August 12th – 2009

The effects of income and population on development aid:

A quantitative survey of the data and the literature

Hristos Doucouliagos, Deakin University, Australia[1]
Martin Paldam, University of Aarhus, Denmark[2]

Abstract:
This paper uses all available information to establish the size of two parameters in the behavior of development aid donors: The effect of recipient income level and population size. These parameters are analyzed by two methods: A primary study of the data and a meta-analysis of the large aid allocation literature. Both methods find that both effects are robustly negative, but have a rather small size. The poverty effect is in accordance with stated donor policies, while the population effect is contrary to these policies. Six hypotheses are presented to explain the population effect.

JEL: F35, O19
Keywords: Aid allocation, poverty effect, population effect, meta-analysis

Acknowledgement: Our cooperation has been assisted by a "Globalization Grant" from the University of Aarhus. Pia Wichmann Christensen has been a very competent research assistant. We are grateful for comments, when the paper was presented at the conference on the Political Economy of International Organizations at Monte Verità (2008), Ascona, Switzerland and the International Workshop on Meta-Analysis in Economics and Business (2008), Nancy, France.

1. School of Accounting, Economics and Finance, Deakin University, 221 Burwood Highway, Burwood, Victoria 3125, Australia. Email: douc@deakin.edu.au.
2. School of Economics and Management, Bartholins Allé 10, University of Aarhus, 8000 Aarhus C, Denmark. Email: mpaldam@econ.au.dk. URL: http://www.martin.paldam.dk.

1. Introduction: Two parameters of need

The purpose of the paper is to establish the size of two parameters in the aid allocation relation: The recipient income level and population size. While the literature generally agrees that aid does depend upon income and population, it shows an amazing range of results – our aim is to narrow the range. The literature suggests that we look for two main effects:

E1 A *poverty effect*: Income has a negative effect on aid, so that poorer countries receive more aid. It is confirmed, but found to be small, as it only explains 10-12% of the variation in the aid share.[3] A possible side effect is:

E1b A *middle-income effect*: The aid-income curve is convex, so the aid-income relation has a section above the best linear fit, at some middle income. It is rejected.

E2 A *population effect*: The population size has a negative effect on aid, so that larger countries have smaller aid shares. It is confirmed, but found to be small, as it only explains 9-10% of the variation in the aid share.

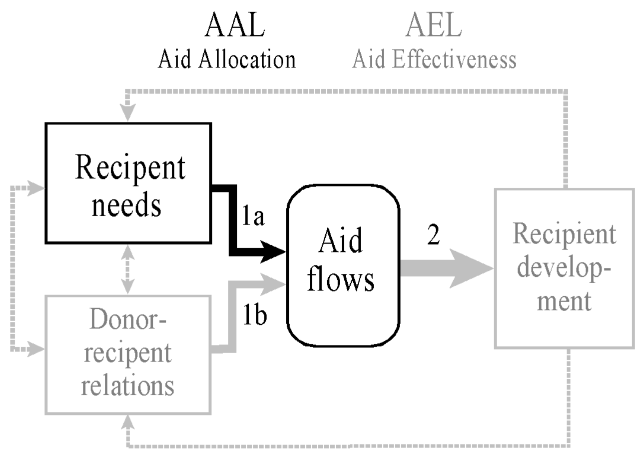
Each effect is analyzed by two methods: A basic primary analysis of the data, and a meta-study of the literature. The data analysis is the most precise, but the results are not controlled for most potentially relevant factors. The meta-analysis study many estimates of the effect, which is found as one part of a large model, with many controls. Nevertheless, the meta-estimates of both effects do converge to an average, which is close to the one of the primary study. It is a strong finding that the same results are reached by both methods.

The empirical literature on aid consists of more than 300 papers,[4] which analyze the three causal flows shown on Figure 1. The Aid Effectiveness Literature (AEL) deals with relation (2). It explores the effects of development aid on growth, savings and investment. The Aid Allocation Literature (AAL) deals with relations (1a) and (1b). It explores the choice of aid recipients and how much they receive. The paper looks at flow (1a) of the AAL: The allocation of development aid on the basis of recipient needs.

The AAL analyzes the policies of donor countries and multilateral organizations. A main theme is to compare the stated goals of donors with the pattern actually found. When they deviate, we say that the allocation process has a *policy bias*. The identification of policy biases provides insights into the behavior of donors.

3. It contributes 0.10 to 0.12 to the R^2 in regressions explaining the aid share, which is aid in percent of GDP.
4. Christensen et al (2007 and 2009) are comprehensive bibliographies of the literature.

Figure 1. The causal relations analyzed in the empirical development aid literatures



Most stated donor aims are humanitarian, with *poverty reduction* as the main goal. The poverty effect is consistent with this goal, but the low power of the effect is puzzling. We think that the main driver for the flow of AAL-literature is the fact that 90% of the variation remains to be explained by other variables. One of the other variables is population. No donor states that poverty in large countries is less important than poverty in small ones. Hence the effect of population on the aid share should be zero. However, the effect is almost as large as the poverty effect. Hence, the population effect is a policy bias.

The literature has found other policy biases. Most follow from donor-recipient relations (flow 1b on Figure 1), and are due to *historical ties,* as well as *strategic* and *commercial interests*. Historical ties and strategic interests have no obvious connections to the effects we analyze. The meta studies confirm that even when these factors are controlled for, the two effects remain. Commercial interests suggest that aid is given to countries with large and growing markets. This is the reason to expect a middle-income effect, and a positive population effect. However, the middle-income effect is rejected by the data, and the population effect is negative, so commercial interests do not explain the findings.

The paper is structured as follows. Section 2 offers our primary analysis of the data, for 118 countries from 1960 to 2005. Section 3 is the meta study of the income effect, while Section 4 is the meta study of the population effect. Section 5 discusses possible explanations for the effects, notably the population effect. Section 6 concludes the paper. The studies covered by the meta-analysis are listed in Appendix A.

2. The primary data analysis

The data analyzed are: 5-year averages for the aid share, h = ODA/GNI (in percent), source WDI. Initial income, $y = ln\ gdp$ (GDP per capita), source Maddison (2003).[5] Initial population, $n = ln\ pop$, source WDI. The years 1960, 65, … , 01 are used as the initial years, while the 5-year averages are for 1961-65, 1966-70, .., 2001-05. The meta-studies in Sections 3 and 4 cover several additional measures of aid.

2.1 Looking for the three effects in the data: Data plots with kernel-curves[6]

The data are displayed on Figures 2 and 3. The kernel-curves are a descriptive device to show how well the aid share can be explained by initial income and population. These curves are a first approximation to the aid-income and the aid-population relations. With bandwidths from about 0.2 to almost 1.0, the kernel-curves look as shown. Nine observations with aid shares above 50% have been deleted. They do not change the form of the curves, but compress the big mass of data so that the graphs are difficult to read.

The first observation from the two graphs is that they show a dramatic scatter. Aid shares are all over the place. Income and population only organize a minor part of the variation; but both the poverty effect and the population effect are clearly visible on the graphs.

The aid-income kernel-curve on Figure 2 has a negative slope consistent with the poverty effect and two additional features: (1) It is less steep until about 7 – which is the income level of South Korea in 1960 or Cameroon in 2000. Thus, it matters for aid that countries are poor, but not so much if they are very poor or just poor. (2) The curve turns up at the end, so it is concave – not convex – at the middle income level. This is due to the 10 observations in the box from two small French dependencies.[7] With and without the box, the curve is contrary to the hypothesis of a *middle income effect* (from Isenman 1975).

The aid-population relation on Figure 3 curve has an almost linear negative slope consistent with the *population effect*. China and India at the extreme right hand of the picture fits into the pattern, but would look the same without these giants.

---

5. He WDI data for GDP and GNI are normally the same. Ln is the natural logarithm. GDP per capita is written in small letters as *gdp*. The Maddison data covers app 164 countries, with a population above 1 million.
6. The reader may understand the kernel regressions as MA-process with a fixed bandwidth. Too low bandwidth gives a zig-zag curve and too high bandwidth makes the curve flat. With a proper bandwidth the kernel-curves show if the relations deviate from linearity.
7. *French Polynesia* has a population of 270,000, of which 10% are French. *New Caledonia* has a population of 220,000, of which 35% are French. They both receive an annual subsidy of about 15% that is classified as aid. Israel is often cited as a case of a middle income country receiving much economic aid, but aid did taper off as the country became wealthier.

Figure 2. The aid share and initial income with a kernel regression, N = 960

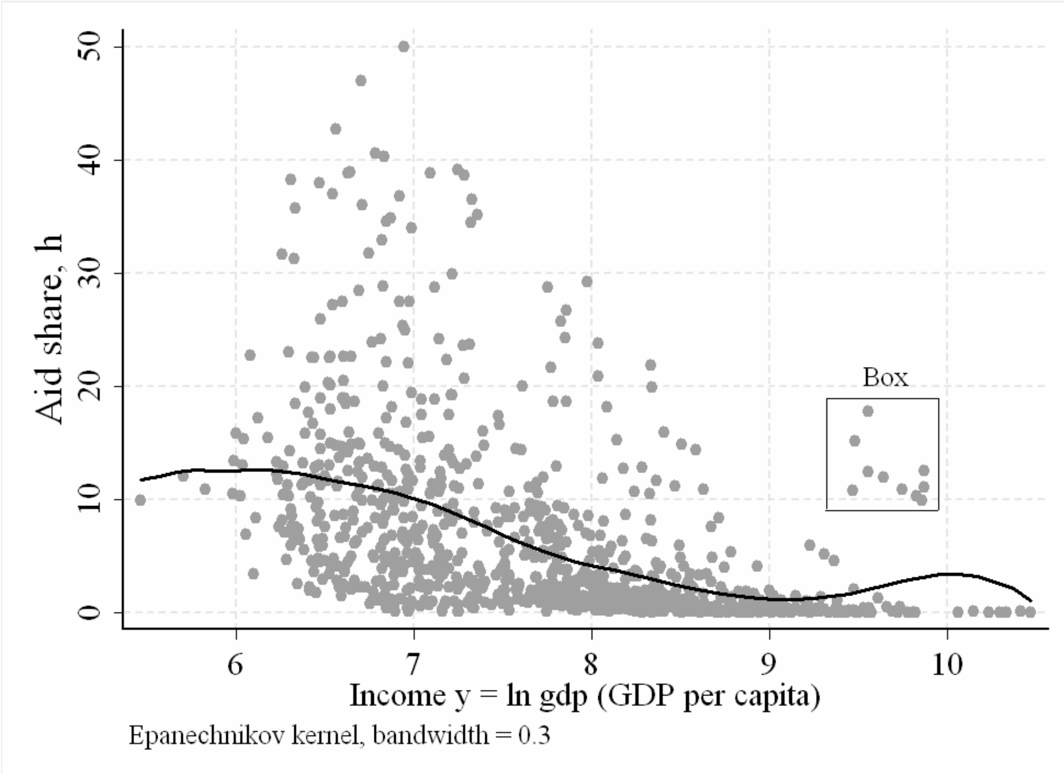


Figure 3. The aid share and initial population with a kernel regression, N = 1,016

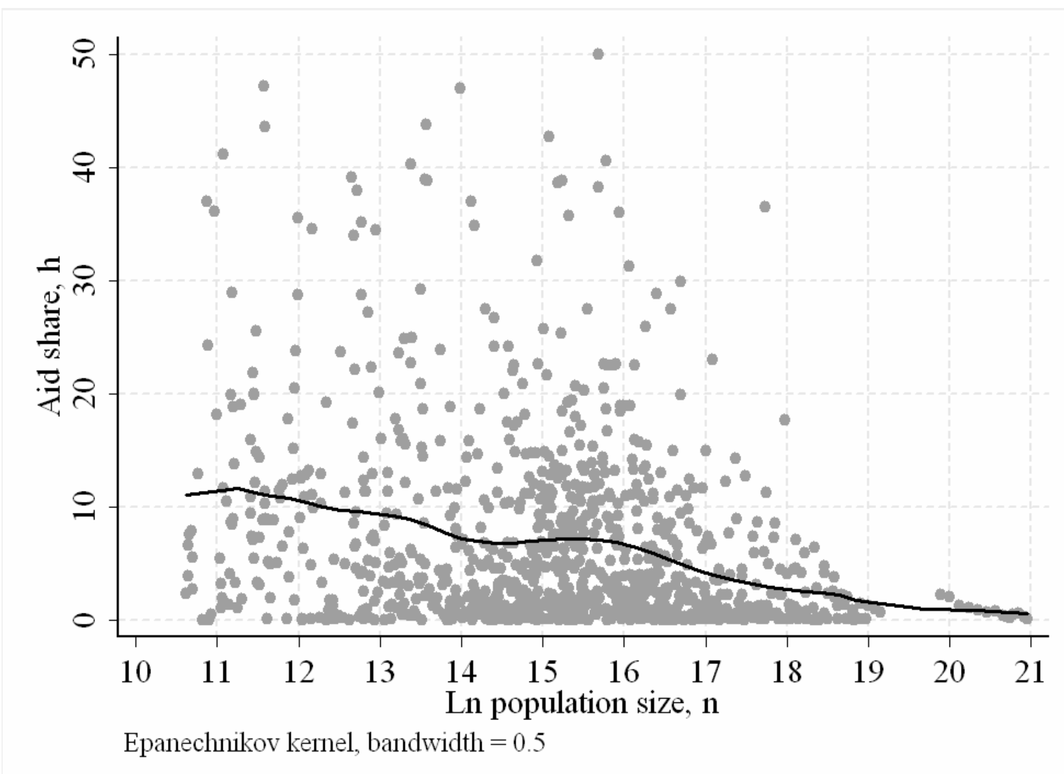


Table 1. The income and the population effects

N = 766	Explaining the aid share						Explaining income	
Nc = 118	(1)	(1b)[a)]	(2)	(3)	(4)	(5)	(6)	(7)
Initial y = ln gdp	**-5.89**	**-5.04**	**-5.88**		**-5.19**	**-5.11**		
(t-ratio)	(-14.6)	(-18.3)	(-14.6)		(-12.0)	(-11.7)		
initial n = ln pop	**-2.12**	**-1.62**	**-2.07**	**-1.72**			**-0.066**	**-0.067**
(t-ratio)	(-11.7)	(-12.9)	(-12.3)	(-8.5)			(-4.3)	(-4.1)
China dummy	2.49	0.86		0.18	**-9.32**			0.39
(t-ratio)	(0.6)	(0.3)		(0.0)	(-2.2)			(1.1)
India dummy	1.18	-0.24		2.07	**-9.18**			-0.15
(t-ratio)	(0.4)	(-0.1)		(0.6)	(-2.8)			(-0.5)
All regressions contain fixed effects (FE) for the nine periods								
AR^2 , including FE	0.57	0.68	0.57	0.44	0.49	0.48	0.988	0.988
AR^2, excluding FE	0.18	0.20	0.18	0.06	0.10	0.09	0.0003	0.0003

Note: All estimates with t-ratios above 2 are bolded. FE is Fixed Effects. Brackets contain t-ratios. AR^2 is the R^2 adjusted for degrees of freedom. N = 766 observations from Nc = 118 countries are included.

a. 13 observations where h > 40 are excluded.

2.2 *Regressions explaining the aid share by income and population: Table 1*

Figures 2 and 3 tell us that we may run *linear* regressions explaining the aid share, h, by population, n, and income, y, as is done in Tables 1 to 3. The regressions use fixed effects for time, and dummies for China and India. As suggested by Figure 3 these dummies are insignificant in all regressions, which also contain n (= ln pop).

All LDCs except middle income oil countries and countries in transition from socialism are included. The dataset has N = 766 for the three variables (h, y, n) for these 118 countries. They are 72% of the potential 118 x 9 = 1,062 sets. However, the aid programs started in the 1960s, so the data for the first periods cover 61 and 67 countries only.

The regressions in the three tables are run as stacked OLS regressions on all available observations. This assumes that there is no simultaneity in the relations. The dummies are exogenous and so is population. Consequently there should be very little multicollinearity. This is confirmed by estimates (5) and (6) in Table 1. It appears that larger countries are poorer; but this effect is really small.

We know from the convergence literature that the correlation between y and the real growth rate, g, is about zero in the short run. A meta-analysis of the aid to growth literature (Doucouliagos and Paldam 2008b) demonstrates that causality from h to g is at most very weak. Also, we use the initial values of y. Hence, we take all causality between h and y to run from y to h, and all causality between h and n to run from n to h.

2.3 The development in the two effects over time: Table 2

Next the basic regression is run as a cross-country regression for each of the 9 periods, to see if the pattern changes over time. In particular, we expected that the poverty orientation would be stronger after the political pressures from the Cold War on aid policies ceased.

Table 2. Results for the individual periods: Explaining the aid share

	(1) Initial y = ln gdp	(2) Initial n = n pop	(3) Constant	(4) AR^2	(5) N
P1, 60-65	**-2.47** (-3.4)	**-1.16** (-3.5)	**39.00** (5.3)	0.26	61
P2, 65-70	**-2.85** (-5.2)	**-1.48** (-6.0)	**47.56** (8.4)	0.47	67
P3, 70-75	**-3.19** (-4.5)	**-1.60** (-5.0)	**53.23** (7.2)	0.37	70
P4, 75-80	**-4.33** (-4.3)	**-2.54** (-5.6)	**78.82** (7.0)	0.34	79
P5, 80-85	**-4.95** (-5.1)	**-1.93** (-5.0)	**74.89** (7.5)	0.33	88
P6, 85-90	**-6.79** (-5.7)	**-2.68** (-5.8)	**102.42** (8.4)	0.36	97
P7, 90-95	**-9.46** (-5.3)	**-2.98** (-4.2)	**129.53** (6.7)	0.26	101
P8, 95-00	**-5.98** (-5.8)	**-2.00** (-4.6)	**84.46** (7.5)	0.30	103
P9, 00-05	**-7.38** (-7.2)	**-1.44** (-3.2)	**87.44** (7.8)	0.36	100
Average	**-5.27** [-2.4]	**-1.98** [-3.3]	**77.48** [2.9]		
All	**-5.20** (-12.4)	**-2.02** (-11.3)	**78.02** (17.3)	0.24	766
Table 1 [a)]	**-5.88** (-14.6)	**-2.07** (-12.3)	FE for periods	0.18	766
Trend-test	**-0.73** (-4.4)	-0.09 (-1.2)	**8.01** (3.2)		

Note: Brackets contain t-ratios. The square brackets give t-ratios for cross period stability. The trend test is done by regressing the coefficients on a trend variable 1, ..,9 for the periods P1,…, P9.

a: Regression (2) from Table 1. The AR^2 is the one excluding FE.

Figure 4. The development over time of the two effects (from Table 2)

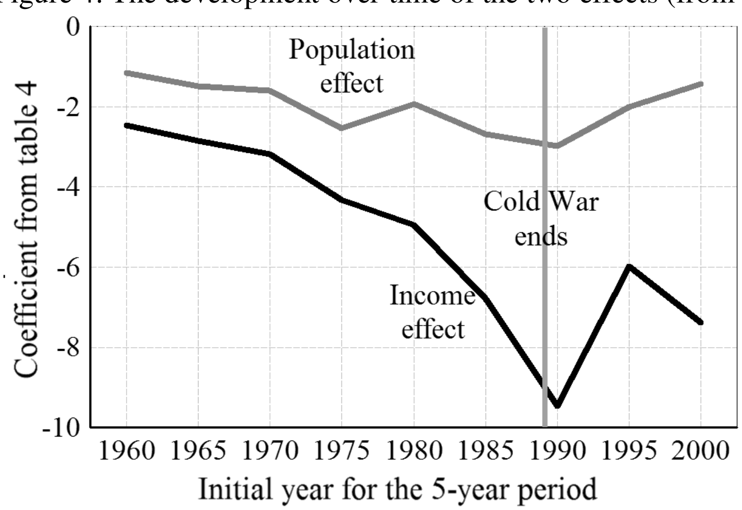


Figure 4 shows that both the poverty and the population effect increases over time. The trend-test at the bottom of the table confirms both trends, though only the poverty effect trend is significant. The end of the Cold War interrupts both trends. Thus, the poverty orientation ceases to increase contrary to expectations.[8]

2.4 *Controlling for non-linearity: Table 3*

The visual impressions from Figures 2 and 3 are controlled in Table 3. We here divide the regression in the income and the population part to include as many observations as possible.

Table 3. Controlling the two effects for non-linearities

Explained: Aid share	(1)	(2)	(3)	(4)	(5)	(6)
	Poverty effect, y, N = 771			Population effect, n, N = 817		
Endogenous, y or n	**-5.234**		**-16.902**	**-1.829**		-0.440
	(-11.9)		(-2.4)	(-10.4)		(-0.2)
Endogenous squared, y^2 or n^2		**-0.339**	0.765		**-0.069**	-0.046
		(-11.8)	(1.7)		(-10.4)	(-0.7)
Form found (see note):	linear	a-linear	concave	linear	a-linear	a-linear
	Fixed effects for periods included, but regressions are also run without					
AR^2 , including FE	0.481	0.479	0.483	0.470	0.471	0.470
AR^2, excluding FE	0.119	0.115	0.122	0.107	0.106	0.106

Notes: A-linear means that the curve is within the 50%-confidence interval of corresponding linear curve. That is (2) does not deviate from (1), and (5) and (6) do not deviate from (4).

When the three lines in each case are drawn, we have checked if the non-linear curves are inside the confidence interval of the linear curve. This is the case for (2), (5) and (6). The only possibly non-linear curve is (3) that looks as expected Figure 2. It is worth noting that we get slightly higher values for the AR^2-contributions of the two effects in Table 3 than we got in the previous tables.

2.5 *Summary of the primary study: The orders of magnitudes*

The variables are measured in logarithmic form. Table 4 shows how the estimates should be understood. The average aid share is 8% for all 766 observations. Since 1980 the average country in Sub-Saharan Africa has received about 15% of GDP in aid. A group of countries (such as the Latin American) which are 5 times richer than the average African country receive about 9.5 percentage points less in aid. That is, they receive about 5% instead of 15%, in accordance with stated policies.

8. The regressions (1) to (5) have been re-run after deleting all 13 sets where the aid share is larger than 40%, and all 31 sets where the aid share is larger than 30%. This barely affects the results.

Table 4. The size of the estimated effect of country differences

From estimated equation			1.5 times	2 times	5 times	10 times
Effect on	From	Coefficient [a]	Ln 1.5 = 0.41	Ln 2 = 0.69	Ln 5 = 1.61	Ln 10 = 2.30
Aid share	Income	-5.9	-2.4	-4.1	-9.5	-13.6
Aid share	Population size	-2.1	-0.9	-1.4	-3.4	-4.8
Income level	Population size	-0.07	-0.03	-0.05	-0.11	-0.16

Note a: Coefficients are from columns 1 and 6 of Table 1.

In the same way we may compare two countries at the same standard of living, where one has 10 times more people. Table 4 says that it receive 4.8 percentage points less aid. This seems an unreasonable policy bias in favor of smaller countries.

The AR^2 of the two variables is only about 0.18, of which we can ascribe about 0.10 to 0.12 to the effect of income and 0.08 to 0.11 to the effect of size. Consequently, the two variables do not explain very much. In particular, we note that the poverty of countries explains only about 11% of the variation in the aid shares.

3. Meta study 1:[9] The poverty effect and the middle-income effect

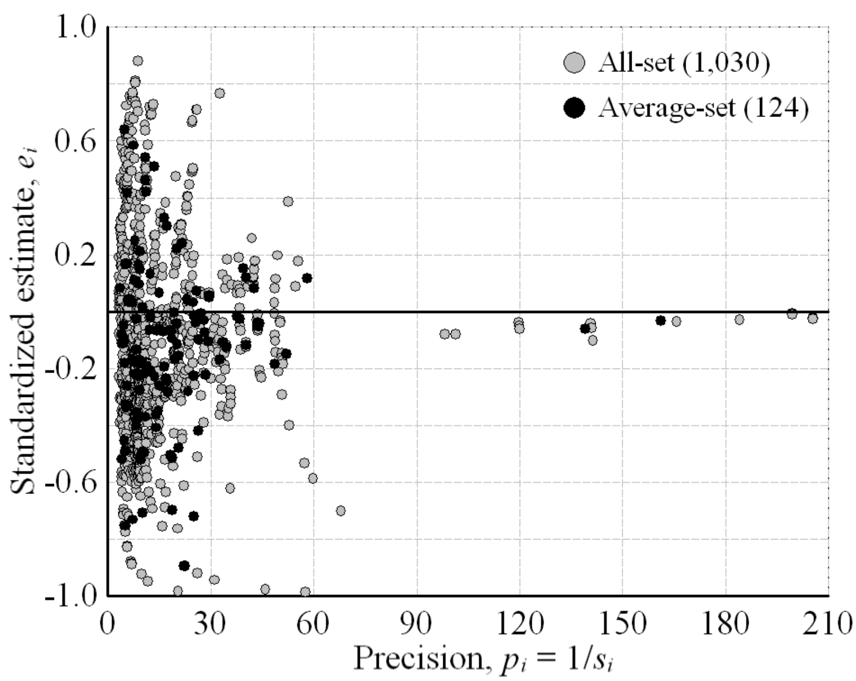
Our bibliography of the AAL (see Christensen et al, 2007) covers 166 studies, of which 124 contain a total of 1,030 estimates of the effect of income on aid. These estimates were *standardized* by a conversion into partial correlations. The meta-analysis considers (1) the *all-set* of the 1,030 estimates, and (2) the *average-set* of the average finding in each of the 124 studies. (2) is analyzed in Figure 5 only.

Throughout this section and the next: e_i are the standardized estimates, s_i and $p_i = 1/s_i$ are their standard errors and precisions, and as usual the t-ratio is $t_i = e_i/s_i$.

3.1 The funnel plot of the estimates of the poverty effect : Figure 5

Funnel plots show the (e_i, p_i)-points, i.e. the estimates over their precision. Figure 5 is the funnel plot of the all-set and the average-set of the estimates of the poverty effect. As usual, it is amazing to see how much the results vary. The reported results range from -1 to almost +1.

Figure 5. Funnel plot of the estimates of the poverty effect



9. Meta-analysis is a quantitative study of a set of estimates of the same effect in the literature. It is done in order to assess the meta-average, which is the result to which research converges – and to study if the literature has biases. A good introduction to meta-analysis is the volume by Roberts and Stanley (2005).

The plot suggests a pattern: (p1) As precision increases the funnel converges to something that is *negative*, but (p2) quite *small*. The point of convergence is the *meta-average*, which is taken as the best estimate of the true value; (p3) more negative than positive estimates are reported, so the plain average is negative too; (p4) The funnel appears to have a small downward asymmetry around the average. (p5) The pattern looks the same for the all set and the average set – hence, from now we only consider the all-set.

Ideal funnels, where the right estimator is used on the true model, are lean and symmetrical, but empirical funnels are often stubby and *asymmetric*,[10] mostly due to censoring during the research-publication process. Fortunately, Figures 5 and 6 are almost symmetrical.

3.2 The FAT-PET MRA technique[11]

Funnel graphs are very suggestive, but the suggestions (p1) to (p4) should pass formal statistical tests. Consequently, meta-analysis has developed the family of MRA-tests, which are run on the data of the funnel. The MRA estimate a variant of the following model:

$$e_i = e_0 + \beta Z_i + v_i \tag{1}$$

Here e_0 is the estimate of the population parameter of interest, while Z is a vector characterizing the estimate, such as data, specification, estimator and publication.

Like any statistical analysis (1) requires that the data are representative, and hence that funnels are symmetric. Thus, asymmetries have to be taken into account in order to estimate meta-average. Rising sample sizes should not affect the size of the estimate, but increase its precision. However, with publication bias smaller studies will search for larger effects in order to compensate for their larger standard errors. Thus, censoring should be largest at low precision. This suggests running the following regression, which is the FAT-PET MRA:

$$e_i = e_M + \gamma s_i + u_i \quad \text{(2a)} \qquad \text{or, after division by } s_i\text{:} \qquad t_i = \gamma + e_M p_i + v_i \quad \text{(2b)}$$

(2a) gives a better intuition, while (2b) is better to estimate, as it has less heteroskedasticity. The two parameters are the meta-average, e_M, and the asymmetry test, γ. Equation (2a) shows that the estimate of e_i converges to e_M as s_i goes to zero, i.e. p_i, goes to infinity. This is the

10. See Doucouliagos and Stanley (2008) and Callot and Paldam (2009) on funnels and their asymmetries. It is common that priors exist so that results that are equally far from the true value to both sides are unequally reasonable and hence unequally easy to publish. A typical case is provided by the aid effectiveness literature. It suffers from a sizable publication bias, caused by the reluctance of the profession to publish negative results, see (Doucouliagos and Paldam 2008a).

11. The new development of these tests (including the acronyms) is due to Stanley (2005a, 2008): MRA is meta regression analysis, PET is precision estimate test, and FAT is funnel asymmetry test.

definition of the meta-average. If the funnel is symmetrical $e = e_M$ is at the axis of symmetry for the funnel, and $\gamma = 0$. At the reverse end, for zero precision, $e_i = \gamma$. If the funnel is asymmetric γ differ from zero.[12] Equation (2b) can be expanded with control variables, Z:

$$t_i = \gamma + e_M p_i + \beta_2 Z + v_i \qquad (3)$$

Also, to control for data dependencies within studies the CDA estimator can be used. In the remainder of the paper, we estimate versions of equation (2b) and (3).

Table 5. Descriptive statistics for the MRA variables used both in Section 3 and 4

	(1)	(2)		(3)	(4)
Variable	Poverty effect	Population effect	Variable	Poverty effect	Population effect
t-ratio	-1.61 (5.33)	-0.32 (6.79)	Aid in $	0.44 (0.50)	0.41 (0.49)
s_i	0.11 (0.07)	0.10 (0.07)	Share of aid [a)]	0.14 (0.35)	0.16 (0.37)
Aid share	0.11 (0.31)	0.09 (0.28)	Multilateral aid	0.32 (0.96)	0.25 (0.43)
Aid per capita	0.33 (0.47)	0.34 (0.47)	World Bank aid	0.22 (0.93)	0.14 (0.34)

Note: Figures in brackets are standard deviations. The last five aid definitions are not used in Section 2.
a. Share of aid is defined as the share of various donors in the aid – it differs from one study to the next.

Descriptive statistics for the variables of our MRAs are presented in Table 5. Columns 1 and 3 are the statistics for the variables for the estimates of the income effect. Columns 2 and 4 present the statistics for the estimates of the population effect.

3.3 The FAT-PET MRA for the poverty effect: Table 6

Table 6 brings estimates of equation (2b). Columns 1 and 2 use all observations. Columns 3 and 4 bring estimates for multilateral aid, while Columns 5 and 6 consider bilateral aid. Columns 1, 3, and 5 use OLS and report two sets of standard errors: standard errors that are robust to heteroskedasticity and standard errors that are derived using clustered data analysis, correcting for data dependence. Columns 2, 4, and 6 use a mixed effects model, estimated using restricted maximum likelihood (REML). This is based on a two-level model, where estimates are nested within studies.

The meta-average, e_M (i.e., the coefficient on p_i) is an unbiased estimate of the poverty effect, corrected for selection bias. It is always small and negative, but with one exception it is significant. The partial correlation it is not fully comparable with the result in Section 2, but is

12. The FAT was developed by Egger *et al.* (1997), Sutton *et al.* (2000), Rothstein *et al.* (2005), and Stanley (2005).

clear that the results are similar. That is, the results from the entire literature support the income effect found in Section 2. The poverty effect is larger for multilateral organizations.

Table 6. FAT-PET MRA, estimates of the income effect. Explains t-ratio

Equation (2b)	(1)	(2)	(3)	(4)	(5)	(6)
	All-set	All-set	Multilateral	Multilateral	Bilateral	Bilateral
Estimator	OLS, CDA	REML	OLS, CDA	REML	OLS, CDA	REML
Asymmetry test, γ	***-0.86***	-0.50	-0.03	0.41	***-0.70***	-0.52
	(5.4, 1.7)	(1.1)	(0.1, 0.1)	(0.5)	(4.3, 1.3)	(1.1)
Meta average, e_M	**-0.05**	**-0.06**	***-0.14***	**-0.16**	**-0.04**	**-0.06**
	(3.9, 2.3)	(4.6)	(2.2, 1.5)	(5.2)	(3.6, 2.4)	(4.0)
R^2	0.03	-	0.11	-	0.03	-
K, studies	123	123	39	39	114	114
N, estimates	1,030	1,030	246	246	861	861

Note: t-ratios are reported in brackets. OLS standard errors are robust to heteroskedasticity. CDS is clustered data analysis. REML is restricted maximum likelihood. *K* is the number of studies, while *N* is the number of estimates. Bold numbers are significant at the 5% level. If a second t-ratio is added, it is derived from clustered data analysis. If the significance differ by the two t-ratios the coefficients are bold and in italics.

The asymmetry test, γ, is negative, but of dubious significance. This negative sign indicates that selection bias in this literature favor negative coefficients (as suggested by the funnel). The size of the selection bias is, however, small so that inferences are not greatly distorted by selection bias in this literature.[13]

3.4 The effect of changing the definition of aid: Table 7, columns (1) to (5)

While the aid share is the main definition of aid in the literature, a number of additional definitions, listed in Table 5 have been used. We analyze how much it matters for the results in Table 7. It is done by equation (3) where a dummy is added for the studies using the alternative definition. These results show that shares of aid allocations have a negative association with gdp (-0.14): The poverty effect is robust to the definition of aid.[14]

Columns 2 to 5 report the FAT-PET separately for multilateral agencies and bilateral donors. For multilateral agencies, the partial correlation between aid-to-gdp and gdp levels is -0.35. This means that income is of significant importance to their aid allocation decisions,

13. Using Monte Carlo simulations, Doucouliagos and Stanley (2007) show that for absolute values of $\gamma < 1$, the effects of selectivity on inference are modest.
14. This paper is to find the sizes of the poverty and population effects. However, the MRA can be is extended to a more general model, which include dummy variables for the time period analyzed, the estimator used, the type of journal in which the study was published, and various variables that capture the specification of the aid allocation equation. The experiments done leave the coefficient on the aid share rather unchanged.

even after holding constant all other factors. The partial correlations for the share of aid, per capita aid, and total aid allocated are -0.14, -0.14 and -0.06, respectively (e.g. for share of aid the coefficient is -0.35 +0.21 = -0.14). Hence, regardless of the measure of aid, the empirical literature has established the negative income effect.

Table 7. FAT-PET MRA, expanded estimates of the income effect. Explains t-ratio

Equation (3)	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	All-set	Multi-lateral	World Bank	Bilateral	(4) with dummies [a)]	Middle-income bias Linear	Non-linear
Constant, γ	***-0.69***	0.07	-0.51	-0.35	0.47	**1.45**	***-0.96***
Asymmetry test	(2.2, 1.2)	(0.1, 0.1)	(0.9, 0.5)	(0.9, 0.6)	(1.1, 0.7)	(4.9, 1.9)	(3.4, 1.6)
Meta average, e_M	-0.01	**-0.35**	**-0.31**	**0.11**	0.06	-	-
Using aid share	(0.2, 0.1)	(4.5, 3.7)	(3.9, 2.4)	(3.8, 1.9)	(1.4, 0.7)		
Share of aid	**-0.14**	**0.21**	**0.26**	**-0.28**	**-0.23**	**-0.18**	-0.04
for diff donors	(3.1, 1.7)	(3.0, 1.7)	(3.5, 2.1)	(9.9, 4.5)	(5.5, 2.6)	(5.6, 4.5)	(1.3, 0.7)
Per capita aid	-0.03	0.21	**0.41**	**-0.14**	-0.09	**-0.11**	0.02
In US $	(0.6, 0.3)	(2.5, 1.6)	(5.1, 3.3)	(5.1, 2.5)	(2.1, 1.0)	(3.7, 2.8)	(0.8, 0.6)
Total aid	-0.03	**0.29**	**0.27**	**-0.23**	-0.17	**0.09**	-0.04
In US $	(1.1, 0.6)	(3.4, 2.1)	(3.0, 1.9)	(3.9, 2.0)	(3.0, 1.5)	(3.2, 2.4)	(1.0, 1.3)
R^2	0.07	0.17	0.25	0.13	0.25	0.14	0.06
K, studies	122	39	28	114	114	17	17
N, estimates	1,029	246	149	861	861	124	124

Note: See note to Table 6.
a: The dummies are for Australia, Japan, Canada, Italy, Germany, UK, Netherlands, and Scandinavia (Denmark, Sweden, Finland, and Norway grouped together), with the US as base

Column 3 focuses on the estimates relating to the World Bank. The partial correlation between income and aid-to-gdp is similar to all multilateral agencies (-0.31 compared to -0.35). The partial correlations for the share of aid, per capita aid, and total aid allocated are -0.05, +0.10 and -0.04, respectively. These are noticeably smaller than for all multilateral agencies. This seems to suggest that poverty is of lesser importance to the Bank,[15] and is consistent with the notion that the World Bank is more inclined to fund successful projects than projects relating to poorer countries. The positive correlation for per capita aid is inconsistent with the other responses.

The results for bilateral donors are mixed. The share of aid, total aid, and per capita aid, all have a negative coefficient. However, the positive coefficient for aid-to-gdp (+0.11) in

15. Note, however, that this conclusion is drawn from past studies. There are indications that in recent years the World Bank has become more focused towards poverty reduction.

column 4 is surprising. Closer inspection of the data shows that this result might be driven by aggregation bias.[16] Equation 3 was rerun with the addition of eight country dummies. The key results are reported in column 5. Now only the share of aid is statistically significant and it has a negative sign, while aid/gdp is now insignificant from zero. Of the eight country dummies, three have negative coefficients: Australia (-0.38, t = -2.44), the Netherlands (-0.15, t = -2.16), and Scandinavia (-0.18, t = -3.13). Italy is the only country with a positive coefficient (+0.10, t = 2.30).

Hence, we conclude that the accumulated evidence points quite clearly to the importance of poverty with regard to the allocation of aid for both multilateral agencies and bilateral donors.

3.5 The middle income effect: Table 7, columns (6) and (7)

The middle-income effect has been explored in only 17 of the 124 studies, which included both linear and non-linear income terms that attempt to define a non-linear association: aid is meant to increase with income until a certain threshold, and then a negative association should be observed. Our own analysis of the data (section 2) suggested an absence of such a middle-income effect. What does the accumulated empirical evidence suggest?

Column 6 presents the FAT-PET regression for only those linear terms that come from a non-linear model, i.e. from a model that includes both a linear term and a non-linear term. Note one important feature of this sub-group of the literature is that there are only four estimates using aid-to-GDP as the aid measure. Total aid has the required positive coefficient, though it is small. However, if aid is measured as per capita aid or as the share of aid, a negative coefficient emerges, invalidating the middle-income bias hypothesis.

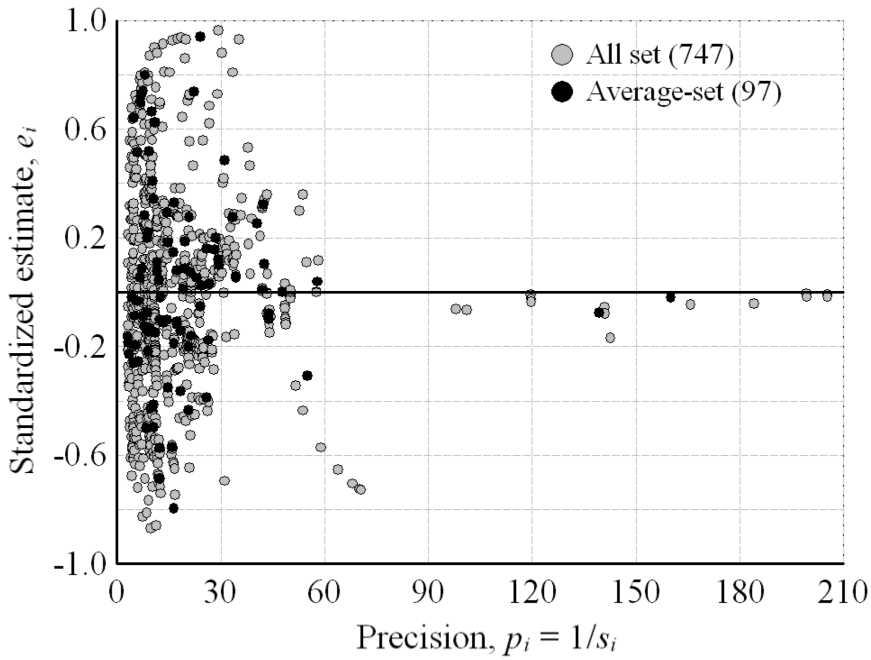
Column 7 reports the FAT-PET for the non-linear term. None of these are statistically significant, even though two have the desired negative sign. The meta-analysis results presented in columns 6 and 7 reject the middle-income bias. Consequently the meta-analysis confirms the results from the study of the raw data: A small poverty effect is confirmed and the middle-income effect is rejected.

16. The choice of donor dummies was purely data driven. These are the donors for which the greater majority of individual donor estimates have been reported.

4. Meta study 2: The population effect

We adopt the same framework from Section 3 in the meta-analysis of estimates of the population effect.[17] Here, the funnel plot of Figure 6 covers all the 747 reported estimates of the effect as well as the 97 estimates, using the average from each study. Once again, the funnel looks fairly symmetrical, and appears to converge to a small negative result.

Figure 6. Funnel plot of estimates of the population effect



4.1 *The FAT-PET MRA for the population effect: Table 8*

The FAT-PET results are presented in Table 8. Columns 1 and 2 are the results for all estimates pooled together. The results for multilateral agencies are presented in columns 3 and 4, while the results for bilateral donors are presented in columns 5 and 6. As was the case in table 6, we compare the results using OLS, clustered data analysis, and restricted maximum likelihood. The results are not as robust as was the case for the poverty effect.

However, the coefficient on the population effect ($1/s_i$) indicates a small negative effect once any selection bias is corrected. That is, taking all estimates into account, larger countries receive less aid. Comparing columns 3 and 4 to columns 5 and 6, the population effect is larger for multilateral donors.

17. Most studies use initial population, but some use average or even final population. Due to the strong autocorrelation in these series, this is of little importance.

Table 8. FAT-PET MRA, estimates of population effect. Explains the *t*-ratio

Equation (2b)	(1)	(2)	(3)	(4)	(5)	(6)
	All-set	All-set	Multilateral	Multilateral	Bilateral	Bilateral
Estimator	OLS, CDA	REML	OLS, CDA	REML	OLS, CDA	REML
Asymmetry test, γ	0.67	***1.30***	0.32	**3.91**	0.67	0.56
	(2.8, 1.1)	(1.8)	(0.2, 0.1)	(2.3)	(2.8, 1.1)	(0.8)
Meta average, e_M	-0.04	**-0.04**	-0.11	**-0.29**	-0.04	-0.02
	(2.9, 1.3)	(2.4)	(0.9, 0.5)	(5.2)	(2.7, 1.4)	(1.2)
R^2	0.02	-	0.03	-	0.02	-
K, studies	97	97	31	31	90	90
N, estimates	747	747	182	182	617	617

Note: See note to Table 6.

4.2 The effect of changing the definition of aid: Table 9, columns (1) to (5)

Table 9 presents the results allowing for different measures of aid allocation (this is similar to Table 8). The negative coefficient on Aid/GDP indicates that larger countries (as measured by population) receive *less* aid, as was the case with our own analysis of the data presented in Section 2. However, this is not statistically significant when clustered data analysis is used. In contrast, both the coefficient on *Share of Aid* and the coefficient on *Total Aid* are positive – the larger the country, the more aid it receives in absolute amounts, and the greater the share of all aid is distributed. These effects appear to be robust. Taken together, they suggest that donors give more aid in total to larger countries, but the share in terms of GDP is smaller for larger countries.

Columns 2 and 3 report the results for the bilateral donors and multilateral agencies, respectively. In all cases, the FAT-PET MRA results suggest that the population effect is smaller for bilateral donors than multilateral agencies. For example, in terms of aid/GDP, the coefficient for bilateral donors is -0.07, compared to -0.36 for all multilateral agencies, and -0.44 for the World Bank. This means that the World Bank gives much less aid as a percent of GDP than bilateral donors: the population bias is larger for World Bank allocations. In terms of total aid, the coefficient for bilateral donors is +0.28 (0.35-0.07), compared to +0.12 (0.48-0.36) and +0.06 (0.50-0.44), for all multilateral donors and the World Bank, respectively. That is, the larger a poor country is, the more aid in total it receives, but it receives relatively more from bilateral donors.

Table 9. FAT-PET MRA expanded estimates of the population effect. Explains t-ratio

Equation (3)	(1) All-set	(2) Bilateral donors	(3) Multilateral donors	(4) World Bank	(5) Population bias Linear	(6) Population bias Non-linear
Constant	**-1.74**	**-1.60**	-0.19	***1.07***	***-2.52***	***2.59***
	(6.4, 2.9)	(5.8, 2.7)	(0.2, 0.1)	(1.7, 1.1)	(2.3, 1.5)	(2.4, 1.5)
Aid share	***-0.06***	***-0.07***	**-0.36**	**-0.44**	-	-
	(2.1, 1.2)	(2.2, 1.2)	(3.9, 3.4)	(5.1, 6.9)		
Share of aid	**0.22**	**0.24**	**0.43**	**0.75**	-0.14	0.07
	(6.2, 2.3)	(6.5, 3.1)	(5.2, 2.5)	(8.4, 7.7)	(1.9, 0.7)	(0.9, 0.5)
Per capita aid	0.01	0.02	0.02	-0.10	**-0.29**	**0.16**
	(0.1, 0.1)	(0.5, 0.3)	(0.2, 0.2)	(1.1, 0.9)	(6.6, 4.4)	(5.6, 3.2)
Total aid	**0.35**	**0.35**	**0.48**	**0.50**	**0.30**	**-0.17**
	(9.2, 4.8)	(4.7, 8.8)	(6.5, 5.5)	(6.2, 7.6)	(6.2, 4.1)	(4.9, 2.8)
R^2	0.24	0.27	0.35	0.66	0.23	0.09
K, studies	97	90	31	20	12	12
N, estimates	747	617	182	102	89	89

Note: See note to Tables 6 and 7.

Columns 1 to 4 focus on the linear terms that have been the major focus in this literature. Our final meta-analysis is a direct test of the non-linearities in the population bias. This involves FAT-PET regressions on the non-linear terms. Column 5 reports the FAT-PET for those linear terms that have been estimated in the context of a non-linear model. The results are essentially the same as when all the linear terms are analyzed. The one difference of note is that none of these estimates relate to aid as a percentage of GDP. This subgroup of the linear population effects literature shows that more aid is allocated in total to larger poorer countries.

Column 6 reports the FAT-PET for the associated non-linear terms. The negative coefficient on total aid indicates that it rises initially for larger poorer countries, but does so in a non-linear manner. The finding of a non-linear association is different to what we found in our own analysis presented in Section 2. However, recall that our own analysis uses a longer time period and a wider group of countries. Moreover, our measure of aid was the aid share.

5. Discussing the results

We have found very much the same results in the primary data study in the two meta studies. Both the poverty effect and the population effect are very well established, they are both rather small, and the population effect is almost as large as the income effect. Basically the two effects explain no more than 20% of the variation in the aid share. These conclusions are the main ones of the study. But we still want to discuss why these results appear.

5.1 Explaining the low power of the poverty effect

It is not difficult to understand that the poverty of the recipient country is a highly significant and increasing factor explaining aid allocation. This is in accordance with the expressed goal of all donors, and the rationale of development aid from the start. The goal of poverty reduction is everywhere declared to be the overriding goal of aid. Thus it is puzzling that poverty only explains 10-12% of the variation in the aid share.

One possibility is that it is an artifact, as might be suggested by Figure 1 in the introduction. Maybe the low power of the poverty effect is due to biases from other relations in the AEL-AAL complex, and in particular to the relations in the aid-income-growth nexus. The nexus is discussed and the findings as regards each relation are confronted in Doucouliagos and Paldam (2008b). Most of the causal links produce small (even dubious) effects, so all biases within the nexus are likely to be very small. Many have tried simultaneous estimation techniques on the relations in the nexus, but this rarely has a substantial effect. Thus, we can trust that the size of the poverty effect we have identified is real.

The main conclusion that follows must be that the poverty effect is dominated by the many other effects. Aid is generated by a large and complex process, where the decisions are affected by many actors, with different motives and interests. All these *other factors* somehow determine the remaining 90% of the variation in the aid flows. We believe that main driver in the research of aid allocation is to untangle the remaining 90%.

5.2 Explaining the population effect

One part of the 90% is the population effect. It is also a well established effect, and it is a clear example of a policy bias as it is contrary to the stated policy of the donors. Thus, we have to understand it as a result of the politico-administrative processes operating in the process of aid giving. The OECD (1969), followed by Isenman (1976), were the first to discuss the population size bias in aid allocation. Isenman proposed a number of explanations, and since then other explanations have been proposed. We have classified the explanations into six families:

(1) *Political Influence buying:* Development aid may be seen as an attempt by the donor country – or its aid agency – to buy influence. The cost of influence is cheaper, the smaller the recipient country. This idea has several aspects: (1.1) The *bang for the buck effect:* It is important for donors to have a visible effect which can be communicated to taxpayers. (1.2) The *pond effect:* Representatives from the donor country will inevitably be relatively bigger fish the smaller the pond, and it is nicer to be a big fish. Also, a decision-maker in a recipient country has an equal amount of time available in a small and a large country. So he can allocate less to each donor in the large country. (1.3) Showing *respect* is important in international relations. Donors might want to avoid giving small nations a proportionate amount in aid because the resulting small amount might appear to be insulting to the recipient nation. Note that these three factors may affect multilateral aid allocation as much as they affect bilateral aid allocation.

(2) *Results of the power distribution in international organizations*: It appears that small countries have disproportionably more power in international organizations. This applies especially to the UN. Also, small nations tend to have less interest in power-politics, and consequently their interests are more concentrated on the economy. Thus, small countries may get a disproportionable share of aid for two reasons: (a) they have relatively more power, and (b) they may sell their support to large nations in their power-play in exchange for aid.[18]

Many argue that with the end of the Cold War, political considerations in the allocation of aid have diminished. The empirical analysis in Table 2 does not support this view. Also, the points noted under (1) and (2) extend beyond the context of the Cold War.

(3) *Commercial interests*: As argued in the introduction this should have the reverse effect on the population effect from the one found: Commercial interests should favor countries with large and growing markets.

(4*) LDC Status seeking*: Countries often aim for larger international status. This is more realistic the larger the country. (4.1) To receive aid is a sign of weakness, so international status seeking reduces the demand for aid more so for larger countries. Also, it is likely to reduce the supply of aid for two additional reasons: (4.2) Status seeking by new countries will create rivalry with countries having such a status already, which may be wealthy donors. Thus, tensions will occur between the donor community and the large LDCs. (4.3) Large

18. This is further analysed in the literature on the relation between aid and the way countries vote in the UN general assembly, as pioneered by Wittkopf (1973) and Rai (1980). See also Dreher and Sturm (2006). Another body of literature analyses how small countries may get a relatively good deal in international organizations as they are able to free ride. This literature took off from Olson and Zeckenhauser (1966).

LDCs may undertake their own aid programs as tools to seek status. It then becomes awkward for a donor to give aid to a country that gives aid itself. Reversely, smaller countries may pursue aid seeking strategies as they can not obtain a high status anyhow. Also, they may want to get donors into their country as a counterweight to local powers.

(5) *Country size and black spots*: It is well known that most (if not all) countries have black spots that cause unfavorable comments in the international press.[19] It may be an ethnic conflict, or a lack of one or another civil liberty, it may be corruption, etc. *Ceteris paribus*, the number of black spots is likely to increase with country size. This can make aid allocation problematic and potentially embarrassing for donors in the eyes of their own citizens, and in the eyes of the international community. The same applies to white spots, but they are less newsworthy. Thus, if the supply of aid depends negatively on the amount of negative press, the small countries have an advantage.

(6) *Aid effectiveness*: Aid is more visible in small countries and might, hence, be easier to monitor. Further, Dowling and Hiemenz (1985) argue that larger countries are more vulnerable to bottlenecks and inefficiencies, and this might make them less attractive to donors. There seems to be no support in the AEL for the notion that aid is less effective in larger countries than in smaller, so for now this point will be disregarded.

The first five points are part of a broader argument supported by other evidence, so it appears that they all have some empirical value. However, several are overlapping, and their importance is likely to have changed over time. Consequently, we are not, at present, able to assign weights to the importance of the five factors.

5.3 Should the results differ for bilateral and multilateral donors?

Several empirical studies have focused exclusively on the issue of bias in the aid allocation process of multilateral agencies. Examples include Cline and Sargen (1975), Arvin, Rice and Cater (2001), and Neumayer (2003c), while many others explore the behavior of both bilateral and multilateral donors.

Cline and Sargen (1975) argue that multilateral agencies tend to be protected from 'temporary political oscillations' so that they can be expected to be more focused on economic criteria for aid allocation. Other aspects of multilateral agency allocations include the administrative and organizational efficiency of the agencies and their effectiveness in allocating funds on the basis of need (see, for example, the references in Arvin, Rice and Cater 2001, and the study by Barrett and Heisey 2002). There are also important agency and

19. A dozen papers in the AAL consider the importance of the news coverage in the donor countries of events in the recipient countries for aid to the same countries. See, for example, Belle and Hook (2000) and Belle (2003).

governance issues involved. For example, Congleton (2006, p. 335) argues that given their nature: “International agencies are predicted to be underfinanced, undermonitored, and under-sanctioned.” Moreover, there is the important issue of bilateral donors influencing the allocation decisions of multilateral agencies (Neumayer 2003c, and Kilby 2006).

Thus, it is unlikely that the same mix of policy pressures operate on bilateral and on multilateral donors.

6. Concluding remarks

The paper has assessed the importance of the need of the recipient country for the development aid they receive. The analysis looks at two variables measuring need: Income level and population. For both variables, we have looked at all available data and all empirical studies. That is, we have looked at about 800 data points and the cumulative knowledge reached by 40 years of research. Both our own study and the meta studies tell the same story:

Income: Donors normally proclaim poverty alleviation as the main reasons for allocating aid. The poverty effect should appear as an inverse association between aid allocation and income, and it certainly does. The effect is slightly smaller for multilateral than for bilateral donors. The effect is almost linear throughout the observed data range, and the evidence does not support the notion of a middle-income bias. However, the poverty effect explains only about 10% of the variation in the data. Thus, even when the income-aid relation is both significant and robust it is not a very powerful relation – many other factors count for the allocation of aid.

Population: It is not the expressed aim of donors to support small rather than large countries, so there should be no effect of population. However, population size has a significant negative effect on aid. The evidence shows that the population bias is stronger for multilateral organizations, and that it is stronger still for World Bank allocations. The population effect is almost as strong as the poverty effect.

A priori, it is unclear if the humanitarian and development orientation of bilateral versus multilateral agencies is the largest. On the one hand, it can be argued that bilateral donors are more likely to pursue their own national and foreign policy interests and, hence, potentially downplay humanitarian concerns. On the other hand, multilateral agencies may be ineffective and under-resourced to meet humanitarian obligations. The donors might also be influenced in their allocations by the interests of large contributors. The evidence reviewed in this paper show that multilateral agencies are, on average, less predisposed towards allocating aid on the basis of humanitarian concerns: the income effect is weaker when aid is measured as the share of aid while the population effect is stronger.

References (see also Appendix A):[20]

Abreu, M., de Groot, H.L.F.R., Florax R.G.M., 2005. A meta-analysis of beta-convergence: The legendary two-percent. *Journal of Economic Surveys* 19, 389-420.

Barrett, C.B., Heisey, K.C., 2002. How effectively does multilateral food aid respond to fluctuating needs? *Food Policy* 27, 477–91.

Barro, R.J., Sala-i-Martin, X., 1995, 2004. *Economic Growth*. MIT Press, Cambridge, MA.

Bateman, I.J., Jones, A.P., 2003. Contrasting conventional with multi-level modeling approaches to meta-analysis: Expectation consistency in U.K. woodland recreation values. *Land Economics* 79, 235-58.

Callot, L., Paldam, M., 2009. Natural born funnel asymmetries. A simulation analysis of the basic graph of meta-analysis. Conference paper for the Corvallis Workshop on Meta-Analysis

Christensen, P.W., Doucouliagos, H., Paldam M., 2007. Master list of the AAL: the Aid Allocation Literature

Christensen, P,W., Doucouliagos, H., Paldam M., 2009. Master list of the AEL: the Aid Effectiveness Literature

Congleton, R. 2006. International public goods and agency problems in treaty organizations", *Review of International Organizations*, 1:319-36.

DAC, Development Advisory Committee at the OECD. Operating in DCD, Development Co-operation Directorate. URL: http://www.oecd.org/department/0,3355,en_2649_34447_1_1_1_1_1,00.html

Doucouliagos, H. and Stanley, T.D. 2007. Theory competition and selectivity. Economics Working Paper, Deakin University.

Doucouliagos, H., Paldam, M., 2006. Aid effectiveness on accumulation. A meta study. *Kyklos* 59, 227-54.

Doucouliagos, H., Paldam, M., 2008a. Aid effectiveness on growth. A meta study. *European Journal of Political Economy* 24, 1-24

Doucouliagos, H., Paldam, M., 2008b. Explaining development aid allocation by growth: A meta study.

Doucouliagos, H., Paldam, M., 2009a. The aid effectiveness literature. The sad results of 40 years of research *Journal of Economic Surveys*

Doucouliagos, H., Paldam, M., 2009b. Conditional aid effectiveness. A meta study. *Journal of International Development*, forthcoming

Doucouliagos, H., Stanley, T.D., 2008. Picture This: A Simple Graph that Reveals Much Ado about Research. Working paper presented at the Nancy Workshop on Meta-Analysis

Doucouliagos, H., Ulubasoglu, M., 2008. Democracy and Growth: A meta-analysis. *American Journal of Political Science* 52, 61-83

Dreher, A., Sturm, J.-E., 2006. Do IMF and World Bank influence voting in the UN General Assembly? Cesifo WP no 1724. Munich, Germany.

Egger, M., Smith, G.D., Schneider, M., Minder, C., 1997. Bias in meta-analysis detected by a simple, graphical test. *Lancet* 350, 326-9.

Hadi, A.S. 1994. A modification of a model for the detection of outliers in multivariate samples. *Journal of Royal Statistical Society*, Series B 56, 393-396.

Herbertsson, T.T., Paldam, M., 2007. Does development aid help poor countries catch up? An analysis using the basic relations. *Nationaløkonomisk Tidsskrift/Danish Economic Journal* 145, 188-214

Isenman, P., 1976. Biases in aid allocations against poorer and larger countries. *World Development* 4, 631-41.

20. Papers of the authors not (yet) published are available from: http://www.martin.paldam.dk.

Kilby, C., 2006. Donor influence in multilateral development banks: The case of the Asian Development Bank. *Review of International Organizations*, 1, 173-195.

OECD, 1969, *Development assistance: Efforts and policies of the members of the Development Assistance Committee*, Paris, OECD.

Olson, M., Zeckhauser, R., 1966. An Economic Theory of Alliances. *The Review of Economics and Statistics* 48, 266-79.

Rai, K.B., 1980. Foreign Aid and Voting in the UN General Assembly, 1967-1976. *Journal of Peace Research* 17, 269-77.

Roberts, C.J., Stanley, T.D. (eds), 2005. *Meta-Regression Analysis: Issues of Publication Bias in Economics*, Oxford: Blackwell.

Rothstein H., Sutton, A.J., Borenstein, M., eds., 2005. *Publication Bias in Meta-Analysis: Prevention, Assessment and Adjustments.* Wiley, Chichester.

Stanley, T.D., 2005a. Beyond publication bias. *Journal of Economic Surveys* 19, 309-45.

Stanley, T.D., 2005b. Integrating the empirical tests of the natural rate hypothesis: A meta-regression analysis. *Kyklos* 58, 611–34.

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

Sutton, A.J., Duval, S.J., Tweedie, R.L., Abrams, K.R., Jones, D.R., 2000. Empirical assessment of effect of publication bias on meta-analyses. *British Medical Journal* 320, 1574-77

WDI, World Development Indicators. URL: http://ddp-ext.worldbank.org/ext/DDPQQ/member

Wittkopf, E., 1973. Foreign aid and United Nations votes: A comparative study. *The American Political Science Review* 67, 868-88.

Appendix A: The studies covered

Studies reporting income and population effects are provided with a *y* and an *n*, respectively.

Abrams, B.A., Lewis, K.A., 1993. Human rights and the distribution of U.S. foreign aid. *Public Choice* 77, 815-21 — *y*

Akram, T., 2003. The international foreign aid regime: Who gets foreign aid and how much? *Applied Economics* 35, 1351-56 — *y, n*

Alesina, A., Dollar, D., 2000. Who gives foreign aid to whom and why? *Journal of Economic Growth* 5, 33-63 — *y, n*

Alesina, A., Weder, B., 2002. Do corrupt governments receive less foreign aid? *American Economic Review* 92, 1126-37 — *y, n*

Andersen, T.B., Hansen, H., Markussen, T., 2005. US politics and World Bank IDA-lending. WP 05-06, Institute of Economics, Univ. of Copenhagen — *y, n*

Anyadike-Danes, M.K., Anyadike-Danes, M.N., 1992. The geographic allocation of the European Development Fund under the Lomé Conventions. *World Development* 20, 1647-61 — *y, n*

Apodaca, C., Stohl, M., 1999. United States human rights policy and foreign assistance. *International Studies Quarterly* 43, 185-98 — *y*

Arvin, B.M., Drewes, T., 1998. Biases in the allocation of Canadian official development assistance. *Applied Economics Letters* 5, 773-75 — *y, n*

Arvin, B.M., Drewes, T., 2001. Are there biases in German bilateral aid allocations? *Applied Economics Letters* 8, 173-77 *y, n*

Arvin, M., Piretti, A., Lew, B., 2002. Biases in the allocation of foreign aid: The case of Italy. *Review of Economic Conditions in Italy* (Banco di Roma), 305-312 *y, n*

Arvin, M., Rice, J., Carter, B., 2001. Are there country size and middle-income biases in the provision of EC multilateral foreign aid? *The European Journal of Development Research* 13, 49-57 *y, n*

Arvin, M., Savage, N., Scigliano, M., 1998. Herd instinct and offsetting behaviour in the foreign aid contributions of G7 countries. *Scandinavian Journal of Development Alternatives and Area Studies* 19, 83-90 *y*

Ball, R., Johnson, C., 1996. Political, economic, and humanitarian motivations for PL 480 food aid: Evidence from Africa. *Economic Development and Cultural Change* 44, 515-37 *y, n*

Beenstock, M., 1980. Political econometry of official development assistance. *World Development* 8, 137-44 *y, n*

Behrman, J.R., Sah, R.K., 1984. What role does equity play in the international distribution of development aid? In Syrquin, M., Taylor, L. Westphal, L.E. (eds.) *Economic Structure and Performance. Essays in Honor of Hollis B Chenery*. Academic Press, New York *y*

Belle, D.A.v., 2003. Bureaucratic responsiveness to the news media: Comparing the influence of The New York Times and network television news coverage on US foreign aid allocations. *Political Communication* 20, 263-85 *y, n*

Belle, D.A.v., Hook, S.W., 2000. Greasing the squeaky wheel: News media coverage and US development aid, 1977-1992. *International Interactions* 26, 321-46 *y, n*

Bertélemy, J.-C., 2005. Bilateral donors' interest vs. recipients' development motives in aid allocation: Do all donors behave the same? WP presented at the HWWA conference on the Political Economy of Aid in Hamburg. *y, n*

Bertélemy, J.-C., Tichit, A., 2004. Bilateral donors' aid allocation decisions – a three-dimensional panel analysis. *International Review of Economics and Finance* 13, 253-74 *y, n*

Blanton, S.L., 1994. Impact of human rights on U.S. foreign assistance to Latin America. *International Interactions* 19, 339-58 *y, n*

Boone, P., 1996. Politics and the effectiveness of foreign aid. *European Economic Review* 40, 289-329 *y, n*

Boschini, A., Olofsgård, A., 2002. Foreign aid: An instrument for fighting poverty of communism? WP Georgetown Univ. and Stockholm Univ. *y, n*

Bowen, J.L., 1995. Foreign aid and economic growth: An empirical analysis. *Geographical Analysis* 27, 249-61 *y*

Bowen, J.L., 1998. *Foreign aid and economic growth: A theoretical and empirical investigation*. Ashgate, Aldershot, UK *y*

Bowles, P., 1987. The political economy of UK foreign aid. *International Review of Applied Economics* 1, 225-40 *y, n*

Bowles, P., 1989. Recipient needs and donor interests in the allocation of EEC aid to developing countries. *Canadian Journal of Development Studies* 10, 7-19 *y, n*

Burnside, C., Dollar, D., 2000. Aid, policies, and growth. *American Economic Review* 90, 847-68 *y, n*

Canavire, G., Nunnenkamp, P., Thiele, R., Triveño, 2005. Assessing the allocation of aid: Developmental concerns and the self-interest of donors. WP 1253, Kiel Institute for World Economics *y, n*

Chan, S., 1992. Humanitarianism, mercantilism, or comprehensive security? Disbursement patterns of Japanese foreign aid. *Asian Affairs: An American Review* 19, 3-16 *y*

Chauvet, L., 2002. Socio-political instability and the allocation of international aid by donors. *European Journal of Political Economy* 19, 33-59 *y, n*

Cingranelli, D.L., Pasquarello, T.E., 1985. Human rights practices and the distribution of U.S. foreign aid to Latin American countries. *American Journal of Political Science* 29, 539-63 *n*

Cline, W.R., Sargen, N.P., 1975. Performance criteria and multilateral aid allocation. *World Development* 3, 383-91 *y*

Cohen, S.I., 1995. Allocation of foreign aid in a segmented international context. *The Pakistan Development Review* 34, 987-1000 *y, n*

Collier, P., Dollar, D., 2002. Aid allocation and poverty reduction. *European Economic Review* 46, 1475-500 *y, n*

Collier, P., Hoeffler, A., 2004. Aid, policy and growth in post-conflict societies. *European Economic Review* 48, 1125-45 *y, n*

Cooray, N.S., Shahiduzzaman, Md., 2004. Determinants of Japanese aid allocation: An econometric analysis. WP IUJ Research Institute, Japan *y, n*

Crosswell, M., 1981. Growth, poverty alleviation, and foreign assistance. A.I.D. Discussion paper no. 39 *y, n*

Davenport, M., 1970, The allocation of foreign aid: A cross section study, with special reference to the Pearson Commission Report. *Yorkshire Bulletin of Economic and Social Research* 22, 26-41 *y*

Dollar, D., Levin, V., 2004. The increasing selectivity of foreign aid, 1984-2002. World Bank Policy Research WP 3299 *y*

Dowling, J.M., Hiemenz, U., 1985. Biases in the allocation of foreign aid: Some new evidence. *World Development* 13, 535-41 *y, n*

Drury, A.C., Olson, R.S., Belle, D.A.v., 2005. The politics of humanitarian aid: U.S. foreign disaster assistance, 1964-1995. *Journal of Politics* 67, 454-73 *y*

Dudley, L., 1979. Foreign aid and the theory of alliances. *Review of Economics and Statistics* 61, 564-71 *y, n*

Dudley, L., Montmarquette, C., 1976. A model of the supply of bilateral foreign aid. *American Economic Review* 66, 132-142 *y, n*

Eggleston, R.C., 1987. Determinants of the levels and distribution of PL 480 food aid: 1955-79. *World Development* 15, 797-808 *y, n*

Feeny, S., McGillivray, M., 2002. An inter-temporal model of aid allocation to Papua New Guinea. In Arvin, B.M., ed. *New Perspectives on Foreign Aid and Economic Development*. Praeger, Westport. *y, n*

Feeny, S., McGillivray, M., 2004. Modeling inter-temporal aid allocation: A new application with an emphasis on Papua New Guinea. *Oxford Development Studies* 32, 101-18 *y, n*

Fleck, R.K., Kilby, C., 2001. World Bank independence: A model and statistical analysis of U.S. influence. WP Dept of Agricultural Economics and Economics, Montana State Univ., Vassar College *y, n*

Fleck, R.K., Kilby, C., 2004. Politics and aid: The effect of liberal conservative shifts on U.S. bilateral aid allocations. WP Dept of Agricultural Economics and Economics, Montana State Univ., Vassar College *y, n*

Frey, B.S., Schneider, F., 1986. Competing models of international lending activity. *Journal of* *y*

Development Economics 20, 225-45
Gang, I.N., Lehman, J.A., 1990. New directions or not: USAID in Latin America. *World Development* 18, 723-32 *y*
Gates, S., Hoeffler, A., 2004. Global aid allocation: Are Nordic donors different? WP 234 Center for the study of African Economies, Univ. of Oxford, U.K. *y, n*
Gounder, R., 1994. Empirical results of aid motivations: Australia's bilateral aid program. *World development* 22, 99-113 *y, n*
Gounder, R., 1995. Non-nested models of Australia's overseas aid program. *Applied Economics* 27, 609-21 *y, n*
Gounder, R. 1999. Modelling the aid motivation using time series data: The case of Papua New Guinea. *Oxford Development Studies* 27, 233-50 *y, n*
Gounder, R., Doessel, D.P., 1994. Population and middle-income biases in Australia's bilateral aid: Some empirical results. *Development Policy Review* 12, 29-44 *y, n*
Gounder, R., Doessel, D.P., 1997. Motivations models of Australia's bilateral aid program: The case of Indonesia. *Bulletin of Indonesian Economic Studies* 33, 97-109 *y, n*
Gounder, R., Sen, K., 1999. What motivates foreign aid: A case study of Australia's aid to Indonesia. *Journal of Developing Areas* 33, 379-94 *y, n*
Grilli, E., Riess, M., 1992. EC aid to associated countries: Distribution and determinants. *Weltwirtschaftliches Archiv* 128, 202-20 *n*
Guillaumont, P., and L. Chauvet 2001. Aid and performance: A reassessment. *Journal of Development Studies* 37, 66-92 *y, n*
Gulhati, R., Nallari, R., 1988. Reform of foreign aid policies: The issue of inter-country allocation in Africa. *World Development* 16, 1167-84 *y, n*
Harrigan, J., Wang, C., 2003? A new approach to the allocation of aid among developing countries: Is the USA more selfish than the rest. WP School of Economic Studies, Univ. of Manchester *y, n*
Henderson, P.D., 1971. The distribution of official development assistance commitments by recipient countries and by sources. *Bulletin of the Oxford University Institute of Economics and Statistics* 33, 1-20 *y, n*
Herrmann, R., Prinz, C., Schenck, P., 1992. How food aid affects food trade and how food trade matters to the international allocation of food aid. *Journal of Economic Development* 17, 71-98 *y*
Hudson, J., Mosley, P., 2001. Aid policies and growth: In search of the Holy Grail. *Journal of International Development* 13, 1023-38 *y, n*
Isenman, P., 1976. Biases in aid allocations against poorer and larger countries. *World Development* 4, 631-41 *y, n*
Kang, S., Meernik, J., 2004. Determinants of post-conflict economic assistance. *Journal of Peace Research* 41, 149-66 *y*
Kaplan, S.S., 1975. The distribution of aid to Latin America: A cross-national aggregate data and time series analysis. *Journal of Developing areas* 10, 37-60 *y, n*
Katada, S.N., 1997. Two aid hegemons: Japanese-US interaction and aid allocation to Latin America and the Caribbean. *World Development* 25, 931-45 *y, n*
Kato, M., 1969. A model of U.S. foreign aid allocation: An Application of a rational decision-making scheme. Cpt 6b p 198-215 in J.E. Mueller, ed., *Approaches to measurement in international* *y*

relations. A non-evangelical survey. Appleton-Century-Crofts (Meredith), NY

Khadka, N., 1997. Foreign aid to Nepal: Donor motivations in the Post-Cold War period. *Asian Survey* 37, 1044-61 *y*

Kilby, C., 2002. Donor influence in MDBs: The case of the Asia Development Bank. WP, Vassar College and Haverford College. *y*

Knowles, S., 2002. Does social capital affect foreign aid allocations? WP no 0209. Univ. Of Otago, New Zealand *y*

Karunaratne, N.D., 1986. A holistic analysis of trade versus aid issues: World and Australian insights. *Developing Economies* 24, 44-55 *y*

Lai, B., 2003. Examining the goals of US foreign assistance in the Post-Cold War period, 1991-96. *Journal of Peace Research* 40, 103-28 *n*

Lebovic, J.H., 1988. National interests and US foreign aid: The Carter and Reagan years. *Journal of Peace Research* 25, 115-135 *y*

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

Levitt, M.S., 1968. The allocation of economic aid in practice. *Manchester School of Economic and Social Studies* 36, 131-47 *y, n*

Lewis, T.L., 2003. Environmental aid: Driven by recipient need or donor interests? *Social Science Quarterly* 84, 144-161 *y*

Lundborg, P., 1998. Foreign aid and international support as a gift exchange. *Economics and Politics* 10, 127-41 *y*

Macdonald, R., Hoddinott, J., 2004. Determinants of Canadian bilateral aid allocations: Humanitarian, commercial or political? *Canadian Journal of Economics* 37, 294-312 *y*

Maizels, A., Nissanke, M.K., 1984. Motivations for aid to developing countries. *World Development* 12, 879-900 *y*

McCormik, J.M., Mitchell, N., 1988. Is U.S. aid really linked to human rights in Latin America? *American Journal of Political Science* 32, 231-39 *n*

McGillivray, M. 1986. An examination of Australian bilateral aid allocations. *Economic Papers* 5, 43-51 *y, n*

McGillivray, M., 2003. Modelling aid allocation: Issues, approaches and results. *Journal of Economic Development* 28, 171-188 *y, n*

McGillivray, M., Oczkowski, E., 1991. Modelling the allocation of Australian bilateral aid: A two-part sample selection apporoach. The Economic Record, 147-52 *y, n*

McGillivray, M., Oczkowski, E., 1992. A two-part sample selection model of British bilateral foreign aid allocation. *Applied Economics* 24, 1311-19 *y, n*

McGillivray, M., White, H., 1993. Explanatory studies of aid allocation among developing countries: A critical survey (include alternative calculations). Institute of Social Studies WP 148, The Hague, The Netherlands *y, n*

McKinlay, R.D., 1978. The German aid relationship: A test of the recipient need and the donor interest models of the distribution of German bilateral aid 1961-70. *European Journal of Political Research* 6, 235-57 *y, n*

McKinley, R.D., Little, R., 1978a. The French aid relationship: A foreign policy model of the distribution of French bilateral aid, 1964-70. *Development and Change* (SAGE) 9, 459-78 *y, n*

McKinley, R.D., Little, R., 1978b. A foreign-policy model of the distribution of British bilateral aid, *y, n*

1960-70. *British Journal of Political Science* 8, 313-331

McKinley, R.D., Little, R., 1979. The US aid relationship: A test of recipient need and the donor interest models. *Political Studies* 27, 236-50 *n*

McKinlay, R.D., Mughan, A., 1984. *Aid and Arms to the Third World. An Analysis of the Distribution and Impact of US Official Transfers*. Frances Pinter Publ., London UK *y*

Meernik, J., Krueger, E.L., Poe, S.C., 1998. Testing models of U.S. foreign policy: Foreign aid during and after the Cold War. *Journal of Politics* 60, 63-85 *y*

Mosley, P., 1981. Models of the aid allocation process: A comment on McKinlay and Little. *Political Studies* 29, 245-53 *y, n*

Neumayer, E., 2003 Is respect for human rights rewarded? An analysis of bilateral and multilateral aid allocation before and after the end of the Cold War. *Human Rights Quarterly* 25, 510-27. *y, n*

Neumayer, E., 2003a. The pattern of aid giving: The impact of good governance on development assistance. Routledge (Studies in Development Economics), London and NY *y, n*

Neumayer, E., 2003b. What factors determine the allocation of aid by Arab countries and multilateral agencies? *Journal of Development Studies* 39, 134-47 *y, n*

Neumayer, E., 2003c. The determinants of aid allocation by regional multilateral development banks and United Nations agencies. *International Studies Quarterly* 47, 101-22 *y, n*

Neumayer, E., 2003d. Do human rights matter in bilateral aid allocation? A quantitative analysis of 21 donor countries. *Social Science Quarterly* 84, 650-66 *y, n*

Neumeyer, E., 2004. Arab-related bilateral and multilateral sources of development finance: Issues, trends, and the way forward. *World Economy* 27, 281-300 *y*

Neumayer, E., 2005. Is the allocation of food aid free from donor bias? *Journal of Development Studies* 41, 394-411 *y, n*

Petersen, J.H., 1976. Economic interest and U.S. foreign policy in Latin America: an Empirical Analysis. Chapter 3, 63-86 in Raichur, S., Liske, C., eds. *The politics of aid, trade and investments*. Sage Publ., New York *n*

Poe, S., Pilatovsky, S., Miller, B., Ogundele, A., 1994. Human rights and US foreign aid revisited: The Latin American region. *Human Rights Quarterly* 16, 539-58. *y, n*

Poe, S.C., Sirirangsi, R., 1993. Human rights and U.S. economic aid to Africa. *International Interactions* 18, 309-22 *y, n*

Poe, S.C, Sirirangsi, R., 1994. Human rights and U.S. economic aid during the Reagan years. *Social Science Quarterly* 75, 494-509 *y, n*

Poe, S.C., 1992. Human rights and economic aid allocation under Ronald Reagan and Jimmy Carter. *American Journal of Political Science* 36, 147-67 *y, n*

Potter, D.A., Belle, D.v., 2004. News media coverage influence on Japan's foreign aid allocations. *Japanese Journal of Political Science* 5, 113-35 *y*

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

Rioux, J.-S., Belle, D.A.V., 2005. The influence of Le Monde coverage on French foreign aid allocations. *International Studies Quarterly* 49, 481-502 *y, n*

Round, J.I., Odedokun, M., 2004. Aid effort and its determinants. *International Review of Economics and Finance* 13, 293-309 *y, n*

Schraeder, P.J., Hook, S.W., Taylor, B., 1998. Clarifying the foreign aid puzzle: A comparison of American, Japanese, French, and Swedish aid flows. *World Politics* 50, 294-323 *y*

Shapouri, S., Missiaen, M., 1990. Food aid: Motivation and allocation criteria. United States Department of Agriculture. Foreign Agricultural Economic Report 240. Washington DC *y*

Shishido, S., Minato, N., 1994. A comparative study of official development assistance by major industrial countries: An econometric analysis. *The Developing Economies* 32, 3-12 *y, n*

Shourie 1971 Bulletin of the Oxford University Institute of Economics and Statistics

Silva, A.d., 2002. The allocation of Canada´s bilateral foreign aid. *Canadian Journal of Development Studies* 23, 47-67 *y, n*

Snyder, D.W., 1990. Foreign aid and domestic savings: A spurious correlation? *Economic Development and Cultural Change* 39, 175-81 *y*

Sorensen, D.S., 1979. Food for peace – or defense and profit? The role of P.L. 480, 1963-73. *Social Science Quarterly* 60, 62-71 *y*

Svensson, J., 2000. Foreign aid and rent-seeking. *Journal of International Economics* 51, 437-61 *y, n*

Svensson, J., 2003. Why conditional aid does not work and what can be done about it? *Journal of Development Economics* 70, 381-402 *y, n*

Tarp, F., Bach, C.F., Hansen, H., Baunsgaard, S., 1999. Danish aid policy: Theory and empirical evidence. Cpt. 9, 149-69, in K. L. Gupta, ed. *Foreign Aid: New Perspectives.* Kluwer Academic Publishers, Norwell MA *y, n*

Travis, R., 1995. U.S. security assistance policy and democracy: A look at the 1980s. *Journal of Developing Areas* 29, 541-62 *y, n*

Travis, R., Zahariadis, N., 2002. A multiple streams model of U.S. foreign aid policy. Policy Studies Journal 30, 495-514 *y*

Trumbull, W.N., Wall, H.J., 1994. Estimating aid-allocation criteria with panel data. *Economic Journal* 104, 876-82 *y, n*

Tsoutsoplides, C., 1991. The determinants of the geographical allocation of EC aid to the developing countries. *Applied Economics* 23, 647-58 *y, n*

Tuman, J.P, Emmet, C.F, Sterken, R.E., 2001. Explaining Japanese aid policy in Latin America: A test of competing theories. Political Research Quarterly 54, 87-101 *y, n*

Tuman, J.P., Ayoub, A.S., 2004. The determinants of Japanese official development assistance in Africa: A pooled time series analysis. *International Interactions* 30, 45-57 *y*

Vengroff, R., 1982. Food and dependent: P.L. 480 aid to Black Africa. *Journal of Modern African Studies* 20, 27-43 *y, n*

Wall, H.J., 1995. The allocation of official development assistance. *Journal of Policy Modeling* 17, 307-14 *y, n*

Weck-Hanneman, H., Scheider, F., 1991. Determinants of foreign aid under alternative institutional arrangements. Chapter 11, pp 245-66 in Vaubel, R., Wilett, T.D, eds. *The political economy of international organizations. A public choice approach.* Westview Press, Boulder, C.O. *y, n*

Wittkopf, E.R., 1972. Western bilateral aid allocations: A comparative study of recipient state attributes and aid received. Sage, Series Number 02-005 *y, n*

Zhang, G., 2004. The determinants of foreign aid allocation across China. The case of World Bank loans. *Asian Survey* 44, 691-710 *y*