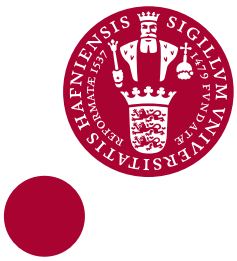

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Article

A Meta-Analysis of Aid Effectiveness: Revisiting the Evidence

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Abstract
As research on the empirical link between aid and growth continues to grow, it is time to revisit the accumulated evidence on aid effectiveness. This study extends previous meta-analyses, noting that the increased availability of data enables us to conduct a sub-group analysis by disaggregating the sample into different time horizons to assess whether there are temporal shifts in aid effectiveness. The new and updated results show that the previously reported positive evidence of aid's impact is robust to the inclusion of more recent studies and this holds for different time horizons as well. The authenticity of the observed effect is further confirmed by results from funnel plots, regression-based tests, and a cumulative meta-analysis for publication bias.

Keywords
aid; growth; publication bias; meta-analysis

Issue
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1. Introduction

Analyzing the aid-growth nexus continues to be an area of focus in development economics. The empirical research on the effect of aid on growth goes back as far as the early 1970s. Though the methodological rigour varies, the profession has made numerous efforts since then to empirically analyze the effectiveness of aid in promoting growth. Results range from 'aid works' to 'aid does not work' and yet in other cases 'aid works but only under certain conditions'. Until 2007, the empirical evidence from individual studies varied but the past decade has witnessed convergence towards a positive assessment regarding the potency of aid in spurring economic growth (see, among others, Arndt, Jones, & Tarp, 2010, 2016). Over the years a variety of efforts have been made in the aid effectiveness literature to scrutinize and critically analyze the nature of the existing mixed aid growth evidence with the aim of showing where the balance of evidence lies. For instance, Hansen and Tarp (2000) carefully analyzed three generations of the aid effectiveness literature, and more recently, Arndt et al. (2010) discussed a fourth generation. Our aim here is to complement these efforts, by synthesizing the existing empirical results from the accumulated evidence on aid and growth. In particular, we are interested in knowing what the range of findings (negative, zero, or positive) that have been evolving over the years, on average, tell us about aid's impact on growth.

Mekasha and Tarp (2013) addressed this issue relying on aid and growth empirical studies carried out over the period from 1970 to 2004. The accumulated evidence showed a positive impact of aid on growth during the 34-year period in question, and the authors documented that this effect is authentic, rather than an artefact of publication selection.

As the sample period in the work of Mekasha and Tarp (2013) only stretches until 2004, and given that more than a decade has passed since then, we present an update of the accumulated evidence here by including aid and growth empirical articles produced after 2004. Apart from enlarging the sample coverage and

hence working with a larger sample size, this also deepens the analysis in two important ways: (i) we now cover a longer time period and so are able to conduct a more disaggregated analysis, mainly by splitting the sample into different time periods (sub-groups); and (ii) we are able to assess whether there are temporal shifts in aid effectiveness.

In this line of thinking, the present study answers the following questions. First, does the addition of new studies have any impact on the results documented by Mekasha and Tarp (2013)? Second, has aid effectiveness changed over time and if so, is the change genuine or an artefact of publication bias? Third, is there heterogeneity between studies and if so, what explains the observed heterogeneity? To address these questions, we use a data set of 141 empirical studies on aid and growth that were conducted over the 1970–2011 period. This gives a total of 1,778 estimates for the meta-analysis.

The article is structured as follows. Section 2 first updates the aid effectiveness meta-analysis evidence documented by Mekasha and Tarp (2013) and then proceeds to present a sub-group analysis by disaggregating the data by year of publication. Section 3 presents a cumulative meta-analysis to establish how the weight of the evidence has shifted over time. This is followed by an in-depth investigation of publication bias in Section 4. In Section 5, we present a multivariate meta-regression analysis to understand the source of heterogeneity in effect estimates across studies. Finally, concluding remarks are given in Section 6.

2. Revisiting the Accumulated Evidence

2.1. Overall Effect

One of the main objectives of meta-analysis is to obtain an overall effect estimate (weighted average) from a body of literature by combining the appropriate summary statistics from each study. The choice of an appropriate model to combine the summary statistics extracted from each study is a major step in any meta-analysis and this choice depends on the degree of heterogeneity in effect sizes. In this regard, there are two alternative models: a fixed-effects model, which assumes away heterogeneity between studies and hence only uses within-study variances as study weights, and a random-effects model, which takes the across-study variation in the true effect estimates into account and uses both the within and between-study variances as weights.

Denoting the number of studies considered for the meta-analysis by k and the corresponding effect size estimates by $x_1, x_2, x_3 \ldots x_k$, the overall effect estimate is:

$$\hat{\theta} = \frac{\sum_{1}^{k} \hat{w}_i x_i}{\sum_{1}^{k} \hat{w}_i} \quad (1)$$

where $\hat{w}_i$ in the case of the random and fixed-effects model is respectively given by $1/(\sigma_i^2 + \tau^2)$ and $1/\sigma_i^2$ where σ_i^2 and τ_i^2 are within and between-study variance of effect estimates respectively.

As can be seen from Equation 1, the random-effects model accounts for both within and between study variance to calculate the weighted average effect. Compared to the fixed-effects model, which only accounts for the within-study variance, the random-effects model gives a wider confidence interval for the overall effect and hence conservative estimates compared to the fixed-effects model (see also Kontopantelis, Springate, & Reeves, 2013). The assumption of effect homogeneity by the fixed-effect model is often criticized. In practice, a certain degree of variation in the true effect is expected. This is due to differences in the study populations as well as in the type, duration, and intensity of interventions (see Thompson & Pocock, 1991).

In this study, we rely on a random-effects model to obtain an overall average effect from the aid effectiveness literature using estimates from empirical aid-growth articles that became available over the 1970–2011 period. This choice is motivated by the apparent between-study heterogeneity in aid-growth empirical studies. This can easily be checked using statistical tests and graphical tools as shown in Mekasha and Tarp (2013) which discusses in detail why it is that the random-effects model is more appropriate in conducting a meta-analysis of aid and growth empirical studies.

The Bootstrapped DerSimonian–Laird (BDL) model was used to estimate the random-effects model. This is a non-iterative moments-based estimator which improves upon the DerSimonian–Laird model, a commonly used random-effects model, by estimating the between-study variance and other heterogeneity parameters applying a non-parametric bootstrap method. The BDL model has proven to be the best method in terms of detecting any heterogeneity, particularly for large-scale meta-analysis (see Kontopantelis et al., 2013).

Against this background, Table 1 presents the weighted average overall effect estimate from the aid-growth literature. We first disaggregated the sample into 'old period' and 'new period', where the former is the same as the sample period used in Mekasha and Tarp (2013) and the latter is a new sample focusing on the years added in this study. We finally report an overall effect estimate for the full sample period by combining the old and new periods indicated above. Such a sub-group analysis is useful in assessing whether the effect size has shifted over time (see Borenstein, Hedges, Higgins, & Rothstein, 2009). Factors such as improvement in data quality, changes in donor priorities, and the evolution of better estimation techniques, among others, are the likely explanations for potential changes in research findings within the aid effectiveness literature.

As can be seen from Table 1, the overall effect is found to be positive and statistically significant at 5 per cent level of significance. This is true both in the full

Table 1. Meta-analysis of the aid and growth literature.

Impact of aid on growth	Overall effect (BDL)	[95% CI]	Heterogeneity value (I^2) %	[95% CI]	Between study variance (τ^2)	N
Old period (1970–2004)	0.095	[0.083 0.107]	71.49	[69.31 73.51]	0.016	731
New period (2005–2011)	0.039	[0.032 0.047]	79.78	[78.62 80.88]	0.009	1,047
Full sample (1970–2011)	0.058	[0.052 0.064]	77.31	[76.28 78.30]	0.011	1,778

Notes: BDL refers to Bootstrapped DerSimonian-Laird random-effects model. Bootstrap of 10,000 repetitions is used in all cases. I^2 ranges from 0–100 per cent where a larger score shows a higher level of heterogeneity. Source: authors' estimates.

and the disaggregated samples. Even if the magnitude of the effect varies across periods and shows some decline over time, the overall conclusion regarding the potency of foreign aid in spurring growth remains the same. Regarding the practical relevance of the effect size estimate from meta-analysis, as such, no standard cut-off value exists to label an effect estimate as 'small', 'medium', or 'large'. However, according to a preliminary guideline in the literature that suggests a cut-off for economics meta-analysis, the effect sizes (the partial correlations) from our meta-analysis reported in Table 1, fall in the small to medium range. However, given that this is a preliminary guideline, one needs to be cautious about drawing firm conclusions. Further discussion is available in Mekasha and Tarp (2018).

As well as the above analysis, we have also estimated the overall effect at study level, i.e. by taking a single estimate from each study. The results from this exercise are presented in Table A2, which shows that the combined effect remains positive, statistically significant, and is higher compared to the case where the estimation is done based on study by regression level data. Moreover, as a further robustness check, we report in the Appendix a weighted average overall effect using a sample disaggregation based on the discussion in the aid effectiveness literature regarding the different generations of aid-growth empirical studies (see Arndt et al., 2010). As can be seen from Table A3 in the Appendix, our result remains robust.

Apart from showing the average effect size from studies included in the meta-analysis, the results presented in Table 1 show the level of heterogeneity as indicated by the I^2 statistics. In particular, the I^2 statistic shows the percentage of the between-study heterogeneity that can be attributed to the variability in the true treatment effect instead of sampling variation. An I^2 value of more than 50 per cent is normally considered to be high (see, for example, Kontopantelis et al., 2013).

In Table 1, there is, in all the cases, considerable heterogeneity (in the true effect of aid) across studies, suggesting that the effect homogeneity assumption implied by the fixed-effects model is not valid. In other words, the use of a random-effects model, which allows the true effect of aid to vary between studies, is an appropriate choice.

To put our results into perspective, our finding stands in contrast to the results reported in Doucouliagos and Paldam (2015). These authors mainly focus their analysis on the 2007–2011 period and particularly argue that the 2007–2008 years are 'dark years' in aid effectiveness. They further add that the effect estimates in the 2009–2011 period show presence of an 'upward kink' which, according to these authors, is purely a result of publication bias rather than a real improvement in aid effectiveness.

We use the same dataset as Doucouliagos and Paldam (2015), so checking the assertions made by the authors makes our analysis more complete. We do so by answering the following four questions: (i) is there any reasonable justification behind the classification of the different periods?; (ii) is the 2007–2008 period really a dark period in aid effectiveness?; (iii) is the 'upward kink' real and is there any theoretical/intuitive reason to expect an upward kink in the 2009–2011 period?; (iv) can the concern regarding publication bias be justified by the data at hand?

To begin, we find that the decision to categorize the years 2005 and 2006 as 'old-period' is arbitrary and actually matters for the results. As indicated in Doucouliagos and Paldam (2015):

> The period covered by Doucouliagos and Paldam (2008) is taken as the old period and *two more years with broadly similar results are added* [emphasis added], so the old period (1) stretches until the end of 2006. The article concentrates on the new period (2) commencing in 2007. (p. 6)

However, given that the sample in Doucouliagos and Paldam (2008) is from 1970 to 2004, there is no clear and convincing reason to categorize 2005 and 2006 as old period. As shown in the replication table (Table 2), comparing row 2 and row 3 in the middle section, this choice matters for the results; i.e., when one includes years 2005 and 2006 in the 'new-period', the effect of aid is positive (albeit small) and statistically significant, but

Table 2. Replication of Table 1 in Doucouliagos and Paldam (2015).

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
	Observations			**Arithmetic mean**						**FAT-PET MRA**			
	Period	N	Papers	Mean	(t1)	(t2)	P	PET	(t)	(trc)	FAT	(t)	(trc)
						Top section: All 1,779 estimates							
All	1970–2011	1,779	141	.066	.9	14.6	15.25	0.031	5.96	2.12	0.378	4.56	1.38
						Middle section: All estimates divided into old and new							
(1)	1970–2006	904	88	.098	1.1	13.8	13.67	0.036	5.27	3.56	0.586	5.86	3.37
(2)	2007–2011	875	53	.034	.6	6.3	16.88	**0.036**	4.50	**1.36**	0.000	0.00	0.00
(3)	2005–2011	1,047	68	.037	.699	7.4	17.9	**.0416**	7.22	**2.54**	−.0448	−0.41	−0.11
						Bottom section: The new estimates starting in 2007 divided into two sub-periods							
(A)	2007–2008	534	28	.002	.2	.27	15.95	**0.039**	3.06	**1.01**	−.423	−2.21	−0.67
(B)	2009–2011	341	25	.084	1.3	11.0	18.32	**0.019**	1.92	**0.91**	**.915**	**4.59**	1.75
						New classification for period A and period B							
(A)	2005–2007	430	32	0.029	.580	3.47	20.4	**.039**	5.03	**1.99**	−.214	−1.14	−0.41
(B)	2008–2011	617	36	0.043	.785	6.93	16.17	**.055**	5.75	**1.94**	−**.098**	−**0.61**	−0.15

Notes: FAT: funnel asymmetry test; PET: precision estimate test; MRA: meta regression analysis; trc: robust cluster corrected t-statistics, where the clustering is done at the paper level. t1 is the average t-statistics of the estimates, t2 is t-statistics given by the ratio of the mean and standard error of the N estimates and p is the average of the precision of the estimates. Source: authors' estimates.

this would not have been the case had the new period started from 2007.

We also believe there is no clear and convincing reason to pick 2009 as a starting year for period B (2009–2011), and the results and main conclusion of Doucouliagos and Paldam (2015) are sensitive to a change in the starting year of period B. Following the discussion above, we redefine periods A and B by including 2005 and 2006 in period A and 2008 in period B, and the results are presented in the last panel of Table 2. As can be seen from the last panel of this table, the effect of aid on growth remains positive and statistically significant in both the 2005–2007 and 2008–2011 periods. And if one starts period B from 2008 instead of 2009 (last row of Table 2), the result appears to be contrary to what Doucouliagos and Paldam (2015) found. That is, in the 2008–2011 sample period, the impact of aid on growth is, on average, positive (0.05) and is precisely estimated. On the other hand, the bias coefficient is negative and statistically indistinguishable from zero. Moreover, the Doucouliagos and Paldam (2015) claim of an 'upward kink' in the 2009–2011 period is not robust to how one defines periods A and B. Given that there is no clear reason why one should expect any jump in this period, the 'upward kink' reported in Doucouliagos and Paldam (2015) does not seem to reflect real changes. As it will become clear in what follows, this jump is exclusively due to the inclusion of a large set of observations from one single study.

The 0.084 mean estimated in Doucouliagos and Paldam's (2015) classification of period B (2009–2011) is almost twice as large as the 0.043 mean estimated in an alternative classification of period B covering the years 2008–2011. This clearly shows that the results reported in Doucouliagos and Paldam (2015) vary a lot depending on whether one puts observations from year 2008 in either period A or period B. A closer look at the data shows that this is due to the influence of a large set of estimates from the article by Rajan and Subramanian (2008), which contributes 138 estimates (observations) out of the total 276 estimates coded for 2008. Observations taken from Rajan and Subramanian (2008) account for about 25 per cent of the total observations used in the 2007–2008 period. Thus, Doucouliagos and Paldam's (2015) labelling of 2007–2008 as a dark period for aid effectiveness is mainly driven by the large number of observations taken from Rajan and Subramanian (2008). It is important to highlight that estimating the effect of aid on growth by excluding estimates from Rajan and Subramanian (2008) gives a positive and statistically significant effect of aid on growth for the 2007–2008 period.

2.2. Patterns of Evidence over Time—Cumulative Meta-Analysis

Another question of interest to both researchers and policymakers is whether there are temporal changes in aid effectiveness. The article presented here has made effort to assess whether the magnitude and precision of the impact of aid on growth changes with the passage of time or following the addition of newer studies. To this end, the work of Lau et al. (1992) was followed and cumulative meta-analysis was conducted with studies being sequentially added to the analysis according to a variable of interest, and a new-pooled estimate recalculated every time a new study was added to the analysis. Since the objective is to uncover the pattern of evidence over time and to see how the conclusions may have shifted, the variable of interest is the year of publication for each study. Thus, in doing the cumulative meta-analysis, studies were sorted in chronological order for the 1970–2011 period. In cases where studies report multiple estimates,

the data were pooled by study and an overall effect estimate calculated for each study.

Figure 1 and Table A4 in the Appendix present the results from cumulative random-effects meta-analysis of the aid-growth literature. In Figure 1, the circles show the estimates from the cumulative meta-analysis and the horizontal lines show the 95 per cent confidence interval. Moreover, the vertical dotted line in the middle of the figure shows the combined estimate. The value for each row shows the summary estimate for a meta-analysis based on all studies up-to and including that row. The point estimate in the last row is the same as the effect estimate shown in the summary line as the analysis in the last row includes data from all the 141 studies.

As can be seen from the results in Figure 1 and Table A4, there is evidence of the positive impact of aid on growth since the early 1980s with a magnitude of 0.206. As one moves further down the plot, the effect size shows some decline and stabilizes around a combined effect equal to 0.074 with a confidence interval from 0.051 to 0.097. Over the years, the addition of new studies does not substantially change the aid effectiveness conclusion. In general, even if the answers to the aid effectiveness question in terms of growth impact have evolved over the years, the balance of evidence, on average, points to a positive (albeit small to moderate) and statistically significant impact of aid on growth.

3. Assessing Publication Bias

One issue that can jeopardize the credibility of results from meta-analysis is the issue of publication bias. It arises if there is a tendency to only publish research findings with statistically significant treatment effect (Sterne, Gavaghan, & Egger, 2000). That is, if studies included in the meta-analysis are a biased sample of the target population of studies (for example, if small studies with statistically insignificant findings remain unpublished/in the grey literature), the meta-analysis may overestimate the true effect (see Borenstein et al., 2009). In the following section, using various methods we, assess whether publication bias is a concern within the aid effectiveness literature.

3.1. Funnel Plot

One way to assess the issue of publication bias in a body of literature is to use funnel plots that relate the precision of studies (study size) to the size of the effect estimate. In the absence of publication bias, smaller studies are expected to scatter widely at the bottom of the graph with the spread getting narrower as study precision increases. Thus, if publication bias is not a problem, the plot takes the shape of a symmetrically inverted funnel.

Figure 2 presents a funnel plot of the aid effectiveness literature. The vertical line at the centre of the plot shows the combined effect estimate from the aid effectiveness literature. As can be seen from the figure, the estimates appear randomly distributed around the combined effect estimate, and the plot exhibits symmetry showing lack of evidence to suggest the existence of publication bias in the aid-growth literature. Particularly note that smaller studies with statistically insignificant results are not missing.

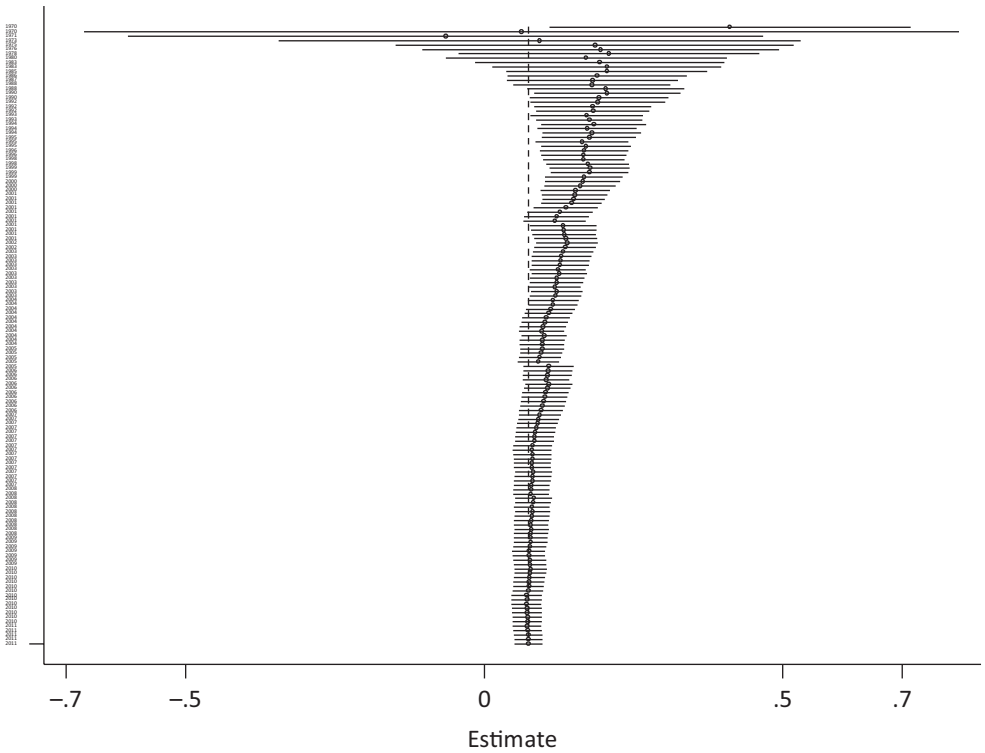

Figure 1. Cumulative random effects meta-analysis. Source: authors' computation.

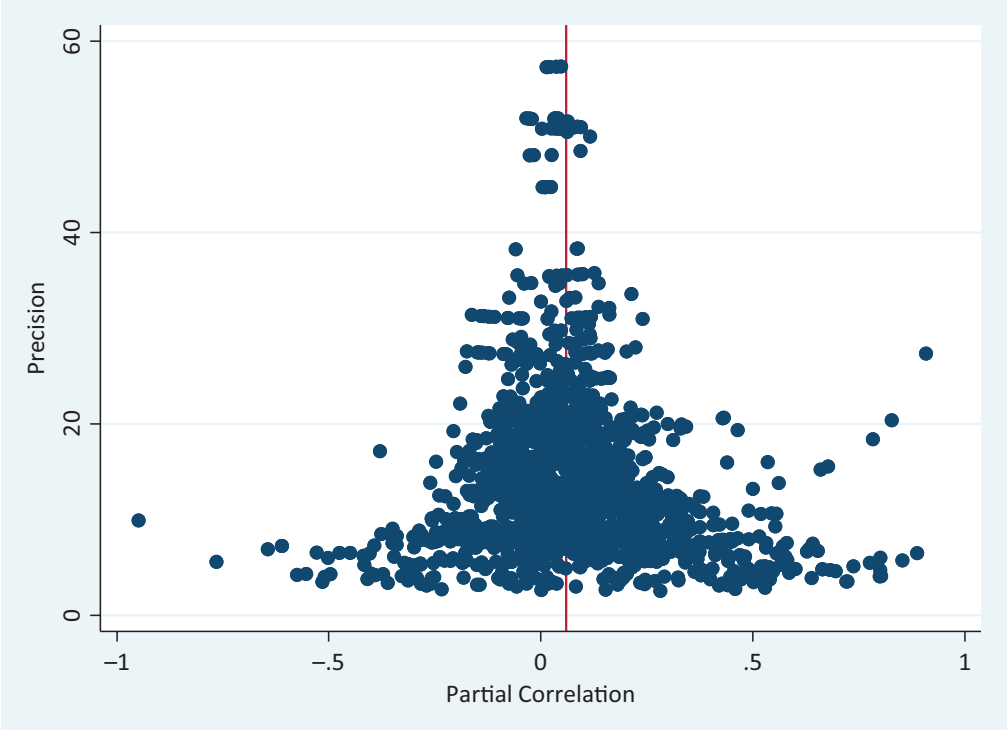

Figure 2. Funnel plot from the aid-growth literature. Source: authors' computation.

A further check for publication bias relies on contour enhanced funnel plots. This approach uses the idea that the main reason for studies to remain unpublished is lack of statistical significance, with studies that cannot achieve standard levels of statistical significance left out of mainstream publications (Dickersin, 1997).

To check whether this is the case in the aid effectiveness literature, we add contours of statistical significance on the funnel plot shown in Figure 1. This makes it easier to assess the statistical significance of hypothetically missing studies. That is, we can check whether the areas where studies are likely to be missing are areas of low statistical significance and whether areas, where studies are more visible, are areas of high statistical significance.

Publication bias is likely to exist if the areas where studies are missing are areas of low statistical significance. As shown in the contour enhanced funnel plot depicted in Figure 3, this is not the case for the aid effectiveness literature studied here. Overall, the distribution of the estimates is reasonable in the regions of both low and high statistical significance, and there is no evidence that studies with insignificant results have been repressed.

3.2. Cumulative Meta-Analysis and Publication Bias

Cumulative meta-analysis can also be used to investigate whether the combined effect estimate presented in Section 2 suffers from publication bias in the literature. This is done first by sorting studies based on their level of precision (from the most precise to the least precise) and then by sequentially adding studies to the analysis. That is, in the cumulative meta-analysis, the first estimate represents an estimate of the most precise study, and the second estimate represents meta-analysis of the first two precise studies, and so on. The assumption here is that precise studies are less likely to suffer from publication bias, and it is the less precise studies that are more prone to overstating their effect estimates to compensate for their large standard errors in order to achieve a statistically significant effect.

This approach helps us to see if the effect estimates of the less precise studies that are likely to report biased (larger) effect estimates to increase their chances of publication influence the combined effect estimate. Thus, if the effect size increases, as less precise studies are included in the analysis, it is likely that there is a bias from small studies (see Borenstein et al., 2009).

Figure 4 presents the cumulative meta-analysis of studies conducted over the 1970–2011 period. Here studies are sorted from most to least precise, and the vertical reference line represents the combined effect estimate based on the random-effects model. While the circles show the cumulative effect estimates, the horizontal lines show the 95 per cent confidence intervals. On the vertical axis, study names ordered based on their level of precision are shown and the horizontal axis shows the partial effect estimate. Since the names of these 141 studies and respective cumulative effect estimates are not visible in this plot, we have also presented the same cumulative meta-analysis in a table format (see Table A5).

As shown in Figure 4 and Table A5, there is no as such consistent pattern of an increase in the cumulative effect

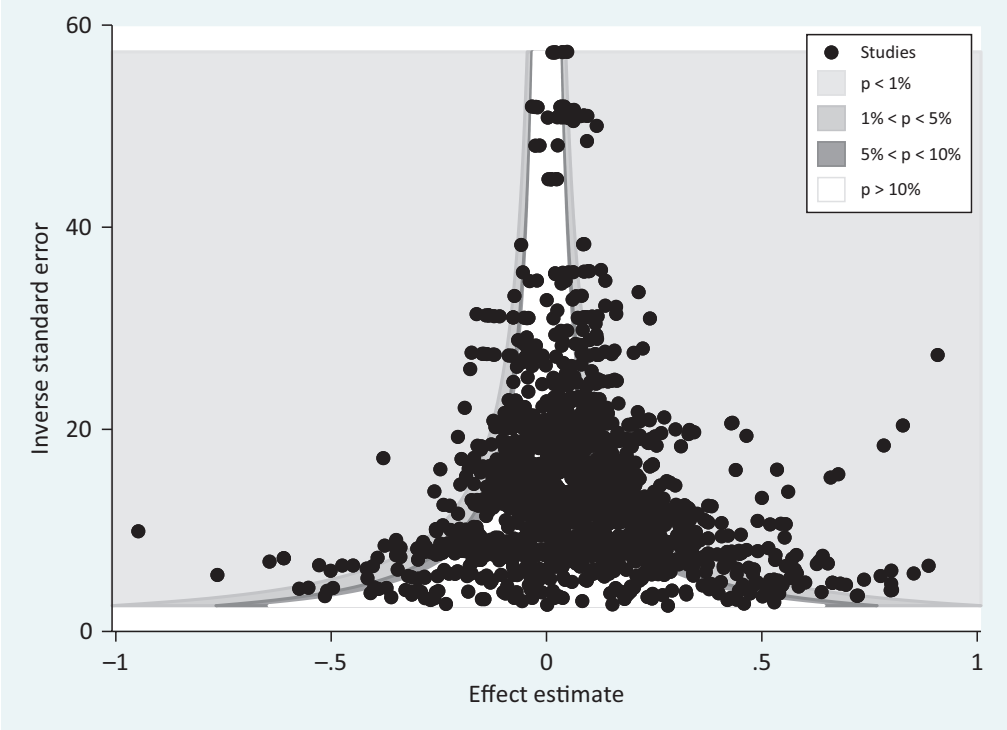

Figure 3. Contour enhanced funnel plot. Source: authors' computation.

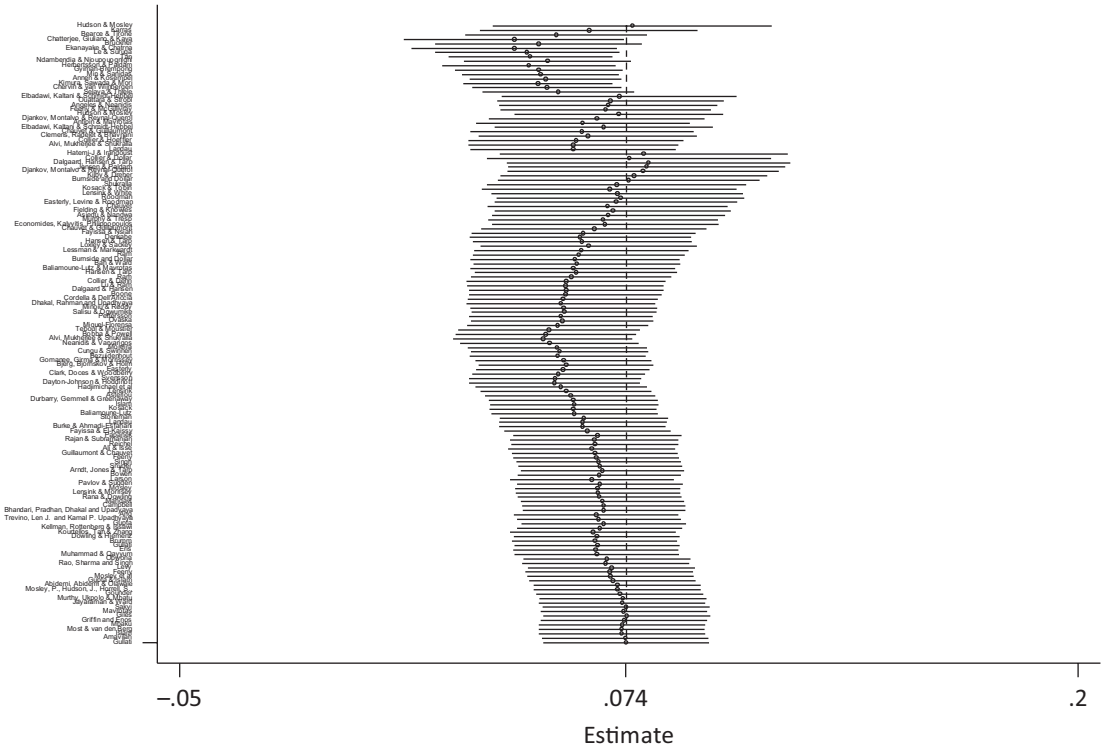

Figure 4. Cumulative meta-analysis: 1970–2011. Source: authors' computation.

estimate as less and less precise studies are added to the analysis. For instance, the most precise study has an effect estimate of 0.076 with a confidence interval from 0.037 to 0.115, while the cumulative meta-analysis of the ten most precise studies shows an estimate of 0.05. After that, the combined effect estimate starts to increase, reaching 0.07 and 0.08 with the top 20 and 30 most precise studies added, respectively. As more and more (relatively less precise) studies are added, the cumulative effect rather shows a decline reaching 0.05 and gradually converging at 0.074.

In general, further addition of the less and less precise studies does not reveal a steadily increasing clear pattern of the cumulative effect estimates to suggest the

existence of publication bias in the literature. It is also worth noting that the confidence intervals from the cumulative meta-analysis of the least precise studies do overlap with that obtained from the cumulative effect estimates of the most precise studies; i.e. comparing the confidence interval from the least precise studies (final rows) with the confidence interval when the 1st, 10th, 20th etc. most precise studies are added to the analysis. This shows that the effect estimates from the most and least precise studies are not statistically significantly different, making the issue of publication bias less of a concern here.

3.3. Regression-Based Test

Since visual inspection of a funnel plot is subjective, we also conducted a regression-based test to objectively assess the presence or absence of publication bias. Egger, Smith, Sceider and Minder (1997) is the most commonly used test to assess asymmetry in funnel plots. It regresses the standardized effect from each study on precision (inverse of standard error). The regression to be estimated takes the following form:

$$t_i = \beta_0 + \beta_1 \frac{1}{SE_i} + v_i \quad (2)$$

where t_i is the standardized effect and $1/SE_i$ is the measure of precision. The parameters of interest are β_0 and β_1 which capture bias and genuine effect respectively. A detailed discussion of the test, the importance of doing a multivariate analysis and the choice of covariates can be found in Mekasha and Tarp (2013).

The result from the Egger et al. (1997) funnel asymmetry test is reported in Table 3. As can be seen from the results in both the bivariate and multivariate regressions, the bias coefficient is found to be statistically indistinguishable from zero, confirming the absence of publication bias in the aid-growth literature, in line with the funnel plot analysis. Moreover, in both the bivariate and multivariate results, the coefficient of precision (the estimate of the impact of aid on growth) is found to be positive and statistically significant. Note that when we look at our preferred estimation, controlling for all study characteristics (Columns 2, 5 and 6), the estimated effect of aid from the existing literature is 0.13, 0.05, and 0.05 for the 'old period', 'new period', and the 'full sample', respectively, with the coefficients being statistically significant in all cases. This is in stark contrast to the finding of Doucouliagos and Paldam (2015) who reported that this coefficient was insignificant in both a statistical and an economic sense.

Overall, based on graphical tools and the regression-based tests, publication bias is not found to be a concern in the aid-growth empirical literature. This confirms that the overall effect estimate obtained from the aid effectiveness literature is not an artefact of publication bias.

4. Meta-Regression Analysis

As seen in Table 1, there is considerable heterogeneity in the aid effectiveness literature. In this section, we explore whether this observed heterogeneity could be attributed to one or more of the study characteristics. To this end, we employ a random-effects meta-regression analysis. In this regression, following estimation of the between-study variance τ^2 using methods of moments, the coefficient estimates are estimated using weighted least squares where $1/(\sigma_i^2 + \tau^2)$ is the weight.

The results from the meta-regression are presented in Table A6 in the Appendix. According to the statistics reported at the bottom of the table, 72 per cent of the residual variance is due to heterogeneity of the true effect, with the remaining 18 per cent attributed to sampling variability. Moreover, the proportion of between-study variance explained by the covariates can be seen from the adjusted R^2. This is calculated by comparing the estimated between-study variance with its value when no covariates are included. We note that 25 per cent of the between-study variance is explained by the covariates and the remaining between-study variance is found to be 0.008.

Turning to the role of the study characteristics in explaining the variation in reported effects, it appears that more than 20 covariates are important. However, caution needs to be exercised in interpreting the results from this regression. According to Higgins and Thompson (2004), testing several covariates without adjusting for multiplicity will lead to increased false positive rates in

Table 3. Funnel asymmetry test (FAT) meta-regression analysis (MRA) (dependent variable: standardized effect (t-stat)).

	Old period		New period		Full sample	
	Bivariate	Multivariate	Bivariate	Multivariate	Bivariate	Multivariate
Precision	0.05	0.13***	0.04**	0.05**	0.03**	0.05**
	(0.03)	(0.04)	(0.02)	(0.02)	(0.02)	(0.02)
_cons	0.54*	0.37	−0.05	−1.42	0.38	−0.09
	(0.31)	(0.75)	(0.40)	(1.0)	(0.27)	(0.59)
N	731	715	1,047	1,047	1,778	1,762

Notes: Standard errors in parentheses. * $p < .1$, ** $p < .05$, *** $p < 0.01$. Old period (1970–2004), new period (2005–2011) and full sample (1970–2011). Source: authors' estimates.

meta-regression. To deal with this issue, these authors suggest a permutation test to assess statistical significance in meta-regression and warn researchers not to make claims about statistical significance before conducting such a test. Thus, following the suggestion of Higgins and Thompson (2004), we conduct the permutation test on the meta-regression reported in the Appendix.

The results are reported in Table 4. The first column shows permutation p-values without adjustment for multiplicity and the second column shows p-values adjusted for multiplicity. While Table 4 reveals which study characteristics are, statistically speaking, important in explaining the variation in reported effect estimates within the aid-growth literature, Table A6 shows in which direction (how) each particular study characteristic affects the reported estimates. After adjusting for multiple testing, only 10 of the included covariates appear to have a role in explaining the heterogeneity in effect size, shown in bold within Table 4. We highlight that the type of publication outlet, data type (structure), and type of controls included in the growth regression are found to be important in explaining the observed heterogeneity in reported effect estimates of the impact of aid on economic growth. For instance, the positive and statistically significant coefficient on the variable 'Panel' (from Table A6 and Table 4) implies, ceteris paribus, that studies using panel data, on average report higher (positive) partial correlations. Another point worth noting from the results in the tables is that the coefficients of the decade dummies are statistically indistinguishable from zero. This implies that the sample period covered by the original studies does not have a role in explaining the reported variation in research findings on aid and growth.

5. Conclusion

The main aim of this study was to update the aid effectiveness meta-analysis evidence in Mekasha and Tarp (2013), adding newly available studies which emerged from 2004 to 2011. To this end, we employed a random-effects model. This is the appropriate choice in the presence of considerable heterogeneity in the true effects, which is the case in the aid effectiveness literature. The positive impact of aid on growth in Mekasha and Tarp (2013) is shown here as being robust to the inclusion of new studies in the meta-analysis and this appears to be true for different time horizons.

Having established this result, we carefully assessed whether publication bias has any impact on the observed effect estimates. Results from funnel plots, a regression-based test, and a cumulative meta-analysis for publication bias all suggest that publication bias is not a concern within the aid-growth literature and the observed effect is not an artefact hereof. Finally, given the considerable heterogeneity observed in the data, we conducted a meta-regression analysis to explain the heterogeneity in reported effect estimates. After adjusting the p-values for multiple testing, it is found that only ten out

Table 4. Monte Carlo permutation test for meta-regression p-values unadjusted and adjusted for multiple testing.

Number of obs. = 1,761 Permutations = 20,000		
Partial	Unadjusted	Adjusted
Gender	0.891	1.000
Working paper	0.963	1.000
Cato	0.293	1.000
JDS	0.494	1.000
JID	0.498	1.000
EDCC	0.000	**0.000**
AER	0.654	1.000
Applied economics	0.039	0.829
Sub-sample	0.000	**0.007**
Low income	0.019	0.581
World Bank	0.519	1.000
Influence	0.112	0.991
Theory	0.004	0.174
Gap model	0.088	0.977
Panel	0.000	**0.005**
No. of countries	0.000	**0.008**
No. of years	0.488	1.000
Average	0.026	0.696
y1960s	0.006	0.238
y1970s	0.064	0.941
y1980s	0.006	0.238
y1990s	0.099	0.985
y2000	0.312	1.000
Outliers	0.820	1.000
Single country	0.000	**0.008**
EDA	0.080	0.968
Asia	0.122	0.995
Latin	0.813	1.000
Aid-institutions interaction	0.002	**0.078**
Aid-policy interaction	0.003	0.137
Aid square	0.010	0.391
Lag used	0.287	1.000
System growth and aid	0.064	0.941
System growth and capital	0.179	0.999
Capital	0.700	1.000
Human capital	0.077	0.958
FDI	0.402	1.000
Policies	0.030	0.750
Instability	0.423	1.000
Inflation	0.000	**0.001**
Fiscal	0.029	0.725
Size of government	0.000	**0.001**
Region dummy	0.031	0.753
Ethnic fractionalization	0.000	**0.002**
Financial development	0.000	**0.004**
Openness	0.219	1.000
Population	0.316	1.000
Per capita income	0.051	0.886
OLS	0.516	1.000
Africa	0.582	1.000

Note: see Table A1 for a detailed description of the variables used in Table 4. Source: authors' estimates.

of the 50 study characteristics appear to be important in explaining the observed heterogeneity. These include the type of publication outlet, data types, and the type of controls used in the growth regression.

In sum, careful meta-analysis, including more recent studies do not suggest any material changes in the previously established insight that aid promotes growth in a statistically significant manner. The results presented here coupled with the previously documented evidence in Mekasha and Tarp (2013) provide a systematic and objective (quantitative) assessment of the current body of findings within the literature and hence give a clear answer to the question raised by Cassen and Associates (1994): *Does Aid Work?* Having drawn this conclusion, the following points need attention in future evaluations of aid effectiveness.

First, the evidence presented here is clearly not the full story of aid effectiveness. Promoting economic growth is often not the primary objective of foreign aid, and neither should it be. Following the adoption of the Millennium Development Goals (MDGs) back in 2000 and the Sustainable Development Goals (SDGs) in 2017, donors tend to channel most of their assistance to social sectors such as health and education as well as to poverty reduction interventions in general. With multifaceted objectives, aid effectiveness meta-analysis needs to move beyond examining the role of aid on economic growth. A meta-analysis of aid and poverty reduction would be an interesting future avenue to explore, once sufficient empirical evidence from individual studies has accumulated. Furthermore, on top of the aid effectiveness analysis, careful attention should also be given to the increasing focus on the concept of development effectiveness that covers rather broader outcomes.

Second, there is a need to complement the existing empirical evidence on aid and growth with country-specific success/failure stories, which we believe are a valid and yet often neglected aspect in the discourse surrounding aid effectiveness. For instance, Arndt, Jones and Tarp (2007) have shown how a high level of sustained aid to Mozambique helped the country establish peace, manage the difficulties of post-war stabilization, and embark on widespread reconstruction. In addition, the experiences of Vietnam and South Korea are also examples regarding the role that aid can play in facilitating the development process of a country.

Last, but by no means least, future aid effectiveness studies need to deal with data and methodological concerns associated with the current aid-growth empirical studies. These concerns include, but are not limited to, the need to control important factors such as export price (terms of trade) shocks, exports and private capital flows, the need for comparing aid effectiveness results using alternative aid data such as Country Programmable Aid which better reflect actual aid flows to countries and which have increasingly become available in recent years. Moreover, in assessing aid effectiveness, it is crucial to look for the longer-term impact of aid as a large proportion of aid goes to social sectors like health and education following global development commitments such as the MDGs and SDGs.

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Conflict of Interests

The authors declare no conflict of interests.

References

Arndt, C., Jones, S., & Tarp, F. (2007). Aid and development: The Mozambican case. In S. Lahiri (Ed.), *Frontiers of economics and globalization: Theory and practice of foreign aid* (pp. 235–288). Amsterdam: Elsevier.

Arndt, C., Jones, S., & Tarp, F. (2010). Aid, growth, and development: Have we come full circle? *Journal of Globalization and Development*, *1*(2), 1–27.

Arndt, C., Jones, S., & Tarp, F. (2016). What is the aggregate economic rate of return to foreign aid? *The World Bank Economic Review*, *30*(3), 446–474.

Borenstein, M., Hedges, L. V., Higgins, J. P. T., & Rothstein, H. R. (2009). *Introduction to meta-analysis*. Chichester: John Wiley & Sons Ltd.

Cassen, R., & Associates. (1994). *Does aid work?* Oxford: Oxford University Press.

Dickersin, K. (1997). How important is publication bias? A synthesis of available data. *AIDS Education and Prevention*, *9*, 15–21.

Doucouliagos, H., & Paldam, M. (2008). Aid effectiveness on growth: A meta study. *European Journal of Political Economy*, *24*(1), 1–24.

Doucouliagos, H., & Paldam, M. (2015). Finally a breakthrough? The recent rise in the size of the estimates of aid effectiveness. In M. Arvin (Ed.), *Handbook on the economics of foreign aid*. Cheltenham: Edward Elgar.

Egger, M., Smith, G. D., Sceider, M., & Minder, C. (1997). Bias in meta-analysis detected by a simple, graphical test. *British Medical Journal*, *315*(7109), 629–634.

Hansen, H., & Tarp, F. (2000). Aid effectiveness disputed. *Journal of International Development*, *12*(3), 375–398.

Higgins, J. P. T., & Thompson, S. G. (2004). Controlling the risk of spurious findings from meta-regression. *Statistics in Medicine*, *23*(11), 1663–1682.

Kontopantelis, E., Springate, D. A., & Reeves, D. (2013). A re-analysis of the cochrane library data: The dangers of unobserved heterogeneity in meta-analyses. *PLoS ONE*, *8*(7), 1–14.

Lau, J., Antman, E. M., Jimenez-Silva, J., Kupelnick, B.,

Mosteller, F., & Chalmers, T. C. (1992). Cumulative meta-analysis of therapeutic trials for myocardial infarction. *The New England Journal of Medicine*, *327*(4), 248–254.

Mekasha, T. J., & Tarp, F. (2013). Aid and growth: What meta-analysis reveals. *Journal of Development Studies*, *49*(4), 564–583.

Mekasha, T. J., & Tarp, F. (2018). *A meta-analysis of aid effectiveness: Revisiting the evidence* (UNU-WIDER Working Paper, No. 44). Helsinki: UNU-WIDER.

Rajan, R. G., & Subramanian, A. (2008). Aid and growth: What does the cross-country evidence really show? *The Review of Economics and Statistics*, *90*(4), 643–665.

Sterne, J. A. C., Gavaghan, D., & Egger, M. (2000). Publication and related bias in meta-analysis: Power of statistical tests and prevalence in the literature. *Journal of Clinical Epidemiology*, *53*(11), 1119–1129.

Thompson, S. G., & Pocock, S. J. (1991). Can meta analysis be trusted? *The Lancet*, *338*(8775), 1127–1130.

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Appendix

Table A1. Variables and their descriptions.

Variables	Description	Variables	Description
Working paper	Binary dummy (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 capita 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 govt.	BD for control of government size		

Source: based on Doucouliagos and Paldam (2008).

Table A2. Meta-analysis of aid and growth literature: Using observations at study level.

Impact of aid on growth	Overall effect (BDL)	[95% CI]	Heterogeneity value (I^2)%	[95% CI]	Between-study variance (τ^2)	N
Old period (1970–2004)	0.097	[0.061 0.134]	60.90	[49.57 69.69]	0.013	73
New period (2005–2011)	0.058	[0.027 0.088]	77.53	[71.80 82.09]	0.010	68
Full sample (1970–2011)	0.074	[0.051 0.098]	71.28	[66.01 75.73]	0.011	141

Notes: BDL refers to Bootstrapped DerSimonian-Laird random-effects model. Bootstrap of 10,000 repetitions used in all cases. I^2 = a heterogeneity measure ranging from 0–100 per cent where a larger score shows a higher level of heterogeneity. Source: authors' estimates.

Table A3. Meta-analysis of aid and growth literature.

Impact of aid on growth	Overall effect (BDL)	[95% CI]	Heterogeneity value (I^2)%	[95% CI]	Between study variance (τ^2)	N
Full sample	0.058	[0.052 0.064]	77.39	[76.36 78.37]	0.011	1,778
Period I: 1st Generation (1970–1979)	0.292	[0.142 0.442]	90.48	[87.41 92.79]	0.139	28
Period II: 2nd Generation (1980–1995)	0.108	[0.083 0.133]	46.44	[35.78 55.33]	0.009	169
Period III: 3rd Generation (1996–2007)	0.055	[0.047 0.064]	80.43	[79.26 81.53]	0.012	964
Period IV: 4th Generation (2008–2011)	0.049	[0.040 0.058]	71.24	[68.83 73.46]	0.007	617

Notes: BDL refers to Bootstrapped DerSimonian-Laird random-effects model. Bootstrap of 10,000 repetitions used in all cases. I^2 = a heterogeneity measure ranging from 0–100 per cent where a larger score shows a higher level of heterogeneity. Source: authors' estimates.

Table A4. Cumulative random-effects meta-analysis of 141 studies: Pattern of aid effectiveness over time (Studies sorted in chronological order).

Trial	Cumm. Est.	[95% Conf. Interval] Lower	Upper	Trial	Cumm. Est.	[95% Conf. Interval] Lower	Upper	Trial	Cumm. Est.	[95% Conf. Interval] Lower	Upper
1970	0.411	0.110	0.713	2001	0.138	0.084	0.191	2007	0.090	0.058	0.122
1970	0.062	−0.672	0.795	2001	0.136	0.084	0.188	2007	0.092	0.061	0.124
1971	−0.065	−0.597	0.467	2002	0.139	0.088	0.190	2007	0.091	0.059	0.122
1973	0.093	−0.344	0.530	2002	0.135	0.085	0.186	2007	0.089	0.058	0.120
1975	0.185	−0.148	0.518	2003	0.139	0.089	0.189	2007	0.088	0.058	0.119
1976	0.195	−0.103	0.493	2003	0.137	0.088	0.186	2007	0.085	0.054	0.116
1978	0.209	−0.042	0.460	2003	0.134	0.087	0.182	2007	0.084	0.054	0.115
1980	0.171	−0.063	0.406	2003	0.131	0.084	0.179	2007	0.083	0.053	0.114
1983	0.193	−0.015	0.401	2003	0.133	0.086	0.180	2007	0.081	0.051	0.111
1983	0.206	0.015	0.397	2003	0.132	0.086	0.179	2007	0.080	0.050	0.110
1985	0.206	0.038	0.373	2003	0.129	0.083	0.174	2007	0.080	0.050	0.109
1986	0.189	0.040	0.339	2003	0.126	0.081	0.171	2008	0.079	0.049	0.108
1987	0.182	0.039	0.324	2003	0.126	0.082	0.169	2008	0.078	0.049	0.107
1988	0.180	0.049	0.311	2003	0.122	0.079	0.165	2008	0.077	0.048	0.106
1988	0.203	0.072	0.334	2003	0.119	0.077	0.162	2008	0.081	0.052	0.111
1990	0.189	0.066	0.312	2004	0.115	0.073	0.157	2008	0.079	0.050	0.109
1990	0.193	0.077	0.308	2004	0.111	0.069	0.152	2008	0.078	0.049	0.107
1992	0.190	0.078	0.302	2004	0.115	0.073	0.156	2008	0.078	0.049	0.106
1992	0.191	0.083	0.298	2004	0.112	0.072	0.153	2008	0.079	0.050	0.107
1992	0.182	0.088	0.276	2004	0.109	0.069	0.149	2008	0.078	0.049	0.107
1993	0.172	0.078	0.265	2004	0.105	0.065	0.145	2008	0.079	0.051	0.107
1993	0.176	0.088	0.265	2004	0.101	0.061	0.141	2008	0.078	0.051	0.106
1994	0.184	0.097	0.272	2004	0.099	0.060	0.138	2009	0.076	0.048	0.104
1994	0.174	0.091	0.256	2004	0.099	0.061	0.137	2009	0.076	0.048	0.103
1994	0.180	0.098	0.262	2004	0.099	0.062	0.136	2009	0.077	0.049	0.105
1995	0.168	0.087	0.248	2004	0.097	0.060	0.133	2009	0.077	0.050	0.104
1995	0.174	0.096	0.252	2005	0.094	0.058	0.130	2009	0.076	0.049	0.103
1995	0.170	0.096	0.245	2005	0.092	0.058	0.127	2009	0.077	0.050	0.103
1996	0.169	0.097	0.241	2005	0.090	0.056	0.124	2009	0.077	0.050	0.103
1996	0.167	0.096	0.237	2005	0.107	0.066	0.149	2010	0.074	0.047	0.101
1998	0.167	0.099	0.234	2005	0.108	0.066	0.149	2010	0.075	0.048	0.101
1998	0.174	0.105	0.242	2006	0.105	0.065	0.146	2010	0.074	0.048	0.100
1999	0.164	0.096	0.231	2006	0.104	0.064	0.145	2010	0.074	0.048	0.099
1999	0.167	0.101	0.233	2006	0.102	0.064	0.141	2010	0.073	0.047	0.098
1999	0.167	0.103	0.231	2006	0.100	0.062	0.138	2010	0.073	0.047	0.098
2000	0.162	0.102	0.223	2006	0.099	0.061	0.137	2010	0.073	0.048	0.097
2000	0.160	0.101	0.220	2006	0.097	0.059	0.134	2010	0.071	0.047	0.096
2000	0.153	0.095	0.210	2006	0.096	0.059	0.133	2010	0.070	0.046	0.095
2001	0.152	0.097	0.207	2006	0.100	0.063	0.137	2010	0.071	0.047	0.095
2001	0.142	0.085	0.198	2006	0.097	0.060	0.134	2010	0.071	0.047	0.095
2001	0.131	0.072	0.190	2006	0.095	0.059	0.132	2010	0.071	0.048	0.095
2001	0.127	0.070	0.184	2007	0.095	0.059	0.131	2010	0.072	0.049	0.096
2001	0.128	0.073	0.182	2007	0.093	0.058	0.129	2011	0.072	0.049	0.095
2001	0.122	0.068	0.175	2007	0.092	0.058	0.125	2011	0.072	0.049	0.095
2001	0.136	0.079	0.193	2007	0.090	0.057	0.122	2011	0.074	0.050	0.097
2001	0.133	0.078	0.188	2007	0.090	0.057	0.122	2011	0.074	0.051	0.097
2001	0.136	0.081	0.191	2007	0.090	0.058	0.122	2011	0.074	0.051	0.097

Source: authors' computation.

Table A5. Cumulative random-effects meta-analysis of 141 studies: Assessing publication bias (studies sorted from most to least precise).

Study	Cumm. Est.	[95% Conf. Interval] Lower	Upper	Study	Cumm. Est.	[95% Conf. Interval] Lower	Upper
Hudson & Mosley	0.076	0.037	0.115	Burnside and Dollar	0.060	0.031	0.089
Karras	0.064	0.034	0.094	Bah & Ward	0.061	0.032	0.089
Bearce & Tirone	0.055	0.029	0.080	Baliamoune-Lutz & Ma	0.059	0.031	0.088
Chatterjee, Giuliano	0.043	0.013	0.074	Hansen & Tarp	0.060	0.032	0.088
BrŸckner	0.050	0.021	0.078	Ram	0.059	0.031	0.087
Ekanayake & Chatrna	0.043	0.015	0.072	Collier & Dehn	0.057	0.030	0.085
Le & Suruga	0.047	0.021	0.072	Lu & Ram	0.057	0.030	0.085
Tan	0.048	0.025	0.070	Dalgaard & Hansen	0.058	0.031	0.085
Ndambendia & Njoupou	0.052	0.029	0.076	Boone	0.057	0.031	0.084
Herbertsson & Paldam	0.047	0.023	0.071	Cordella & Dell'Aric	0.057	0.030	0.083
Gyimah-Brempong	0.050	0.027	0.073	Dhakal, Rahman and U	0.056	0.030	0.082
Min & Sanidas	0.050	0.029	0.072	Minoiu & Reddy	0.057	0.031	0.083
Annen & Kosempel	0.052	0.031	0.073	Salisu & Ogwumike	0.057	0.031	0.083
Kimura, Sawada & Mor	0.050	0.029	0.070	Pettersson	0.056	0.031	0.082
Chervin & van Wijnbe	0.052	0.032	0.073	Ovaska	0.056	0.031	0.082
Selaya & Thiele	0.055	0.034	0.076	Miquel-Florensa	0.055	0.030	0.080
Elbadawi, Kaltani &	0.072	0.040	0.105	Teboul & Moustier	0.053	0.028	0.078
Ouattara & Strobl	0.070	0.038	0.101	Bobba & Powell	0.052	0.027	0.077
Angeles & Neanidis	0.069	0.039	0.100	Alvi, Mukherjee & Sh	0.051	0.026	0.076
Feeny & McGillivray	0.069	0.039	0.098	Neanidis & Varvarigo	0.053	0.028	0.078
Hudson & Mosley	0.072	0.043	0.101	Moreira	0.055	0.030	0.080
Djankov, Montalvo &	0.066	0.036	0.096	Cungu & Swinnen	0.056	0.031	0.080
Antipin & Mavrotas	0.062	0.033	0.092	Bezuidenhout	0.055	0.031	0.080
Elbadawi, Kaltani &	0.068	0.038	0.098	Gomanee, Girma & Mor	0.057	0.032	0.081
Chauvet & Guillaumon	0.062	0.031	0.093	Bjerg, Bjornskov & H	0.058	0.033	0.082
Clemens, Radelet & B	0.064	0.033	0.094	Easterly	0.057	0.033	0.081
Collier & Hoeffler	0.060	0.030	0.090	Clark, Doces & Woodb	0.055	0.031	0.079
Alvi, Mukherjee & Sh	0.060	0.030	0.089	Svensson	0.055	0.031	0.078
Landau	0.059	0.031	0.088	Dayton-Johnson & Hod	0.054	0.031	0.078
Hatemi-J & Irandoust	0.079	0.039	0.119	Hadjimichael et al.	0.056	0.032	0.080
Collier & Dollar	0.075	0.036	0.114	Lensink	0.058	0.034	0.081
Dalgaard, Hansen & T	0.080	0.041	0.120	Asteriou	0.059	0.035	0.082
Jensen & Paldam	0.080	0.041	0.118	Durbarry, Gemmell &	0.060	0.036	0.083
Djankov, Montalvo &	0.079	0.041	0.117	Islam	0.060	0.036	0.083
Kilby & Dreher	0.076	0.039	0.113	Kosack	0.059	0.036	0.083
Burnside and Dollar	0.075	0.039	0.111	Baliamoune-Lutz	0.060	0.037	0.083
Shukralla	0.072	0.036	0.108	Stoneman	0.062	0.039	0.086
Kosack & Tobin	0.070	0.034	0.105	Landau	0.062	0.039	0.085
Lensink & White	0.072	0.037	0.107	Burke & Ahmadi-Esfah	0.062	0.039	0.085
Roodman	0.073	0.038	0.107	Fayissa & El-Kaissy	0.063	0.040	0.086
Easterly, Levine & R	0.071	0.038	0.105	Papanek	0.066	0.043	0.090
Chauvet	0.069	0.036	0.102	Rajan & Subramanian	0.065	0.042	0.089
Fielding & Knowles	0.071	0.038	0.103	Reichel	0.066	0.042	0.089
Asiedu & Nandwa	0.069	0.037	0.102	Ali & Isse	0.065	0.042	0.088
Murphy & Tresp	0.068	0.036	0.100	Guillaumont & Chauve	0.066	0.042	0.089
Economides, Kalyviti	0.068	0.037	0.100	Feeny	0.066	0.043	0.089
Chauvet & Guillaumon	0.065	0.034	0.097	Singh	0.067	0.044	0.089
Fayissa & Nsiah	0.062	0.031	0.094	Snyder	0.067	0.044	0.090
Denkabe	0.061	0.031	0.092	Arndt, Jones & Tarp	0.068	0.045	0.090
Hansen & Tarp	0.062	0.032	0.092	Bowen	0.067	0.044	0.089
Loxley & Sackey	0.064	0.034	0.094	Larson	0.065	0.042	0.087
Lessman & Markwardt	0.062	0.032	0.092	Pavlov & Sugden	0.067	0.044	0.090
Ram	0.061	0.032	0.090	Mosley	0.066	0.043	0.089

Table A5. (Cont.) Cumulative random-effects meta-analysis of 141 studies: Assessing publication bias (studies sorted from most to least precise).

Study	Cumm. Est.	[95% Conf. Interval] Lower	Upper	Study	Cumm. Est.	[95% Conf. Interval] Lower	Upper
Lensink & Morrisey	0.066	0.044	0.089	Feeny	0.070	0.046	0.093
Rana & Dowling	0.067	0.044	0.090	Mosley et al	0.070	0.047	0.093
Mahdavi	0.068	0.045	0.090	Gupta & Islam	0.070	0.047	0.094
Campbell	0.068	0.045	0.091	Abidemi, Abidemi & O	0.072	0.049	0.095
Bhandari, Pradhan, D	0.068	0.046	0.091	Mosley, P., Hudson,	0.072	0.049	0.095
Ang	0.066	0.043	0.089	Gounder	0.072	0.049	0.096
Trevino, Len J. and	0.067	0.044	0.089	Murthy, Ukpolo & Mba	0.073	0.050	0.097
Gupta	0.068	0.045	0.091	Jayaraman & Ward	0.073	0.050	0.096
Kellman, Rottenberg	0.067	0.044	0.090	Sakyi	0.074	0.051	0.097
Kourtellos, Tan & Zh	0.065	0.042	0.088	Mavrotas	0.074	0.051	0.097
Dowling & Hiemenz	0.066	0.043	0.089	Giles	0.074	0.051	0.098
Brumm	0.065	0.043	0.088	Griffin and Enos	0.074	0.051	0.097
Gullati	0.066	0.043	0.089	Mbaku	0.073	0.050	0.096
Eris	0.066	0.043	0.089	Most & van den Berg	0.073	0.050	0.096
Muhammad & Qayyum	0.066	0.043	0.089	Islam	0.073	0.050	0.096
Obwona	0.069	0.046	0.092	Amavilah	0.074	0.051	0.097
Rao, Sharma and Sing	0.069	0.045	0.092	Gullati	0.074	0.051	0.097
Levy	0.070	0.047	0.093				

Source: Authors' computation

Table A6. Meta-regression analysis (dependent variable: Partial correlation).

	Partial		Partial
Gender	−0.004	Aid-Institutions Interaction	−0.061***
	(0.011)		(0.019)
Working paper	0.003	Aid-Policy Interaction	−0.036***
	(0.010)		(0.013)
Cato	−0.044	Aid square	0.029***
	(0.041)		(0.010)
JDS	0.018	Lag used	0.012
	(0.021)		(0.010)
JID	−0.011	System growth and aid	−0.033
	(0.017)		(0.021)
EDCC	−0.178***	System growth and capital	−0.037
	(0.034)		(0.030)
AER	−0.016	Capital	0.007
	(0.033)		(0.014)
Applied Economics	−0.053*	Human capital	0.028*
	(0.029)		(0.016)
Sub-sample	−0.047***	FDI	0.014
	(0.014)		(0.019)
Low income	0.037**	Policies	−0.032**
	(0.018)		(0.015)
World Bank	−0.011	Instability	−0.008
	(0.019)		(0.011)
Theory	0.027**	Inflation	−0.063***
	(0.011)		(0.015)
Gap model	0.041	Fiscal	0.036**
	(0.026)		(0.015)
Panel	0.093***	Size of government	0.056***
	(0.024)		(0.014)
No. countries	−0.001***	Region dummy	0.019*
	(0.000)		(0.010)
No. years	−0.001	Ethnic fractionalization	−0.049***
	(0.001)		(0.013)
Average	0.003**	Financial development	0.042***
	(0.001)		(0.011)
y1960s	−0.037**	Openness	0.014
	(0.014)		(0.012)
y1970s	0.026	Population	0.012
	(0.016)		(0.013)
y1980s	−0.057***	Per capita income	−0.020
	(0.020)		(0.013)
y1990s	−0.033*	OLS	−0.006
	(0.019)		(0.009)
y2000	−0.010	Africa	−0.011
	(0.011)		(0.021)
Outliers	−0.002	Constant	0.146***
	(0.011)		(0.043)
Single country	0.140***	Number of Obs.	1,761
	(0.036)	F-stat	9.2
EDA	−0.018	Between study variance	0.01
	(0.012)	Heterogeneity Measure (%)	0.72
Asia	−0.029	Adj R-squared	25.39
	(0.021)		
Latin	0.009		
	(0.021)		

Notes: standard errors in parenthesis. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Source: authors' estimates.

Table A7. List of original articles used in the meta-analysis.

Year	Authors	Title	Journal Title
1970	Gupta, K. L.	Foreign capital and domestic savings: A test of Haavelmo's hypothesis with cross-country data: A comment.	*Review of Economics and Statistics*
1970	Griffin, K. B., & Enos, J. L.	Foreign assistance: Objectives and consequences.	*Economic Development and Cultural Change*
1971	Kellman, M.	Foreign assistance: Objectives and consequences: Comments (to Griffin and Enos, 1970).	*Economic Development and Cultural Change*
1973	Papanek, G.F.	Aid, foreign private investment, savings, and growth in less developed countries.	*Journal of Political Economy*
1975	Stoneman, C.	Foreign capital and economic growth.	*World Development*
1976	Gulati, U. C.	Foreign aid, savings and growth: Some further evidence.	*Indian Economic Journal*
1978	Gulati, U. C.	Effects of capital imports on savings and growth in less developed countries.	*Economic Inquiry*
1980	Mosley, P.	Aid, savings and growth revisited.	*Bulletin of the Oxford University Institute of Economics and Statistics*
1983	Gupta, K. L., & Islam, M. A.	Foreign capital, savings and growth. An international cross-section study.	*Dordrecht, Reidel Publishing Company*
1983	Dowling Jr, J. M., & Hiemenz, U.	Aid, savings, and growth in the Asian region.	*Developing Economies*
1985	Singh, J. M.	State intervention, foreign economic aid, savings and growth in LDCs: Some recent evidence.	*Kyklos*
1986	Landau, D.	Government and economic growth in the less developed countries: An empirical study for 1960–1980.	*Economic Development and Cultural Change*
1987	Mosley, P., Hudson, J., & Horrell, S.	Aid, the public sector and the market in less developed countries.	*The Economic Journal*
1988	Levy, V.	Aid and growth in Sub-Saharan Africa: The recent experience.	*European Economic Review*
1988	Rana, P. B., & Dowling, J. M.	The impact of foreign capital on growth: Evidence from Asian developing countries.	*Developing Economies*
1990	Landau, D.	Public choice and economic aid.	*Economic Development and Cultural Change*
1990	Mahdavi, S.	The effects of foreign resource inflows on composition of aggregate expenditure in developing countries: A seemingly unrelated model.	*Kyklos*
1992	Islam, M. A.	Foreign aid and economic growth: An econometric study of Bangladesh.	*Applied Economics*
1992	Gyimah-Brempong, K.	Aid and economic growth in LDCs: Evidence from Sub-Saharan Africa.	*Review of Black Political Economy*
1992	Mosley, P., Hudson, J., & Horrell, S.	Aid, the public sector and the market in less developed countries: A return to the scene of the crime.	*Journal of International Development*
1993	Lensink, R.	Recipient government behavior and the effectiveness of development aid.	*De Economist*

Table A7. (Cont.) List of original articles used in the meta-analysis.

Year	Authors	Title	Journal Title
1993	Mbaku, J. M.	Foreign aid and economic growth in Cameroon.	*Applied Economics*
1994	Giles, J. A.	Another look at the evidence on foreign aid led economic growth.	*Applied Economics Letters*
1994	Murthy, V. N. R., Ukpolo, V., & Mbatu, J. M.	Foreign aid and economic growth in Cameroon: Evidence from cointegration tests.	*Applied Economics Letters*
1994	Boone, P.	The impact of foreign aid on savings and growth.	*WP London School of Econ.*
1995	Reichel, R.	Development aid, savings and growth in the 1980s: A cross-section analysis.	*Savings and Development*
1995	Hadjimichael, M. T., Ghura, D., Mühleisen, M., Nord, R., & Ucer, E. M.	Sub-Saharan Africa: Growth, savings, and investment, 1986–93.	*IMF Occasional Paper*
1995	Bowen, J. L.	Foreign aid and economic growth: An empirical analysis.	*Geographical Analysis*
1996	Most, S. J., & De Berg, H. V.	Growth in Africa: Does the source of investment financing matter?	*Applied Economics*
1996	Snyder, D. W.	Foreign aid and private investment in developing economies.	*Journal of International Development*
1998	Durbarry, R., Gemmell, N., & Greenaway, D.	New evidence on the impact of foreign aid on economic growth.	*Credit research paper*
1998	Amavilah, V. H.	German aid and trade versus Namibian GDP and labour productivity.	*Applied Economics*
1999	Campbell, R.	Foreign aid, domestic savings and economic growth: Some evidence from the ECCB area.	*Savings and Development*
1999	Svensson, J.	Aid, growth and democracy.	*Economics and Politics*
1999	Fayissa, B., & El-Kaissy, M.	Foreign aid and the economic growth of developing countries (LDCs): Further evidence.	*Studies in Comparative International Development Fall*
2000	Burnside, C., & Dollar, D.	Aid, policies and growth.	*American Economic Review*
2000	Lensink, R., & Morrisey, O.	Aid instability as a measure of uncertainty and the positive impact of aid on growth.	*Journal of Development Studies*
2000	Hansen, H., & Tarp, F.	Aid effectiveness disputed.	*Journal of International Development*
2001	Lu, S., & Ram, R.	Foreign Aid, government policies, and economic growth: Further evidence from cross-country panel data for 1970–1993.	*Economia Internazionale/ International Economics*
2001	Larson, J. D.	An updated analysis of Weisskopf's savings-dependency theory.	*Review of Development Economics*
2001	Gounder, R.	Aid-growth nexus: Empirical evidence from Fiji.	*Applied Economics*
2001	Obwona, M. B.	Determinants of FDI and their impact on economic growth in Uganda.	*African Development Review*
2001	Lensink, R., & White, H.	Are there negative returns to aid?	*Journal of Development Studies*
2001	Dalgaard, C. J., & Hansen, H.	On aid, growth and good policies.	*Journal of Development Studies*
2001	Guillaumont, P., & Chauvet, L.	Aid and performance: A reassessment.	*Journal of Development Studies*

Table A7. (Cont.) List of original articles used in the meta-analysis.

Year	Authors	Title	Journal Title
2001	Collier, P., & Dehn, J.	Aid, shocks, and growth.	*World Bank Policy Research*
2001	Hansen, H. & Tarp, F.	Aid and growth regressions.	*Journal of Development Economics*
2001	Tebouel, R., & Moustier, E.	Foreign aid and economic growth: The case of the countries south of the Mediterranean.	*Applied Economics Letters*
2001	Hudson, J., & Mosley, P.	Aid policies and growth: In search of the Holy Grail.	*Journal of International Development*
2002	Mavrotas, G.	Aid and growth in India: Some evidence from disaggregated aid data.	*South Asia Economic Journal*
2002	Gomanee, K., Girma, S., & Morrissey, O.	Aid, investment and growth in Sub-Saharan Africa.	*Paper prepared for the 10th General Conference of EADI*
2003	Dayton-Johnson, J., & Hoddinott, J.	Aid, policies and growth, redux.	*WP Dalhousie Univ*
2003	Moreira, S. B.	Evaluating the impact of foreign aid on economic growth: A cross-country study (1970–1998).	*WP for 15th Annual Meeting on Socio-Economics, Aix-en-Provence, France*
2003	Brumm, H. J.	Aid, policies and growth: Bauer was right.	*Cato Journal*
2003	Cungu, A., & Swinnen, J.	The impact of aid on economic growth in transition economies: An empirical study.	*LICOS Discussion Papers, Leuven*
2003	Ram, R.	Roles of bilateral and multilateral aid in economic growth of developing countries.	*Kyklos*
2003	Easterly, W.	Can foreign aid buy growth?	*Journal of Economic Perspectives*
2003	Cordella, T., & Dell'Ariccia, G.	Budget support versus project aid.	*IMF WP/03/88*
2003	Islam, M. A	Political regimes and the effect of foreign aid on economic growth.	*The Journal of Developing Areas*
2003	Trevino, L. J., & Upadhyaya, K. P.	Foreign aid, FDI and economic growth: Evidence from Asian countries.	*Transnational Corporations*
2003	Ovaska, T.	The failure of development aid.	*Cato Journal*
2003	Kosack, S.	Effective aid: How democracy allows development aid to improve the quality of life.	*World Development*
2004	Roodman, D.	An Index of Donor Performance.	*Center for Global Development Working Paper*
2004	Easterly, W., Levine, R., & Roodman, D.	Aid, policies, and growth: Comment.	*American Economic Review*
2004	Denkabe, P.	Policy, aid and growth: A threshold hypothesis.	*Journal of African Finance and Economic Development*
2004	Clemens, M., Radelet, S., & Bhavnani, R.	Counting chickens when they hatch: The short-term effect of aid on growth.	*Center for Global Development WP 44*
2004	Collier, P., & Hoeffler, A.	Aid, policy and growth in post-conflict societies.	*European Economic Review*
2004	Burnside, C., & Dollar, D.	Aid, policies and growth: Reply.	*American Economic Review*
2004	Ram, R.	Recipient country's "policies" and the effect of foreign aid on economic growth in developing countries: Additional evidence.	*Journal of International Development*
2004	Dalgaard, C. J., Hansen, H., & Tarp, F.	On the empirics of foreign aid and growth.	*Economic Journal*

Table A7. (Cont.) List of original articles used in the meta-analysis.

Year	Authors	Title	Journal Title
2004	Chauvet, L., & Guillaumont, P.	Aid and growth revisited: Policy, economic vulnerability and political instability. In B. Tungodden, N. Stern, I. Kolstad (Eds.), *Toward pro-poor policies—Aid, institutions and globalization* (pp. 95–109).	*World Bank/Oxford UP*
2004	Collier, P., & Dollar, D.	Development effectiveness: What have we learnt?	*Economic Journal*
2004	Shukralla, E. K.	Aid, incentives, policies, and growth: Theory and a new look at the empirics.	*WP Western Michigan Univ.*
2005	Ali, A. M., & Isse, H. S.	An empirical analysis of the effect of aid on growth.	*International Advances in Economic Research*
2005	Le. M. V., & Suruga, T.	Foreign direct investment, public expenditure and economic growth: The empirical evidence for the period 1970–2001.	*Applied Economics Letters*
2005	Hatami-J, A., & Irandoust, M.	Foreign aid and economic growth: New evidence from panel cointegration.	*Journal of Economic Development*
2005	Chauvet, L.	Can foreign aid dampen external political shocks?	*EPCS-2005*
2005	Feeny, S.	The impact of foreign aid on economic growth in Papua New Guinea.	*The Journal of Development Studies*
2006	Murphy, R. G., & Tresp, N. G.	Government policy and the effectiveness of foreign aid.	*WP 399. Economics Department, Boston College*
2006	Burke, P. J., & Ahmadi-Esfahani, F. Z.	Aid and growth: A study of South East Asia.	*Journal of Asian Economics*
2006	Djankov, S., Montalvo, J. G., & Reynal-Querol, M.	Does foreign aid help?	*Cato Jourral*
2006	Pavlov, V., & Sugden, C.	Aid and growth in the Pacific Islands.	*Asia-Pacific Economic Literature*
2006	Jayaraman, T. K., & Ward, B. D.	Economic growth in a vulnerable island nation: An empirical study of the aid-growth nexus in Vanuatu.	*Asia-Pacific Development Journal*
2006	Kosack, S., & Tobin, J.	Funding self-sustaining development: The role of aid, FDI and government in economic success.	*International Organizations*
2006	Antipin, J. E., & Mavrotas, G.	On the empirics of aid and growth. A fresh look.	*UN-WIDER WP 2006/05*
2006	Clark, W. R., Doces, J. A., & Woodberry, R. D.	Aid, protestant missionaries, and growth.	*Prepared for presentation at the University of Illinois at Urbana-Champaign*
2006	Jensen, P. S., & Paldam, M.	Can the two new aid-growth models be replicated?	*Public Choice*
2006	Karras, G.	Foreign aid and long-run economic growth: Empirical evidence for a panel of developing countries.	*Journal of International Development*
2007	Hudson, J., & Mosley, P.	Aid volatility, policy and development.	*Sheffield Economic Research Paper Series (SERP)*

Table A7. (Cont.) List of original articles used in the meta-analysis.

Year	Authors	Title	Journal Title
2007	Asiedu, E., & Nandwa, B.	On the impact of foreign aid in education on growth: How relevant is the heterogeneity of aid flows and the heterogeneity of aid recipients?	*Kiel Institute*
2007	Minoiu, C., & Reddy, S. G.	Aid does matter, after all. Revisiting the relationship between aid and growth.	*Challenge*
2007	Chatterjee, S., Giuliano, P., & Kaya, I.	Where has all the money gone? Foreign aid and the quest for growth.	*IZA DP*
2007	Bobba, M., & Powell, A.	Aid and growth: Politics matters.	*IDB Research Department WP*
2007	Herbertsson, T. T., & Paldam, M.	Does development aid help poor countries to converge to our standard of living?	*Danish Journal of Economics/ Nationaløkonomisk Tidsskrift*
2007	Dhakal, Rahman, & Upadhyaya	Foreign Direct Investment and Economic Growth in Asia.	*Indian Journal of Economics and Business*
2007	Miquel-Florensa, J. M.	Aid effectiveness: A comparison of tied and untied aid.	*WP 2007-2. Department of Economics*
2007	Elbadawi, I. A., Kaltani, L., & Schmidt-Hebbel, K.	Post-conflict aid, real exchange rate adjustment, and catch-up growth.	*Post-conflict transitions working paper*
2007	Rao, B. B., Sharma, M., & Singh, R.	Estimating aid-growth equations: The case of Pacific Island countries.	*MPRA paper no*
2007	Fielding, D., & Knowles, S.	Measuring aid effectively in tests of aid effectiveness.	*University of Otago, Economic WP*
2007	Pettersson, J.	Foreign sector aid fungibility, growth, and poverty reduction.	*Journal of International Development*
2007	Feeny, S.	Impacts of foreign aid to Melanesia.	*Journal of the Asia Pacific Economy*
2007	Economides, G., Kalyvitis, S., & Philippopoulos, A.	Does foreign aid distort incentives and hurt growth? Theory and evidence from 75 aid-recipient countries.	*Public Choice, W.P.*
2007	Kimura, H., Sawada, Y., & Mori, Y.	Aid proliferation and economic growth: A cross-country analysis.	*RIETI WP*
2007	Upadhyaya, K. P., Pradhal, G., Dhakal, D., & Bhandari, R.	Foreign aid, FDI and economic growth in East European countries.	*Economics Bulletin*
2007	Kourtellos, A., Tan, .M., & Zhang, X.	Is the relation between aid and economic growth nonlinear?	*Journal of Macroeconomics*
2008	Alvi, E., Mukherjee, D., & Shukralla, E. K.	Aid, policies, and growth in developing countries: A new look at the empirics.	*Southern Economic Journal*
2008	Alvi, E., Mukherjee, D., & Shukralla, E. K.	Foreign aid, growth, policy and reform.	*Economics Bulletin*
2008	Elbadawi, I. A., Kaltani, L., & Schmidt-Hebbel, K.	Foreign aid, the real exchange rate, and economic growth in the aftermath of civil wars.	*The World Bank Economic Review*
2008	Rajan, R. G., & Subramanian, A.	Aid and growth: What does the cross-country evidence really show?	*The Review of Economics and Statistics*
2008	Djankov, S., Montalvo, J. G., & Reynal-Querol, M.	The curse of aid.	*J Econ Growth*
2008	Eris, M.	Foreign aid and growth.	*Economics Bulletin*
2008	Loxley, J., & Sackey, H. A.	Aid Effectiveness in Africa.	*Journal compilation*

Table A7. (Cont.) List of original articles used in the meta-analysis.

Year	Authors	Title	Journal Title
2008	Fayissa, B., & Nsiah, C.	The impact of remittances on economic growth and development in Africa.	*WP Department of Economics and Finance. Middle Tennessee State University*
2008	Asteriou, D. five South Asian countries.	Foreign aid and economic growth: New evidence from a panel data approach for	*Journal of Policy Modeling*
2008	Tan, K. Y.	A pooled mean group analysis on aid and growth.	*Applied Economic Letters*
2008	Ouattara, B., & Strobl, E.	Aid, policy and growth: Does aid modality matter?	*Weltwirtschaftliches Archiv/Journal of World Economics*
2009	Annen, K., & Kosempel, S.	Foreign aid, donor fragmentation, and economic growth.	*The B.E. Journal of Macroeconomics*
2009	Chauvet, L., & Guillaumont, P.	Aid, volatility, and growth again: When aid volatility matters and when it does not.	*Review of Development Economics*
2009	Chervin, M., & van Wijnbergen, S.	Economic growth and volatility of foreign aid.	*Tinbergen Institute Discussion Paper*
2009	Neanidis, K. C., & Varvarigos, D.	The allocation of volatile aid and economic growth: Theory and evidence.	*European Journal of Political Economy*
2009	Bezuidenhout, H.	A regional perspective on aid and FDI in Southern Africa.	*North West University WP*
2009	Baliamoune-Lutz, M., & Mavrotas, G.	Aid effectiveness: Looking at the aid-social capital-growth nexus.	*Review of Development Economics*
2009	Baliamoune-Lutz, M.	Policy reform and aid effectiveness in Africa.	Icer working paper series
2010	Feeny, S., & McGillivray, M.	Aid and growth in small island developing states.	*The Journal of Development Studies*
2010	Brückner, M.	On the simultaneity problem in the aid and growth debate.	*Universitat Pompeu Fabra WP*
2010	Lessman, C., & Markwardt, G.	Decentralization and foreign aid effectiveness: Do aid modality and federal design matter in poverty alleviation?	*CESifo working paper Fiscal Policy, Macroeconomics and Growth, No. 3035*
2010	Kilby, C. ,& Dreher, A.	The impact of aid on growth revisited: Do donor motives matter?	*Economics Letters*
2010	Ndambendia, H., & Njoupouognigni, M.	Foreign aid, foreign direct investment and economic growth in Sub-Saharan Africa: Evidence from pooled mean group estimator (PMG).	*International Journal of Economics and Finance*
2010	Selaya, P., & Thiele, R.	Aid and sectoral growth: Evidence from panel data.	*The Journal of Development Studies*
2010	Ekanayake, E. M., & Chatrna, D.	The effect of foreign aid on economic growth in developing countries.	*Journal of International Business and Cultural Studies*
2010	Sakyi, D.	Trade openness, foreign aid and economic growth in post-liberalisation Ghana: An application of ARDL bounds test.	*Journal of Economics and International Finance*
2010	Ang, J. B.	Does foreign aid promote growth? Exploring the role of financial liberalization.	*Review of Development Economics*
2010	Arndt, C., Jones, S., & Tarp, F.	Aid, growth, and development: Have we come full circle?	*UNU-WIDER WP*

Table A7. (Cont.) List of original articles used in the meta-analysis.

Year	Authors	Title	Journal Title
2010	Salisu, A. A., & Ogwumike, F. O.	Aid-macroeconomic policy environment and growth: Evidence from Sub-Saharan Africa.	*Pakistan Journal of Applied Economics*
2010	Neanidis, K. C.	Humanitarian aid, fertility, and economic growth.	*CGBCR Discussion Paper Series*
2010	Bearce, D. H., & Tirone, D. C.	Foreign aid effectiveness and the strategic goals of donor governments.	*The Journal of Politics*
2011	Javid, M., & Qayyum, A.	Foreign aid and growth nexus in Pakistan: The role of macroeconomic policies.	*PIDE Working Papers*
2011	Bah, E. M., & Ward, J.	Effectiveness of foreign aid in small island developing states.	*Munich Personal RePEc Archive Paper*
2011	Bjerg, C., Bjornskov, C., & Holm, A.	Growth, debt burdens and alleviating effects of foreign aid in least developed countries.	*European Journal of Political Economy*
2011	Min, K., & Sanidas, E.	The impact of foreign aid's 7 functional categories on economic development in recipient countries.	*Korea and the World Economy*
2011	Abidemi, O. I., Abidemi, L., & Olawale, A. L.	Foreign aid, public expenditure and economic growth: The Nigerian case	*The Journal of Applied Business Research*