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Aid and Growth

What Meta-Analysis Reveals

Tseday Jemaneh Mekasha and Finn Tarp

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Abstract

Some recent literature in the meta-analysis category where results from a range of studies are brought together throws doubt on the ability of foreign aid to foster economic growth and development. This paper assesses what meta-analysis has to say about the effectiveness of foreign aid in terms of the growth impact. We re-examine key hypotheses, and find that the effect of aid on growth is positive and statistically significant. This significant effect is genuine, and not an artefact of publication selection. We also show why our results differ from those published elsewhere.

Keywords: aid and growth, meta-analysis, heterogeneity and publication bias
JEL classification: F35, O1, O4

[*]Both authors UNU-WIDER, Helsinki

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UNU World Institute for Development Economics Research (UNU-WIDER)
Katajanokanlaituri 6 B, 00160 Helsinki, Finland

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1 Introduction

The literature on the potential impact of aid on growth is large and multi-facetted.[1] Hansen and Tarp (2000) identify three generations of literature, and more recently, a fourth generation has emerged (see Arndt et al. 2010). A distinctive aspect of this generation is the view that aid's aggregate impact on economic growth is non-existent. Doucouliagos and Paldam (2008) (henceforth DP08) reach a similar pessimistic conclusion in their various papers based on a meta-analytic approach and a database including 68 studies on the aid–growth link.

More specifically DP08 ask: (i) Whether the aid effectiveness literature has established that aid has an impact on economic growth and if so how large is the impact? (ii) What explains the heterogeneity in reported aid-growth effects? DP08 apply different meta-analysis techniques,[2] and conclude that the aid effectiveness literature has failed to show that the effect of development aid on growth is positive and statistically significant. They also attribute the variation in the reported effect of aid on growth to different study characteristics.[3]

In relation to the aid–growth literature, DP08 is an example where studies which have emerged over a long time period and which rely on differing methodologies are analysed. The DP08 analysis has attracted attention in policy debates about aid so we decided to re-examine their core aid-growth analytical result.[4] This was motivated by three underlying concerns. These include: (i) the need to specify and justify the underlying *econometric* model that is used; (ii) *statistical* choices related to measurement of the effect estimates and calculation of the weighted average (both in terms of methodology and choice of precision of coefficient estimates); and (iii) time consuming and tedious data entry and coding work that is not always straight forward to replicate for those interested in the results.

This paper reports what we uncovered in the process, and expands the DP08 meta-analysis in various ways that better reflect the econometric, statistical and data challenges faced in this type of research. In doing so, we address two main research questions that are common to any standard meta-analysis: (i) whether the empirical effect (in our case the impact of aid on growth) is different from zero when one combines the existing empirical evidence; and (ii) if so, whether the effect is genuine or an artefact of so-called publication bias (also referred to as the 'file drawer' problem).

Meta-analysis—also known as regression of regression analysis—is normally used with the aim of synthesizing the results from a group of studies while controlling for heterogeneity among studies. One advantage of meta-analysis is that it can potentially address the subjectivity associated with traditional narrative literature surveys, and it may indeed provide

1 See, for example, Mosley (1986), White (1992), Tsikata (1998), Burnside and Dollar (2000), Morrissey (2001), Dalgaard et al. (2004), Tarp (2006), McGillivray et al. (2006), and Rajan and Subramanian (2008), Arndt et al. (2010), among many others.

2 These include Funnel Asymmetry Test (FAT), Meta Significance Test (MST), and a meta-regression analysis (MRA). As regards the MRA both fixed and random model effects results are reported by DP08, who opt for relying on the fixed effects (see DP08: 13)

3 See DP08: 13-18.

4 Doucouliagos and Paldam (forthcoming) expand the dataset and provide a brief update of DP08 but their focus, basic methodological choices and conclusions are the same.

a more systematic and objective (quantitative) assessment of an existing body of findings. Yet, the meta-methodology is by no means flawless (Stanley 2001). Even if one accepts that meta-analysis is relatively more objective than narrative literature reviews, sizeable room for subjectivity still remains. For instance, in identifying the appropriate population of studies authors often exercise personal judgment. Hence, bias from systematic selection of studies may follow.

In a similar manner, subjectivity is a regular concern in the selection of study characteristics (moderator variables). There is typically no guide as to which moderator variables should be included in model specifications. So unless due care is taken, meta-analysis cannot per se guarantee an objective assessment of an existing body of findings. Moreover, it has long been understood in the medical profession that it does not follow (in any simple way) from a zero meta-impact result that the medical practitioner should immediately stop 'treatment' and leave the ailing patient alone. In this paper, we by-pass these general bias issues, and rely on the exact same 68 studies as DP08. Turning to our three fundamental concerns with DP08, i.e. econometric modelling, statistical choices, and data issues, illuminating results and observations emerge.

First, DP08 argue that there is a single 'true' effect of aid on growth, which is common to all their 68 studies and that this implies that random sampling error is the only factor behind the variation in reported effects among studies. As a result of this assumption of effect homogeneity, the authors mainly focus on a fixed effects meta-analysis. Our expectation is, in contrast, that the impact of aid on growth across the 68 studies is heterogeneous, and using both statistical tests and graphical tools we reject the 'effect homogeneity' assumption. One can also rule out the effect homogeneity assumption on theoretical grounds as the effect of aid on growth is a function of other factors. For instance, some authors like Burnside and Dollar (2000), Dalgaard et al. (2004), Hansen and Tarp (2001), and Chauvet and Guillaumont (2004), among several others, use interaction terms by which the partial effect of aid on growth is a function, not a constant. In light of this, it is highly unrealistic to expect the effect homogeneity assumption of the fixed effects model to hold in the aid growth literature. Consequently, we conclude that random effects meta-analysis is more appropriate and show that the underlying model choice does matter for the conclusions drawn.

Second, one major concern with the DP08 approach and hence in the current paper is the way the partial effect estimate is measured for papers that include non linear terms. That is, both in DP08 and in this paper, the partial effect of aid is mismeasured for papers that include an interaction term with the aim of capturing the non-linearity in the aid-growth relation. To see how this is the case, consider the following growth regression:

$$G = \beta_o + \beta_1 * aid + \beta_2 * (aid * X) + \beta_3 * Z + \varepsilon \qquad (1)$$

where X can be aid, policy or institutional controls and Z is a vector of other explanatory variables.

In this case, the partial effect of aid on growth is given by $(\beta_1 + \beta_2 * X)$.[5] However, the data used in DP08 miscalculates the partial effect of aid by taking only β_1 as the partial effect of aid.

[5] Note that in the case of aid squared term, the partial effect is $\beta_1 + 2\beta_2 * aid$.

In the meta analysis, this problem matters the most for regressions that use the partial effect as a dependent variable. One case in point is in calculating the weighted average effect of aid on growth. We have therefore tried to partly address the problem and have shown how the results of the weighted average effect changes when one takes this issue into account. DP08, on the other hand, ignored the issue.

Moreover, we differ from DP08 in the method we use in calculating the weighted average effect of aid on growth and in our choice of the measure of statistical precision of coefficient estimates. In DP08 the weighted average aid-growth effect is calculated using sample size as weights with the assumption that studies with large sample size are more accurate. Accordingly, DP08 tune in on sample size as the preferred measure of statistical precision of parameter estimates. This does not appear to be in line with established best-practice in standard fixed and random effects meta-analysis which normally relies on calculating weighted average effects from an existing body of empirical literature. As also noted by Sterne and Harbord (2009) the precision of an effect estimate cannot be fully captured by sample size as other data characteristics are important in determining standard errors. Studies with very different sample sizes may have the same standard error and precision and vice versa. Consequently, in our estimations of the weighted average (combined) effect of aid on growth, we use standard random and fixed effects meta-analysis where the inverse of the variance of estimates are used as weights (i.e., as measure of precision). And we show that the way the weighted average is estimated matters for the results.

Third, turning to data issues we began by re-entering all DP08 data. Our initial data review uncovered various mistakes that needed to be corrected.[6] This includes the number of observations used for the multivariate meta-regression-analysis (MRA) is increased from 471 to 519.[7] Nevertheless, we have throughout followed DP08 as closely as possible to make sure results are comparable. Thus, even if our revised data set does not exactly match that of DP08, the correlations between the two sets of data are high (see Table A9.1 in the appendix).

This paper is structured as follows. Section 2 deals with data and methodology, while detailed results are presented in Section 3. Section 4 concludes that the DP08 findings paint an erroneous picture. Careful meta-analysis of the 68 studies chosen by DP08 suggest a positive and statistically significant impact of aid on growth; and this empirical effect is not an artefact of publication selection. Various appendix tables give necessary background and detail.

2 Data and methodology

The data used in this paper originate from 68 published and unpublished aid–growth studies identified by DP08 covering the period 1970-2004 (see Table A6). Since each of the 68

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[6] See Table A9.1 in the appendix for full details. Note also that in our data we do not include the variable 'Danida affiliation'. None of the three authors classified by DP08 as Danida affiliated (studies 12, 13, 33, 34 and 40) fall into this category.

[7] Note that we were able to increase the number to 519 by re-coding the values of the moderator variables which, for some studies, were wrongly coded as missing in DP08. These moderator variables include: OUTLIERS, AFRICA, ASIA, LATIN, AVERAGE and LOW INCOME. See Table A8 in the appendix for a detailed listing of the moderator variables.

studies reports one or more regressions, we have a total of 542 observations (regressions) to work with.[8]

The first step in any standard meta-analysis is to establish whether the size of the combined empirical effect in the literature under investigation is significantly different from zero or not. This is basically done by examining the pooled estimates (i.e. the mean overall effect) of all the studies included. There are two ways to calculate the pooled estimate, i.e. the fixed effects model and the random effects model.[9]

In the fixed effects model it is assumed that all studies come from a population with a fixed average effect size, that is, that all studies share a common true effect. Accordingly, in the fixed effects model the observed effect size[10] is assumed to vary from one study to another only because of random sampling error (within study variation). In contrast, in the random effects model, the assumption is that studies were drawn from populations that differ from each other in ways that could affect the treatment effect (Borenstein et al. 2007). In this case, the effect size will vary both due to sampling error (like in the fixed effects model) and due to true variation in effect size from one study to another (between study variations).

In calculating the pooled estimate and hence the combined empirical effect, each effect size is weighted, the weight being the inverse of the variance from each study. In the case of the fixed effects model the weight is given by $1/_{v_i}$ where v_i is the within study variance. On the other hand, the weight in the random effects model is given by $1/_{(v_i + \tau^2)}$ where v_i and τ^2 refer to the within and between study variances respectively.

Having estimated the mean overall effect, the next step is to examine whether this observed effect is genuine or an artefact of publication bias (i.e., the file drawer problem). The most commonly used tool to make a preliminary examination of the presence of publication bias is funnel plots, which are visual graphical images that illustrate the relationship between treatment effects estimated in individual studies (plotted on the horizontal axis) and a measure of study precision (shown on the vertical axis). The idea is that the precision in estimation (estimation accuracy) of the underlying treatment effect (in our case the impact of aid on growth) increases as the study size grows. Consequently, small studies are expected to scatter widely at the bottom of the graph, while the spread is expected to narrow among larger studies at the top of the funnel. If there is no bias the plot will take the shape of an inverted funnel, and be symmetrical around the expected true effect. As indicated above, since sample size cannot fully capture the precision of reported effect size, our choice of the measure of precision for the vertical axis in funnel plots follows Sterne and Egger (2001).

[8] We removed one regression from the study (ID 30) as this regression is already included (coded) in study ID 29. In study ID 30, the author used the regression from study ID 29 purely for comparative purposes. Thus, correcting for this double coding leads to 542 observations rather than 543.

[9] The terms fixed and random effects used in meta-analysis are quite different from the ones applied in standard panel data models in econometrics. In meta-analysis the difference between fixed and random effects models originate from the underlying assumption as regards the nature of the 'true' effects.

[10] The term effect size refers to the magnitude of the effect observed in each study. In the meta-literature there are different metrics to measure this; the partial correlation coefficient being the most commonly used one. As in DP08 we calculated the partial correlation coefficients of each study by using $\sqrt{t^2/(t^2 + df)}$ where t and df refer to t-statistics and degrees of freedom respectively.

They argue that standard errors (or their inverses) are the most appropriate measure of the precision of reported effect size.[11]

Even if funnel plots help in tracing publication bias or in general small study effects in the data, visual assessment of funnel plots is essentially subjective. Moreover, Sterne and Harbord (2009) note that funnel plot asymmetry does not necessarily arise from publication bias. Other potential reasons include, for instance, heterogeneity in underlying effects and/or low methodological quality of smaller studies. So, funnel plots should be seen as a generic means for investigating small study effects,[12] not as a tool to diagnose a specific type of bias. It is therefore wise to complement graphical observations from a funnel plot inspection with statistical tests for funnel plot asymmetry. Egger et al. (1997) provides the most commonly used test in the meta-literature. The Egger et al. test is a regression-based test to assess skewness in a funnel plot. This test starts by examining the relationship between study i's reported effect size $(Effect_i)$ and its associated standard error (SE_i) and is written as:

$$Effect_i = \alpha_0 + \alpha_1 SE_i + \varepsilon_i \qquad (2)$$

Following Stanley (2005), one can divide this equation by SE_i to avoid potential problems of heteroscedasticity, rewriting equation (2) as:

$$t_i = \frac{Effect_i}{SE_i} = \alpha_1 + \alpha_0 \frac{1}{SE_i} + \mu_i \qquad \text{where } \mu_i \text{ is } \varepsilon_i/SE_i \qquad (3)$$

The main idea behind this test is that, assuming a non-zero underlying effect and absence of publication bias, small studies will have a precision $(1/SE_i)$ and a standardized effect $(Effect_i/SE_i)$ close to zero. Large studies will have both high precision and standardized effect. Accordingly, the standardized effects are expected to scatter around a regression line that passes approximately through the origin. The slope of this regression line estimates both the size and direction of the underlying effect. Failure of the regression line to pass through the origin implies publication bias. The size of the intercept gives a measure of asymmetry; the larger the deviation from zero the higher the asymmetry and hence bias in the effect size reported by the literature.

In sum, equation (3) provides a basis for testing both funnel graph asymmetry and the presence of a genuine empirical effect beyond any publication bias. Stanley (2005) insists that the presence of an underlying genuine empirical effect, irrespective of publication bias, must be confirmed by another test. This is the so-called meta significance test (MST), which verifies the authenticity of empirical effects by analysing the relationship between the natural logarithm of the absolute value of a study's standardized effect (t-statistics) and its degrees of freedom (df). The MST equation can be written as:

$$\ln(|t|) = \beta_0 + \beta_1 \ln(df) + \epsilon_i \qquad (4)$$

Equation (4) provides evidence of a genuine empirical effect if $H_0: \beta_1 \leq 0$ is rejected. This test thus helps to identify a genuine empirical effect over and above publication bias.

[11] We also present the funnel plots with sample size for comparison with DP08, but our preferred measure of precision follows Sterne and Egger (2001) as already discussed in our introduction.

[12] That is, an effect which is observed when small studies show a larger treatment effect in meta-analysis.

Observing a positive association between df and the standardized test statistic throughout a given empirical literature is an additional means to confirm the authenticity of the effect in question. Without such a confirmation, seemingly positive findings reported in the literature may be the consequence of fortuitous misspecification or systematic publication biases. Without this or similar validation, a theoretical economic proposition should not be regarded as empirically corroborated or 'verified'. Seemingly strong empirical results across an entire literature might easily be the remnants of selected bias. (Stanley 2005)

3 Results and discussion

In this section we first present the pooled estimate of the combined effect of aid on growth, and then turn to investigating whether the observed effect is genuine (authentic) or an artefact of publication bias.

3.1 The weighted average effect of aid on growth

The first (and typically main) aim of any meta-analysis is to combine the available empirical evidence so as to establish whether the impact of an intervention is different from zero or not. Accordingly, in Table 1 we present the combined estimates of the impact of aid on growth (and the associated confidence intervals) from fixed and random effects meta analysis. Both suggest a positive and significant effect of aid on growth (0.082 and 0.098 respectively) when the empirical evidence from the 68 studies is combined.

Table 1: Meta analysis of the effect of aid on growth

Method	No. of Regressions	Pooled Estimate	95% CI Lower	95% CI Upper	P-value H_o:No Effect
Overall					
Fixed	537	0.082	0.076	0.089	0.000
Random	537	0.098	0.085	0.112	0.000

Note: Test for heterogeneity: Q = 1791.745 on 536 degrees of freedom (p = 0.000) and the estimate of between studies variance = 0.015. The number of regressions is 537 instead of 542 as four estimates do not have data on standard errors due to missing data, and we have also removed one regression from the study with ID38 as an outlier.[13]

Source: Authors' estimates.

As discussed in the methodology section, the fixed effect estimate is based on the assumption that there is a single true effect size (population treatment effect) inherent in all studies. This is equivalent to assuming away heterogeneity between studies (homogeneity of effect sizes). This assumption is empirically testable and the fixed effects result can easily be challenged if there is heterogeneity of true effects across studies. Heterogeneity may not always be an issue in, for example, tightly controlled medical experiments (Schell and Rathe 1992). Yet, in our case where we rely on a wide ranging set of 68 different studies with varying focus and analytical approach, heterogeneity is to be expected. This is indeed what the *Q*-test for

[13] We have also checked the sensitivity of the overall effect to the inclusion of the outlier and the results still hold. That is, 0.081 and 0.097 for the fixed and the random effects respectively.

heterogeneity reported in Table 1 suggests.[14] The presence of heterogeneity is also clearly confirmed in graphical inspection of the Galbraith plot attached in the appendix.[15] Many studies fall outside the confidence bounds indicating significant heterogeneity in the effect of aid on growth.

In sum, the fixed effects model, based on homogeneity of effects, is clearly inappropriate as a meta-analysis of aid and growth. In light of this, the effect homogeneity claim of DP08 is invalid and does not appear to be supported by the evidence inherent in the data.[16] Thus, in this paper our discussion of the meta analysis results focuses on the random effects model.

Turning back to the overall effect of aid reported in Table 1, the weighted average effect of aid on growth from the 68 studies is positive and statistically significant with a magnitude of 0.098 in the random effect meta analysis. On the other hand, the weighted average effect reported in DP08 is 0.08 which is similar to the fixed effect estimate reported in Table 1. Note from Table 1 that the DP08 weighted average does not fall in our 95 per cent confidence interval which indicates that we can reject their 0.08 estimate at 5 per cent level of significance.

But this is not the whole story about the weighted average effect of aid on growth. As we have shown in equation (1) the partial effect of aid on growth will be mismeasured for papers that capture the non-linear effect of aid on growth. In Table 2 below we show how this matters for the result and we have separately re-estimated the weighted average effects by classifying the papers based on their treatment of non-linearity.

For instance, for papers that include the aid squared term overlooking $2\beta_2 * aid$ will overstate the weighted average effect of aid reported from these papers. This is so because the expected sign of the coefficient of aid square in equation 1 above is negative. This is consistent with the result reported in Table 2. As shown in this table, the weighted average effect from papers that include the aid squared term is much higher than papers which do not include the aid squared term. In a similar fashion, for papers that include aid-policy and aid-institution interaction terms, the expected sign of the coefficient of the interaction term is positive. Hence, ignoring the $\beta_2 * X$ term in equation (1) will understate the estimated weighted average effect of aid. Again, this is confirmed from the results in Table 2. Papers that include

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[14] The test involves $Q = \sum_{i=1}^{k} w_i\,(T_i - T)^2$ where T_i is the estimate of the effect magnitude, T is the weighted average and w_i is the weight (the inverse of the variance of T_i). Under the null hypothesis of homogeneity, Q is distributed as chi-square with degrees of freedom equal to the number of studies minus one.

[15] A Galbraith plot is a scatter plot of the standardized effect against its precision and is used to complement the statistical test for heterogeneity. This graphical tool helps to visually examine the extent of heterogeneity in meta-analysis. The position of each point on the horizontal axis shows the weight allocated to each study in the meta-analysis. The vertical axis shows the contribution of each study to the Q statistics for heterogeneity. In the absence of heterogeneity, all points in the graph are expected to lie within the confidence bounds (positioned 2 units above and below the regression line). This is an unweighted regression line that is constrained through the origin and has a slope equal to the overall effect estimated in a fixed effect meta-analysis.

[16] On page 13, footnote 33 in DP08, the authors report a test for residual between-study variance (τ^2) from a random effects model and find τ^2 = 0.0091. Based on this the authors argue that the between study variance is actually small. But even if the magnitude looks small, the test clearly shows that it is statistically different from zero with a p-value = 0.000. Unfortunately, this fact is overlooked by DP08. In addition, in the same footnote the authors report Q-tests for heterogeneity for their two fixed effect regressions and claimed that the null of effect homogeneity is accepted. But again, even if their Q values are correct, the reported p-values are wrong. Thus, even when one applies the heterogeneity tests on the original DP08 data, there is no ground to accept the effect homogeneity assumption of the fixed effects model.

either aid-policy or aid-institution interaction terms appear to have a lower weighted average effect compared to papers that do not include these terms.

Finally, as shown in the lower part of Table 2, we have estimated the weighted average effect of aid separately for papers that include at least one of the above interaction terms and for those that do not include any of these interaction terms. The random effect estimate of the weighted average effect of aid for the latter appears to be positive and statistically significant with a magnitude of 0.138. This magnitude is much higher than the estimate found for papers that include at least one of the interaction terms. Moreover, this estimate is also higher than the one reported in Table 1 where the non-linearity issues are ignored.

To sum up, when one combines the existing empirical evidence from the 68 studies using appropriate meta analysis, the results suggest that the effect of aid on growth is about 0.14 and it is statistically significantly different from zero. This result is close to the key finding by Arndt et al. (2010).

Table 2: Meta analysis of the effect of aid on growth by classifying the studies based on the type of non-linearities included in the papers

Type of Non-linearity used in the papers:	No. of Regressions	Combined Effect Estimate	95% CI Lower	95% CI Upper	P-value H_o: No Effect
Studies with aid square					
Fixed	97	0.124	0.112	0.137	0.000
Random	97	0.131	0.110	0.153	0.000
Studies without aid square					
Fixed	441	0.064	0.056	0.072	0.000
Random	441	0.087	0.071	0.104	0.000
Studies with aid-policy					
Fixed	157	0.044	0.034	0.054	0.000
Random	157	0.044	0.027	0.060	0.000
Studies without aid-policy					
Fixed	381	0.113	0.104	0.122	0.000
Random	381	0.131	0.111	0.150	0.000
Studies with aid-institution					
Fixed	27	-0.112	-0.142	-0.081	0.000
Random	27	-0.112	-0.149	-0.075	0.000
Studies without aid-institution					
Fixed	511	0.091	0.084	0.098	0.000
Random	511	0.108	0.094	0.122	0.000
Studies with conditionality*					
Fixed	232	0.067	0.058	0.075	0.000
Random	232	0.066	0.051	0.082	0.000
Studies without conditionality					
Fixed	306	0.109	0.097	0.120	0.000
Random	306	0.138	0.113	0.162	0.000

Note: The Q tests for heterogeneity for studies with and without conditionality are Q = 756.157 on 231 degrees of freedom (p-value = 0.00) and Q = 1106.690 on 305 degrees of freedom (p = 0.000) respectively. *These are papers that include at least one of the above non linear terms: aid square, aid-institution or aid-policy interaction terms.

Source: Authors' estimates.

3.2 Publication bias versus authentic effect

Publication bias is typically said to exist when researchers, editors, and reviewers tend to favour statistically significant findings causing studies that yield relatively small and/or insignificant results to remain unpublished (the 'in the file drawer' problem; see Stanley 2005).[17] Whether this is indeed a problem in the aid–growth literature is not easy to say. In this literature, small and insignificant results have on several occasions drawn considerable academic and policy attention after which they have been shown not to be robust to even minor changes in data and methodology. Prominent examples include the 'micro-macro' paradox by Mosley (1986); the 'aid only works with good policy' hypothesis by Burnside and Dollar (2000); and the Rajan and Subramanian (2008) 'aid is insignificant' finding.[18] In any case, if a publication/small study bias exists it would tend to bias empirical effects, and as such must be carefully investigated with a view to disentangling any genuine empirical impact on the one side, and publication effects on the other. In line with established practice in the meta-literature we first use funnel plots to visually examine if the aid–growth literature seems to suffer from such bias.

In Figure 1, we present a funnel plot which is done using standard error as the measure of precision.[19] The vertical line at the centre of the funnel plot shows a summary estimate of the effect size from the 68 aid–growth studies. When there is no bias, estimates are expected to vary randomly and evenly around this estimate. The diagonal lines in the figure represent the 95 per cent confidence limits around the summary treatment effect for each standard error on the vertical axis.[20] These lines show the expected distribution space of studies in the *absence of heterogeneity*. That is, assuming that there is no heterogeneity in the reported effect sizes among studies, 95 per cent of the studies should lie within the funnel defined by the diagonal lines.

As can be seen from the funnel plot in Figure 1, the estimates from the aid–growth literature are fairly randomly distributed around the fixed effect estimate. Although the distribution of the studies to the right of the funnel seems relatively more concentrated, there is no clear asymmetry in the funnel graph. This lack of asymmetry becomes clearly visible in Figure 1.1 A and B, which rely on the inverse of the standard error and sample size as measure of precision, respectively. These figures depict the clearly symmetrical distribution of the effect of aid on growth as estimated from the 68 studies. These funnel plots provide, in contrast to DP08, no basis to argue for a directional bias.[21]

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[17] Also, small studies tend to have large standard errors leading to insignificant results. If this leads authors to strive to come up with large sized effects in order to compensate for the high standard errors such a bias should be detected.

[18] See Hansen and Tarp (2000), Hansen and Tarp (2001), Dalgaard et al. (2004), and Arndt et al. (2010).

[19] When standard errors are used in the vertical axis, the vertical axis is reversed (zero at the top), so as to put large studies at the top of the graph reflecting that larger studies have smaller standard errors.

[20] The summary estimate of the effect size in Figure 1 is obtained from the fixed effect model (under the effect homogeneity assumption). This presents one limitation in funnel plot analysis. Vevea and Hedges (1995) explain why one should not necessarily associate asymmetry in the funnel plot with publication bias. Presence of heterogeneity can also potentially lead to such an asymmetry in the funnel plot.

[21] In investigating publication bias, it is (following Stanley 2005) the graph's symmetry or asymmetry that is important, and Stanley (2005) also points out that associating publication selection with asymmetry of the funnel graph presumes that the bias (selection) is directional. Figure A3 attached in the appendix shows how the funnel plot can easily be made to look asymmetric if one makes the overall empirical effect of aid on growth equal to zero as done by DP08. But as shown above the mean overall effect of aid on growth is significantly different from zero, and the reference line in the funnel plot must be inserted according to this overall effect instead of at zero effect.

Figure 1: Funnel plot with pseudo 95% confidence limits

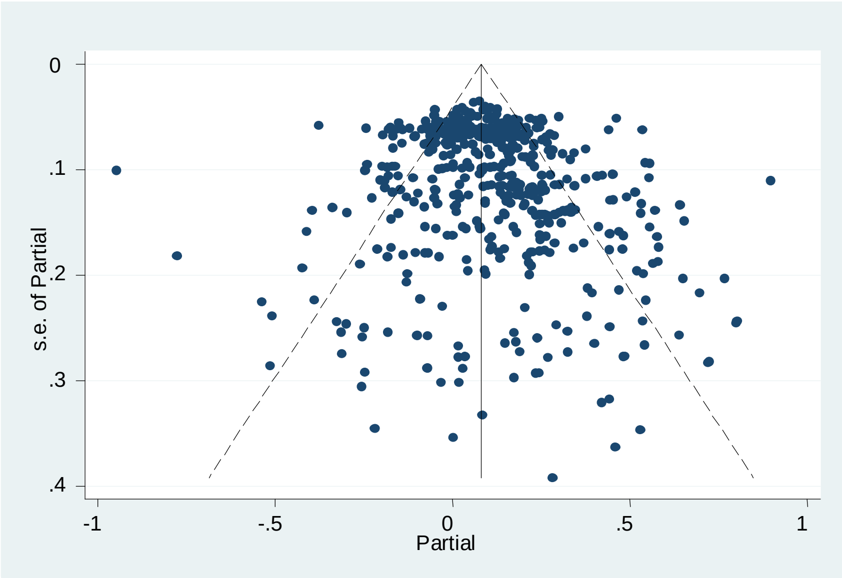
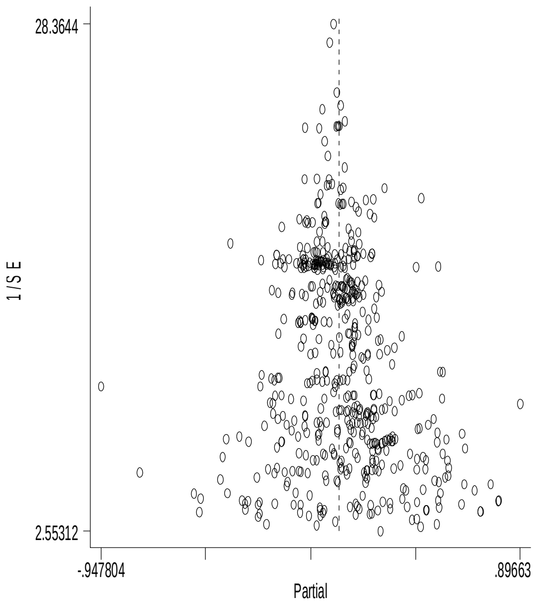
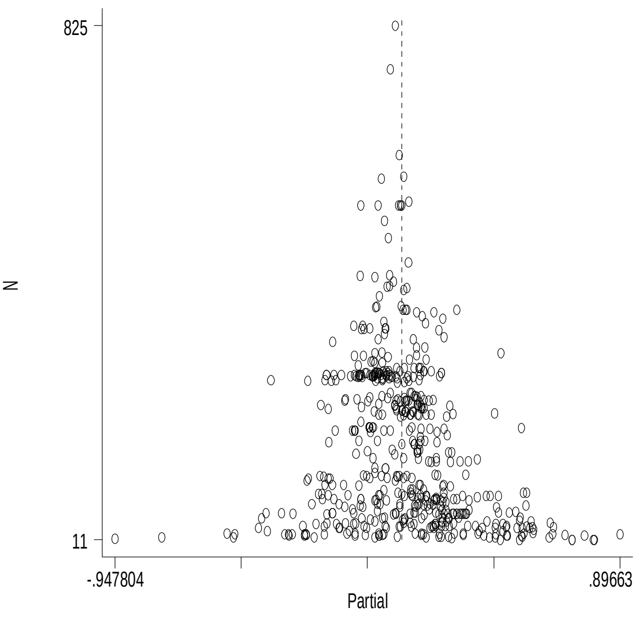


Figure 1.1: Funnel plots of the aid–growth literature

A. 1/Standard error used as precision



B. Sample size used as precision



While the above funnel plot analysis provides no grounds to claim that a publication bias is present, it is premature to draw any firm conclusion on publication bias from this evidence. Even though funnel plots can be revealing, their interpretation is subjective and potentially ambiguous. We therefore move on to statistical testing. The most commonly used statistical test of publication bias is the Egger et al. (1997) test, also known as the funnel asymmetry test (FAT) (Stanley 2005). FAT basically estimates equation 3, which is then expanded in a next stage to control for more explanatory variables.

The main variables of interest are the constant term and the coefficient of 'precision'. While the coefficient of 'precision' shows the magnitude and direction of any genuine underlying effect over and above any possible bias, the constant term depicts the existence and degree of the bias in the literature surveyed. The results of our bivariate and multivariate meta regression analysis are presented in Tables 3 and 4 respectively. We first discuss the results from the bivariate FAT meta-regression-analysis (FAT-MRA) where the dependent variable is the standardized effect of aid (t-statistics) regressed on the inverse of the standard error (i.e. precision) (Table 3), and then move on to the multivariate regression analysis (Table 4). Since more than one regression is taken from most of the studies, observations within a study are unlikely to be independent. To address this problem, in all our regressions we used standard errors that are clustered on publications.[22] For the sake of comparison, we also report heteroskedasticity consistent and heteroskedasticity and autocorrelation consistent (HAC) standard errors.

Table 3: Bivariate FAT meta regression analysis dependent variable = standardized effect (t-stat)

Variables	(1) Robust	(2) HACSE	(3) Clustered
Bias Coefficient			
Constant	0.794***	0.794***	0.794***
	(0.164)	(0.223)	(0.297)
Genuine Effect of Aid			
Precision	0.0245*	0.0245	0.0245
	(0.0142)	(0.01998)	(0.0260)
Observations	537	537	537
R-squared	0.005	0.005	0.005

Note: Robust, heteroskedastcity and autocorrelation consistent and clustered standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Source: Authors' estimates.

Coming to our results, despite the reasonable symmetry in the funnel graph discussed above, the result from the bivariate regression depicted in Table 3 seems to suggest the presence of a positive and statistically significant publication bias. The positive sign of the bias suggests that small studies with high standard error tend to report a high partial effect of aid on growth, and hence a statistically significant effect. Should we conclude and stop the analysis here? We do not believe so.

The above bivariate Egger et al. (1997) test is commonly criticized for leading to an inflated false-positive rate (high type I error), and such false positive results become a major issue especially when there is between study heterogeneity (see Ioannidis and Trikalinos 2007). In addition, Stanley (2005) argues that heterogeneity of effects may induce asymmetry into the funnel plots even in the absence of publication bias. This implies that failure to account for factors that can explain heterogeneity in research findings will potentially exaggerate the bias. We have already argued that heterogeneity is evident in the aid–growth literature, so

[22] In DP08 the results appear to be very sensitive to clustering. To show this, we replicated their fixed effect result which is reported in column 2 of Table 5 in DP08 and checked the sensitivity of this result for clustering. As can be seen from column three of Table A5 in the appendix, out of the fourteen significant variables they had, six of them became insignificant. The authors used bootstrapping as an alternative to clustering. But if one resorts to bootstrap standard errors, for the case at hand, it is appropriate to apply block bootstrapping. This is because unlike the bootstrapping used in DP08 which assumes independence across all observations, block bootstrap method assumes away within cluster (publication) independence.

caution must be exercised in making inference about publication bias from the bias coefficient reported in column 3 above. It is a bivariate regression which needs to be substantiated by multivariate analysis.[23]

Before moving on to the multivariate analysis, we should highlight that (in spite of the difficulty of establishing publication bias), Stanley (2008) notes that the FAT-MRA can be relied on to identify genuine empirical effects of aid on growth; and this is so regardless of publication bias. In Table 3 above, this genuine empirical effect is captured by the coefficient of 'precision'. As can be seen from Table 3 the FAT-MRA shows a positive and significant effect in column 1, but this does not appear to be the case when we apply HAC and clustered standard errors. For the reasons indicated above, it is too early to conclude about publication bias and the empirical effect of aid solely based on the bivariate regression reported in Table 3. We thus now move beyond the bivariate model and consider the multivariate regression, see for example Abreu et al. (2005) and Stanley (2005).

Stanley (2005) points out that FAT-MRA may suffer from omitted variable bias like any other econometric analysis.[24] This accentuates the need to expand the FAT-MRA test in Table 3 above into a more general MRA, by including important explanatory variables that can potentially affect the reported variation (heterogeneity) in research findings. We do not pretend to have insight on this point that goes beyond that of DP08. Accordingly, we expand the FAT-MRA model by including all the 50 moderator variables they identified. The result is depicted in Table A1 in the appendix, and it can be seen that the magnitude of the precision coefficient improves and becomes significant in two of the cases, though it fails to be significant in the last column.

Moreover and importantly, after controlling for factors that can potentially explain heterogeneity in reported effects, the bias coefficient (i.e. the constant term) becomes insignificant in all cases. This suggests that once the moderator variables (study characteristics) are controlled for then there is no publication bias. However, most of the variables included in the multivariate regression reported in Table A1 are statistically insignificant. There is, in other words, a trade-off here between including these variables in order to explain heterogeneity versus potential multicolleniarity and loss of degrees of freedom. We therefore follow the General to Specific (GETS) Modelling procedure by Krolzig and Hendry (2001) to systematically reduce the insignificant variables from the multivariate model. The result from the reduced multivariate model is reported in Table 4 below.

As can be seen from the multivariate FAT-MRA results reported in Table 4, the genuine impact of aid on growth, as reflected in the coefficient of 'precision', is found to be positive and statistically significant in all the three cases with a magnitude of 0.17. This implies that a one percentage point increase in aid is associated with a 0.17 percentage point rise in GDP growth. This result is again close to the Arndt et al. (2010) estimate of 0.13. Compared to the bivariate model, controlling for other variables which can potentially affect the reported

[23] Harbord et al. (2009) indicate that such a test for funnel plot asymmetry must not be taken as a final evidence for publication bias or any other small study effect.

[24] Stanley (2005) notes: 'As in econometric analysis, omitting relevant explanatory variables can bias the MRA tests ... A study's reported statistics may reflect patterns of model selection and misspecification bias, beyond publication bias. Nearly all meta-analysis found that choices of models, data and or estimation technique are systematically related to study's findings. Even characteristics of the researcher such as gender can affect findings. Thus, it would be prudent to embed these tests of publication selection and empirical effect into more general MRA models that explain the reported variation in research results.'

variation of the effect of aid on growth greatly improves the magnitude of the genuine effect of aid. Moreover, in all the regressions the constant term, i.e. the publication bias becomes statistically insignificant.

Table 4: Multivariate FAT meta regression analysis: reduced model dependent variable = standardized effect (t-stat)

Variables	(1) Robust	(2) HACSE	(3) Clustered
Bias Coefficient			
Constant	-0.232	-0.232	-0.232
	(0.321)	(0.308)	(0.350)
Genuine Effect of Aid			
Precision	0.166**	0.166**	0.166*
	(0.0733)	(0.0843)	(0.0924)
Publication Outlet			
Working paper	-0.0697***	-0.0697***	-0.0697***
	(0.0167)	(0.0193)	(0.0184)
Cato	-0.202***	-0.202***	-0.202***
	(0.0324)	(0.0295)	(0.0282)
JDS	-0.0833***	-0.0833***	-0.0833***
	(0.0280)	(0.0271)	(0.0272)
JID	-0.0587***	-0.0587**	-0.0587*
	(0.0196)	(0.0239)	(0.0304)
EDCC	-0.146***	-0.146***	-0.146***
	(0.0389)	(0.0434)	(0.0501)
Applied economics	-0.116**	-0.116**	-0.116**
	(0.0545)	(0.0574)	(0.0519)
Author Detail			
World Bank	-0.0853***	-0.0853***	-0.0853***
	(0.0204)	(0.0198)	(0.0178)
Gender	-0.0737***	-0.0737***	-0.0737**
	(0.0202)	(0.0258)	(0.0293)
Influence	0.0668***	0.0668***	0.0668***
	(0.0164)	(0.0167)	(0.0162)
Data			
Panel	0.105***	0.105***	0.105**
	(0.0379)	(0.0404)	(0.0426)
No. of years	-0.0106***	-0.0106***	-0.0106***
	(0.00162)	(0.00159)	(0.00152)
Asia	0.0303	0.0303	0.0303
	(0.0222)	(0.0222)	(0.0239)
Single country	0.491***	0.491***	0.491**
	(0.160)	(0.170)	(0.191)
y1960s	0.0547**	0.0547**	0.0547
	(0.0270)	(0.0289)	(0.0368)
y1990s	0.103***	0.103***	0.103***
	(0.0318)	(0.0329)	(0.0328)
Sub sample	0.0446**	0.0446***	0.0446**
	(0.0212)	(0.0169)	(0.0187)
Low income	-0.0879***	-0.0879***	-0.0879***
	(0.0284)	(0.0254)	(0.0328)
EDA	-0.0376**	-0.0376**	-0.0376**
	(0.0164)	(0.0176)	(0.0181)
Conditionality			
Aid square	0.0716***	0.0716***	0.0716***
	(0.0125)	(0.01015)	(0.0108)
Interaction institutions	-0.100***	-0.100***	-0.100**
	(0.0248)	(0.0291)	(0.0380)
Specification and Control			
FDI	0.0909***	0.0909***	0.0909**
	(0.0258)	(0.0343)	(0.0417)
Theory	0.0415***	0.0415**	0.0415**
	(0.0155)	(0.0165)	(0.0191)
Average	0.0115***	0.0115***	0.0115***

	(0.00232)	(0.00211)	(0.00206)
Inflation	-0.0510**	-0.0510**	-0.0510***
	(0.0204)	(0.0198)	(0.0173)
Size of government	0.101***	0.101***	0.101***
	(0.0150)	(0.0142)	(0.0151)
Financial development	0.0345***	0.0345**	0.0345**
	(0.0129)	(0.0139)	(0.0142)
Region dummy	-0.0313**	-0.0313**	-0.0313**
	(0.0123)	(0.0130)	(0.0127)
Openness	-0.0706***	-0.0706***	-0.0706**
	(0.0185)	(0.0226)	(0.0274)
Per capita income	-0.0709**	-0.0709**	-0.0709*
	(0.0283)	(0.0318)	(0.0383)
Observations	518	518	518
R-squared	0.459	0.459	0.459

Note: Q-test for heterogeneity: (chi2(518) = 1000; p>chi2 = 0.000). Robust, heteroskedastcity and autocorrelation consistent and clustered standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Source: Authors' estimates.

On this basis we suggest that it is highly likely that the DP08 results suffer from omitted variable bias, noting that DP08's conclusions are exclusively dependent on a Table 4 type bivariate analysis. Furthermore, in Table A3 we have presented a robustness check for the FAT results presented in Table 4. The first regression in column 1 of Table A3 is done by considering studies after the 1990s only; in the second column we exclude studies that did not include African countries in their sample; and finally in the third column we only considered published studies. In all the cases the key finding presented in Table 4 holds.

The above evidence should as Stanley (2005) puts it, be confirmed by a meta-significance test (MST) for authentic effect before firm conclusions are drawn. The MST test uses the relationship between the logarithms of a study's absolute value of t-statistics and the degrees of freedom to examine a genuine empirical effect. A genuine empirical effect is reflected in a positive and statistically significant coefficient of the log of degrees of freedom in equation 4 (in Section 2). The bivariate and multivariate results of the MST regressions are reported in Table 5 and Table 6 respectively. As can be seen from the bivariate regression reported in Table 5 below, the coefficient of log of degrees of freedom (ln (df)) exhibits a positive sign, but it is insignificant in all cases. This should come as no surprise. The results reported in Table 5 are from a bivariate regression, and it is likely that this bivariate MST-MRA suffers from omitted variable bias for reasons similar to those discussed above.

Table 5: Bivariate MST meta regression analysis dependent variable = ln (t-stat)

Variables	(1) Robust	(2) HACSE	(3) Clustered
ln(df)	0.00338	0.00338	0.00338
	(0.0474)	(0.0568)	(0.0635)
Constant	0.0637	0.0637	0.0637
	(0.219)	(0.258)	(0.277)
Observations	538	538	538
R-squared	0.000	0.000	0.000

Note: Robust, heteroskedastcity and autocorrelation consistent and clustered standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Source: Authors' estimates.

We therefore turn again to the DP08 explanatory variables used for the FAT-MRA in Table 4 and run a multivariate MST-MRA. The results from the full model are presented in Table A2 in the appendix. Moreover in the first three columns of Table 6 we report the reduced form MST-MRA model after systematically removing insignificant variables using GETS modelling procedure. And finally, column 4 of Table 6 checks if the result remains the same when one uses the log of the number of observations (ln(n)) instead of the log of degrees of freedom (ln(df)) as a measure of estimation accuracy. As can be seen from Table A2 and Table 6 below, in all the multivariate MST-MRA regressions, the coefficient of estimation accuracy is positive and significant. This underpins the authenticity of the positive and significant effect of aid on growth observed in the FAT-MRA regressions. Moreover, similar to the FAT robustness checks, we present a robustness check for our MST-MRA results in Table A4. As can be seen from Table A4 our finding continues to hold in all the cases.

Table 6: Multivariate MST meta regression analysis: reduced model dependent variable = ln (t-stat)

Variables	(1) Robust	(2) HACSE	(3) Clustered	(4) Clustered
Genuine Empirical Effect				
ln(df)	0.328***	0.328***	0.328***	
	(0.0847)	(0.0964)	(0.0820)	
ln(n)				0.365***
				(0.0942)
Publication Outlet				
Working Paper	-0.626***	-0.626***	-0.626***	-0.639***
	(0.145)	(0.138)	(0.140)	(0.139)
CATO	-1.390***	-1.390***	-1.390***	-1.402***
	(0.285)	(0.258)	(0.220)	(0.218)
JDS	-0.606**	-0.606**	-0.606**	-0.611**
	(0.235)	(0.254)	(0.265)	(0.263)
EDCC	-0.877	-0.877**	-0.877***	-0.867***
	(0.541)	(0.354)	(0.316)	(0.316)
AER	-1.029***	-1.029***	-1.029***	-1.035***
	(0.320)	(0.265)	(0.272)	(0.270)
Author Details				
World Bank	-0.496**	-0.496**	-0.496**	-0.504**
	(0.203)	(0.194)	(0.213)	(0.212)
Gender	-0.400**	-0.400**	-0.400**	-0.402**
	(0.178)	(0.159)	(0.155)	(0.155)
Influence	0.334**	0.334**	0.334**	0.330**
	(0.135)	(0.129)	(0.129)	(0.130)
Data				
No. of Years	-0.0357**	-0.0357**	-0.0357**	-0.0356**
	(0.0149)	(0.0168)	(0.0169)	(0.0169)
Africa	-0.286*	-0.286*	-0.286*	-0.297*
	(0.164)	(0.166)	(0.147)	(0.149)
Single Country	1.426***	1.426***	1.426***	1.389***
	(0.300)	(0.298)	(0.252)	(0.249)
y1960s	0.399**	0.399*	0.399*	0.388*
	(0.201)	(0.217)	(0.233)	(0.231)
y1990s	1.016***	1.016***	1.016***	1.004***
	(0.203)	(0.211)	(0.209)	(0.207)

Conditionality				
Aid Square	0.574***	0.574***	0.574***	0.573***
	(0.141)	(0.146)	(0.124)	(0.127)
Interaction Institutions	0.822***	0.822***	0.822***	0.814***
	(0.216)	(0.217)	(0.217)	(0.216)
Specification and Control				
FDI	0.576***	0.576***	0.576***	0.549***
	(0.173)	(0.145)	(0.137)	(0.137)
Gap Model	0.294	0.294	0.294*	0.316**
	(0.211)	(0.185)	(0.149)	(0.151)
Theory	0.612***	0.612***	0.612***	0.618***
	(0.141)	(0.141)	(0.156)	(0.158)
Average	0.0530***	0.0530***	0.0530***	0.0540***
	(0.0128)	(0.0143)	(0.0119)	(0.0124)
Lag used	0.259	0.259	0.259	0.259
	(0.184)	(0.161)	(0.186)	(0.185)
Size of government	0.601***	0.601***	0.601***	0.596***
	(0.137)	(0.137)	(0.135)	(0.134)
Region Dummy	-0.329**	-0.329**	-0.329***	-0.332***
	(0.148)	(0.124)	(0.0952)	(0.0952)
Openness	-0.275**	-0.275**	-0.275**	-0.276**
	(0.124)	(0.123)	(0.120)	(0.122)
Constant	-1.681***	-1.681***	-1.681***	-1.873***
	(0.434)	(0.470)	(0.354)	(0.403)
Observations	519	519	519	519
R-squared	0.240	0.240	0.240	0.239

Note: Test for heterogeneity: (chi2(518)= 550.16; P>chi2=0.317). Robust, heteroskedastcity and autocorrelation consistent and clustered standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Source: Authors' estimates.

In sum, our results stand in contrast to the conclusions of DP08. They found a negative and insignificant coefficient on ln (df). On this basis, DP08 suggested that there is a lack of evidence to support the idea that development aid has an effect on economic growth. Once again, this is based on a simple bivariate MST, which fails to take into account other explanatory variables. The DP08 result does not survive when the bivariate model is expanded to the multivariate context.

4 Conclusions

The main aim of this paper is to contribute to the aid–growth literature using as our starting point the method and data from the 68 studies employed by DP08. In the initial process we discovered a variety of data issues. Accordingly, we decided to rectify erroneously entered information in DP08 and fill in missing values (whenever possible) in their data and hence increase the number of observations for our meta-analysis. Moreover, we decided to carry out a more complete analysis, in line with best-practice guidelines. What did we find?

Our combined meta analysis estimate of the aid–growth link in the random effects model is found to be positive and significant with a magnitude of 0.14. In the same vein, the FAT-MRA results reported in Table 4 not only confirm this positive and significant effect of aid on growth, they also suggest that publication bias is not a severe problem in the aid–growth literature. The measure of publication bias obtained from the multivariate FAT-MRA model appears to be statistically indistinguishable from zero, which is in line with the fairly symmetrical funnel plot depicted in Figure 1.

The genuineness of the positive and significant effect of aid on growth was further underpinned by the results of our MST-MRA regressions. As shown in Table 6, there is evidence of a clear empirical effect that goes beyond publication bias. Though the coefficient that verifies the authenticity of the impact of aid on growth is not significant in the bivariate MST, the authenticity of the observed positive and significant aid–growth impact becomes evident once we move to a multivariate setting taking into account the DP08 explanatory variables. In addition, as shown in Tables A3 and A4, our findings appear to be robust in different samples. We highlight that the heterogeneity in the true effect of aid on growth across the studies under review is important. Accordingly, we emphasize the need to use the random effects model for the meta analysis at hand in contrast to the fixed effects model.

We have also indicated that the partial effect of aid on growth for papers that include interaction terms is wrongly coded in DP08. While we have not fully addressed the problem here, we did calculate the weighted average effect of aid separately for papers with and without non-linear terms. In doing so we have shown how a proper coding of the partial effect matters for the results. We thus suggest that future meta analysis on aid and growth needs to find a way to properly incorporate the partial effect of aid from studies that include a non-linear term.

To summarize, when one combines the findings of the 68 studies identified by DP08 that used economic growth as an outcome indicator to assess aid effectiveness, the evidence shows that foreign aid has, on average, had a positive and significant impact on economic growth. At the same time, the conclusions that emerge from the present review are obviously not the whole story about aid effectiveness. Economic growth is only one of the multifaceted development objectives of foreign aid. For example, poverty reduction is the main aim and target in most foreign aid programmes.[25] Moreover, we agree with calls to improve the design and implementation of aid to the benefit of the poorest people in the poorest countries.

[25] See Feeny and Ouattara (2009), Gomanee and Morrissey (2002), Feeny (2003) and Gomanee et al. (2005).

Appendix tables and figures

Table A1. Multivariate FAT meta regression analysis:
full model dependent variable = standardized effect (t-stat)

Variables	(1) Robust	(2) HACSE	(3) Clustered
Bias Coefficient			
Constant	-0.356	-0.356	-0.356
	(0.421)	(0.4062)	(0.462)
Genuine Effect of Aid			
Precision	0.283*	0.283*	0.283
	(0.155)	(0.1602)	(0.182)
Publication Outlet			
Working paper	-0.0621***	-0.0621**	-0.0621**
	(0.0219)	(0.0251)	(0.0272)
Cato	-0.174***	-0.174***	-0.174***
	(0.0535)	(0.0530)	(0.0534)
JDS	-0.0678*	-0.0678*	-0.0678
	(0.0385)	(0.0394)	(0.0413)
JID	-0.0478*	-0.0478	-0.0478
	(0.0268)	(0.0322)	(0.0405)
EDCC	-0.142	-0.142	-0.142
	(0.0891)	(0.0905)	(0.101)
AER	-0.0330	-0.0330	-0.0330
	(0.0410)	(0.0355)	(0.0363)
Applied economics	-0.113*	-0.113*	-0.113*
	(0.0676)	(0.0673)	(0.0644)
Author Detail			
World Bank	-0.0615**	-0.0615*	-0.0615*
	(0.0282)	(0.0329)	(0.0311)
Gender	-0.0718**	-0.0718*	-0.0718*
	(0.0354)	(0.0384)	(0.0390)
Expectations met	0.00501	0.00501	0.00501
	(0.0348)	(0.0355)	(0.0360)
Influence	0.0711***	0.0711***	0.0711***
	(0.0224)	(0.0232)	(0.0256)
Data			
Panel	0.0835*	0.0835*	0.0835
	(0.0465)	(0.0466)	(0.0523)
No. of countries	-9.09e-05	-9.09e-05	-9.09e-05
	(0.000483)	(0.000530)	(0.000610)
No. of years	-0.00899***	-0.00899***	-0.00899***
	(0.00196)	(0.00189)	(0.00196)
Africa	-0.0427	-0.0427	-0.0427
	(0.0382)	(0.0378)	(0.0446)
Asia	0.0765*	0.0765*	0.0765*
	(0.0450)	(0.0459)	(0.0448)
Latin	-0.0555	-0.0555	-0.0555
	(0.0377)	(0.0392)	(0.0443)
Single country	0.441**	0.441**	0.441**
	(0.184)	(0.198)	(0.220)
y1960s	0.0376	0.0376	0.0376
	(0.0335)	(0.0327)	(0.0411)
y1970s	-0.0622*	-0.0622*	-0.0622
	(0.0334)	(0.0405)	(0.0394)
y1980s	-0.0376	-0.0376	-0.0376
	(0.0486)	(0.0485)	(0.0551)
y1990s	0.108**	0.108*	0.108*
	(0.0534)	(0.0571)	(0.0564)
Sub sample	0.0280	0.0280	0.0280
	(0.0243)	(0.0210)	(0.0224)
Low income	-0.0648**	-0.0648**	-0.0648*

	(0.0326)	(0.0301)	(0.0377)
EDA	-0.0284	-0.0284	-0.0284
	(0.0184)	(0.0196)	(0.0182)
Outlier	0.00500	0.00500	0.00500
	(0.0139)	(0.0160)	(0.0179)
Conditionality			
Aid square	0.0583***	0.0583***	0.0583***
	(0.0174)	(0.0144)	(0.0152)
Interaction policy	0.0144	0.0144	0.0144
	(0.0227)	(0.0193)	(0.0197)
Interaction institutions	-0.0996***	-0.0996***	-0.0996**
	(0.0254)	(0.0318)	(0.0396)
Specification and Control			
Capital	0.0144	0.0144	0.0144
	(0.0361)	(0.0377)	(0.0432)
FDI	0.0790**	0.0790*	0.0790*
	(0.0338)	(0.03960)	(0.0444)
Gap model	-0.0213	-0.0213	-0.0213
	(0.0661)	(0.0727)	(0.0831)
Theory	0.0454*	0.0454	0.0454
	(0.0247)	(0.0288)	(0.0347)
Average	0.0100***	0.0100***	0.0100***
	(0.00275)	(0.00248)	(0.00274)
Lag used	0.0316	0.0316	0.0316
	(0.0269)	(0.0283)	(0.0328)
Inflation	-0.0528*	-0.0528*	-0.0528*
	(0.0304)	(0.02963)	(0.0271)
Instability	-0.0120	-0.0120	-0.0120
	(0.0315)	(0.0342)	(0.0316)
Fiscal	-0.00171	-0.00171	-0.00171
	(0.0345)	(0.0371)	(0.0400)
Size of government	0.0919***	0.0919***	0.0919***
	(0.0252)	(0.0228)	(0.0224)
Financial development	0.0409*	0.0409*	0.0409*
	(0.0215)	(0.0230)	(0.0223)
Ethnic Fractionalization	-0.000708	-0.000708	-0.000708
	(0.0316)	(0.0369)	(0.0319)
Region dummy	-0.0336**	-0.0336**	-0.0336*
	(0.0146)	(0.0162)	(0.0186)
Human capital	-0.0132	-0.0132	-0.0132
	(0.0325)	(0.0326)	(0.0351)
Openness	-0.0503**	-0.0503*	-0.0503
	(0.0256)	(0.0285)	(0.0337)
population	-0.0127	-0.0127	-0.0127
	(0.0236)	(0.0257)	(0.0285)
Per capita income	-0.0363	-0.0363	-0.0363
	(0.0434)	(0.0485)	(0.0581)
policy	-0.0304	-0.0304	-0.0304
	(0.0236)	(0.0241)	(0.0264)
Estimation			
OLS	0.00122	0.00122	0.00122
	(0.0155)	(0.0224)	(0.0281)
Growth and aid	-0.0161	-0.0161	-0.0161
	(0.0340)	(0.0242)	(0.0237)
Growth and capital	0.00286	0.00286	0.00286
	(0.0321)	(0.0277)	(0.0240)
Observations	518	518	518
R-squared	0.472	0.472	0.472

Note: Q-test for heterogeneity: (chi2(518) = 988.01; p>chi2 = 0.000). Robust, heteroskedastcity and autocorrelation consistent and clustered standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Source: Authors' estimates.

Table A2: Multivariate MST meta regression analysis:
full model dependent variable = ln (t-stat)

Variables	(1) Robust	(2) HACSE	(3) Clustered	(4) Clustered
Genuine Empirical Effect				
ln(df)	0.275**	0.275**	0.275**	
	(0.132)	(0.138)	(0.133)	
ln(n)				0.295*
				(0.151)
Publication Outlet				
Working paper	-0.587***	-0.587***	-0.587***	-0.598***
	(0.188)	(0.182)	(0.174)	(0.175)
Cato	-1.579***	-1.579***	-1.579***	-1.595***
	(0.399)	(0.361)	(0.333)	(0.329)
JDS	-0.746*	-0.746**	-0.746**	-0.747**
	(0.380)	(0.361)	(0.310)	(0.309)
JID	0.277	0.277	0.277	0.273
	(0.313)	(0.283)	(0.295)	(0.292)
EDCC	-0.907	-0.907*	-0.907*	-0.920*
	(0.679)	(0.465)	(0.475)	(0.480)
AER	-1.246***	-1.246***	-1.246***	-1.255***
	(0.430)	(0.401)	(0.428)	(0.426)
Applied Economics	-0.431	-0.431	-0.431	-0.459
	(0.348)	(0.372)	(0.279)	(0.284)
Author Details				
World Bank	-0.712**	-0.712***	-0.712**	-0.719***
	(0.327)	(0.266)	(0.270)	(0.269)
Gender	-0.561**	-0.561**	-0.561**	-0.573**
	(0.282)	(0.258)	(0.266)	(0.262)
Expectations met	0.367	0.367	0.367*	0.369*
	(0.307)	(0.251)	(0.202)	(0.201)
Influence	0.236	0.236	0.236	0.230
	(0.192)	(0.219)	(0.254)	(0.252)
Data				
Panel	0.0323	0.0323	0.0323	0.0506
	(0.282)	(0.234)	(0.215)	(0.216)
No. of countries	0.000154	0.000154	0.000154	0.000291
	(0.00395)	(0.00378)	(0.00345)	(0.00348)
No. of years	-0.0287	-0.0287	-0.0287	-0.0277
	(0.0204)	(0.0237)	(0.0252)	(0.0250)
Africa	-0.206	-0.206	-0.206	-0.194
	(0.213)	(0.208)	(0.192)	(0.192)
Asia	0.0602	0.0602	0.0602	0.0733
	(0.244)	(0.253)	(0.247)	(0.243)
Latin	-0.0113	-0.0113	-0.0113	-0.000630
	(0.218)	(0.241)	(0.254)	(0.255)
Single Country	1.722***	1.722***	1.722***	1.719***
	(0.458)	(0.507)	(0.404)	(0.407)
y1960s	0.461*	0.461	0.461	0.458
	(0.254)	(0.294)	(0.327)	(0.328)
y1970s	0.0878	0.0878	0.0878	0.0800
	(0.228)	(0.226)	(0.217)	(0.218)
y1980s	0.0562	0.0562	0.0562	0.0632
	(0.301)	(0.263)	(0.206)	(0.204)
y1990s	1.119***	1.119***	1.119***	1.106***
	(0.238)	(0.268)	(0.271)	(0.268)
Sub Sample	-0.00537	-0.00537	-0.00537	-0.00304
	(0.167)	(0.172)	(0.162)	(0.163)
Low Income	0.00627	0.00627	0.00627	0.00721
	(0.205)	(0.206)	(0.265)	(0.264)
EDA	0.110	0.110	0.110	0.111
	(0.238)	(0.253)	(0.280)	(0.280)
Outlier	0.157	0.157	0.157	0.158

	(0.171)	(0.159)	(0.172)	(0.174)
Conditionality				
Aid Square	0.570***	0.570***	0.570***	0.567***
	(0.158)	(0.151)	(0.178)	(0.180)
Interaction Policy	0.145	0.145	0.145	0.142
	(0.215)	(0.211)	(0.212)	(0.213)
Interaction Institutions	0.891***	0.891***	0.891***	0.882***
	(0.261)	(0.263)	(0.271)	(0.269)
Specification and Control				
Capital	0.139	0.139	0.139	0.135
	(0.224)	(0.208)	(0.219)	(0.217)
FDI	0.619***	0.619***	0.619***	0.596***
	(0.206)	(0.207)	(0.183)	(0.181)
Gap Model	0.412	0.412	0.412	0.433
	(0.322)	(0.322)	(0.322)	(0.318)
Theory	0.599***	0.599***	0.599***	0.597***
	(0.200)	(0.179)	(0.188)	(0.188)
Average	0.0462**	0.0462**	0.0462**	0.0466**
	(0.0204)	(0.0211)	(0.0204)	(0.0206)
Lag used	0.244	0.244	0.244	0.244
	(0.198)	(0.191)	(0.210)	(0.210)
Inflation	-0.337	-0.337	-0.337	-0.341
	(0.342)	(0.280)	(0.279)	(0.277)
Instability	-0.0142	-0.0142	-0.0142	-0.0163
	(0.386)	(0.412)	(0.484)	(0.487)
Fiscal	0.338	0.338	0.338	0.330
	(0.314)	(0.253)	(0.311)	(0.311)
Size of government	0.379**	0.379**	0.379**	0.377**
	(0.184)	(0.184)	(0.184)	(0.183)
Financial Development	-0.132	-0.132	-0.132	-0.125
	(0.241)	(0.206)	(0.189)	(0.189)
Ethnic Fractionalization	0.223	0.223	0.223	0.219
	(0.402)	(0.429)	(0.345)	(0.345)
Region Dummy	-0.361*	-0.361**	-0.361**	-0.363**
	(0.194)	(0.174)	(0.171)	(0.171)
Human Capital	0.162	0.162	0.162	0.166
	(0.276)	(0.275)	(0.234)	(0.229)
Openness	-0.245	-0.245	-0.245	-0.242
	(0.157)	(0.166)	(0.174)	(0.173)
Population	0.00903	0.00903	0.00903	0.00463
	(0.225)	(0.231)	(0.191)	(0.192)
Per capita Income	0.0238	0.0238	0.0238	-0.000978
	(0.236)	(0.213)	(0.226)	(0.231)
Policy	-0.273	-0.273	-0.273	-0.271
	(0.252)	(0.255)	(0.208)	(0.207)
Estimation				
OLS	-0.00202	-0.00202	-0.00202	-0.00661
	(0.158)	(0.154)	(0.147)	(0.147)
Growth and Aid	-0.162	-0.162	-0.162	-0.178
	(0.328)	(0.308)	(0.261)	(0.259)
Growth and Capital	-0.0496	-0.0496	-0.0496	-0.0464
	(0.293)	(0.264)	(0.258)	(0.258)
Constant	-1.934**	-1.934**	-1.934***	-2.086***
	(0.799)	(0.769)	(0.600)	(0.635)
Observations	519	519	519	519
R-squared	0.255	0.255	0.255	0.254

Note: Q-test for heterogeneity: (Chi2(518)=539.51; P>chi2= 0.497). Robust, heteroskedastcity and autocorrelation consistent and clustered standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Source: Authors' estimates.

Table A3: FAT robustness check

	1		2		3	
Variables	Robust	Clustered	Robust	Clustered	Robust	clustered
Precision	0.293***	0.293**	0.213***	0.213**	0.190*	0.190
	(0.105)	(0.121)	(0.0790)	(0.105)	(0.102)	(0.127)
Working paper	-0.0507***	-0.0507***	-0.0667***	-0.0667***		
	(0.0167)	(0.0178)	(0.0177)	(0.0201)		
Cato	-0.173***	-0.173***	-0.199***	-0.199***	-0.237***	-0.237***
	(0.0329)	(0.0228)	(0.0324)	(0.0279)	(0.0598)	(0.0664)
JDS	-0.0591*	-0.0591*	-0.0758***	-0.0758***	-0.157***	-0.157***
	(0.0302)	(0.0307)	(0.0291)	(0.0262)	(0.0327)	(0.0315)
JID	-0.0776***	-0.0776***	-0.0562***	-0.0562*	-0.0617***	-0.0617
	(0.0184)	(0.0193)	(0.0195)	(0.0308)	(0.0234)	(0.0391)
EDCC			-0.109***	-0.109*	-0.211***	-0.211**
			(0.0403)	(0.0574)	(0.0670)	(0.0834)
Applied economics	-0.0977*	-0.0977*	-0.108*	-0.108*	-0.0869	-0.0869
	(0.0511)	(0.0512)	(0.0561)	(0.0554)	(0.0587)	(0.0522)
World Bank	-0.0845***	-0.0845***	-0.0859***	-0.0859***	-0.127***	-0.127***
	(0.0216)	(0.0203)	(0.0205)	(0.0187)	(0.0265)	(0.0231)
Gender	-0.0339	-0.0339	-0.0766***	-0.0766**	-0.0420	-0.0420
	(0.0210)	(0.0247)	(0.0211)	(0.0320)	(0.0286)	(0.0507)
Influence	0.0451**	0.0451***	0.0619***	0.0619***	0.0713***	0.0713***
	(0.0175)	(0.0117)	(0.0171)	(0.0161)	(0.0206)	(0.0256)
Panel	0.0130	0.0130	0.0919**	0.0919*	0.137***	0.137**
	(0.0490)	(0.0431)	(0.0459)	(0.0522)	(0.0451)	(0.0547)
No. of years	-0.0111***	-0.0111***	-0.0112***	-0.0112***	-0.0139***	-0.0139***
	(0.00170)	(0.00142)	(0.00166)	(0.00147)	(0.00314)	(0.00396)
Asia	-0.0116	-0.0116	0.0224	0.0224	0.0456	0.0456
	(0.0278)	(0.0296)	(0.0264)	(0.0292)	(0.0431)	(0.0465)
Single country	0.497***	0.497***	0.605***	0.605**	0.529***	0.529***
	(0.132)	(0.166)	(0.179)	(0.269)	(0.166)	(0.197)
y1960s	-0.00949	-0.00949	0.0544*	0.0544	0.0724*	0.0724
	(0.0398)	(0.0501)	(0.0295)	(0.0405)	(0.0397)	(0.0559)
y1990s	0.115***	0.115***	0.106***	0.106***	0.127***	0.127**
	(0.0303)	(0.0319)	(0.0332)	(0.0340)	(0.0483)	(0.0579)
Sub sample	0.0196	0.0196	0.0237	0.0237	0.0528*	0.0528**
	(0.0301)	(0.0236)	(0.0247)	(0.0195)	(0.0272)	(0.0260)
Low income	-0.0596*	-0.0596*	-0.0699**	-0.0699***	-0.0810**	-0.0810*
	(0.0307)	(0.0346)	(0.0306)	(0.0235)	(0.0352)	(0.0448)
EDA	-0.0180	-0.0180	-0.0318*	-0.0318*	0.00238	0.00238
	(0.0167)	(0.0139)	(0.0165)	(0.0167)	(0.0231)	(0.0254)
Aid square	0.0737***	0.0737***	0.0718***	0.0718***	0.0601***	0.0601***
	(0.0134)	(0.0102)	(0.0130)	(0.0119)	(0.0189)	(0.0187)

Interaction institutions	-0.0829***	-0.0829**	-0.0926***	-0.0926**	-0.167***	-0.167***
	(0.0231)	(0.0358)	(0.0239)	(0.0375)	(0.0374)	(0.0574)
FDI	0.0706**	0.0706	0.0918***	0.0918	0.0645*	0.0645
	(0.0273)	(0.0423)	(0.0322)	(0.0573)	(0.0342)	(0.0525)
Theory	0.0347**	0.0347*	0.0405***	0.0405**	0.0976***	0.0976**
	(0.0176)	(0.0183)	(0.0156)	(0.0180)	(0.0258)	(0.0431)
Average	0.00817***	0.00817***	0.0120***	0.0120***	0.0149***	0.0149***
	(0.00265)	(0.00162)	(0.00239)	(0.00208)	(0.00360)	(0.00424)
Inflation	-0.0594**	-0.0594***	-0.0449**	-0.0449**	0.0153	0.0153
	(0.0234)	(0.0190)	(0.0210)	(0.0180)	(0.0474)	(0.0552)
Size of government	0.0791***	0.0791***	0.101***	0.101***	0.103***	0.103***
	(0.0181)	(0.0153)	(0.0154)	(0.0168)	(0.0241)	(0.0296)
Financial development	0.0339***	0.0339**	0.0388***	0.0388**	-0.0439*	-0.0439
	(0.0130)	(0.0142)	(0.0135)	(0.0148)	(0.0247)	(0.0302)
Region dummy	-0.0278**	-0.0278**	-0.0320**	-0.0320**	-0.0554**	-0.0554*
	(0.0133)	(0.0111)	(0.0126)	(0.0135)	(0.0258)	(0.0291)
Openness	-0.0256	-0.0256	-0.0785***	-0.0785**	-0.0736**	-0.0736*
	(0.0232)	(0.0293)	(0.0204)	(0.0306)	(0.0311)	(0.0427)
Per capita income	-0.0478	-0.0478	-0.0731*	-0.0731	-0.0517	-0.0517
	(0.0320)	(0.0438)	(0.0384)	(0.0559)	(0.0371)	(0.0482)
Constant	-0.557	-0.557	-0.543	-0.543	-0.490	-0.490
	(0.497)	(0.552)	(0.336)	(0.382)	(0.423)	(0.501)
Observations	412	412	442	442	377	377
R-squared	0.480	0.480	0.489	0.489	0.487	0.487

Note: Robust and clustered standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. The first two columns are done by focusing on studies from 1990s onwards, the second two are done by excluding studies that did not include African countries and the last two are done by considering published papers only.

Source: Authors' estimates.

Table A4: MST robustness check

	1		2		3	
Variables	Robust	Clustered	Robust	Clustered	Robust	Clustered
ln(df)	0.284***	0.284**	0.369***	0.369***	0.329***	0.329***
	(0.0985)	(0.106)	(0.0899)	(0.0881)	(0.0951)	(0.0901)
Working Paper	-0.559***	-0.559***	-0.704***	-0.704***		
	(0.149)	(0.140)	(0.148)	(0.158)		
CATO	-1.259***	-1.259***	-1.563***	-1.563***	-1.390***	-1.390***
	(0.295)	(0.219)	(0.296)	(0.234)	(0.306)	(0.245)
JDS	-0.645**	-0.645**	-0.714***	-0.714**	-0.600**	-0.600**
	(0.271)	(0.271)	(0.256)	(0.279)	(0.249)	(0.244)
EDCC	-1.160***	-1.160***	-1.625***	-1.625***	-1.017	-1.017**
	(0.395)	(0.416)	(0.602)	(0.587)	(0.665)	(0.391)
AER	-1.052***	-1.052***	-1.082***	-1.082***	-1.088***	-1.088***
	(0.324)	(0.286)	(0.325)	(0.266)	(0.341)	(0.282)
World Bank	-0.470**	-0.470**	-0.495**	-0.495**	-0.437*	-0.437*
	(0.219)	(0.226)	(0.209)	(0.207)	(0.226)	(0.226)
Gender	-0.214	-0.214	-0.475**	-0.475**	-0.450**	-0.450***
	(0.172)	(0.130)	(0.190)	(0.194)	(0.198)	(0.164)
Influence	0.262*	0.262*	0.312**	0.312**	0.214	0.214
	(0.153)	(0.153)	(0.145)	(0.151)	(0.223)	(0.207)
No. of Years	-0.0470***	-0.0470**	-0.0347**	-0.0347*	-0.0229	-0.0229
	(0.0166)	(0.0201)	(0.0166)	(0.0192)	(0.0195)	(0.0200)
Africa	0.0359	0.0359			-0.287	-0.287
	(0.210)	(0.148)			(0.182)	(0.179)
Single Country	1.229***	1.229***	1.719***	1.719***	1.309***	1.309***
	(0.326)	(0.288)	(0.377)	(0.380)	(0.317)	(0.271)
y1960s	0.547*	0.547	0.583**	0.583**	0.367	0.367
	(0.280)	(0.357)	(0.241)	(0.286)	(0.239)	(0.286)
y1990s	1.044***	1.044***	0.987***	0.987***	0.802***	0.802***
	(0.197)	(0.197)	(0.274)	(0.298)	(0.228)	(0.236)
Aid Square	0.551***	0.551***	0.520***	0.520***	0.597***	0.597***
	(0.147)	(0.139)	(0.147)	(0.124)	(0.164)	(0.169)
Interaction Institutions	0.730***	0.730***	0.784***	0.784***	0.735***	0.735***
	(0.214)	(0.204)	(0.215)	(0.205)	(0.236)	(0.245)
FDI	0.365**	0.365*	0.626***	0.626***	0.468***	0.468***
	(0.184)	(0.209)	(0.210)	(0.184)	(0.178)	(0.139)
Gap model	0.231	0.231*	-0.0167	-0.0167	0.257	0.257
	(0.175)	(0.121)	(0.291)	(0.281)	(0.227)	(0.196)

Theory	0.675***	0.675***	0.597***	0.597***	0.613***	0.613***
	(0.177)	(0.213)	(0.153)	(0.194)	(0.237)	(0.205)
Average	0.0513***	0.0513***	0.0597***	0.0597***	0.0520***	0.0520***
	(0.0158)	(0.0147)	(0.0144)	(0.0136)	(0.0148)	(0.0124)
Lag used	0.328**	0.328	0.510***	0.510**	0.172	0.172
	(0.164)	(0.200)	(0.187)	(0.213)	(0.207)	(0.237)
Size of government	0.482***	0.482***	0.698***	0.698***	0.503**	0.503***
	(0.136)	(0.177)	(0.165)	(0.193)	(0.202)	(0.165)
Region Dummy	-0.360**	-0.360***	-0.426**	-0.426***	-0.444***	-0.444***
	(0.166)	(0.117)	(0.168)	(0.106)	(0.162)	(0.149)
Openness	-0.147	-0.147	-0.387***	-0.387***	-0.235*	-0.235
	(0.156)	(0.154)	(0.145)	(0.134)	(0.140)	(0.143)
Constant	-1.519***	-1.519***	-2.048***	-2.048***	-1.653***	-1.653***
	(0.479)	(0.417)	(0.525)	(0.488)	(0.489)	(0.387)
Observations	435	435	442	442	378	378
R-squared	0.233	0.233	0.269	0.269	0.268	0.268

Note: Robust and clustered standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. The first two columns are done by focusing on studies from 1990s onwards, the second two are done by excluding studies that did not include African countries and the last two are done by considering published papers only.

Source: Authors' estimates.

Table A5: DP08 replication of column 2 of Table 5

Variables	(1) Robust DP08 Replication	(2) Bootstrapped DP08 Replication	(3) Clustered
Working paper	-0.00561	-0.00561	-0.00561
	(0.0482)	(0.0511)	(0.0694)
CATO	-0.0909	-0.0909	-0.0909
	(0.0992)	(0.102)	(0.135)
JDS	-0.0679	-0.0679	-0.0679
	(0.0649)	(0.0701)	(0.0810)
JID	-0.0575	-0.0575	-0.0575
	(0.0602)	(0.0625)	(0.0801)
EDCC	-0.574***	-0.574***	-0.574***
	(0.181)	(0.210)	(0.166)
AER	-0.0528	-0.0528	-0.0528
	(0.0757)	(0.0818)	(0.101)
Applied Economics	-0.119*	-0.119*	-0.119*
	(0.0681)	(0.0716)	(0.0641)
Danida	0.114**	0.114*	**0.114**
	(0.0561)	(0.0602)	**(0.0766)**
World Bank	0.0646	0.0646	0.0646
	(0.0593)	(0.0676)	(0.0876)
Gender	0.0104	0.0104	0.0104
	(0.105)	(0.109)	(0.150)
Expectations met	0.0129	0.0129	0.0129
	(0.0535)	(0.0603)	(0.0727)
Influence	0.108***	0.108***	0.108**
	(0.0293)	(0.0309)	(0.0444)
Panel	-0.00934	-0.00934	-0.00934
	(0.0479)	(0.0505)	(0.0485)
No. of countries	4.60e-05	4.60e-05	4.60e-05
	(0.000710)	(0.000736)	(0.000769)
No. of years	-0.00326	-0.00326	-0.00326
	(0.00223)	(0.00234)	(0.00363)
Africa	-0.0446	-0.0446	-0.0446
	(0.0482)	(0.0523)	(0.0835)
Asia	0.117**	0.117**	0.117*
	(0.0465)	(0.0474)	(0.0625)
Latin	-0.0733	-0.0733	-0.0733
	(0.0515)	(0.0522)	(0.0637)
Single country	0.257	0.257	0.257
	(0.161)	(0.159)	(0.230)
y1960s	-0.0369	-0.0369	-0.0369
	(0.0541)	(0.0550)	(0.0814)
y1970s	-0.121***	-0.121***	-0.121*
	(0.0413)	(0.0442)	(0.0609)
y1980s	-0.137**	-0.137**	**-0.137**
	(0.0688)	(0.0696)	**(0.0861)**
y1990s	0.150***	0.150**	0.150**
	(0.0580)	(0.0595)	(0.0643)
Sub sample	-0.0275	-0.0275	-0.0275
	(0.0330)	(0.0344)	(0.0361)
Low income	0.0194	0.0194	0.0194
	(0.0479)	(0.0496)	(0.0691)
EDA	-0.0559**	-0.0559**	-0.0559**
	(0.0223)	(0.0249)	(0.0245)
Outliers	-0.00476	-0.00476	-0.00476
	(0.0204)	(0.0219)	(0.0266)
Aid square	-0.0207	-0.0207	-0.0207

	(0.0304)	(0.0317)	(0.0392)
Interaction policy	0.00500	0.00500	0.00500
	(0.0238)	(0.0253)	(0.0254)
Interact. institutions	-0.0866*	-0.0866*	**-0.0866**
	(0.0450)	(0.0494)	**(0.0744)**
Capital	0.0887*	0.0887*	**0.0887**
	(0.0471)	(0.0535)	**(0.0580)**
FDI	0.0846*	0.0846*	0.0846*
	(0.0451)	(0.0491)	(0.0501)
Gap model	-0.0120	-0.0120	-0.0120
	(0.0845)	(0.0873)	(0.129)
Theory	0.0241	0.0241	0.0241
	(0.0422)	(0.0448)	(0.0507)
average	0.00150	0.00150	0.00150
	(0.00381)	(0.00385)	(0.00455)
Lag used	0.0655	0.0655	0.0655
	(0.0458)	(0.0479)	(0.0826)
Inflation	-0.0762*	-0.0762*	**-0.0762**
	(0.0412)	(0.0430)	**(0.0512)**
Instability	0.0956	0.0956	0.0956
	(0.0628)	(0.0717)	(0.0877)
Fiscal	0.0695	0.0695	0.0695
	(0.0442)	(0.0484)	(0.0516)
Size of government	0.0677*	0.0677*	**0.0677**
	(0.0386)	(0.0408)	**(0.0430)**
Finan. development	0.00612	0.00612	0.00612
	(0.0284)	(0.0296)	(0.0326)
Ethnic Fractional.	-0.105*	-0.105	-0.105
	(0.0576)	(0.0643)	(0.0744)
Region Dummy	-0.0283	-0.0283	-0.0283
	(0.0240)	(0.0253)	(0.0293)
Human Capital	-0.0292	-0.0292	-0.0292
	(0.0459)	(0.0505)	(0.0547)
Openness	-0.0155	-0.0155	-0.0155
	(0.0347)	(0.0367)	(0.0442)
Population	-0.0358	-0.0358	-0.0358
	(0.0469)	(0.0495)	(0.0650)
Per Capita Income	0.0731	0.0731	0.0731
	(0.0447)	(0.0477)	(0.0562)
Policy	-0.117***	-0.117***	-0.117***
	(0.0338)	(0.0348)	(0.0387)
OLS	-0.0268	-0.0268	-0.0268
	(0.0195)	(0.0217)	(0.0286)
Growth and Aid	-0.0575	-0.0575	-0.0575
	(0.0440)	(0.0486)	(0.0436)
Growth and Capital	-0.0107	-0.0107	-0.0107
	(0.0435)	(0.0577)	(0.0498)
Constant	0.284**	0.284**	0.284
	(0.129)	(0.133)	(0.185)
Observations	474	474	474
R-squared	0.391	0.391	0.391

Note: Standard errors in parentheses (robust, bootstrapped, clustered). *** p<0.01, ** p<0.05, * p<0.1.

Source: Authors' estimates.

Table A6: List of studies included in the meta analysis

Study ID	*Study Details*
1	**Amavilah, V.H.,** 1998. German aid and trade versus Namibian GDP and labor productivity. Applied Economics 30, 689-95
2	**Boone, P.,** 1994. The impact of foreign aid on savings and growth. WP London School of Econ.
3	**Bowen, J.L.,** 1995. Foreign aid and economic growth: An empirical analysis. Geographical Analysis 27, 249-61. Estimates also in **Bowen, J.L.,** 1998. Foreign aid and economic growth: A theoretical and empirical investigation.
4	**Brumm, H.J**., 2003. Aid, policies and growth: Bauer was right. Cato Journal 23, 167-74
5	**Burnside, C., Dollar, D.,** 2000. Aid, policies and growth. American Economic Review 90, 847-68 (Working paper available from World bank since 1996)
6	**Burnside, C., Dollar, D.,** 2004. Aid, policies and growth: Reply. American Economic Review 94, 781-84 (reply to Easterly, Levine and Roodman, 2004)
7	**Campbell, R.,** 1999. Foreign aid, domestic savings and economic growth: Some evidence from the ECCB area. Savings and Development 23, 255-78
8	**Chauvet, L., Guillaumont**, P., 2004. Aid and growth revisited: Policy, economic vulnerability and political instability. pp 95-109 in Tungodden, B., Stern, N., Kolstad, I., eds, 2004. Toward Pro-Poor Policies - Aid, Institutions and globalization. World Bank /Oxford UP
9	**Collier, P., Dehn, J.,** 2001. Aid, shocks, and growth. WP 2688 World Bank Policy Research
10	**Collier, P., Dollar, D.,** 2002. Aid allocation and poverty reduction. European Economic Review 46, 1475-1500
11	**Collier, P., Hoeffler, A.,** 2004. Aid, policy and growth in post-conflict societies. European Economic Review 48, 1125-45
12	**Dalgaard, C.-J., Hansen, H.,** 2001. On aid, growth and good policies. Journal of Development Studies 37, 17-41
13	**Dalgaard, C.-J., Hansen, H., Tarp, F.,** 2004. On the empirics of foreign aid and growth. Economic Journal 114, 191-216
14	**Dayton-Johnson, J., Hoddinott, J.,** 2003. Aid, policies and growth, redux. WP Dalhousie Univ
15	**Denkabe, P.,** 2004. Policy, aid and growth: A threshold hypothesis. Journal of African Finance and Economic Development 6, 1-21 (WP version used)
16	**Dowling, J.M., Hiemenz, U.,** 1983. Aid, savings, and growth in the Asian region. The Developing Economies 21, 4-13
17	**Durbarry, R., Gemmell, N., Greenaway, D.,** 1998. New evidence on the impact of foreign aid on economic growth. Credit WP Univ. of Nottingham
18	**Easterly, W**., 2003. Can foreign aid buy growth? Journal of Economic Perspectives 17, 23-48
19	**Easterly, W., Levine, R., Roodman, D**., 2004. Aid, policies, and growth: Comment. American Economic Review 94, 774-80 (Comment to Burnside and Dollar, 2001)
20	**Economides, G., Kalyvitis, S., Philippopoulos, A.,** 2004. Does foreign aid distort incentives and hurt growth? Theory and evidence from 75 aid-recipient countries. WP Athens Univ. of Econ. and Business

21 **Fayissa, B., El-Kaissy, M.,** 1999. Foreign aid and the economic growth of developing countries (LDCs): Further evidence. Studies in Comparative International Development Fall, 37-50

22 **Giles, J.A.,** 1994. Another look at the evidence on foreign aid led economic growth. Applied Economics Letters 1, 194-99

23 **Gomanee, K., Girma, S., Morrissey, O.,** 2002. Aid and growth: Accounting for the transmission mechanisms in Sub-Sahara Africa. Credit WP Univ. of Nottingham

24 **Gounder, R.,** 2001. Aid-growth nexus: Empirical evidence from Fiji. Applied Economics 33, 1009-19

25 **Griffin, K.B., Enos, J.L.,** 1970. Foreign assistance: Objectives and consequences. Economic Development and Cultural Change 18, 313-27

26 **Guillaumont, P., Chauvet, L.,** 2001. Aid and performance: A reassessment. Journal of Development Studies 37, 66-92

27 **Gulati, U.C.,** 1976. Foreign aid, savings and growth: Some further evidence. Indian Economic Journal24,152-60

28 **Gulati, U.C.,** 1978. Effects of capital imports on savings and growth in less developed countries.Economic Inquiry 16, 563-69

29 **Gupta, K.L.,** 1975. Foreign capital inflows, dependency burden, and saving rates in developing countries: A simultaneous equation model. Kyklos 28, 358-74

30 **Gupta, K.L., Islam, M.A.,** 1983. Foreign Capital, Savings and Growth – an International Cross-Section Study. Dordrecht, Reidel Publishing Company

31 **Gyimah-Brempong, K.,** 1992. Aid and economic growth in LDCs: Evidence from Sub-Saharan Africa. Review of Black Political Economy 20, 31-52

32 **Hadjimichael, M.T., Ghura, D., Mühleisen, M., Nord, R., Ucer, E.M.,** 1995. Sub-Saharan Africa: Growth, savings, and investment, 1986-93. IMF Occasional Paper, No. 118

33 **Hansen, H., Tarp, F.,** 2000. Aid effectiveness disputed. Journal of International Development 12, 375-398. Also pp 103-128 in **Tarp, F., Hjertholm, P**., eds. 2000. Foreign aid and development. Lessons learnt and directions for the future. Routledge Studies in development Economics: London

34 **Hansen, H., Tarp, F.,** 2001. Aid and growth regressions. Journal of Development Economics 64, 547- 70

35 **Hudson, J., Mosley, P.,** 2001. Aid policies and growth: In search of the Holy Grail. Journal of International Development 13, 1023-38

36 **Islam, M.A**., 1992. Foreign aid and economic growth: An econometric study of Bangladesh. Applied Economics 24

37 **Jensen, P.S., Paldam, M.,** 2004. Can the two new aid-growth models be replicated? Public Choice forthcoming

38 **Kellman, M.,** 1971. Foreign assistance: Objectives and consequences: Comments (to **Griffin and Enos,** 1970). Economic Development and Cultural Change 20, 142-54

39 **Kosack, S.,** 2003. Effective aid: How democracy allows development aid to improve the quality of life. World development 31, 1-22

40 **Landau, D.,** 1986. Government and Economic Growth in the less Developed Countries: An empirical study for 1960-1980. Economic Development and Cultural Change 35, 35-75

41 **Landau, D.,** 1990. Public choice and economic aid. Economic Development and Cultural Change 38, 559-

75

42 **Larson, J.-D.,** 2001. An updated analysis of Weisskopf's savings-dependency theory. Review of Development Economics 5, 157-67

43 **Lensink, R.,** 1993. Recipient government behavior and the effectiveness of development aid. De Economist 141, 543-62.

44 **Lensink, R., Morrissey, O.,** 2000. Aid instability as a measure of uncertainty and the positive impact of aid on growth. Journal of Development Studies 36, 30-48

45 **Lensink, R., White, H.,** 2001. Are there negative returns to aid? Journal of Development Studies 37, 42-65

46 **Levy, V.,** 1988. Aid and growth in Sub-Saharan Africa: The recent experience. European Economic Review 32, 1777-95

47 **Lu, S., Ram, R.,** 2001. Foreign Aid, government policies, and economic growth: Further evidence from cross-country panel data for 1970-1993. Economia Internazionale/International Economics 54, 15-29

48 **Mahdavi, S.,** 1990. The effects of foreign resource inflows on composition of aggregate expenditure in developing countries: A seemingly unrelated model. Kyklos 43, 111-37

49 **Mbaku, J.M.,** 1993. Foreign aid and economic growth in Cameroon. Applied Economics 25, 1309-14

50 **Moreira, S.B.,** 2003. Evaluating the impact of foreign aid on economic growth: A cross-country study (1970-1998). WP for 15th Annual Meeting on Socio-Economics

51 **Mosley, P.,** 1980. Aid, savings and growth revisited. Bulletin of the Oxford University Institute of Economics and Statistics 42, 79-95

52 **Mosley, P., Hudson, J., Horrell, S.,** 1987. Aid, the public sector and the market in less developed countries. Economic Journal 97, 616-41

53 **Mosley, P., Hudson, J., Horrell, S.,** 1992. Aid, the public sector and the market in less developed countries: A return to the scene of the crime. Journal of International Development 4, 139-50

54 **Most, S.J., Berg, H.v.d.,** 1996. Growth in Africa: Does the source of investment financing matter? Applied Economics 28, 1427-33

55 **Murthy, V.N.R., Ukpolo, V., Mbaku, J.M.,** 1994. Foreign aid and economic growth in Cameroon: Evidence from cointegration tests. Applied Economics Letters 1, 161-63

56 **Ovaska, T.,** 2003. The failure of development aid. Cato Journal 23, 175-88

57 **Papanek, G.F.,** 1973. Aid, foreign private investment, savings, and growth in less developed countries. Journal of Political Economy 81, 120-30

58 **Ram, R.,** 2003. Roles of bilateral and multilateral aid in economic growth of developing countries. Kyklos 56, 95-110

59 **Ram, R.,** 2004. Recipient country's 'policies' and the effect of foreign aid on economic growth in developing countries: Additional evidence. Journal of International Development 16, 201-11

60 **Rana, P.B., Dowling, J.M.,** 1988. The impact of foreign capital on growth: Evidences from Asian developing countries. The Developing Economies 26, 3-11

61 **Reichel, R.,** 1995. Development aid, savings and growth in the 1980s: A cross-section analysis. Savings and Development 19, 279-96.

62 **Roodman, D.,** 2004. The anarchy of numbers: Aid, development and cross-country empirics. WP 32 Center for Global Development

63 **Shukralla, E.K**., 2004. Aid, incentives, polices, and growth: Theory and a new look at the empirics. WP Western Michigan University

64 **Singh, R.D.,** 1985. State intervention, foreign economic aid, savings and growth in LDCs: Some recent evidence. Kyklos 38

65 **Snyder, D.W.**, 1993. Donor bias towards small countries: An overlooked factor in the analysis of foreign aid and economic growth. Applied Economics 25, 481-88

66 **Stoneman, C.,** 1975. Foreign capital and economic growth. World Development 3, 11-26

67 **Svensson, J.**, 1999. Aid, growth and democracy. Economics and Politics 11, 275-97

68 **Tebouel, R., Moustier, E**., 2001. Foreign aid and economic growth: The case of the countries south of the Mediterranean. Applied Economics Letters 8

Table A7: Studies, number of estimates, and summary statistics

ID	References	No. of Estimates	Min.	Mean	Max.
1.	Amavilah, V.H., 1998.	6	0.459	0.672	0.802
2.	Boone, P., 1994.	6	0.002	0.047	0.159
3.	Bowen, J.L., 1995.	3	-0.228	-0.089	0.092
4.	Brumm, H.J., 2003.	4	-0.412	-0.075	0.111
5.	Burnside, C., Dollar, D., 2000.	12	-0.080	-0.002	0.245
6.	Burnside, C., Dollar, D., 2004.	9	-0.060	0.020	0.062
7.	Campbell, R., 1999.	27	-0.184	0.177	0.556
8.	Chauvet, L., Guillaumont, P., 2004.	3	-0.244	-0.199	-0.158
9.	Collier, P., Dehn, J., 2001.	8	-0.108	-0.045	0.005
10.	Collier, P., Dollar, D., 2002.	4	-0.076	-0.058	-0.040
11.	Collier, P., Hoeffler, A., 2004.	2	-0.048	-0.043	-0.037
12.	Dalgaard, C.-J., Hansen, H., 2001.	12	-0.075	0.079	0.172
13.	Dalgaard, C.-J., Hansen, H., Tarp, F., 2004.	8	0.154	0.258	0.461
14.	Dayton-Johnson, J., Hoddinott, J., 2003.	12	-0.170	0.011	0.183
15.	Denkabe, P., 2004.	9	-0.378	0.014	0.206
16.	Dowling, J.M., Hiemenz, U., 1983.	10	0.173	0.343	0.577
17.	Durbarry, R., Gemmell, N., Greenaway, D., 1998.	11	-0.112	0.175	0.346
18.	Easterly, W., 2003.	2	-0.015	0.008	0.031
19.	Easterly, W., Levine, R., Roodman, D., 2004.	2	-0.017	0.012	0.041
20.	Economides, G., Kalyvitis, S., Philippopoulos, A., 2004	10	0.081	0.138	0.169
21.	Fayissa, B., El-Kaissy, M., 1999.	12	0.109	0.253	0.451
22.	Giles, J.A., 1994.	2	0.179	0.414	0.650
23.	Gomanee, K., Girma, S., Morrissey, O., 2002.	8	0.155	0.243	0.343
24.	Gounder, R., 2001.	6	-0.030	0.365	0.566
25.	Griffin, K.B., Enos, J.L., 1970.	3	-0.777	-0.294	0.189
26.	Guillaumont, P., Chauvet, L., 2001.	8	0.011	0.172	0.277
27.	Gulati U.C., 1976.	1	0.246	0.246	0.246
28.	Gulati U.C., 1978.	1	.	.	.
29.	Gupta, K.L., 1975.	1	0.411	0.411	0.411
30.	Gupta, K.L., Islam, M.A., 1983.	15	0.078	0.300	0.695
31.	Gyimah-Brempong, K., 1992.	7	-0.051	0.061	0.100
32.	Hadjimichael, M.T., Ghura, D., Mühleisen, M., Nord, R., Ucer, E.M., 1995.	2	0.169	0.307	0.445
33.	Hansen, H., Tarp, F., 2000.	10	0.017	0.096	0.145
34.	Hansen, H., Tarp, F., 2001.	16	-0.168	0.117	0.287
35.	Hudson, J., Mosley, P., 2001.	4	0.104	0.159	0.300
36.	Islam, M.A., 1992.	6	-0.313	0.165	0.536
37.	Jensen, P.S., Paldam, M., 2004.	21	-0.002	0.060	0.154

38.	Kellman, M., 1971.	2	-0.948	-0.474	0.000
39.	Kosack, S., 2003.	3	-0.247	-0.070	0.076
40.	Landau, D., 1986.	4	-0.025	0.088	0.252
41.	Landau, D., 1990.	22	-0.174	0.044	0.307
42.	Larson, J.-D., 2001.	1	.	.	.
43.	Lensink, R., 1993.	2	0.203	0.228	0.254
44.	Lensink, R., Morrissey, O., 2000.	16	-0.212	0.104	0.469
45	Lensink, R., White, H., 2001.	7	0.093	0.161	0.207
46.	Levy, V., 1988.	2	0.580	0.580	0.580
47.	Lu, S., Ram, R., 2001.	5	0.055	0.107	0.167
48.	Mahdavi, S., 1990.	1	0.235	0.235	0.235
49.	Mbaku, J.M., 1993.	6	-0.328	-0.272	-0.183
50.	Moreira, S.B., 2003.	4	0.206	0.245	0.278
51.	Mosley, P., 1980.	6	-0.204	-0.036	0.442
52.	Mosley, P., Hudson, J., Horrell, S., 1987.	19	-0.514	0.072	0.639
53.	Mosley, P., Hudson, J., Horrell, S., 1992.	12	-0.033	0.165	0.324
54.	Most, S.J., Berg, H.v.d., 1996.	18	-0.538	0.014	0.767
55.	Murthy, V.N.R., Ukpolo, V., Mbaku, J.M., 1994.	1	0.897	0.897	0.897
56.	Ovaska, T., 2003.	10	-0.048	0.075	0.167
57.	Papanek, G.F., 1973.	5	0.288	0.536	0.653
58.	Ram, R., 2003.	4	-0.020	0.024	0.065
59.	Ram, R., 2004.	4	-0.143	-0.077	-0.007
60.	Rana, P.B., Dowling, J.M., 1988.	1	0.149	0.149	0.149
61.	Reichel, R., 1995.	1	0.100	0.100	0.100
62.	Roodman, D., 2004.	42	-0.059	0.100	0.263
63.	Shukralla, E.K., 2004.	12	-0.175	-0.063	0.023
64.	Singh, R.D., 1985.	6	0.002	0.173	0.344
65.	Snyder, D.W., 1993.	12	-0.339	0.144	0.491
66.	Stoneman, C., 1975.	11	0.375	0.490	0.581
67.	Svensson, J., 1999.	16	-0.396	-0.049	0.167
68.	Tebouel, R., Moustier, E., 2001.	4	-0.241	-0.181	-0.152
Total		542	-0.948	0.112	0.897

Source: Authors' computations.

Table A8: Variables and their descriptions as defined by DP08

Variables	Description*	Variables	Description
Working paper	BD for unpublished paper	No. of countries	Number of countries included in the sample
Cato	BD for Cato journal	No. of years	Number of years covered in the analysis
JDS	BD for Journal of Development Studies	Africa	BD if countries from Africa included
JID	BD for Journal of International Development	Asia	BD if countries from Asia included
EDCC	BD for Economic Development and Cultural Change	Latin	BD if countries from Latin America included
AER	BD for American Economic Review	Single Country	BD if data from single country
Applied Economics	BD for Applied Economics	y1960s	BD if data for the 1960s
World Bank	BD for authors affiliated with the World Bank	y1970s	BD if data for the 1970s
Gender	BD if at least one of the authors is female	y1980s	BD if data for the 1980s
Expectations	BD for authors with realized expectations about aid growth relation	y1990s	BD if data for the 1990s
Influence	BD for authors who acknowledge feedback from other authors in aid effectiveness literature	Sub sample	BD if data relate to sub sample of countries
Panel	BD for use of panel data	Low income	BD if data related to sub sample of low-income countries
EDA	BD for use of Effective Development Assistance Data	Financial development	BD for control of financial development
Aid Square	BD if aid square term added	Ethnic fractionalization	BD for control of ethnic fractionalization
Interaction policy	BD for aid interacted with policy	Region dummy	BD for regional dummies
Interaction institutions	BD for aid interacted with institutions	Human capital	BD for control of human capital
Capital	BD for control of domestic savings or investment	Openness	BD for control of trade openness
FDI	BD for control of foreign capital flows other than aid	population	BD for control of population size
Gap model	BD for two gap model	Per capita income	BD for control of per capital Income

Theory	BD for paper developing a Theory	Policy	BD for control of policies
Average	Number of years involved in data averaging	OLS	BD for use of OLS
Lag used	BD for use of lagged value of aid	Growth and aid	BD for equation system with a growth and an aid equation
Inflation	BD for control if inflation	Growth and capital	BD for equation system with a growth and a saving equation
Instability	BD for control of political instability		
Fiscal	BD for control of fiscal stance		
Size of government	BD for control of Government size		

Note: *BD stands for binary dummy.

Source: DP08.

Table A9: Correlation between variables in the DP08 dataset and our dataset

Variables	Correlation	No. of Obs.	Remark on the difference in the number of observations used
t-statistics*	0.2024	538	Number of observations is reduced by 4 as 4 observations from study ID 25, 28, 42 and 46 are left as missing due to lack of information.
t-statistics without study ID 22	0.9842	536	Due to the exclusion of 2 regressions from study ID 22.
No. of years	0.8252	542	-
Lag used	0.8319	542	-
Population	0.9278	542	-
Interaction Institutions	0.9459	542	-
No. of countries	0.9552	542	-
Standard error	0.9732	538	Number of observations is reduced by 4 due to missing data in study ID 25, 28, 42 and 46 as there is not enough information to code the standard error in these studies.
Per capita income	0.9765	542	-
Africa	0.9777	487	35 observations from study ID 30, 41, 52 and 53 were wrongly reported as missing by DP08. The remaining 20 observations are left as missing due to lack of enough information in study ID 3, 21, 35 and 42.
Df	0.9794	541	1 observation is changed to missing in study ID 46 as there is not enough information to code the df in this study.
Average	0.9799	538	4 observations from study ID 35 were wrongly reported as missing by DP08.
Sample size	0.9806	541	1 observation from study ID 46 is changed to missing as there is not enough information to code the sample size.
FDI	0.9815	542	-
Asia	0.9835	487	35 observations from study ID 30, 41, 52 and 53 were wrongly reported as missing by DP08. The remaining 20 observations are left as missing due to lack of enough information in study ID 3, 21, 35 and 42.
Outlier	0.9839	536	6 observations from study ID 34 were wrongly reported as missing by DP08.
Region dummy	0.9844	542	-
Precision	0.9847	536	2 observations from study ID 22 were wrongly entered as missing by DP08. The remaining 4 observations are left as missing following the remark given for standard error.
Low income	0.9885	541	1 observation from study ID 66 was wrongly reported as missing by DP08.

Policy	0.9919	542	-
Partial	0.9776	538	4 observations from study ID 25, 28, 42 and 46 are changed to missing as there is not enough information to code them.
Ln(df)	0.9926	541	1 observation is changed to missing following the remark given for df.
Capital	0.9926	542	-
Sub sample	0.9954	542	-
Panel	0.9958	542	-
OLS	0.9958	542	-
Working paper	1.0000	542	-
cato	1.0000	542	-
JDS	1.0000	542	-
JID	1.0000	542	-
EDCC	1.0000	542	-
AER	1.0000	542	-
Applied Economics	1.0000	542	-
Author Hansen (DANIDA)	1.0000	542	-
World Bank	1.0000	541	1 observation in study ID 6 was wrongly coded as missing.
Gender	1.0000	542	-
Expectation	1.0000	542	-
Influence	1.0000	542	-
Latin	1.0000	481	41 observations from study ID 30, 41, 51, 52 and 53 were wrongly reported as missing by DP08. The remaining 20 observations are left as missing due to lack of information in study ID 3, 21, 35 and 42.
Single country	1.0000	542	-
y1960s	1.0000	542	-
y1970s	1.0000	542	-
y1980s	1.0000	542	-
y1990s	1.0000	542	-
EDA	1.0000	542	-
Aid Square	1.0000	542	-
Interaction policy	1.0000	542	-
Gap model	1.0000	542	-

Theory	1.0000	542	-
Inflation	1.0000	542	-
Instability	1.0000	542	-
Fiscal	1.0000	542	-
Size of government	1.0000	542	-
Financial development	1.0000	542	-
Ethnic Fractionalization	1.0000	542	-
Human capital	1.0000	542	-
Openness	1.0000	542	-
Growth and aid	1.0000	542	-
Growth and capital	1.0000	542	-

Note: *The main reason behind this low correlation coefficient is an error made by DP08 in coding study ID 22.

Source: Authors' computation.

Table A9.1: Remarks on variables with correlation coefficients less than 1

Variable name	Correlation coefficient	List of studies where corrections are made in the data
t-statistics (without study ID 22)	0.9842	Study ID 5, 25,28 30,22,17,33,24,34,41,42,46, 8,55, 63
No. of years	0.8252	Study ID 6,7,26,30,32,37,41,54,55,62
Lag used	0.8319	Study ID 41
Population	0.9278	Study ID 30
Interaction Institutions	0.9459	Study ID 9
No. of countries	0.9552	Study ID 6, 7, 16,17,26, 37, 41, 53, 65, 58, 59,32,68
Standard error	0.9732	Study ID 2, 5, 6,7, 8, 9, 13, 17, 22, 24, 25, 26, 28, 30, 33, 36, 37, 41, 42, 46, 47, 49, 50, 52, 55, 61, 62, 67
Per capita income	0.9765	Study ID 30
Africa	0.9777	Study ID 30, 41, 52, 53
Df	0.9794	Study ID 2, 5, 6, 7,8, 9 11, 13, 20, 24, 26, 30,33, 36, 37, 40, 41, 45, 46, 47, 49, 50, 52 ,56, 59, 61, 62, 63, 64, 67
Average	0.9799	Study ID 1 , 7, 22, 24, 25, 30, 31, 32, 35, 36, 40, 43, 49, 52,54,55,62,68
Sample size	0.9806	Study ID 5,6,7,20,24,25,30,36,37,41,50,62,63,67
FDI	0.9815	Study ID 34, 30
Asia	0.9835	Study ID 3,21,30,35,41,42,52,53
Outlier	0.9839	Study ID 34,30
Region dummy	0.9844	Study ID 58,30
Precision	0.9847	Study ID 2,5, 6, 7, 8, 9, 11, 13, 17, 20, 22, 24, 25, 26, 28, 30, 33, 34, 36, 37, 40, 41, 42, 45, 46, 47, 49, 50, 52, 55, 56, 59, 61, 62, 63, 64, 67
Low income	0.9885	Study ID 30, 59, 66
Policy	0.9819	Study ID 58,30
Partial	0.9776	Study ID 2 , 5, 6, 7, 8, 9, 13, 17, 22, 24, 25, 26, 28, 30, 33,34,36,37,41,42,46,47,49,50,52,55,59,61,62,63,64,67
Ln(df)	0.9926	Because of the corrections made on degrees of freedom.
Capital	0.9926	Study ID 30,34
Sub sample	0.9954	Study ID 30,59
Panel	0.9958	Study ID 30,32
OLS	0.9958	Study ID 18,30

Note: *These corrections are the reason behind the difference in correlation coefficient between DP08 data and our data.

Source: Based on authors' computations.

Figure A1: Galbraith plot

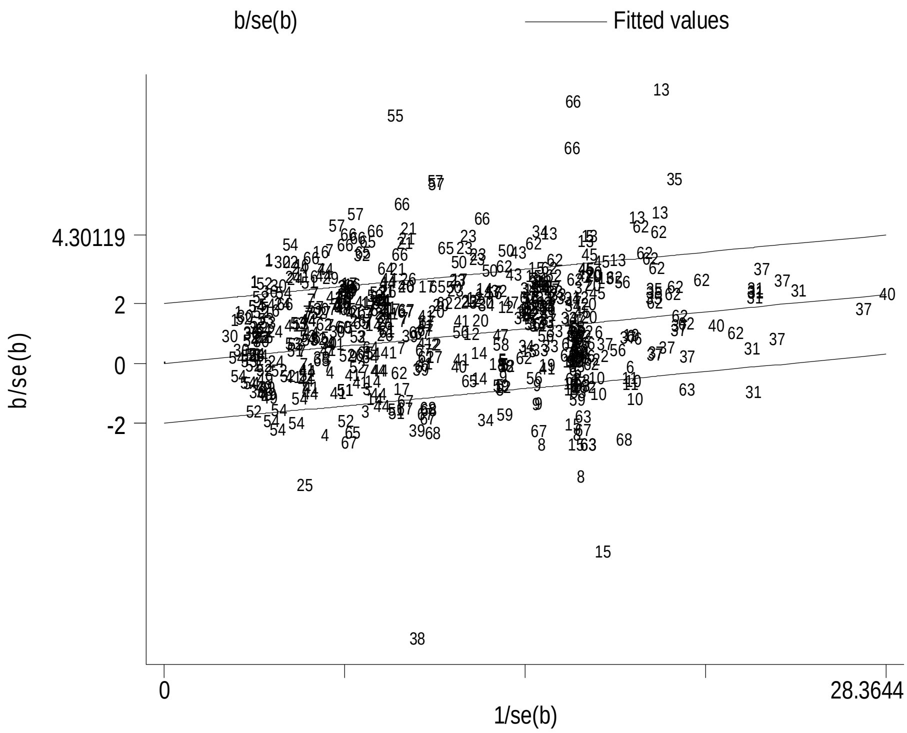


Figure A2: Funnel Plot using Original DP08 Data

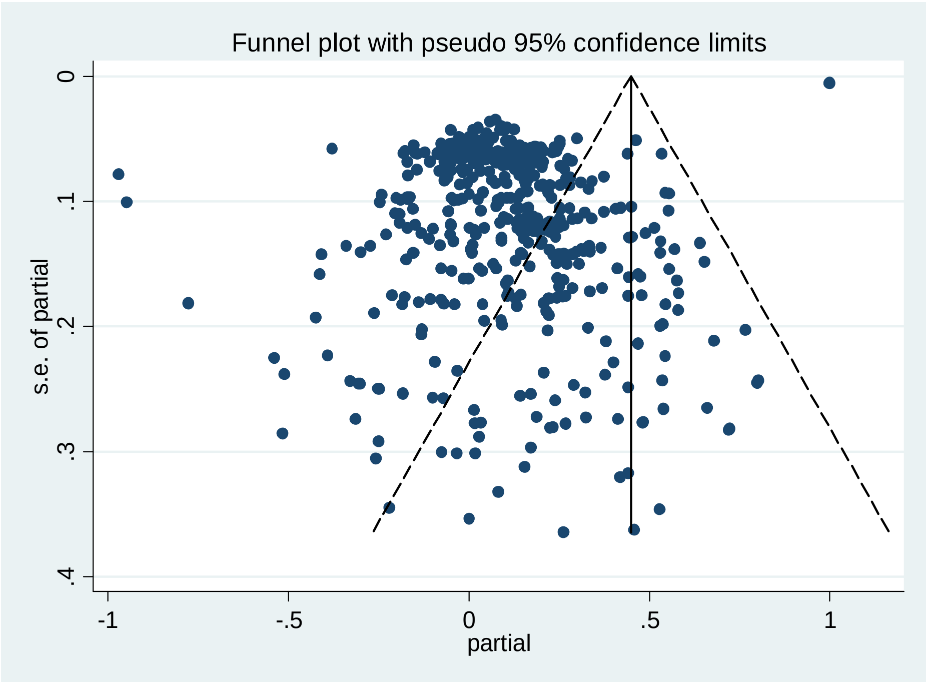


Figure A2.1: Funnel Plot After Correcting Coding Error in DP08

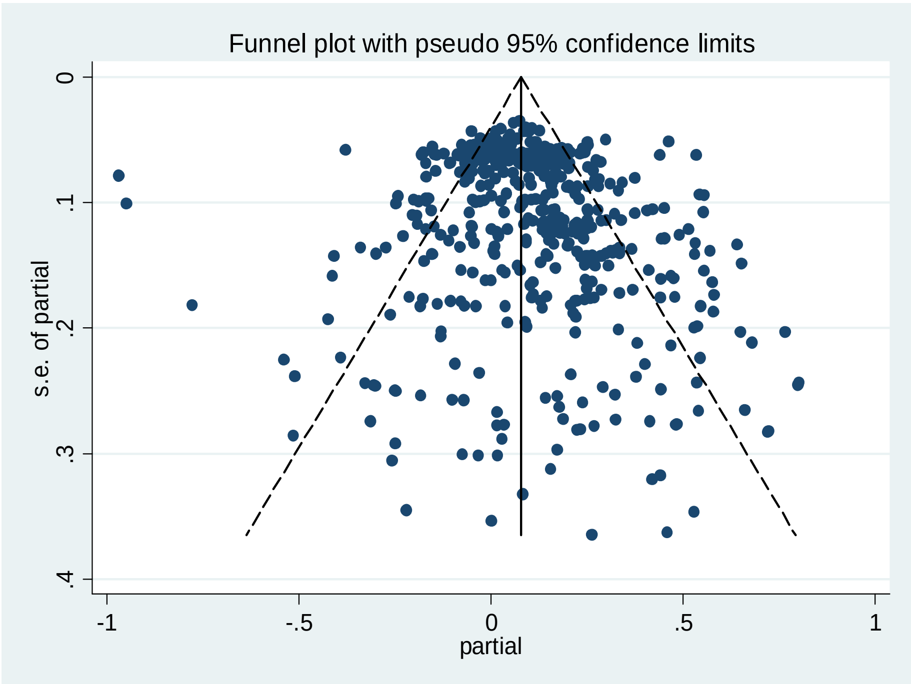
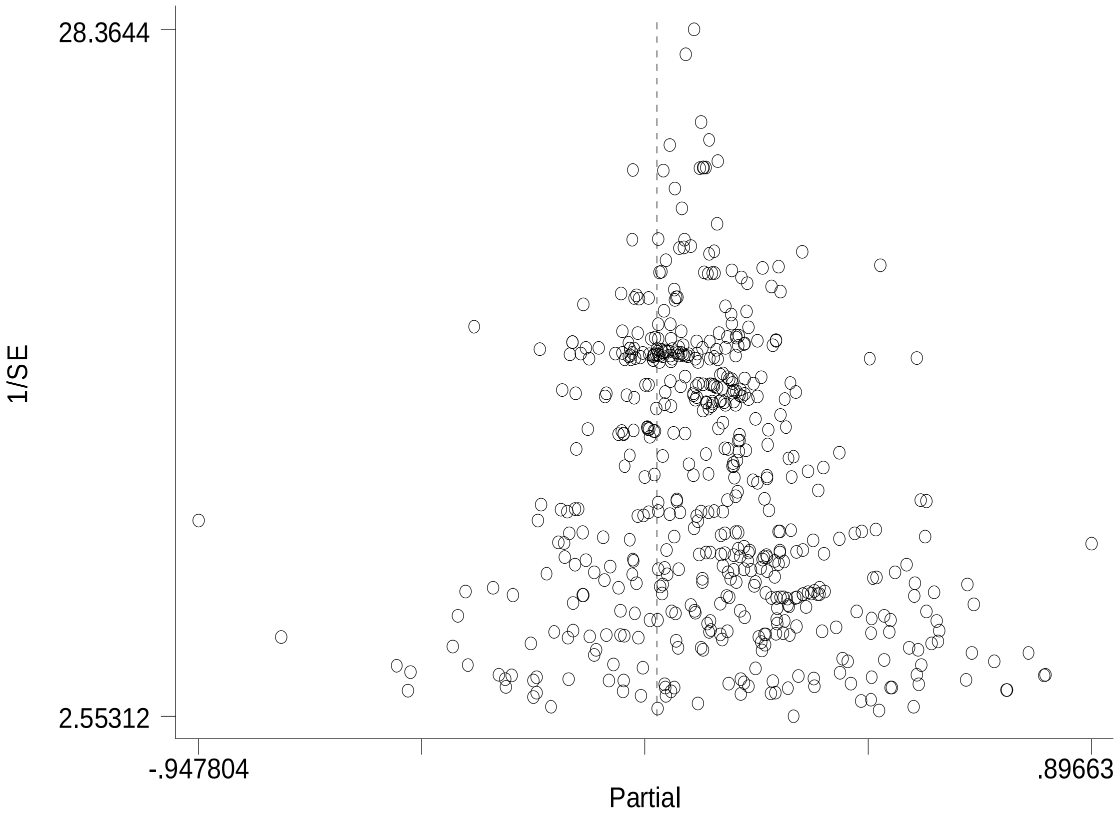


Figure A3: Funnel plot setting overall empirical effect of aid on growth to be zero as in DP08



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