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Development thresholds of foreign aid effectiveness in Africa

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Abstract

Purpose – This paper examines whether initial levels in GDP growth, GDP per capita growth and inequality adjusted human development matter in the impact of aid on development. In substance its object is to assess if threshold development conditions are necessary for the effectiveness of foreign aid in Africa.

Design/methodology/approach – The panel quantile regression technique enables us to investigate if the relationship between development dynamics and development assistance differs throughout the distributions of development dynamics.

Findings – Three main findings are established. (1) With slight exceptions, the effectiveness of aid in economic prosperity (at the macro level) increases in positive magnitude across the distribution. This implies high-growth countries are more likely to benefit from development assistance (in terms of general economic growth) than their low-growth counterparts. (2) The positive nexus between aid and per capita economic growth displays nonlinear patterns across distributions and specifications, with the correlations broadly higher in top quantiles than in bottom quantiles after controlling for the unobserved heterogeneity. (3) The aid-human development nexus is negative and almost similar in magnitude across distributions and specifications.

Practical implications – As a policy implication, there is need to improve management of aid funds destined for health and education projects in the sampled countries. Moreover, given the magnitude of the nexuses, while blanket aid initiatives could be applied for policies targeting the HDI (due to the absence of significant differences in the magnitude of estimated coefficients), such are unlikely to succeed for aid targeting economic prosperity at macro and micro levels. From the weight of the findings, given a policy of balancing the impact of aid, it could be inferred that low-growth countries would need more aid than their high-growth counterparts because of the less positive effects in the former countries.

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Originality/value – This paper contributes to existing literature on the effectiveness of foreign aid by focusing on the distribution of the dependent variables (development dynamics). It is likely that high- and low-growth countries respond differently to development assistance.

1. Introduction

The concern over the effectiveness of foreign aid has been widely debated since the institution of the Official Development Assistance (ODA) programs over five decades ago. A great chunk of the literature focusing on the macroeconomic impact of aid is mixed at best on the results and those that have revealed significant positive effects face heavy methodological criticisms (Masud & Yontcheva, 2005). Beside the antagonistic picture of the macroeconomic merits of development assistance painted by mainstream research, there has been an almost exclusive focus on the effect of aid-flows on GDP growth and other macroeconomic variables (investment or public consumption), with the underlying assumption being the notion that aid is destined to bridge the saving-investment gap poor countries face (Rostow, 1960; Chenery & Strout, 1966; Easterly, 2005a). Surprisingly, there has been much less research conducted on the impact of foreign aid on the evolution of human development (Masud & Yontcheva, 2005), in spite of the shift in objectives announced by the donor community which have evolved from intensive industrialization programs advocated in the 1950s to more poverty reducing objectives such the Millennium Development Goals (MDGs).

The contribution of this paper to the literature is fourfold. Firstly, we deviate from the mainstream approach to the aid-development nexus and assess the effectiveness of foreign assistance from three dimensions (GDP growth, GDP per capita growth and human

development). Secondly, a substantial body of work in the literature is based on data collected between 1960 and 1995. By using much recent data, the paper provides an updated account of the nexus with more focused policy implications. Another novelty worth pointing out within this contribution is the use of an updated human development index (adjusted for inequality) first published in 2010 that corrects past works of the bulk of criticisms inherent in the first index. Thirdly, owing to the debate on methodological issues in the assessment of foreign aid effectiveness, this paper provides new dimensions to the debate by investigating the aid-development nexus when existing development levels matter. Thus there is a presumption here that certain development thresholds might be imperative for the effectiveness of foreign aid and hence, blanket aid policies might not be appropriate, unless they are contingent on the prevailing levels of development dynamics (GDP growth, GDP per capita growth and human development) and tailored differently across high- and low-growth developing countries. Fourthly, with the year 2015 approaching, it is high time to assess donors' objective of reaching the MDGs. In plainer terms, examining the effectiveness of development assistance on human development by virtue of the three points highlighted above (in the run-up to 2015) could provide crucial policy options to donor and multilateral agencies on their assistance (aid) impact.

The rest of the paper is organized as follows. Section 2 presents the literature on aid-effectiveness. Measurement and methodology issues are discussed in Section 3. Empirical analysis is covered in Section 4. We conclude with Section 5.

2. Literature review

2.1 Theoretical highlights

The imperative of aid in the improvement of GDP growth can be traced back to the two-gap model (Chenery & Strout, 1966), which remains the most influential theoretical

underpinning of the aid effectiveness literature. In this model, developing countries face draw-backs in savings and export earnings that deter investment and economic growth. Though it has suffered from severe criticism since its inception, this model has provided the underlying principles both for early aid policies (Easterly, 1999) and regression specifications in the aid-growth (savings) empirical literature (Masud & Yontcheva, 2005).

2.2 Conflicts in the literature

Literature on the effectiveness of aid has almost exclusively been focused on the macroeconomic impacts of aid: examining the effects of aid on economic savings, investment and growth. The absence of an analytical framework, heavy reliance on empirical evidence (which is often ambiguous for the most part) and inconclusive results with recently refined methodologies (Masud & Yontcheva, 2005), leaves the subject matter widely open to debate. For organizational reasons, literature pertaining to the effectiveness of aid in growth (development) could be categorized into two strands as summarized in Table 1 below: one purporting the negative consequences of aid and the other acknowledging the positive rewards of development assistance.

The first panel entails a strand of authors presenting the case for the insignificant impact of aid on investment, savings or growth. Aid has been confirmed to improve unproductive public consumption (Mosley et al., 1992) and fails to increase investment at best. This latter point has been supported by Reichel (1995) and Boone (1996). Ghura (1995) points-out the negative effect of aid on domestic savings whereas Pedersen (1996) asserts that foreign aid distorts development and leads to aid dependency. In the second strand, we find studies favoring the positive effects of aid on growth (development). It is interesting to highlight the Burnside & Dollar (2000) work that has received abundant comments from researchers (Guillaumont & Chauvet, 2001; Colier &

Dehn, 2001; Easterly et al., 2003), whose results have been challenged as being "extremely data dependent" (Clemens et al., 2004).

Table 1: Summary of conflicts in the literature

Researchers	Main findings
First-strand: Aid does not lead to growth (development)	
Mosley et al. (1992)	Aid increases unproductive public consumption and fails to promote growth.
Reichel (1995)	Aid fails to promote savings owing to the substitution effect.
Ghura (1995)	Aid negatively impacts savings.
Boone (1996)	Aid is insignificant in improving economic development for two reasons: poverty is not caused by capital shortage and it is not optimal for politicians to adjust distortionary policies when they receive aid flows.
Pedersen (1996)	Foreign Aid distorts development and leads to aid dependency.
Asongu (2012a)	Development assistance is perilous to government quality dynamics
Asongu (2012b)	Development assistance is inhumane and leads to reversed economics
Asongu (2012c)	Foreign aid fuels (mitigates) corruption (corruption-control)
Asongu (2013a)	Foreign aid is detrimental to institutional quality irrespective of initial institutional development levels.
Second-strand: Aid improves growth (development)	
Burnside & Dollar (2000)	Aid can be effective when policies and economic management are good.
Ghura (1995)	Aids positively impacts savings for good adjusters.
Guillaumont & Chauvet (2001)	Aid effectiveness is contingent on environmental factors (shocks and hazards).
Collier & Dehn (2001)	Aid effectiveness depends on negative supply shocks. Targeting aid contingent on negative supply shocks is better than targeting based on good policies.
Collier & Dollar (2001)	The positive effect of aid on poverty depends on its impact on per capita income growth and the impact of per capita income growth on poverty reduction.
Feeny (2003)	The sectoral allocation of foreign aid to Papua New Guinea has been broadly in line with a strategy to effectively reduce poverty and increase human wellbeing.
Gomanee et al. (2003)	Aid has either a direct effect on welfare or an indirect effect through public spending on social services.
Clement et al. (2004)	Aid has a short-term positive impact on growth.
Ishfaq (2004)	Foreign aid, in a limited way though, helped in reducing the extent of poverty in Pakistan.
Mosley et al. (2004)	Foreign assistance has an indirect impact on poverty and the wellbeing of recipient countries.
Addison et al. (2005)	Aid increases pro-poor public expenditure and has a positive effect on growth. Aid broadly works to mitigate poverty, and poverty would be higher in the absence of aid.
Fielding et al. (2006)	There is a straight forward positive impact of aid on development outcomes.
Minou & Reddy (2010)	Aid positively impacts economic prosperity in the long-run.
Okada & Samreth (2012)	Aid mitigates corruption.
Resnick (2012)	Aid has promoted democratic transitions in the 1990s in African countries.

Source (Author)

2.3 African perspective

2.3.1 Africa's needs and Western responses

Relative to international development standards, a bulk of African countries are lagging behind. In line with Easterly (2005a), they occupy most of the bottom places in per capita income, life expectancy, infant mortality, literacy, percentage of population living in extreme poverty (less than a dollar a day), infant mortality, HIV prevalence and the human development index (HDI). By most objective standards of assessment, the last four decades have been those of extreme growth disappointment in Africa. The West has responded to Africa's tragedy with intensive involvement of foreign aid organizations and international agencies. On average, African countries receive more aid as a percentage of their GDPs than other developing countries.

In 2005, the West substantially increased its effort towards saving Africa. The Group of Eight (G8) in July of that year agreed to double foreign aid to Africa from $25 billion a year to $50 billion in a bid to finance the 'Big push', as well as cancel African aid-loans contracted during previous attempts at a 'Big push'. Prior to this effort, Africa was already the most aid-intensive continent in the world. Two months after (September 2005), world leaders gathered at the United Nations to further discuss progress on ending poverty in Africa. To put their concerns into perspective and match the facts with figures, as of 2005 sub-Saharan Africa contained 11% of the world's population and produced only 1% of global GDP. In the median African nation, 43% of the population lived on less than a dollar a day. On the World Food Program list, of the 23 countries with more than 35% of the population malnourished, 17 were in Africa. More so, human development has been greatly mitigated by the long and brutal civil wars in Angola, Chad, Somalia, Sierra Leone, Liberia…etc, not to mention Rwanda's genocide and recent

carnages in Darfur-Sudan. Due to the terrible destructiveness of war, the Democratic Republic of Congo (DRC) registered the world's highest war casualties since World War II. Indeed seven of the last eight recent cases of total societal breakdown into anarchy in the world known to the literature have been in Africa: Angola, Burundi, Liberia, Sudan, Sierra Leone, Somalia and the DRC (beside Afghanistan).

2.3.2 Theories and empirics of Western assistance to Africa

a) The Big-Push models and foreign aid

The 'Big-Push' models suggest that Africa is poor because it is stuck in a 'poverty trap' (Easterly, 2005a). Thus, to emerge from the poverty trap, it needs a large aid-financed investment increase: a 'Big-Push'. Both the Harrod-Domar and the Solow growth models have been used to discuss the mechanisms of the poverty trap.

The first mechanism is that, savings are quite low for people who are very close to subsistence (as is confirmed by a Stone-Geary utility function). In a closed economy savings equal investment, thus investment is thin. In the Harrod-Domar model with the capital constraint binding, growth in GDP per capita is simply a linear function of the investment (=saving) rate minus the demographic and depreciation rates. If the saving is too thin to compensate for population growth and the depreciation of per capita, then per capita growth will be zero or negative. In the 1950s and 1960s, early development economists postulated a desirable per capita growth rate and calculated the "investment need" to meet this target: the distance between the low domestic saving rate and the "investment need" was termed the "Financing Gap". The role of development assistance was therefore to cover the Financing Gap (Rostow, 1960; Chenery & Strout, 1966). This model predicted a strong growth effect for foreign aid through its role in boosting domestic investment above what domestic savings would finance. Although this model

soon went out of favor in the academic development literature, it remained interesting to international organizations like the World Bank. Current policies advocating for the promotion of foreign aid to Africa have explicitly quoted this model (Devarajan et al., 2002 at the World Bank; Blair Commission on Africa, 2005; Sachs, 2005). Sachs (2005) posits that *"success in ending the poverty trap will be much easier than it appears"*. He argues that an increase in foreign aid and a debt relief can end Africa's poverty in our time. In a closed economy, savings are contingent not only on the distance from subsistence but also on the incentive to save depending on the rate of return to savings and investment. In an open economy, investment is not only a function of domestic savings but also depends on the rate of return to investment. As demonstrated by Collier et al. (2001), Africa's extensive capital flight is estimated at 39%. Thus, this large chunk of Africa's capital stock is held outside the continent because domestic investors compare the returns to domestic and foreign investments before making investment decisions. Also, bank lenders will invest in the economy if returns are attractive enough. In the Solow model, a strong relationship between income and saving rates could generate multiple equilibria at low and high levels of capital stock, bringing to light the possibility of a poverty trap. Again, the low domestic savings would not be an issue in an open economy in which investment responds to incentives. Kraay & Raddatz (2005) have shown that the relationship between initial capital and savings must follow an S-shaped curve to generate a poverty-trap; though they fail to find evidence for this shape in the data.

The second mechanism on poverty is similar to the non-convexity of the production function in the Solow model. There could be strong external economies to investment or there maybe high fixed costs associated to investment projects such that a minimum threshold must be surpassed for investment to be productive. This notion was part of the inspiration for the original

article that first suggested a 'Big Push' (Rosentein-Rodan, 1943). In comparison to the 'Financing Gap' model, this strand has had a longer shelf-life in the academic literature because theorists have a great zeal in models with multiple equilibira (Murphy et al., 1989). In emphasizing such non-convexities, Sachs (2005) has suggested that Africa is in a poverty trap. 'Big Push' models predict strong effects of aid on investment and growth (development). This prediction has been subject to a substantial empirical literature which this paper has already detailed above (see Table 1).

b) Project interventions: education and health

Another perspective of Africa's poverty has been that it originates from low human capital (poor health and education) and infrastructure. This emphasis which began in the 1960s is still a major theme in elucidating Africa's poverty. While enrollments have expanded rapidly, the quality of education is hampered by missing inputs like textbooks and other school material, weak incentives for teachers, corruption in educational circles, bureaucracies and disruption of schooling by political crisis (Filmer & Pritchett, 1997). In health, some of the initial progress has been stifled, possibly by corruption in the health system (studies in Cameroon, Guinea, Uganda and Tanzania estimated that 30 to 70% of government drugs disappeared before reaching patients). Also, there are more complicated health problems that are not solvable with routine methods (Filmer et al., 2000; Pritchett & Woolcock, 2004).

c) Policies and growth models

Another view as to why Africa remains poor is the structural adjustment program. It gained prominence in the early 1980s with the advent of the "Washington consensus" and the 'pro-free market' arguments from respected intellectuals like the World Bank chief economist Anne Krueger. According to this strand, Africa is poor because its governments have chosen bad

policies. Indeed, it is obvious that many African governments pursued policies very destructive of growth and economic development: artificially overvalued currencies, high black market premiums on foreign exchange, controls on interest rates that led to negative real interest rates for savers, drastic restrictions on international trade, absence of social justice, little political morality and reliance on state companies with unsound prospects for freedom of economic enterprise. This 'bad policies' view of Africa's poverty gave rise to a different perspective of the role of aid. The role of Western donors and international institutions within this framework was to induce changes in African macroeconomic policies by making aid contingent on such changes. Structural adjustment loans of the International Monetary Fund (IMF) and the World Bank were thus embodied in this framework: which had as objective an "adjustment with growth". How fruitful were these loans in facilitating "adjustment", that is to say: changing policy? How instrumental was development assistance in inducing better policies? The answer appears to be that Western donors and international institutions were not quite successful at changing policy (Alesina & Dollar, 2002; Burnside & Dollar, 2000; Van de Walle, 2001; Easterly, 2005b).

d) Aid, institutions and development

A substantial literature on institutions and development suggests that Africa is poor because it has poor institutions: dictatorships, lack of property rights, weak courts and contract enforcement, violence and political instability, hostile regulatory environment for private business and high inflation. In order to eradicate African poverty, according to this strand the West needs to promote good institutions. Svensson (2000) finds that aid increases corruption in ethnically fractionalized countries (which is common place in most African states). Knack (2001) discovers that higher aid worsens bureaucratic quality, leads to violating the law with

more impunity and corruption (after controlling for potential reverse causality). Similarly, Djankov et al. (2005) find that high aid caused substantial setbacks to democracy between 1960-1999. Indeed they found aid's effect on democracy to be far worse than that of the "natural resource curse".

e) Dysfunctional donors

In accordance with Easterly (2005a), while all the attention in the aid and development debate is focused on Africa, it is also interesting to assess how effective donors have been at delivering valuable services to Africa. There have been alarming cases of donor dysfunction. An eloquent example is the over 2 billion US dollars spent on roads in Tanzania over the last 20 years. Yet roads have not improved. Even by bureaucratic standards, foreign aid bureaucracy is dire, why? Maybe it is because efforts in and results of aid are largely unobservable and noticed only by the voiceless poor. Therefore, the absence of results visibility makes aid bureaucracies unaccountable. As opposed to private firms or democratic governments in rich countries, aid agencies do not face a "voter test" or "a market test". Africa's poor could sink into the category of political orphans; with no voice or feedback on if aid is helping them and nobody accountable to them as well.

Consistent with Clement et al. (2004), aggregate aid could be divided into three main strands: (1) emergency and humanitarian aid (that could be negatively correlated with growth); (2) aid that affects growth only over the long-term (such as aid to support democracy, the environment, health or education); and (3) aid that could stimulate growth in the long-term (including budget and balance of payments support, investments in infrastructure and aid for productive sectors such as agricultural and industrial). While studies on aid effectiveness implicitly define donors' objective as solely the promotion of economic growth or the reduction

of poverty in the recipient countries, a parallel strand of the literature on aid allocation has shown that most donors have different underlying objectives: allocating aid according to their own strategic interests. Masud & Yontcheva (2005) have emphasized that where a significant part of aid is allocated for strategic purposes, no positive impact in terms of growth or poverty alleviation should be expected. We partially refute this claim by arguing that irrespective of vested donor-interest, aid should either improve or stifle economic development (even in marginal terms).

3. Data and Methodology

3.1 Data

We examine a sample of 22 countries for the period 1996-2009 with data from African Development Indicators (ADI) of the World Bank (WB). Development dependent variables include: GDP growth, GDP per capita growth and the HDI[2] (adjusted for inequality). While the first two indicators intuitively have a substantial degree of substitution, we employ both for robustness purposes. The independent variable of interest is Net Official Development Assistance (NODA). For robustness purposes we use three different NODA indicators: Total NODA; NODA from DAC[3] countries (DADAC) and NODA from Multilateral Donors (DAMD). While the first is used in the empirical section, the last two have been used for robustness checks.

Borrowing from recent development threshold literature (Asongu, 2013b), we control for institutional quality (polity and democracy), openness (trade), inflation, investment (public,

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[2] The HDI is a composite statistic of life expectancy, education and income indices. In 2010, beside the modifications brought to the computation of its three dimensions (to incorporate criticisms from the literature), the index was also adjusted for inequality (HDI (1-GINI)), where the GINI index is the coefficient of inequality. Hence, countries with high inequality are penalized.

[3] Development Assistance Committee.

private and domestic) and population growth. We also control for the unobserved heterogeneity using fixed effects: openness to sea, income-level and legal origin. While the legal origin classification is consistent with La Porta et al. (2008, p. 289), the choice of income-levels is in accordance with the Financial Development and Structure Database (FDSD) of the WB. From intuition, inflationary pressures are detrimental to economic growth and human development. Investments dynamics should also stimulate economic growth. Population growth inherently reflects a danger to development if measures are not put in place to use the human resource for economic prosperity. The effect of democratic institutions should be positive but could also be contingent on institutional quality and vary depending on macroeconomic characteristics (petroleum export for instance). Landlocked countries inherently have lower levels of development (François & Manchin, 2006). English Common law countries have higher levels of government quality and economic prosperity in Africa (Asongu, 2012d, p. 190; Agbor, 2011). From intuition, income levels should be positively correlated with economic growth.

Details about the descriptive statistics (with presentation of countries), variable definitions and correlation analysis (showing the relationships between key variables used in the paper) are presented in the appendices. The 'summary statistics' (Appendix 1) of the variables used in the panel regressions shows that there is quite some variation in the data utilized so that one should be confident that reasonable estimated relationships would emerge. The purpose of the correlation matrix (Appendix 3) is to address issues resulting from overparametization and multicolinearity. Based on a preliminary examination of the correlation coefficients, there do not appear to be any serious concerns in terms of the relationships to be estimated.

3.2 Methodology

In line with Billger & Goel (2009) and recent development threshold literature (Asongu, 2013b), to determine whether existing levels in development dynamics affect how development assistance comes into play, we use quantile regression. This approach permits us to investigate if the relationship between development dynamics and foreign aid differs throughout the distribution of the development dynamics (Koenker & Hallock, 2001).

Some studies on the determinants of development are based on estimation by Ordinary Least Squares (OLS), which report parameter estimates at the conditional mean of development. Whereas mean effects are certainly important, this study expands such findings by using quantile regression. In addition, one of the underlying assumptions of OLS regression is that the error term and the dependent variable are normally distributed. However, in quantile regression the error term need not be normally distributed. Thus, based on this estimation technique we are able to carefully assess the impact of foreign aid throughout the conditional distributions with particular emphasis on high- and low-growth countries. Quantile regression[4] (hence QR) yields parameters estimated at multiple points in the conditional distribution of the dependent variable (Koenker & Bassett, 1978) and has been relevant in recent development literature (Billger & Goel, 2009; Okada & Samreth, 2012). Beyond these facts, the choice of this estimation technique is in line with the research goal. The θth quantile estimator of the endogenous variable is obtained by solving for the following optimization problem.

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[4] Quantiles are used to describe non-central positions of a distribution. The *p*th quantile represents that value of the response below which the proportion of the population is *p*. Hence, quantiles can specify any position of a distribution. For instance 2.5% of the population lies below the 0.25^{th} quantile. Therefore researchers can choose positions that are tailored to their specific inquiries. Poverty studies are concerned with low-income population (for instance bottom 20%) whereas tax policy studies are focused on the rich (top 5% of the population for example). Accordingly, conditional-quantile models offer the flexibility to focus on these population segments whereas conditional mean models do not.

$$\min_{\beta \in R^k} \left[\sum_{i \in \{i: yi \geq xi'\beta\}} \theta|yi - xi'\beta| + \sum_{i \in \{i: yi \geq xi'\beta\}} (1-\theta)|yi - xi'\beta| \right] \qquad (1)$$

Where $\theta \in (0,1)$. Contrary to OLS that is based on minimizing the sum of squared residuals, with QR we minimize the weighted sum of absolute deviations. For example the 50th or 75th quantiles (with θ=0.50 or 0.75 respectively) by approximately weighing the residuals. The conditional quantile of y_i given x_i is:

$$Qy(\theta / xi) = xi'\beta\theta \qquad (2)$$

where unique slope parameters are derived for each θ th quantile of interest. This formulation is analogous to $E(y/x) = x_{i'}\beta$ in the OLS slope though parameters are estimated only at the mean of the conditional distribution of the endogenous variable. For the model in Eq. (2) the dependent variable y_i is the development indicator (GDP growth, GDP per capita growth and the HDI) while x_i contains a constant term, foreign aid, population growth, democracy, polity, domestic investment, inflation, public investment, trade and private investment. The quantile estimation approach is more robust than the OLS approach in the presence of outliers when the distribution of the dependent variable is a highly non-normal pattern (Okada & Samreth, 2012). We also report findings for Least Absolute Deviations (LAD) which should match those of the 0.50 quantile.

4. Empirical analysis

4.1 Summary of results

The results presented in Tables 2-6 include OLS, LAD and QR estimates. Table 2 summarizes the results from initial regressions (Tables 3-4) and robustness modeling (Tables 5-6). The latter modeling approach controls for the unobserved heterogeneity or fixed effects.

Table 3 and Table 5 show results for development in overall economic (Panels A) and per capita economic (Panels B) perspectives. Table 4 and Table 6 report findings for human development. OLS estimates provide a baseline of mean effects and we compare these to estimates of LAD and separate quantiles in the conditional distributions of the development variables. In the interpretation of estimated coefficients, it is worth noting that smaller values (in conditional distributions) of the dependent variable denote less development (general economic, per capita economic and human).

From the summary in Table 2 below, the following conclusions could be drawn. (1) For Panel A on the first specification, the positive incidence of development assistance on general economic prosperity broadly increases from the bottom (0.1 and 0.25 quantiles) to the top distributions (0.75 and 0.90 quantiles). This implies the positive aid correlations of prosperity are more present in top quantiles of the economic prosperity distribution. This finding is consistent across specifications of Panel A in Tables 3 and 5 (with the slight exception of the 0.90 quantile in Table 5). Results of the first specification are consistent with those of the second specification with one additional slight exception (the 0.10 quantile of Specification 2 in Panel A of Table 3 and 0.90 quantile of Specification 2 in Panel A of Table 5). (2) With respect to the 'per capita income prosperity' regressions (Panel B of Table 2), the quasi-linear conclusions of results on overall economic prosperity discussed above do not hold. While there is sound evidence of nonlinear patterns across distributions and specifications, the positive correlation of the aid-development nexus is much higher in top quantiles than in bottom quantiles of the distribution, after controlling for unobserved heterogeneity (Specification 1 of Panel B in Table 5 and Specification 2 of Panel B in Table 5). (3) The nonlinear patterns extend to the findings on human development (Panel C of Table 2) with an additional difference of negative correlations

in the aid-development nexuses. We also notice that in terms of the magnitude in negative correlations, the negative nexuses are not significantly different across specifications and distributions. (4) Most of the control variables are significant with the right signs since inflation and population growth seriously infringe on human development while investment (public, domestic and private) improve it. Estimates of fixed effects controlling for the unobserved heterogeneity in legal origins, openness to sea and income-levels also have the expected signs.

Table 2: Summary of results

	OLS	LAD	Q 0.1	Q 0.25	Q 0.50	Q 0.75	Q 0.90
	Panel A: General Economic Prosperity						
	Specification 1 of Panel A in Table 3 (Initial)						
Development Assistance	**0.098***	**0.122***	**0.075***	**0.100***	**0.121***	**0.134***	**0.139***
	(0.000)	**(0.001)**	**(0.002)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**
	Specification 1 of Panel A in Table 5 (Controlling for the UH)						
Development Assistance	**0.107***	**0.134**	**0.086***	**0.121***	**0.134***	**0.179***	**0.169***
	(0.004)	**(0.010)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**
	Specification 2 of Panel A in Table 3 (Initial)						
Development Assistance	**0.064**	**0.064***	**0.096**	0.055	**0.064***	**0.088***	**0.099***
	(0.013)	**(0.063)**	**(0.015)**	(0.126)	**(0.000)**	**(0.005)**	**(0.003)**
	Specification 2 of Panel A in Table 5 (Controlling for the UH)						
Development Assistance	**0.092***	**0.108**	**0.085***	**0.096***	**0.108***	**0.125***	**0.107***
	(0.000)	**(0.020)**	**(0.064)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**
	Panel B: Per capita Economic Prosperity						
	Specification 1 of Panel B in Table 3 (Initial)						
Development Assistance	**0.056**	**0.050***	0.037	0.035	**0.050**	**0.091***	**0.106***
	(0.016)	**(0.057)**	(0.384)	(0.164)	**(0.014)**	**(0.002)**	**(0.000)**
	Specification 1 of Panel B in Table 5 (Controlling for the UH)						
Development Assistance	**0.087***	**0.081***	**0.082***	**0.087***	**0.081***	**0.163***	**0.157***
	(0.008)	**(0.061)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**
	Specification 2 of Panel B in Table 3 (Initial)						
Development Assistance	**0.061**	**0.063***	**0.093***	0.053	**0.063***	**0.085**	**0.049***
	(0.017)	**(0.051)**	**(0.092)**	(0.123)	**(0.003)**	**(0.012)**	**(0.072)**
	Specification 2 of Panel B in Table 5 (Controlling for the UH)						
Development Assistance	**0.089***	**0.106**	**0.082***	**0.095***	**0.106***	**0.137***	**0.104***
	(0.000)	**(0.030)**	**(0.000)**	**(0.005)**	**(0.000)**	**(0.000)**	**(0.000)**
	Panel C: Human Development Index						
	Specification 1 of Table 4 (Initial)						
Development Assistance	**-0.007***	**-0.008***	**-0.006***	**-0.008***	**-0.008***	**-0.007***	**-0.007***
	(0.000)	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**
	Specification 1 of Table 6 (Controlling for the UH)						
Development Assistance	**-0.003***	**-0.006***	**-0.004***	**-0.005***	**-0.006***	**-0.002***	**-0.0005***
	(0.0008)	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.060)**
	Specification 2 of Table 4 (Initial)						

Development Assistance	**-0.005***	**-0.008***	**-0.005***	**-0.006***	**-0.008***	**-0.006***	**-0.007***
	(0.000)	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**
			Specification 2 of Table 6 (Controlling for the UH)				
Development Assistance	**-0.003**	**-0.004**	**-0.002***	**-0.004***	**-0.004***	**-0.004***	**-0.003***
	(0.034)	**(0.013)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**

Notes. Dependent variable is Economic prosperity, Per Capita Economic Prosperity or Human Development Index.. *,**,***, denote significance levels of 10%, 5% and 1% respectively. Lower quantiles (e.g., Q 0.1) signify nations where development is least. P-values in brackets. OLS: Ordinary Least Squares. LAD: Least Absolute Deviations; UH: Unobserved Heterogeneity.

Table 3: Economic Prosperity; OLS, LAD and Quantile Regressions

	Panel A: General Economic Prosperity						
	OLS	**LAD**	**Q 0.1**	**Q 0.25**	**Q 0.50**	**Q 0.75**	**Q 0.90**
				Specification 1			
Constant	**1.665****	**1.664***	**-2.128****	-0.040	**1.880***	**2.594***	**4.960***
	(0.046)	**(0.092)**	**(0.010)**	(0.959)	**(0.008)**	**(0.001)**	**(0.000)**
Development Assistance	**0.098***	**0.122***	**0.075***	**0.100***	**0.121***	**0.134***	**0.139***
	(0.000)	**(0.001)**	**(0.002)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**
Polity	-0.061	-0.044	**0.078****	0.001	-0.040	-0.059	**-0.101****
	(0.108)	(0.265)	**(0.040)**	(0.966)	(0.215)	(0.112)	**(0.023)**
Trade	**-0.014****	**-0.013***	0.0003	-0.007	**-0.013****	**-0.020***	**-0.029***
	(0.029)	**(0.008)**	(0.954)	(0.250)	**(0.016)**	**(0.001)**	**(0.000)**
Inflation	**-0.015***	**-0.013****	**-0.009****	**-0.014***	**-0.014***	**-0.017***	**-0.022***
	(0.000)	**(0.038)**	**(0.029)**	**(0.000)**	**(0.000)**	**(0.001)**	**(0.000)**
Domestic Investment	**0.171***	**0.159***	**0.118***	**0.139***	**0.147***	**0.224***	**0.219***
	(0.000)	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**
Observations	308	308	308	308	308	308	308
				Specification 2			
Constant	**-1.593***	-0.669	**-3.879***	**-2.838****	-0.669	-0.482	**2.273***
	(0.077)	(0.520)	**(0.004)**	**(0.024)**	(0.301)	(0.654)	**(0.054)**
Development Assistance	**0.064****	**0.064***	**0.096****	0.055	**0.064***	**0.088***	**0.099***
	(0.013)	**(0.063)**	**(0.015)**	(0.126)	**(0.000)**	**(0.005)**	**(0.003)**
Democracy	0.005	0.019	**0.250***	0.083	0.019	-0.003	**-0.132***
	(0.924)	(0.685)	**(0.003)**	(0.291)	(0.623)	(0.964)	**(0.075)**
Private Investment	**0.141***	**0.110***	**0.127****	**0.108****	**0.110***	**0.166***	**0.131***
	(0.000)	**(0.009)**	**(0.021)**	**(0.031)**	**(0.000)**	**(0.000)**	**(0.005)**
Public Investment	**0.265***	**0.228***	0.102	**0.251***	**0.228***	**0.308***	**0.307***
	(0.000)	**(0.007)**	(0.286)	**(0.004)**	**(0.000)**	**(0.000)**	**(0.000)**
Population growth	**0.836***	**0.672***	0.315	**0.727****	**0.672***	**0.748***	**0.851***
	(0.000)	**(0.005)**	(0.380)	**(0.027)**	**(0.000)**	**(0.008)**	**(0.006)**
Observations	308	308	308	308	308	308	308
	Panel B: Per capita Economic Prosperity						
	OLS	**LAD**	**Q 0.1**	**Q 0.25**	**Q 0.50**	**Q 0.75**	**Q 0.90**
				Specification 1			
Constant	-0.971	-1.067	**-3.903***	**-2.054****	-1.067	0.210	**1.831****
	(0.226)	(0.234)	**(0.009)**	**(0.019)**	(0.132)	(0.835)	**(0.034)**
Development Assistance	**0.056****	**0.050***	0.037	0.035	**0.050****	**0.091***	**0.106***
	(0.016)	**(0.057)**	(0.384)	(0.164)	**(0.014)**	**(0.002)**	**(0.000)**
Polity	-0.043	-0.026	0.080	0.017	-0.026	-0.048	-0.051
	(0.235)	(0.444)	(0.242)	(0.658)	(0.413)	(0.294)	(0.192)
Trade	-0.004	-0.005	-0.003	0.0008	-0.005	-0.011	**-0.016****
	(0.475)	(0.247)	(0.755)	(0.895)	(0.322)	(0.163)	**(0.012)**
Inflation	**-0.016***	**-0.015***	-0.010	**-0.014***	**-0.015***	**-0.018***	**-0.022***
	(0.000)	**(0.006)**	(0.203)	**(0.001)**	**(0.000)**	**(0.000)**	**(0.000)**
Domestic Investment	**0.166***	**0.172***	**0.117***	**0.128***	**0.172***	**0.208***	**0.231***
	(0.000)	**(0.000)**	**(0.061)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**
Observations	308	308	308	308	308	308	308
				Specification 2			
Constant	**-1.488***	-0.704	**-3.760***	**-2.632****	-0.704	-0.636	**2.516***
	(0.093)	(0.502)	**(0.051)**	**(0.029)**	(0.342)	(0.588)	**(0.008)**
Development Assistance	**0.061****	**0.063***	**0.093***	0.053	**0.063***	**0.085***	**0.049***
	(0.017)	**(0.051)**	**(0.092)**	(0.123)	**(0.003)**	**(0.012)**	**(0.072)**

	OLS	LAD	Q 0.1	Q 0.25	Q 0.50	Q 0.75	Q 0.90
Democracy	0.008	0.025	**0.244****	0.080	0.025	0.017	**-0.153****
	(0.882)	(0.611)	**(0.043)**	(0.283)	(0.587)	(0.815)	**(0.010)**
Private Investment	**0.137*****	**0.105****	0.125	**0.105****	**0.105*****	**0.160*****	**0.111*****
	(0.000)	**(0.011)**	(0.104)	**(0.029)**	**(0.000)**	**(0.000)**	**(0.003)**
Public Investment	**0.263*****	**0.248*****	0.100	**0.238*****	**0.248*****	**0.305*****	**0.373*****
	(0.000)	**(0.002)**	(0.458)	**(0.005)**	**(0.000)**	**(0.000)**	**(0.000)**
Population growth	-0.198	-0.377	-0.695	-0.307	**-0.377***	-0.167	-0.244
	(0.392)	(0.121)	(0.168)	(0.330)	**(0.052)**	(0.585)	(0.327)
Observations	308	308	308	308	308	308	308

Notes. Dependent variable is Economic prosperity. *,**,***, denote significance levels of 10%, 5% and 1% respectively. Lower quantiles (e.g., Q 0.1) signify nations where economic prosperity is least. P-values in brackets. OLS: Ordinary Least Squares. LAD: Least Absolute Deviations.

Table 4: Human development; OLS, LAD and Quantile Regressions

	Human Development Index						
	OLS	LAD	Q 0.1	Q 0.25	Q 0.50	Q 0.75	Q 0.90
	Specification 1						
Constant	**0.401*****	**0.371*****	**0.329*****	**0.381*****	**0.371*****	**0.346*****	**0.390*****
	(0.000)	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**
Development Assistance	**-0.007*****	**-0.008*****	**-0.006*****	**-0.008*****	**-0.008*****	**-0.007*****	**-0.007*****
	(0.000)	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**
Polity	**0.001****	0.001	**0.004*****	0.001	**0.001***	**0.002***	0.0001
	(0.029)	(0.197)	**(0.000)**	(0.189)	**(0.067)**	**(0.051)**	(0.861)
Trade	**0.0008*****	**0.0005*****	**0.001*****	**0.0005*****	**0.0005*****	**0.0008*****	**0.0008*****
	(0.000)	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**
Inflation	**-0.0004*****	**-0.0003*****	**-0.0002****	**-0.0004*****	**-0.0003*****	**-0.0002***	**-0.0003*****
	(0.000)	**(0.000)**	**(0.011)**	**(0.000)**	**(0.000)**	**(0.091)**	**(0.000)**
Domestic Investment	**0.003*****	**0.006*****	0.0009	**0.003*****	**0.006*****	**0.008*****	**0.010*****
	(0.000)	**(0.000)**	(0.260)	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**
Observations	308	308	308	308	308	308	308
	Specification 2						
Constant	**0.522*****	**0.511*****	**0.529*****	**0.551*****	**0.511*****	**0.494*****	**0.540*****
	(0.000)	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**
Development Assistance	**-0.005*****	**-0.008*****	**-0.005*****	**-0.006*****	**-0.008*****	**-0.006*****	**-0.007*****
	(0.000)	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**
Democracy	**0.003*****	**0.003****	**0.008*****	**0.005*****	**0.003*****	0.001	**0.005*****
	(0.001)	**(0.030)**	**(0.000)**	**(0.000)**	**(0.000)**	(0.185)	**(0.000)**
Private Investment	**0.004*****	**0.004*****	**0.004*****	**0.003*****	**0.004*****	**0.007*****	**0.006*****
	(0.000)	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**
Public Investment	**0.004*****	**0.005****	0.002	**0.002*****	**0.005*****	**0.010*****	**0.009*****
	(0.002)	**(0.045)**	(0.233)	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**
Population growth	**-0.043*****	**-0.036****	**-0.093*****	**-0.068*****	**-0.036*****	**-0.044*****	**-0.031*****
	(0.000)	**(0.041)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**
Observations	308	308	308	308	308	308	308

Notes. Dependent variable is the Human Development Index. *,**,***, denote significance levels of 10%, 5% and 1% respectively. Lower quantiles (e.g., Q 0.1) signify nations where human development is least. P-values in brackets. OLS: Ordinary Least Squares. LAD: Least Absolute Deviations.

Table 5: Economic Prosperity; OLS, LAD and Quantile Regressions

	Panel A: General Economic Prosperity						
	OLS	LAD	Q 0.1	Q 0.25	Q 0.50	Q 0.75	Q 0.90
	Specification 1						
Constant	1.223	**1.772****	**-1.712*****	0.358	**1.772****	**1.918*****	**4.010*****
	(0.215)	**(0.012)**	**(0.003)**	(0.516)	**(0.014)**	**(0.009)**	**(0.002)**
Development Assistance	**0.107*****	**0.134****	**0.086*****	**0.121*****	**0.134*****	**0.179*****	**0.169*****
	(0.004)	**(0.010)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**
Polity	**-0.096****	-0.050	-0.044	**-0.049***	-0.050	**-0.141*****	**-0.153****
	(0.025)	(0.205)	(0.106)	**(0.063)**	(0.138)	**(0.000)**	**(0.016)**
Trade	**-0.017*****	**-0.017*****	**-0.020*****	**-0.023*****	**-0.017*****	**-0.026*****	-0.015
	(0.006)	**(0.001)**	**(0.000)**	**(0.000)**	**(0.001)**	**(0.000)**	(0.129)
Inflation	**-0.015*****	**-0.016*****	**-0.007****	**-0.013*****	**-0.016*****	**-0.014*****	**-0.018*****

	OLS	LAD	Q 0.1	Q 0.25	Q 0.50	Q 0.75	Q 0.90
	(0.000)	(0.000)	(0.011)	(0.000)	(0.000)	(0.000)	(0.000)
Domestic Investment	0.175***	0.156***	0.162***	0.151***	0.156***	0.239***	0.177***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
English	1.050*	0.925**	2.959***	1.753***	0.925**	1.324***	1.127
	(0.077)	(0.040)	(0.000)	(0.000)	(0.022)	(0.000)	(0.131)
Low Income	0.041	-0.373	-1.380***	-0.253	-0.373	0.116	-0.221
	(0.931)	(0.511)	(0.000)	(0.467)	(0.410)	(0.801)	(0.792)
Landlocked	0.451	0.149	-0.532	-0.411	0.149	0.138	1.683**
	(0.439)	(0.771)	(0.102)	(0.187)	(0.712)	(0.736)	(0.025)
Observations	308	308	308	308	308	308	308

Specification 2

	OLS	LAD	Q 0.1	Q 0.25	Q 0.50	Q 0.75	Q 0.90
Constant	-2.126**	-1.274	-6.141***	-2.772**	-1.274*	-1.858	1.505***
	(0.036)	(0.246)	(0.000)	(0.011)	(0.054)	(0.131)	(0.000)
Development Assistance	0.092***	0.108**	0.085*	0.096***	0.108***	0.125***	0.107***
	(0.000)	(0.020)	(0.064)	(0.000)	(0.000)	(0.000)	(0.000)
Democracy	-0.006	0.017	-0.012	0.046	0.017	-0.062	-0.157***
	(0.933)	(0.754)	(0.895)	(0.508)	(0.671)	(0.430)	(0.000)
Private Investment	0.141***	0.132***	0.115**	0.100**	0.132***	0.180***	0.131***
	(0.000)	(0.000)	(0.047)	(0.016)	(0.000)	(0.000)	(0.000)
Public Investment	0.261***	0.223***	0.220**	0.196***	0.223***	0.375***	0.305***
	(0.000)	(0.000)	(0.035)	(0.000)	(0.000)	(0.000)	(0.000)
Population growth	1.021***	0.746**	1.418***	0.931***	0.746***	0.907***	0.837***
	(0.000)	(0.029)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
English	0.912	0.701	3.411***	1.596***	0.701**	0.766	1.167***
	(0.175)	(0.147)	(0.000)	(0.000)	(0.044)	(0.238)	(0.000)
Low Income	-1.025*	-0.690	-2.397***	-1.032	-0.690*	-0.516	0.530***
	(0.099)	(0.269)	(0.000)	(0.115)	(0.081)	(0.483)	(0.000)
Landlocked	0.513	0.071	-0.976	-0.545	0.071	1.002	1.323***
	(0.380)	(0.872)	(0.215)	(0.337)	(0.834)	(0.117)	(0.000)
Observations	308	308	308	308	308	308	308

Panel B: Per capita Economic Prosperity

	OLS	LAD	Q 0.1	Q 0.25	Q 0.50	Q 0.75	Q 0.90
Specification 1							
Constant	-1.078	-0.903	-4.488***	-1.806**	-0.903	-0.361	-1.284
	(0.181)	(0.240)	(0.000)	(0.026)	(0.131)	(0.578)	(0.193)
Development Assistance	0.087***	0.081*	0.082***	0.087***	0.081***	0.163***	0.157***
	(0.008)	(0.061)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Polity	-0.068*	-0.043	-0.053	-0.021	-0.043***	-0.088***	-0.140***
	(0.076)	(0.295)	(0.132)	(0.574)	(0.132)	(0.000)	(0.003)
Trade	-0.009*	-0.010*	-0.012**	-0.017***	-0.010**	-0.020***	-0.004
	(0.093)	(0.071)	(0.032)	(0.005)	(0.021)	(0.000)	(0.592)
Inflation	-0.014***	-0.015***	-0.005	-0.012***	-0.015***	-0.013***	-0.013***
	(0.000)	(0.000)	(0.121)	(0.003)	(0.000)	(0.000)	(0.009)
Domestic Investment	0.171***	0.165***	0.172***	0.153***	0.165***	0.240***	0.291***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
English	1.194**	0.982**	3.174***	2.048***	0.982***	1.352***	1.465***
	(0.028)	(0.041)	(0.000)	(0.000)	(0.000)	(0.000)	(0.008)
Low Income	-0.737	-0.665	-2.141***	-1.233**	-0.665*	-0.850**	-1.014
	(0.164)	(0.266)	(0.000)	(0.016)	(0.079)	(0.039)	(0.104)
Landlocked	0.370	0.186	-0.816*	-0.330	0.186	0.136	1.677***
	(0.447)	(0.685)	(0.052)	(0.471)	(0.581)	(0.709)	(0.002)
Observations	308	308	308	308	308	308	308

Specification 2

	OLS	LAD	Q 0.1	Q 0.25	Q 0.50	Q 0.75	Q 0.90
Constant	-2.054**	-1.155	-5.946***	-2.553**	-1.155	-1.353	1.659***
	(0.040)	(0.313)	(0.000)	(0.024)	(0.184)	(0.118)	(0.000)
Development Assistance	0.089***	0.106**	0.082***	0.095***	0.106***	0.137***	0.104***
	(0.000)	(0.030)	(0.000)	(0.005)	(0.000)	(0.000)	(0.000)
Democracy	-0.004	0.022	-0.012	0.048	0.022	0.013	-0.152***
	(0.950)	(0.696)	(0.732)	(0.503)	(0.685)	(0.809)	(0.000)
Private Investment	0.138***	0.129***	0.113***	0.095**	0.129***	0.150***	0.126***
	(0.000)	(0.000)	(0.000)	(0.028)	(0.000)	(0.000)	(0.000)
Public Investment	0.259***	0.220***	0.217***	0.188**	0.220***	0.355***	0.300***
	(0.000)	(0.009)	(0.000)	(0.016)	(0.000)	(0.000)	(0.000)

Population growth	-0.011	-0.298	**0.365*****	-0.109	-0.298	-0.071	**-0.257*****
	(0.969)	(0.395)	**(0.013)**	(0.718)	(0.200)	(0.758)	**(0.005)**
English	0.959	0.721	**3.312*****	**1.594*****	0.721	**0.955****	**1.162*****
	(0.148)	(0.128)	**(0.000)**	**(0.008)**	(0.115)	**(0.036)**	**(0.000)**
Low Income	**-1.041***	-0.721	**-2.304*****	-1.068	-0.721	**-1.425*****	**-0.503****
	(0.083)	(0.256)	**(0.000)**	(0.116)	(0.166)	**(0.006)**	**(0.015)**
Landlocked	0.554	0.073	**-0.957*****	-0.550	0.073	**1.361*****	**1.271*****
	(0.326)	(0.877)	**(0.000)**	(0.350)	(0.870)	**(0.000)**	**(0.000)**
Observations	308	308	308	308	308	308	308

Notes. Dependent variables are Economic prosperity. *,**,***, denote significance levels of 10%, 5% and 1% respectively. Lower quantiles (e.g., Q 0.1) signify nations where economic prosperity is least. P-values in brackets. OLS: Ordinary Least Squares. LAD: Least Absolute Deviations. English: English Common law countries. Low Income: Low Income Countries. Landlocked: Landlocked Countries.

Table 6: Human development; OLS, LAD and Quantile Regressions

	Human Development Index						
	OLS	**LAD**	**Q 0.1**	**Q 0.25**	**Q 0.50**	**Q 0.75**	**Q 0.90**
	Specification 1						
Constant	**0.449*****	**0.422*****	**0.359*****	**0.382*****	**0.422*****	**0.523*****	**0.507*****
	(0.000)	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**
Development Assistance	**-0.003*****	**-0.006*****	**-0.004*****	**-0.005*****	**-0.006*****	**-0.002*****	**-0.0005***
	(0.0008)	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.060)**
Polity	0.001	**0.002****	**0.002*****	**0.002*****	**0.002*****	0.0006	0.0001
	(0.480)	**(0.012)**	**(0.000)**	**(0.000)**	**(0.000)**	(0.301)	(0.695)
Trade	0.0005	**0.0004***	**0.0007*****	**0.0006*****	**0.0004*****	**0.0005*****	**0.0006*****
	(0.155)	(0.057)	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**
Inflation	**-0.0003*****	**-0.0004*****	**-0.0003*****	**-0.0004*****	**-0.0004*****	**-0.0003*****	**-0.0002*****
	(0.000)	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**
Domestic Investment	**0.003***	**0.005*****	**0.001***	**0.001*****	**0.005*****	**0.004*****	**0.005*****
	(0.055)	**(0.000)**	**(0.088)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**
English	0.034	**0.026****	**0.066*****	**0.058*****	**0.026*****	**0.018*****	**0.023*****
	(0.250)	**(0.031)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.009)**	**(0.000)**
Low Income	**-0.091****	**-0.074*****	**-0.032*****	**-0.029*****	**-0.074*****	**-0.154*****	**-0.169*****
	(0.014)	**(0.003)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**
Landlocked	**-0.040***	**-0.026***	**-0.035*****	**-0.028*****	**-0.026*****	**-0.053*****	**-0.048*****
	(0.083)	**(0.068)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**
Observations	308	308	308	308	308	308	308
	Specification 2						
Constant	**0.520*****	**0.468*****	**0.479*****	**0.482*****	**0.469*****	**0.521*****	**0.558*****
	(0.000)	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**
Development Assistance	**-0.003****	**-0.004****	**-0.002*****	**-0.004*****	**-0.004*****	**-0.004*****	**-0.003*****
	(0.034)	**(0.013)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**
Democracy	0.004	**0.006*****	**0.005*****	**0.007*****	**0.006*****	**0.004*****	**0.005*****
	(0.155)	**(0.002)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**
Private Investment	**0.003****	**0.004*****	**0.002*****	**0.001****	**0.004*****	**0.006*****	**0.005*****
	(0.048)	**(0.000)**	**(0.000)**	**(0.022)**	**(0.000)**	**(0.000)**	**(0.000)**
Public Investment	0.003	0.004	**0.001***	**0.004*****	**0.004*****	**0.006*****	**0.005*****
	(0.177)	(0.127)	**(0.056)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**
Population growth	-0.026	-0.008	**-0.055*****	**-0.039*****	**-0.008***	**-0.017*****	**-0.013*****
	(0.109)	(0.607)	**(0.000)**	**(0.000)**	**(0.067)**	**(0.000)**	**(0.000)**
English	0.020	0.018	**0.051*****	**0.041*****	**0.016***	-0.000	-0.003
	(0.453)	(0.173)	**(0.000)**	**(0.000)**	**(0.062)**	(0.991)	(0.588)
Low Income	**-0.093****	**-0.091*****	**-0.055*****	**-0.054*****	**-0.093*****	**-0.108*****	**-0.125*****
	(0.029)	**(0.004)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**
Observations	308	308	308	308	308	308	308

Notes. Dependent variable is the Human Development Index. *,**,***, denote significance levels of 10%, 5% and 1% respectively. Lower quantiles (e.g., Q 0.1) signify nations where human development is least. P-values in brackets. OLS: Ordinary Least Squares. LAD: Least Absolute Deviations. English: English Common law countries. Low Income: Low Income Countries. Landlocked: Landlocked Countries.

4.2 Discussion, policy recommendations and caveats

Before diving into the discussion of the findings, it is worthwhile pointing out the intuition motivating this paper. The concern over the effectiveness of development assistance has been widely debated in the aid-development literature since the institution of the Official Development Assistance (ODA) programs five decades ago. A great proportion of the literature which focuses on the macro economic benefits of aid has been mixed at best. Beside the antagonistic picture of the macroeconomic merits of development assistance painted by mainstream research, there has been an almost exclusive focus on the effect of aid-flows on GDP growth and other macroeconomic variables (investment or public consumption), with the underlying assumption being the notion that aid is destined to bridge the saving-investment gap poor countries face (Rostow, 1960; Chenery & Strout, 1966; Easterly, 2005a). Surprisingly, there has been much less research conducted on the impact of foreign aid on the evolution of human development (Masud & Yontcheva, 2005), in spite of the shift in objectives announced by the donor community which have evolved from intensive industrialization programs advocated in the 1950s to more poverty reducing objectives such the Millennium Development Goals (MDGs).

The object of this paper has been to assess development thresholds of development assistance. In so doing, we have examined the effectiveness of foreign aid throughout the conditional distributions of development dynamics. Three main findings have been established. (1) With slight exceptions, the effectiveness of aid in economic prosperity (at the macro level) increases in positive magnitude across the distribution. This implies high-growth countries are more likely to benefit from development assistance (in terms of general economic growth) than their low-growth counterparts. (2) The positive nexus between aid and per capita economic

growth displays nonlinear patterns across distributions and specifications, with the correlations broadly higher in top quantiles than in bottom quantiles after controlling for unobserved heterogeneity. (3) The aid-human development nexus is negative and almost similar in magnitude across distributions and specifications. We concur with the Anonymous referee that more emphasis needs to be placed on the third finding because the first-two are already well established in the literature (Burnside & Dollar, 2000; Ghura, 1995; Guillaumont & Chauvet, 2001).

We provide two main explanations for the negative aid-HDI nexus: constituents of the HDI and misappropriation of aid funds destined for the improvement of constituents of the HDI. Firstly, on the constituents of the HDI, generalization of the findings to overall development should be treated with caution because human development does not only consist of improvements in education, GDP per capita and life expectancy. Secondly, there is substantial evidence of misappropriation of aid funds meant for the improvement of constituents of the HDI. (1) Looking at health (for the improvement of life expectancy), some of the initial progress in Africa has slowed possibly due to corruption (Easterly, 2005a, p. 8). Studies in Cameroon, Guinea, Uganda and Tanzania have estimated that 30 to 70% of government drugs disappear before reaching patients and complicated health problems cannot be solved with routine methods (Filmer et al., 2000; Prichett & Woolcock, 2004). (2) Concerning the educational dimension of the HDI, while school enrollments have increased rapidly, the quality of education has been hampered by missing inputs like textbooks and other school materials, weak incentives for teachers and corruption in education bureaucracies (Filmer & Pritchett, 1997). (3) We do not discuss the third component of the HDI (GDP per capita) because from the weight of available empirical evidence, the negative aid-HDI nexus is strongly influenced by its education and

health components. Any attribution to GDP per capita within our framework will be contradicting our second finding on per capita economic prosperity, which shows a positive nexus. A good candidate that can be used to substantiate the above explanations is Swaziland, which substantially relies on foreign aid, spends over 55% of its budget on the wage bill, loses nearly double the annual budget to corruption and sells food aid and deposits money accruing from the sale in foreign bank accounts …etc.

As a policy implication, there is need to improve management of aid funds destined for health and education projects in the sampled countries. Moreover, given the magnitude of the nexuses, while blanket aid initiatives could be applied for policies targeting the HDI (due to the absence of significant differences in the magnitude of estimated coefficients), such are unlikely to succeed for aid targeting economic prosperity at macro and micro levels. From the weight of the findings, given a policy of balancing the impact of aid, it could be inferred that low-growth countries would need more aid than their high-growth counterparts because of the less positive effects in the former countries. This inference is consistent with the findings that the positive aid-economic prosperity correlation is broadly higher in top quantiles than in bottom quantiles.

From a general perspective, these findings only partially validate recent results (with updated data) in the African continent which have established the existence of reversed economics and a negative aid-human development nexus (Asongu, 2012b). While the results on human development fully reflect those of Asongu (2012b), those on economic development reflect a positive aid-economic prosperity nexus. This difference is essentially methodological and points to the interesting character of exploring the aid-development nexus throughout the conditional distributions of development dynamics (quantile regression). From a general standpoint however, findings of the paper may either reflect the first or second strand of conflicts

in the literature (as summarized in Table 1). Whereas human development regressions broadly reflect the negative aid-development nexus (Mosley, 1992; Reichel, 1995; Ghura, 1995; Boone, 1996; Pedersen,1996; Asongu, 2012a, b), economic prosperity regressions are generally in line with the positive aid-development nexus (Burnside & Dollar, 2000; Ghura, 1995; Guillaumont & Chauvet, 2001; Collier & Dehn, 2001; Collier & Dollar, 2001; Feeny, 2003; Gomanee et al., 2003; Clement et al., 2004; Ishfaq, 2004; Mosley et al., 2004; Addison et al., 2005; Fielding et al., 2006).

It is also interesting to highlight that this paper has drawn much from the globalization-development nexus. It has been well documented in the globalization-development literature that certain "threshold" levels of financial and institutional development are imperative for an economy get the full indirect benefits and reduced risks of capital account globalization (Henry, 2007; Rodrik & Subramanian, 2009; Kose et al., 2011). Empirically assessing the aid-development nexus in light of the available weight of empirical evidence on 'threshold theories' (from the openness-development literature) has provided relevant policy implications on how existing economic prosperity and human development levels matter in the aid-development African nexus.

Two main caveats are worth noting. First, results of the HDI should not be generalized to human development in particular and development in general because the HDI is only a composite index of three components: education, GDP per capita and life expectancy. For example, the effect of agriculture which might be most effective for the poorest countries is not considered in the analysis. Second, the results should be interpreted as correlations and not causality because we have controlled only for the unobserved heterogeneity which is only a component of endogeneity. Accordingly, the quantile regression instrumental variable approach

that could fully address the concern of endogeneity has not been properly worked-out in the literature.

5. Conclusion

The contribution of this paper to the literature has been fourfold. Firstly, we have deviated from the mainstream approach to the aid-development nexus and assessed the effectiveness of foreign aid from three dimensions (GDP growth, GDP per capita growth and human development). Secondly, a substantial body of work in the literature is based on data collected between 1960 and 1995. By using much recent data, this paper has provided an updated account of the nexus with more focused policy implications. Another novelty worth pointing-out within this contribution is the use of an updated human development index (adjusted for inequality) first published in 2010 that corrects past works of the bulk of criticisms inherent in the first index. Thirdly, owing to the debate on methodological issues in the assessment of the impact of foreign aid, this paper has provided new dimensions to the debate by investigating the aid-development nexus, when existing development dynamics matter. Thus there has been a presumption here that certain development thresholds might be imperative for the effectiveness of foreign aid and hence, blanket aid policies might not be appropriate, unless they are contingent on prevailing levels of development dynamics (GDP growth, GDP per capita growth and human development) and tailored differently across the least and most advanced developing countries. Fourthly, with the year 2015 approaching it was high time to assess donors' objective of reaching the MDGs. In plainer terms, assessing the effectiveness of development assistance on human development by virtue of the three points highlighted above in the run-up to 2015 has provided crucial policy options to donor and multilateral agencies on their assistance impact.

Three main findings have been established. (1) With slight exceptions, the effectiveness of aid in economic prosperity (at the macro level) increases in positive magnitude across the distribution. This implies high-growth countries are more likely to benefit from development assistance (in terms of general economic growth) than their low-growth counterparts. (2) The positive nexus between aid and per capita economic growth displays nonlinear patterns across distributions and specifications, with the correlations broadly higher in top quantiles than in bottom quantiles after controlling for the unobserved heterogeneity. (3) The aid-human development nexus is negative and almost similar in magnitude across distributions and specifications.

As a policy implication, there is need to improve management of aid funds destined for health and education projects in the sampled countries. Moreover, given the magnitude of the nexuses, while blanket aid initiatives could be applied for policies targeting the HDI (due to the absence of significant differences in the magnitude of estimated coefficients), such are unlikely to succeed for aid targeting economic prosperity at macro and micro levels. From the weight of the findings, given a policy of balancing the impact of aid, it could be inferred that low-growth countries would need more aid than their high-growth counterparts because of the less positive effects in the former countries. This inference is consistent with the findings that the positive aid-economic prosperity correlation is broadly higher in top quantiles than in bottom quantiles. Caveats have been discussed.

Appendices

Appendix 1: Summary Statistics and Presentation of Countries

	Panel A:Summary Statistics					
	Variables	**Mean**	**S.D**	**Min.**	**Max.**	**Observations**
Development	Economic Prosperity (GDPg)	4.691	4.058	-12.67	33.629	308
	Per capita Economic Prosperity(GDPpcg)	2.261	3.880	-15.15	29.062	308
	Human Development (IHDI)	0.462	0.121	0.237	0.745	308
Foreign Aid	Development Assistance (NODA)	8.592	9.124	-0.251	95.482	308
Control Variables	Democracy	2.740	4.123	-8.000	10.000	308
	Polity	0.353	5.875	-9.000	10.000	308
	Trade	70.140	35.404	17.859	209.41	308
	Inflation	14.364	49.451	-8.974	513.91	308
	Public Investment	7.451	3.674	0.000	23.785	308
	Private Investment	12.383	6.156	1.999	49.594	308
	Population Growth	2.373	1.000	0.508	10.043	308
	Domestic Investment	19.913	6.648	2.100	59.723	308

Panel B:Presentation of Countries

Algeria, Benin, Botswana, Central African Republic, Chad, Congo Democratic Republic, Congo Republic, Ivory Coast, Egypt, Ethiopia, Ghana, Kenya, Madagascar, Mauritius, Morocco, Mozambique, Rwanda, Senegal, Sudan, Swaziland, Uganda, Zambia.

S.D: Standard Deviation. Min: Minimum. Max: Maximun. GDPg: GDP growth. GDPpcg: GDP per capita growth. IHDI: Inequality adjusted Human Development Index.

Appendix 2: Variable Definitions

Variables	**Signs**	**Variable Definitions**	**Source**
Economic Prosperity	GDPg	GDP Growth (annual %)	World Bank (WDI)
Per Capita Economic prosperity	GDPpcg	GDP per capita Growth (annual %)	World Bank (WDI)
Human Development	IHDI	Inequality adjusted Human Development Index	World Bank (WDI)
Total Development Assistance	DA	Total Development assistance (% of GDP)	World Bank (WDI)
Development Assistance 2	DAMD	Development Assistance from Multilateral Donors(% of GDP)	World Bank (WDI)
Development Assistance 3	DADAC	Development Assistance from DAC Countries (% of GDP)	World Bank (WDI)
Democracy	Demo	Level of Institutionalized Democracy	World Bank (WDI)
Polity	Polity	Level of Polity Democracy	World Bank (WDI)
Trade(Openness)	Trade	Imports plus Exports in commodities (% of GDP)	World Bank (WDI)
Inflation	Infl	Consumer Price Index (annual %)	World Bank (WDI)
Public Investment	PubIvt	Gross Public Investment (% of GDP)	World Bank (WDI)
Private Investment	PrivIvt	Gross Private Investment (% of GDP)	World Bank (WDI)
Domestic Investment	DomIvt	Gross Domestic Investment (% of GDP)	World Bank (WDI)
Population growth	Popg	Average population growth rate (annual %)	World Bank (WDI)

WDI: World Development Indicators. GDP: Gross Domestic Product. DAC: Development Assistance Committee.

Appendix 3: Correlation Analysis

Development			Development Assistance			Control Variables								
GDPg	GDPpcg	IHDI	DA	DAMD	DADAC	Demo	Polity	Trade	Inflation	PubIvt	PrivIvt	DomIvt	Popg	
1.000	0.961	-0.063	0.232	0.267	0.181	0.098	0.037	-0.081	-0.243	0.232	0.142	0.247	0.231	GDPg
	1.000	0.092	0.125	0.143	0.098	0.132	0.053	0.024	-0.259	0.250	0.178	0.289	-0.027	GDPpcg
		1.000	-0.586	-0.637	-0.475	0.265	0.107	0.436	-0.231	0.099	0.322	0.349	-0.578	IHDI
			1.000	0.799	0.955	-0.034	0.095	-0.252	-0.030	0.138	-0.144	-0.065	0.413	DA
				1.000	0.586	0.025	0.132	-0.310	-0.034	0.237	-0.158	-0.021	0.480	DAMD
					1.000	-0.057	0.065	-0.186	-0.023	0.067	-0.115	-0.077	0.320	DADAC
						1.000	0.918	0.082	-0.272	0.331	0.186	0.356	-0.106	Demo
							1.000	-0.034	-0.139	0.267	0.130	0.266	-0.040	Polity
								1.000	-0.091	0.145	0.212	0.270	-0.407	Trade
									1.000	-0.219	-0.079	-0.197	0.039	Inflation
										1.000	-0.109	0.436	-0.028	PubIvt
											1.000	0.827	-0.126	PrivIvt
												1.000	-0.127	DomIvt
													1.000	Popg

GDPg: GDP growth. GDPpcg: GDP per capita growth. IHDI: Inequality adjusted Human Development Index. DA: Development Assistance. DAMD: Development Assistance from Multilateral Donors. DADAC: Development Assistance from Development Assistance Committee. Demo: Democracy. PubIvt: Public Investment. PrivIvt: Private Investment. DomIvt: Domestic Investment. Popg: Population growth.

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