0229129 (.037916)	.0740206 (.0914749)
llgdppc	-.7597138* (.2139891)	-.8008177* (.1857668)	-.0084961 (.0278885)	-.0760278* (.0272226)
Open	.0264629 (.0402146)	-.009524 (.0330382)	-.0365057 (.0874982)	-.3548256* (.0945111)
Infl	-.0183565 (.0292475)	-.0136847 (.0242431)	.0254756 (.058496)	.2382908* (.063697)
Fiscal	-	-	-.0648253 (.2293777)	-.904137* (.2397722)
M2Lag	.0001886 (.0005398)	.0000628 (.0004384)	-.0000618 (.0002133)	-.000016 (.0001931)
Ethn	-	-	-.0000866 (.0001172)	-.0002664* (.0000867)
Assassin	-.0015813 (.0067115)	-.0009211 (.0035328)	-.0072219*** (.0040151)	-.0032781 (.0025323)
Ethn x Assassin	.0000481 (.0001264)	.0000285 (.0000681)	.0001111 (.0000834)	.0000413 (.0000528)
SSA	-	-	-.0161033*** (.0090465)	-.0040056 (.0073911)
East Asia	-	-	.0048966 (.0109854)	.0138758*** (.0083634)
LAC	-	-	-.0089827 (.0075508)	-.0017467 (.006122)
Policy	-.0085749 (.019604)	.0015337 (.0159556)	.0269922 (.041132)	.1695215* (.0446186)
Policy_squared	.0007865 (.0020149)	.00203 (.0017452)	.0004666 (.0014002)	.0018867 (.0013147)
Lgovcon		-.0274409*** (.0149393)		-.0180596* (.0067509)
Lgdi		.0687922* (.0145411)		.0515884* (.0086051)
Lfdi		.6543203** (.3288925)		.6952569* (.2043421)
Mytotl		.0086945 (.0062057)		-.0032646** (.0015119)
Observation	231	189	305	257
Group	47	44	53	50
Sargan test	0.041	0.026	0.286	0.062
AR (1)	No	No	No	No
AR (2)	Yes	Yes	Yes	Yes
GMM estimation	Difference	Difference	System	System

Note: Number of parentheses are robust standard error; *** = significant at 10 percent level; ** = significant at 5 percent level; * = significant at 1 percent level

Conclusions

In this study, we reassessed the non-linearities relationship between aid and growth as well as aid effectiveness results in Burnside, and Dollar (2000), and Hansen, and Tarp (2000, 2001), using the same control variables as the original study.

We developed a neo-classical growth model to investigate whether aid stimulates growth through various indicators such as policy, consumption, foreign direct and gross domestic investment.

In this model the interplay between good policy and aid is ambiguous. The term of 'good' policy is likely to reduce the growth effect of aid because they act as substitutes in the growth process. This shows that the Burnside, and Dollar result is far from obvious on theoretical grounds. The main outcome of the empirical re-examination is that a positive impact of aid on growth in good policy environments is not a robust result in all models. In addition, the result strongly confirms a non-linear relation between aid and growth in which it appears in several GMM models.

The need to expand time span of data is very essential to further explore the dynamic of panel analysis since the study only uses six average periods of four years. Also, this paper relies heavily on assumption of strong exogeneity or strict exogeneity such that $E(\varepsilon_{it}|\alpha_i, x_{i1},...,x_{iT}) = 0$, $t = 1,...,T$, so that the error term is assumed to have mean zero conditional on past, current, and future values of the regressors. If some of the policy variables at time t are correlated with the random shocks at some earlier time $s \leq t$, then the fixed effects estimator and instrumental variable estimators, based on the fixed effects transformation, are biased and inconsistent. To solve this, I decided to use the Arellano – Bond estimator which fit the profile of panel dataset that has a short time dimension and a relatively large country dimension.

However, recent studies show that GMM estimators of dynamic panel models using all mechanical instruments are unstable and potentially biased in finite samples, due to the problem of many and weak instruments (see Roodman 2007; Bazzi, and Clemens 2013). In addition, GMM estimators might also suffer from the lack of valid exclusion restrictions. Thus, future researchs are needed to incorporate this issue by adopting a different identification strategy exploiting a natural experiment based on a different group of countries. To sum up, based on the above results it is premature to apply policy selectivity rules in future aid allocations where it basically increase returns to aid when these returns are measured as the correlation between aid and growth in income per capita. None of the recent aid effectiveness studies question the importance of good policy. Yet, what is stressed in many of the papers challenging the Burnside and Dollar' result is that aid effectiveness must be evaluated after considered on good policy.

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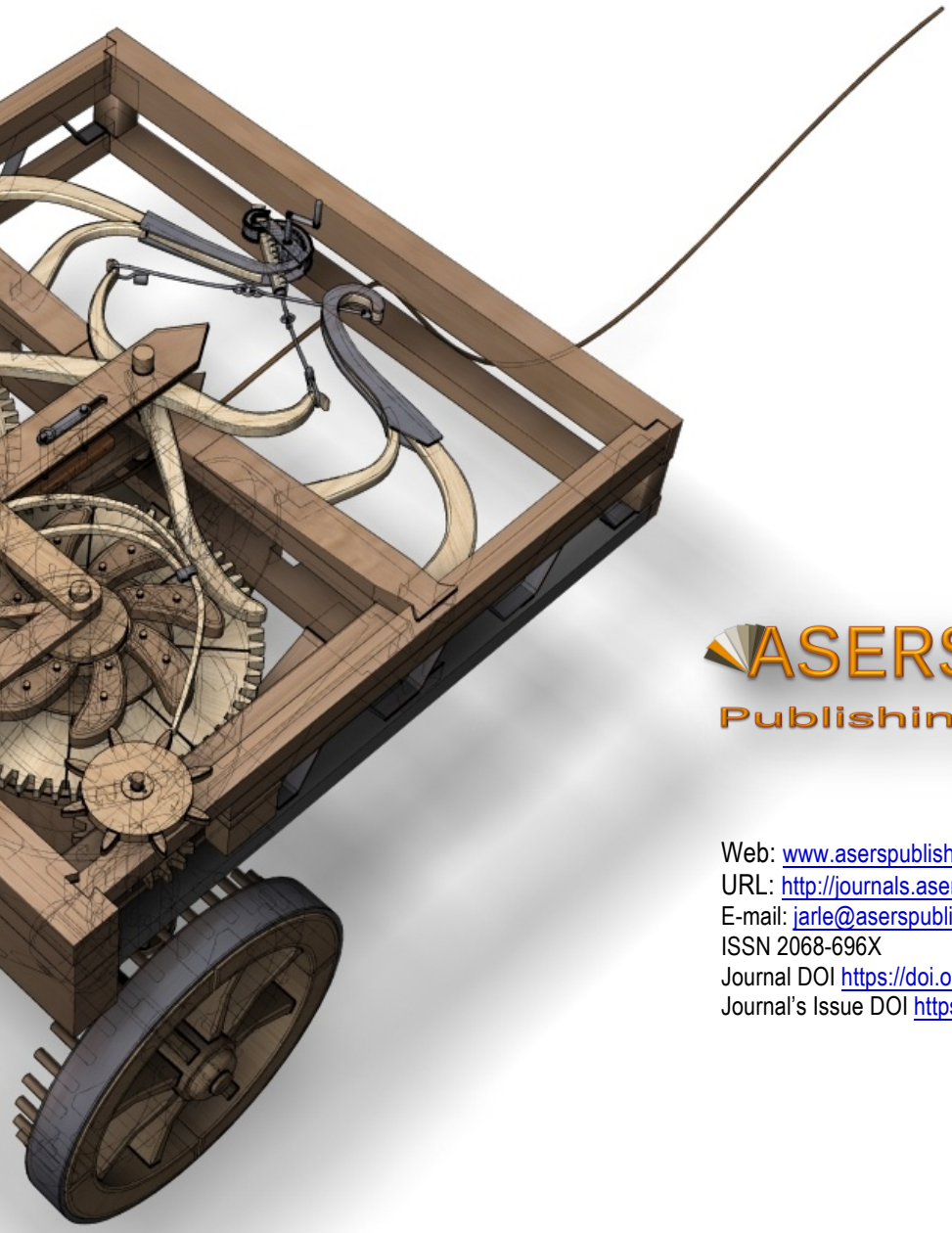

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