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Assessing Foreign Aid's Long Run Contribution to Growth and Development[☆]

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Summary. — This paper confirms recent evidence of a positive impact of aid on growth and widens the scope of evaluation to a range of outcomes including proximate sources of growth (e.g., physical and human capital), indicators of social welfare (e.g., poverty and infant mortality), and measures of economic transformation (e.g., share of agriculture and industry in value added). Focusing on long-run cumulative effects of aid in developing countries, and taking due account of potential endogeneity, a coherent and favorable pattern of results emerges. Aid has over the past 40 years stimulated growth, promoted structural change, improved social indicators, and reduced poverty.

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1. INTRODUCTION

Significant volumes of foreign aid have been channeled to developing countries for more than four decades. Not surprisingly, a large literature considers aid effectiveness particularly from the perspective of the impact of aid on aggregate economic growth. While [Rajan and Subramanian \(2008\)](#) find no systematic evidence that aid has contributed to economic growth, the weight of evidence is shifting to a positive contribution of aid to growth. [Arndt, Jones, and Tarp \(2010a\)](#) employ the same approach and raw data as [Rajan and Subramanian \(2008\)](#). After strengthening the prediction of supply side variation in aid, including correction for a misinterpretation of OECD/DAC bilateral aid data, they find a positive long run effect of aid on growth which lies in the domain predicted by neo-classical growth theory (e.g., [Solow, 1956](#)). [Clemens, Radelet, Bhavnani, and Bazzi \(2012\)](#) revisit the dynamic panel evidence, focusing on aid that is expected to have an “early impact” on growth—e.g., via infrastructure development. The authors conclude that: “[such] aid inflows are systematically associated with modest, positive subsequent growth in cross-country panel data”. (p. 23). More recently, [Frot and Perrotta \(2012\)](#) suggest a new instrument for aid identified by the timing of the initiation of bilateral aid relationships. They come to a similar conclusion that foreign aid is associated with a moderate growth bonus. Finally, time series evidence for a range of African countries ([Juselius, Møller, & Tarp, 2013](#)) support a view that aid has played a positive aggregate developmental role in most instances; and meta-analysis of the aid–growth relation leads to a similar conclusion ([Mekasha & Tarp, 2013](#)). This macro-level evidence comes on top of meso- and micro-level evidence that has long been viewed as broadly positive ([Mosley, 1987](#); see also [Mishra & Newhouse, 2009](#); [Riddell, 2007](#); [Temple, 2010](#)). However, despite increasing evidence that meso-level outcomes can add up to substantial macroeconomic effects

([Cohen & Soto, 2007](#)), these micro- and meso-level findings have not been deployed to argue that aid is effective on aggregate (one exception is [Sachs, 2006](#)).

In this article we aim to provide a broader assessment of aid effectiveness. While a focus on the effect of aid on macroeconomic growth is necessary, it is not sufficient. A growing literature considers the contribution of aid in specific social sectors, such as education. Indeed, many outcomes are valued independently of their contribution to growth. Access to “merit goods,” such as basic health care and primary education, are viewed as essential human rights and fundamental to the development process. Accordingly, these outcomes should be included when considering the accomplishments of aid.

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This broader assessment provides enhanced insight into the aid–growth relationship in three further ways. First, we extend the analysis of [Arndt *et al.* \(2010a\)](#) by adding 7 years of more recent data to the series. Second, we investigate the consistency of the growth evidence with changes in other domains, particularly proximate determinants of growth, thus providing a coherence test for the aid–growth relationship. If no robust evidence of a relationship can be found between aid and important growth determinants such as investment and human capital, then the impact of foreign aid on growth becomes much harder to explain. Third, consideration of a wide range of alternative outcomes also provides a means to validate the robustness of the methods employed to address the likely endogeneity of aid.

As with many empirical questions in the economics literature, studying aid effectiveness is beset by difficulties in determining causality. In order to address these challenges, we outline a general framework that clarifies aid’s potential role in contributing both to intermediate outcomes (e.g., human capital accumulation) and final outcomes (e.g., growth). The model also indicates how these effects can be identified from observational data and precisely what feasible empirical estimates will capture. The empirical analysis is then pursued in four steps: we (i) calculate reduced form estimates of the impact of aid on a range of final economic outcomes (growth, poverty, inequality, and structural change); (ii) apply the same reduced form approach to a set of intermediate economic outcomes (such as investment, consumption, and tax take) as well as social outcomes (such as health and education); (iii) run a set of sensitivity and falsification tests; and (iv) interpret the economic magnitude of the findings as well as their consistency with previous literature. In presenting a broader assessment, this analysis responds, at least in part, to the challenge set forth by [Bourguignon and Sundberg \(2007\)](#) to unpack the causal chain from aid to final outcomes.

We find no evidence that nearly 40 years of development assistance has had an overall detrimental effect on development outcomes. Rather, a coherent and favorable picture emerges. Aid has promoted structural change, reduced poverty, and stimulated growth. Aid also has supported proximate growth determinants, in particular by building human and physical capital. This does not mean that aid works well at all times and in all places. Also, the impact of aid is no doubt heterogeneous. Nevertheless, these findings are consistent with significant strands of the existing literature and add further weight to the conclusion that, while perhaps less potent than initially hoped and certainly not a panacea, aid has registered significant accomplishments in helping to achieve development goals.

2. METHODOLOGY

(a) Analytical framework

A variety of approaches have been developed to address questions of economic causality. These issues are at the core of assessing the impact of aid and are reflected in the ongoing debate concerning the suitability of the various instruments for aid that have been employed in the literature (see [Clemens & Bazzi, 2009](#)). A useful starting point for thinking about these issues is a graphical depiction of the principal (generic) impact channels assumed to be at play. A simple version of this is provided in [Figure 1](#), which is inspired by the directed acyclic graphs (DAGs) that are central to the Structural Causal Model (SCM) approach to analyzing causality due to [Pearl \(2009\)](#)

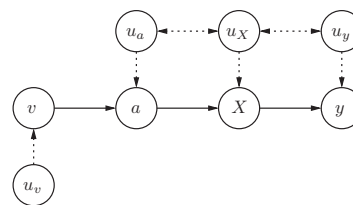


Figure 1. General causal diagram summarizing the linkages between aid and final outcomes. Notes: This figure is a simplified causal directed acyclic graph (DAG) of the relationship between aid (a) and aggregate outcomes (y), via intermediate outcomes (X); v is a single exogenous determinant of aid; u terms are unobserved, possibly errors; solid lines represent directed relationships between observed variables; broken lines represent directed relations due to unobserved variables (errors).

(*inter alia*).¹ Solid lines in the figure represent directed relationships between observed variables, which themselves are depicted by the nodes (circles). Dotted lines represent effects emanating from unobserved variables (u), which can be thought of as composite error terms. Consequently, the figure assumes that aid (a) affects a single final outcome such as income (y) through a vector of intermediate outcomes (X).² In this and the subsequent discussion, it is helpful to think of intermediate outcomes as component inputs in a generic production function for final outcomes. In the case of income, these would be so-called proximate sources of growth such as physical and human capital inputs (see [Mankiw, Romer, & Weil, 1992](#)).

As depicted in the figure, a fundamental problem of identifying the causal impact of aid arises because the unobserved error terms are correlated. In the language of the SCM approach, there are “backdoor paths” running between a and X, y . The implication is that estimates of any of the relationships $a \rightarrow X$, $a \rightarrow y$ or $X \rightarrow y$ may be biased. Specifically, this can come about due to simultaneity or other forms of omitted variables bias, even when a set of conditioning variables is included (not depicted in the figure). Measurement error in the aid variable, as explicitly acknowledged by the OECD who compile the data, is a further challenge that can lead to attenuation bias.³ A potential solution to these problems arises when one or more instrumental variables such as v is observed. As shown in the figure, this represents a parent (ancestor node) of aid and has an error structure that is unrelated to the error structure of any other variables, indicated by the absence of arcs to any of the other unobserved error terms.

It is important to understand what can and cannot be identified when a source of external variation such as v is available. First, any of the individual relationships between aid and specific intermediate outcomes (elements of X) can be identified through separate reduced form models. In these cases the intermediate outcomes are taken as the dependent variable to be explained. Second, assuming the same broad model is valid for other final outcomes—i.e., a generic production function approach with similar proximate inputs is appropriate—then alternative outcomes can be identified in addition to y . For any chosen dependent variable, the ratio of the relationships $v \rightarrow y$ to $v \rightarrow a$, suitably adjusted for other covariates, would correspond to an instrumental variables estimator for the effect $a \rightarrow y$. This corresponds to what [Angrist and Pischke \(2008\)](#) refer to as the ratio of estimates from “long” and “short” regressions. [Appendix A](#) provides a more formal exposition of these ideas.

All estimates of the kind described above should be seen as reduced forms precisely because they may capture impacts through a wide variety of channels (e.g., multiple elements

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