The robust result in meta-analysis of aid effectiveness: A response to Mekasha and Tarp[1]

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Abstract:

In this response to Mekasha and Tarp we show that contrary to what they state, their study validates our basic analysis. They confirm that the literature finds that aid is of little economic importance in generating growth. The results also show that the literature systematically selects control variables for their effect on aid effectiveness. We argue that their choice of the random effects model is not appropriate for the problem at hand, and that the way they use multiple meta-regression analysis contradicts the robust results reached at the basic analysis.

I. Introduction

The most important test of any empirical result is whether it survives independent replication. Meta-regression analysis (MRA) is the systematic analysis of the robustness of empirical results to replications. Doucouliagos and Paldam (2008, 2011; hereafter D&P08 and D&P11) find that *aggregate* aid has no robust effect on growth, *on average*. Aid ineffectiveness is a sad result, and we have stressed promising *disaggregate* results: D&P08 note that it appeared that aid had a positive effect on growth in Asia, while D&P11 note that it appeared that some *components* of aid had a positive effect on growth. Mekasha and Tarp (M&T11 and M&T12)[4] are critical of D&P08 and D&P11, finding evidence that aid tends to have a positive effect on growth in their MRA. In this brief response we argue that D&P and M&T are largely in agreement on the basic issue and the divergence of conclusions relies fundamentally on the treatment of heterogeneity in the MRA and also whether one chooses a fixed effects (D&P) or random effects (M&T) model.

II. Meta-regression analysis

The growth regression literature is well-known to have a robustness problem (Durlauf, Johnson and Temple 2005). If a sufficiently large set of potential control variables and estimators is mined, the researcher generates a wide range of estimated coefficients to choose from. This produces excess

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[4] D&P12 provided a detailed response to M&T11 as a result of which M&T12 clarified or corrected some issues in M&T11.

variation (heterogeneity) in the reported estimates. A principal aim of MRA is to study this variation, quantify the effect of specification differences and identify what if any robust conclusions can be drawn.

MRA is conducted at two levels. The first level involves the literature search, data coding, and the estimation of the basic funnel-asymmetry precision effect test (FAT-PET) MRA:

$$effect_{ij} = \beta_0 + \beta_1 SE_{ij} + \varepsilon_{ij} \qquad (1)$$

where *effect* is the estimated effect of aid of growth and *SE* is the estimate's standard error. The FAT tests H0: $\beta_1 = 0$, often interpreted as a test for publication selection bias. The PET tests H0: $\beta_0 = 0$, a test for the existence of an effect, in our context of aid on growth, corrected for selection bias. The FAT-PET MRA is an objective test: once the literature is coded there is *one and only one* FAT-PET MRA to run, as represented by (1).

The second level of analysis expands (1) to accommodate heterogeneity by estimating multiple MRA which can be used to: (i) identify factors that result in excess variation in reported estimates and (ii) adjust the meta-average for omitted variables bias. If publication bias is detected at the first level, it means that variables are *systematically* omitted as per their effect on the variable of interest (aid). Hence, great care has to be exercised in conducting (ii) in the face of publication bias.

III. Data and the FAT-PET MRA

There is no disagreement on the set of studies to be covered in the MRA of aid effectiveness, as published in Christensen *et al.* (2010); D&P and M&T use the same set of studies. There may be slight differences in the coding of these studies as coding is complicated by wide differences in reporting standards between econometric studies (some contain contradicting, incomplete or doubtful information). Coding differences do not alter the basic results (Table 1).

Table 1 reports estimates of the FAT-PET MRA on five versions of the D&P08 data set. The estimates use either robust standard errors, standard errors adjusted for data clustering, or robust regression. The first two sets of estimates use weighted least squares with precision weights. Panel (i) reports the original D&P08 results. Panel (ii) reports M&T's results; these show a marginally larger publication bias but for all practical considerations the results are identical. Panel (iii) uses our own revised dataset, and panel (iv) replaces estimates from the unpublished studies in D&P08 with estimates in a subsequently published version where applicable. Panel (v) includes some estimates excluded from D&P08 because they were not central to the authors' main analysis.

The results are remarkably consistent (see also D&P12). In all cases, the FAT shows robust evidence of positive funnel asymmetry consistent with selection bias; M&T also find that the aid effectiveness literature (AEL) systematically selects controls to generate positive estimates of aid effectiveness. Although the meta-average (PET) is positive, the size is so small as to be of no practical significance. By the criterion of Cohen (1988: 79-80) the size of the meta-average is negligible (0.02 to 0.04) and when data dependence is accommodated by using clustered standard errors the meta-average is not statistically significant. The null hypothesis of no effect cannot be rejected.

Table 1. Estimates of the FAT-PET MRA

	(1) FAT	(2) PET	
Regression/s.e.	Funnel asymmetry	Meta-average	N
	(i) Original estimate from D&P08 (p.11)		
Robust s.e.	0.73 (4.41)	0.03 (1.82)	541
Clustered s.e.	0.73 (2.43)	0.03 (1.00)	
Robust regression	0.83 (4.77)	0.02 (1.32)	
	(ii) M&T results (p.10)		
Robust s.e.	0.79 (4.84)	0.03 (1.73)	537
Clustered s.e.	0.79 (2.67)	0.03 (0.94)	
	(iii) With new revision		
Robust s.e.	0.69 (4.18)	0.03 (2.23)	536
Clustered s.e.	0.69 (2.30)	0.03 (1.19)	
Robust regression	0.79 (4.49)	0.03 (1.73)	
	(iv) With published version of estimates		
Robust s.e.	0.66 (3.76)	0.04 (2.28)	512
Clustered s.e.	0.66 (2.09)	0.04 (1.22)	
Robust regression	0.82 (4.49)	0.02 (1.43)	
	(v) With additional estimates		
Robust s.e.	0.70 (4.52)	0.03 (1.90)	618
Clustered s.e.	0.70 (2.34)	0.03 (0.99)	
Robust regression	0.81 (4.85)	0.02 (1.14)	

Notes: The dependent variable is the partial correlation. The brackets hold t-ratios.

IV. Methodological issues

Although M&T favour using standard errors rather than sample size as weights, D&P favour sample size as it results in smaller bias (Hunter and Schmidt 2004; Schulze 2004) and the standard error of the correlation is not independent of the correlation (Stanley and Doucouliagos 2012).

However whichever weights are used has no effect on the substantive results. There are also differences between D&P and M&T in the treatment of interaction terms. As D&P10 find that aid interactions fail in independent replications, it would be incorrect to include the interaction terms in the calculation of the partial correlation between aid and growth. The alternative is to include binary variables in the MRA to capture specification differences between studies. Interaction terms impose a structure on the data that can ultimately lead to a misspecification bias. The MRA coefficients quantify that bias.

Fixed versus random effects

One fundamental difference is that M&T12 strongly advocate the use of the random effects model whereas D&P08 draw statistical inferences from the fixed effects models. Stanley (2008) and Stanley and Doucouliagos (2012) show that while both fixed and random effects weighted averages are biased in the presence of publication selection, fixed effects averages are less biased (this explains why M&T12 find significantly larger meta-averages with the random effects weighted average).

Random effects models are extensively used in medical research where estimates are drawn from controlled clinical trials so it can be assumed that research variation is random. Econometric studies use estimates derived from (often overlapping) observational data; our view is that this generates excess variation in applied econometrics that cannot be assumed to be random (Stanley and Doucouliagos 2012). Heterogeneity can actually be analysed within a multiple MRA model with fixed effects (Stanley and Doucouliagos, 2012).

Multiple MRA: Genuine effect heterogeneity or bias?

Another fundamental difference between D&P08 and M&T is in the application of multiple MRA. Both D&P08 and M&T use essentially the same set of moderator variables to run multiple MRAs. D&P08 use the moderator variables only to study the observed heterogeneity in the reported estimates, due to the results reached at the first level. M&T use them for an augmentation process to increase the estimate of aid effectiveness. Their approach disregards the results of their own basic analysis showing precisely that the selection of the controls is non-random.

In D&P08 we did not attempt to report multiple MRA estimates corrected for selection bias. We have now conducted such analysis. The MRA presented in D&P2012 includes: (i) conventional MRA; (ii) the fixed-effects unbalanced panel estimator; and (iii) heterogeneity in selection bias where we show that all of the observed heterogeneity is simply an outcome of research design. These MRA models generate robust results and confirm most of the inferences made in D&P08.

V. Conclusions: Sad robust findings

The fundamental message of our meta-studies is not publication bias (a point on which we are in agreement with M&T). Rather, it is the absence of robust evidence indicating aid effectiveness as a cross-country experience. Few could deny that the eradication of poverty is an urgent and pressing global issue. The key issue is not whether the developed world should assist; for surely it must. Rather, the central issue is the form that this assistance should take. To date, no stable model of aid effectiveness has been found. This result is confirmed by M&T – their basic FAT-PET results are virtually identical to ours. Even after recoding, the prior inferences still stand unchanged. We consequently know that most of the reported aid effects are not robust.

References:

Christensen P.W., Doucouliagos, H., Paldam, M., 2nd edition, 2010. *Master list of the AEL: The Aid Effectiveness Literature.* Posted on http://www.martin.paldam.dk. This replaced the 1st edition from 2007

Cohen, J., 1988. *Statistical Power Analysis for the Behavioral Sciences*. Erlbaum, Hillsdale, NJ.

Doucouliagos, H., Paldam, M., 2008 (**D&P08**). Aid effectiveness on growth. A meta study. *European Journal of Political Economy* 24, 1-24

Doucouliagos, H., Paldam, M., 2010 (**D&P10**). Conditional aid effectiveness. A meta study. *Journal of International Development* 22, 391-410

Doucouliagos, H., Paldam, M., 2011 (**D&P11**). The ineffectiveness of development aid on growth: An update. *European Journal of Political Economy* 27, 399–404

Doucouliagos, H., Paldam, M., 2012 (**D&P12**). The robust result in meta-analysis of aid effectiveness: A response to Mekasha and Tarp. Geelong: Deakin University, *Economics Series Working Paper 2012/4*

Durlauf, S.N., Johnson, P.A., Temple, J.R.W., 2005. Growth econometrics. Chapter 8, 555-677 in Aghion, P., Durlauf, S., eds., *Handbook of Economic Growth.* North-Holland, Amsterdam

Hunter, J.E., Schmidt, F.L., 2004. *Methods of meta-analysis: Correcting error and bias in research synthesis* (2nd ed.). Sage, Newbury Park, CA

Mekasha, T.J., Tarp, F., 2011 (**M&T11**). Aid and growth. What meta-analysis reveals. Helsinki: UNU-WIDER, *Working Paper No. 2011/22*.

Mekasha, T.J., Tarp, F., 2012 (**M&T12**). Aid and growth. What meta-analysis reveals. *Journal of Development Studies*, 1-20, iFirst.

Schulze, R., 2004. *Meta-analysis: A comparison of approaches.* Hogrefe & Huber Pub., Göttingen

Stanley, T.D., 2008. Meta-regression methods for detecting and estimating empirical effect in the presence of publication bias. *Oxford Bulletin of Economics and Statistics* 70, 103-27

Stanley, T.D., Doucouliagos, H., 2012. *Meta-Regression Analysis in Economics and Business.* London: Routledge.